RESEARCH ARTICLE OPEN ACCESS

Digital Transformation of Libraries of Bibliometric Study

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Abstract:

The present study of bibliometric of study of digital transformation libraries for five years from 2019-2023. Total 358 published articles were of articles, degree of collaboration, and articles has been done. Inferences has been drawn from the analysis that Journal Articles were found most prevalent source of information forThe eight bibliometric tools Year wise contribution , No. of Authors wise contribution, Document Types of contribution, index (CI), collaboration coefficient (CC),Degree of collaboration (DC) AGR, Types of Documents have been used for the data analysis

Key word :Digital transformation of libraries of bibliometric study

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1.Introduction

Bibliometrics is the use of statistical methods to analysis books, articles, other publications and scholarly publications especially in scientific contents. The Term Bibliometric coined by Alan Pritchard in 1969.

Bibliometric is the application of mathematics and statistical methods used other media of communication

Bibliometric analysis is to provide information on the publication performance of a person, a scientific group or an institution. It also provides information on the impact of the publication among the professionals public, the integration in the scientific landscape, and the international perception in comparison others aspects of publications.

Authors Bibliometrics provides information about the author metrics publications. Authors Bibliometrics explains author's number of Publications, citations, h-index score and authorship and co-authorship patterns. Publications Bibliometric also refers as documents bibliometrics presents the same discipline articles published in different journals or databases. It described the specific growth of literature in any domain of knowledge.

Definitional Analysis: Bibliometric

I.N. Sengupta (1985) "Organization, Classification and Quantitative evaluation of publication patterns of all macro communication along with their authorship by mathematical and statistical calculus." 'Alan Pritchard' in 1969 has coined the term bibliometrics. In general Bibliometrics is that branch of science, which studies the behavior of information. Bibliometric studies in recent years have attained significance because of its practical application in the evaluation of library operation and services, as a statistical and mathematical technique. This study is helpful in management of scientific literature measuring the utility of periodicals and relationship between journals and subject area and also in knowing the most productive contribution in a given field.

2.Digital Transformations of Libraries

Digital transformations in libraries are not just about adopting new technologies, but also about rethinking the role and value of libraries in the digital age. Libraries have been innovating and adapting to

meet the changing needs and expectations of their users, communities, and partners. In this article, we will explore some of the successful digital transformations in libraries that have enhanced their services, collections, and impact.

Digital transformation is the kind of change management incorporation of activities, processes, competencies and models to fully leverage the changes and opportunities of a mix of digital technologies and their accelerating impact across society in a strategic way, with present and future shifts in mind, while digital library transformation has predominantly have impacts on several types of libraries such as governments, public sector libraries and Institutional repositories, which are involved in tackling ICT challenges. The Libraries have dramatically changed with the pace of digital transformation and thus have changed the face of librarianship with the goals of digital transformation. Since people don't want 'digital' for everything and do value human and face-to-face interactions there will always be an 'offline' element, depending on the resources and usage. Days are gone when traditional library system worked as manual, present scenario digital change in library products and services. There are many open source software for

development of Digital library, Open source is a techniques where source code is given for free and can be further customized, this is to provide better quality software packages featuring reliability, flexibility with least cost, and an end to the traditional vendor processes. The source code and rights that where normally reserved for copyright holders are now being provided under a free software license that permits developers / users to study, change, improve and at times also to distribute the software as and when needed.

3.Web of science Data Base

A rich collection of citation indexes representing the citation connections between scholarly research articles found in the most globally significant journals, books, and proceedings in the sciences, social sciences, and art & humanities. The Web of Science Core Collection serves as the standard data set underpinning the journal impact metrics found in the Journal Citation Reports and the institutional performance metrics found in In Cite

4. Literature Review

Ajiferuke, Isola et.al. (1988), critically examined the limitations of using the collaboration index (CI) and the degree of collaboration (DC) as indicators of collaboration strength in a discipline. It also explored an alternative metric, the collaboration coefficient (CC), which combines the strengths of both CI and DC. The CC ranged from 0 to 1, approaching zero when single-authored papers dominated, and effectively distinguished varying levels of multiple authors. By considering the shortcomings of CI and DC, the CC provided a more comprehensive measure of collaboration within the field.

Dr Vaishali Khaparde (2011) Bibliometrics is the most active field of "Library and Information science." Bibliometric study of electronic journals in Library and information science is the major portion of it. It is traditionally associated with the quantitative measurement of document materials or referred. The study is limited to 1147 articles of total 36498 references. Total 180 issues of 5 E-journals in Library and Information Science namely ASLIB proceeding, Library High Tech, Library Review, Online Information Review, New Library World from 2005-2009 was under taken for the present study. The E-journals which are scholarly peer received were only selected for the present study. In order to perform quantitative analyses the present study considered only articles published in these E- journals during 2005-2009 that reported the results. Articles classified as Editorial Material, Power Point Slides of Conference, Book Reviews, Columns, Reports were not considered for the analysis. In the study of bibliometric study of e-journals 1147 articles were published in 180 issues on an average of 35 articles

per issues. Average articles per issue have been found to be highest in 2007. Male have dominance in the contribution of articles in publication in the field of Library and Information Science. The trend in total authorship for both men and women from 2005 to 2009 appears to be a slight bias against women and in favour of male authors, among 981 male author 47.40 percent (465) male author publish their articles in their own capacity. The highest percentage of international contribution has been observed in LHT (98.21) and it was lowest in the case of ASLIB (1.15). New Library world ranked second.

Dr .Vaishali Khaparde (2011) For the present study citation analysis of the articles published in the Library-Hi-Tech from 2000-2009 was taken into consideration. 479 articles were published in the journal during 10 years. Highest number 52(0.108%) articles were published in 2001. The Journal contained 5386 citations for the study period of which 1121 (20.81%) were web citations, 85(1.57%) were author self –citations and 17 (0.31%) were journal self citations. Female contribution145(30.27%) accounts more than male contribution 334(69.72%).

Thamaraiselvi, M et. al. (2021),analyzed the collaborative measures and authorship patterns of the current science journal from 2014 to 2018. Data from the Web of Science database yielded 4298 articles for analysis. The study revealed that 33.50% of papers had a single author. The average collaborative index was 3.39, with a collaboration degree of 0.90. The overall collaborative coefficient was 0.78, remaining constant. Relative growth rate decreased and doubling time increased. Strong positive correlations existed between publications and authors, as well as between single and multiple authors in the journal.

5.Research Methodology

The study belongs to bibliometric analysis of journal chosen for study. The research papers published during 2019-2023 were downloaded and tabulated in MS-Excel for analysis of 218 numbers of articles from 5 volumes of the journal. Data has been recorded in terms of year of publication, authorship pattern, degree of collaboration, and geographical distribution of articles.

6.Objectives of the Study

The objectives of the study are:

- To estimate the annual growth rate (AGR) of publications
- To study of Annual Publication out digital transformations of Libraries
- To examine the year-wise distribution of articles.
- To find the authorship pattern of the journal.
- To assess the degree of collaboration among authors.
- To estimate the Collaborative Index (CI) of publication
- To estimate the Collaborative Coefficient (CC) of publication
- To analyze the forms of documents cited in the journal articles.

7.Scope and Limitation of the Study

The present study is based on Bibliometric study. The scope of the present study is limited to the 358 articles covered on 'Digital Transformations of Libraries of Bibliometric study' on web of science Database during the year (2019-2023).

8.Data Collection:

The list of Articles on Digital transformations of Libraries were collected from the web of science Database the latest 5 Years from 2019-2023 with adequate details such as applied Bib Estimate

Collaborative Index, Collaborative coefficient etc. various other tables are made on basis upon data collected. These have been classified grouped and analyzed to find the various dimensions of the study.

Data Analysis and Interpretation

Scope and Limitation of the Study The present study is based on Bibliometric study. The scope of the present study is limited to the 358 articles covered on 'A Bibliometric study' on Transformation of libraries web of science database during the year (2019-2023).

1.To estimate the Annual Growth rate (AGR) of publications

Table No-1 **Annual Growth rate (AGR) of publications**

YEAR	Vol	Total No of Publication	AGR %
2019	18	58	
2020	9	61	5.17
2021	25	72	18.03
2022	23	76	6.56
2023	19	91	5.55

The growth rate is a measurement which is essential in any field. In meaning the growth of the number of publications in a particular discipline, this is often a measure of the annual increase or decrease. Here, the AGR has been determined as per the formula given below.

AGR = End value – First Value / First Value x 100

In this study, the end value is 61 in the year 2019, the first value is 16 in the year .Table 2 shows that the year on the change in the number of documents was -25% in 2010, 8.33% over the respective next year.

2.Annual Publication output of Digital Transformations of Libraries

Table No-2 Annual Publication

YEAR	NO. OF PUBLICATION	%	CUM. RECORDS	CUM %
2019	58	16.20	58	16.20
2020	61	17.04	119	33.24
2021	72	20.11	191	53.35
2022	76	21.23	267	74.58
2023	91	25.42	358	100.00
	358	**100.00**		

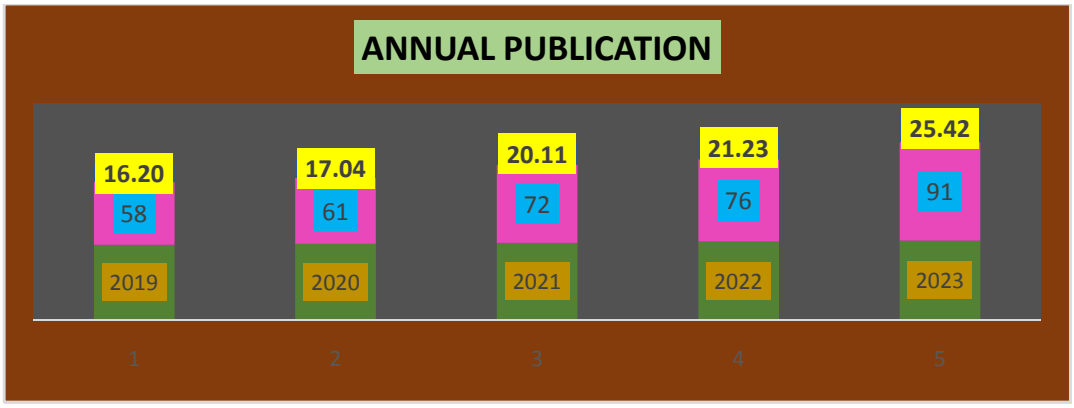

Fig No- 1

As reflected in the total 159 publications were published in the journal of Digital transformation of Libraries during the period 20199-2023.The cumulative output of Digital transformations of Libraries increased from 191 publications during 2021 & 358 papers 2023 showing a (Table 2).

3. Table No 3 Year wise Distribution of Articles

Year wise Distribution of Articles

Sr. No	Year	Frequency	Percentage
1	2019	56	15.64
2	2020	69	19.27
3	2021	69	19.27
4	2022	80	22.35
5	2023	84	23.46
	Total	**358**	**100.00**

Fig . No-2

The table 1 display the total number of articles published in 358from the year 2019-2023published in the journal digital transformations in libraries . On the observation of table 1, it has been found that major contributions of Articlesto the journal published in 202384(23.46%) and 2022 , 80(22.35%). And lowest publication percentage till date 56(15..64%) and 2020 , 69(19.27%)of total articles published in the journal.

4. Table No-4 Authorship Pattern of the Article
Authorship Pattern of the Article

Sr. No	No. of Authors	Frequency	Percentage
1	Single Author	94	26.26
2	Two Authors	85	23.74
3	Three Authors	66	18.44
4	Four Authors	42	11.73
5	Five & More than	71	19.83
	Total	**358**	**100.00**

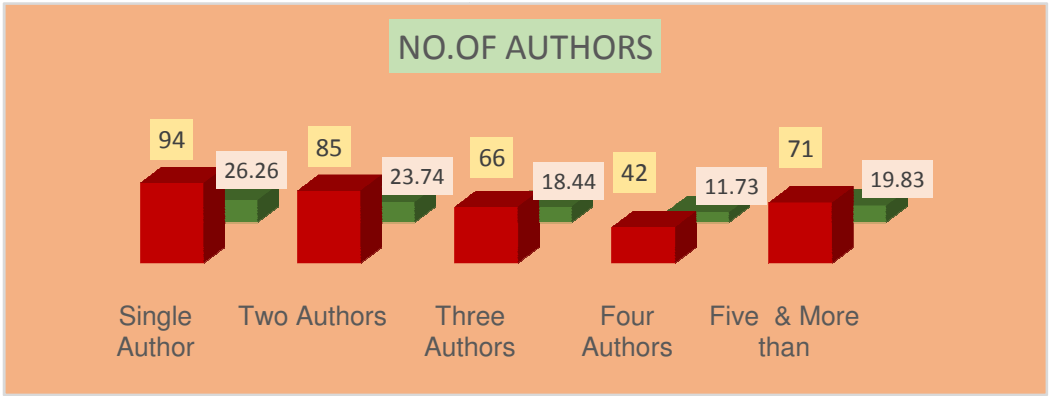

Fig. No-3

The table shows authorship pattern of contributions published in the Articles during 2019-202. On the observation of table 2, it has been found that 26.26% articles published in the name of one (single) author of the total publications in journal. There 94 were 85, (23.74% articles published in the name of two authors of the total publications while were 66 ,(18.44%) articles published in the name of three authors of total publications to the journal.There were only 42(11 .73%)articles published in the name of four authors.articles published in the name of five and above author the total publications while were is 71 (19.83%) From the analysis,

5. To 5 findCollaborative Index of Contribution
Collaborative index of Contribution

YEAR	Single Author	Two Authors	Three Authors	Four Authors	Five Above Authors	Total	CI
2019	18	18	8	4	10	58	2.48
2020	9	17	17	4	14	61	2.95
2021	25	17	13	6	11	72	2.46
2022	23	16	11	11	15	76	2.51
2023	19	20	16	17	19	91	2.79
	94(26.25%)	**88(24.58%)**	**65(18.15%)**	**42(11.73)**	**69(19.27%)**	**358**	**3.50**

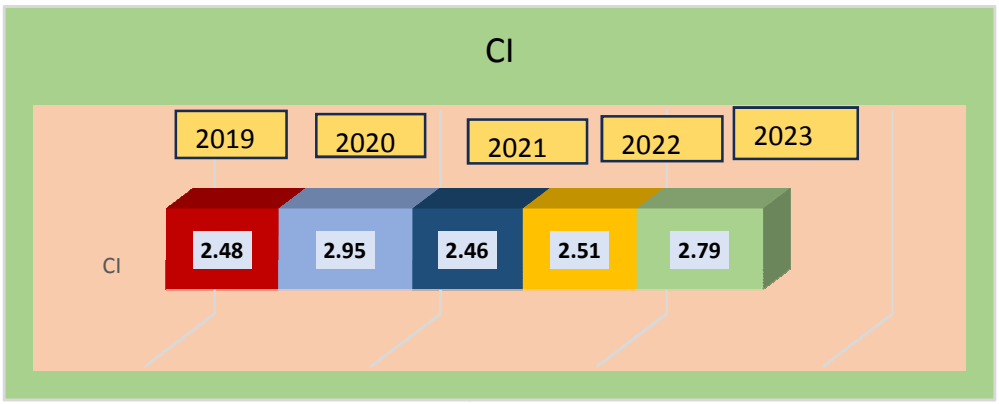

Fig.No-4

This is one of the early measures of degree of collaboration derived by Lawani (1980).

$$CI = \frac{\sum A\ j=1 jfi}{N}$$

It is a measure of mean number of authors. Although it is easily computable, it is not easily interpretable as a degree, for it has no upper limit. Moreover; it gives a non-zero weight to single-authored papers, which involve no collaboration.

CI = [(f1) 1 + (f2) 2 + (f3) 3 + … (fk) k] / N Using data in the Table 3.4, during 2019-2023,

CI = (18 + 18 X 2 + 8X 3 + 4X 4+10X5) / 58

= 18+ 36+ 24 + 16+50 = 144= 144 / 58

= 2.48

Table 4 shows the variation in the CI. It varies from 2.48 in 2019lowest CI in the year 2021 i.e. 2.46 and highest Collaboration we can notices in 2020 i.e. 2.95 this may be due to the Final total Collaborative Index **is 3.50**

6. To study Collaborative Coefficient:

According to Ajiferukeet al. (1988) who have shown the mean number of authors per paper, the proportion of multiple authorship as a measure of degree of collaboration in a discipline, is inadequate. Therefore, they have proposed a measure combining some of the merits of both measures into what is known as Collaborative Coefficient. Suppose, if a paper has a single author, the author receives one credit; if two, each receives ½ credits. In general, if we have 'n' authors each receive 1/n credits. Hence, the average credit awarded to each author of a random paper is E [1/n], a value which lies between 0 and 1. If '0' is to correspond to single authorship, then the CC is defined as: CC = 1-E [1/n] = 1- (1/j) p (N=j) and its sum ∑ rate = 1-f1+ (1/2) f2+ (1/2) f3+… (1/k)fk N Where: Fjis the number of j-authors research papers published in a discipline during a certain period of time, Nis the total number of research papers published in a discipline during a certain period of time (excluding anonymous authors) and K is the greatest number of authors per paper in a discipline. Ajiferuke et al were of the opinion that the C Concorporates the sum of the merits of both CI and DC. It lies between 0 and 1 (0<=cc>1). It tends to zero as single authored papers dominate and differentiates among levels of multiple authorship.

Table NO -6 **To study Collaborative Coefficient**

YEAR	Single Author	Two Authors	Three Authors	Four Authors	Five Above Authors	Total	CC
2019	18	18	8	4	10	58	0.44
2020	9	17	17	4	14	61	0.56
2021	25	17	13	6	11	72	0.41
2022	23	16	11	11	15	76	0.47
2023	19	20	16	17	19	91	0.53
	94(26.25%)	**88(24.58%)**	**65(18.15%)**	**42(11.73)**	**69(19.27%)**	**358**	0.47

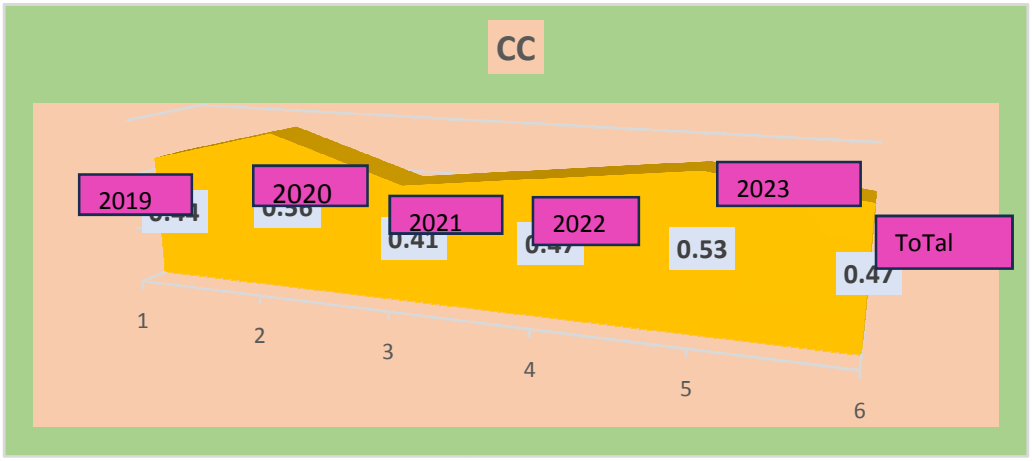

Fig. No-5

Table 6shows the CC has increased from 0.44 in 2019 to 0.41 in 2021 indicating that research among scientists is fairly collaborative with an average CC is 0.56.

CC = 1 – [f1 + (1/2) f2 + (1/3) f3 +… + (1/k) fk] / N Based on the data in the 4 using the values for f1, f2, and f3, CC for the year 2001

CC = 1 – {[9 + (1/2) 17+ (1/3) 17 + (1/4) 4+ (1/5)14] / 61 N}

= 1 – {[9+ 8.5 + 5.67+ 1+2.8] / 61}

= 1 – [26.97 / 61]

= 1 – 0.442

CC = 0.56

7.To measure the DC, and collaborative index

To show the trend towards multiple authorships in a discipline, many studies have used either the mean number of authors per paper, termed the CI by Lawani (1980) and the proportion of multiple authored papers, called Degree of Collaboration (DC) by Subramanyam (1983) as a measure of the strength of collaboration in a discipline

Table No- 7 To measure the DC, and collaborative index

Year	Single Author (Ns)	Multiple Authors (NM)	Total NS+NM	Percentage
2019	18	40	58	0.69
2020	9	52	61	0.85
2021	25	47	72	0.65
2022	23	53	76	0.70
2023	19	72	91	0.79
	94	**264**	**358**	**0.74**

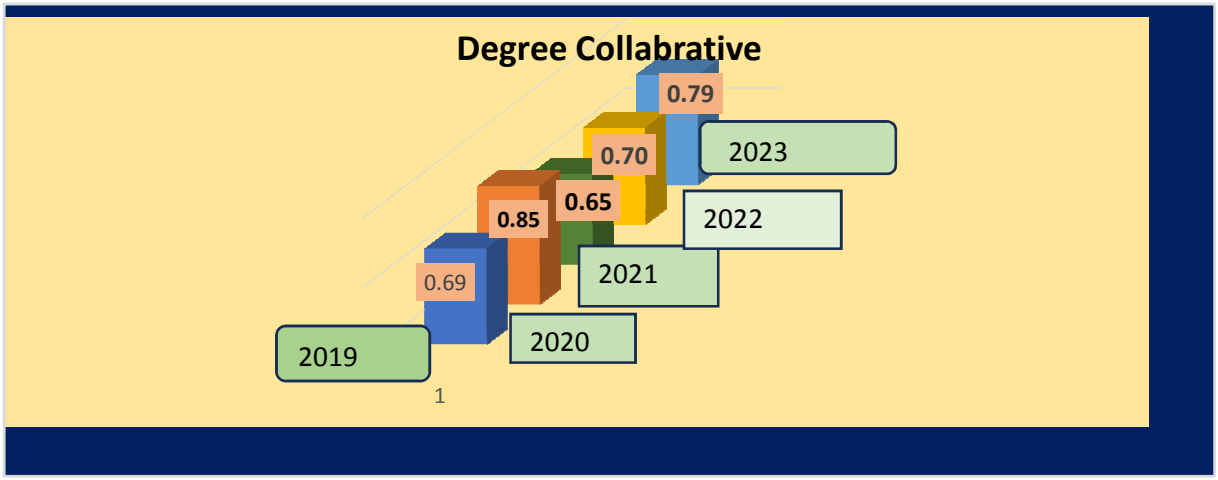

Fig No-6

The degree of collaboration (C) of the contributors has been derived using the Subramanyam formula**:**

Degree of Collaboration (C) = Nm

$Nm+Ns$

Where,

C = Degree of Collaboration

Nm = Number of multiple authors

Ns = Number of single authors

= 264

264+94=358

C = 0.74

The degree of collaboration has been calculated for the year 2019-2023. Single author contribution is 94 and multiple authors' contribution is 264. Volume wise Degree of Collaboration of the journal falls in the range of 0.69 to 0.85. The Degree of Collaboration of the journal is 0.74 The journal has good presence of collaborative Articles among authors. More the degree of collaboration for the journal tends towards more collaborative

8. Document Types Contribution of Distribution

Table No -8 Document Types Contribution of Distribution

Sr. No	Document Types	Frequency	Percentage
1	Article	252	70.39
2	Early Access	20	5.59
3	Processing Paper	28	7.82
4	Review	49	13.69
5	Editor	9	2.51
	Total	**358**	**100.00**

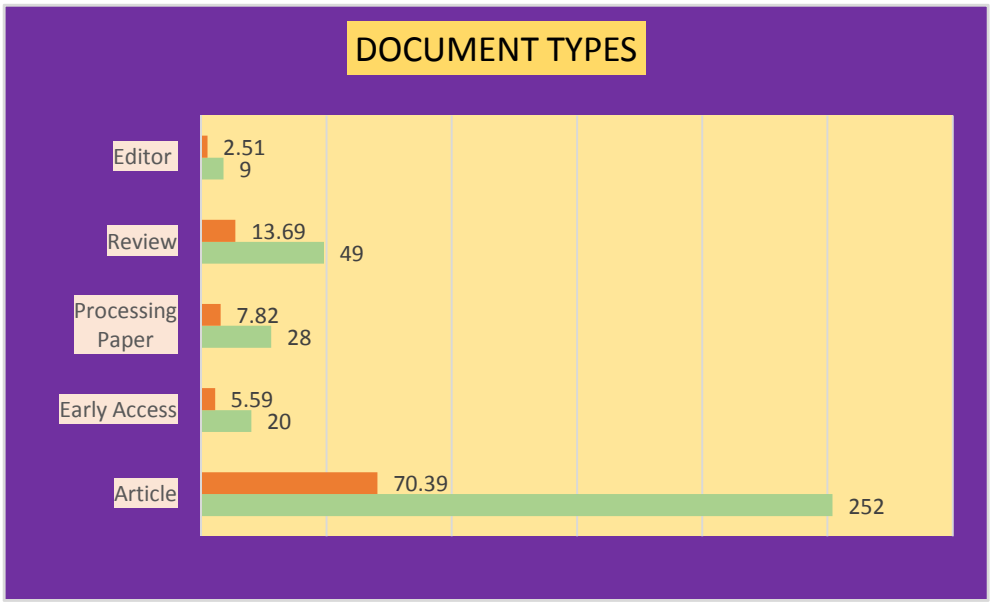

Fig No-7

The study has been conducted to know the prevalent forms of citations appeared inresearch articles published in the journal. From the analysis of table 8, it has been found Highest of Articles 256 (70.39), and Review is 49 ,(13.69) , paper Processing 28 (7.82 %) And Lowest Early Access 20 , (5.59%) & Editor 9(2.51%).

Conclusion

Digital transformation in the libraries refers to the adoption of digital processes and tools to achieve strategic organizational goals. It's a complex, multifaceted process that represents a change in the workplace that affect product, process and services of traditional library. The Digital Library software in present scenario has made possible to create online digital libraries. The Libraries can create their own repository of digital resources for preservation and dissemination on all over the web. On the grounds of above discussion on certain technical features and services we are able to propose emerging platforms for.

REFERENCE :

- Pritchard, Alan (1969),StatisticalBibliograph or Bibliometrics?" Journal of Documentation. 25: 348– 349. Retrieved 20 April 2023
- Thavamani, K. & Velmurugan, C. (2013). Authorship pattern and collaborative research work in 'Annals of Library and Information Studies'. Proceedings of the National Conference on Next Generation Library Services, SALIS 2013 NGLIS August 16-17, Chennai .
- Ajiferuke, Isola et.al. (1988), Collaborative coefficient; A single measure of the degree of collaboration in research.Scientometrics, Vol. 14(5-6), 421-45. https://www.researchgate.net/publication/242915907 (Accessed on 12 June 2023)
- Dr Vaishali Khaparde(2011) E-Journals in Library and Information Science: A Bibliometric Study , International Journal of Humanities and Social Science Vol. 1 No. 11 [Special Issue Page No-1-8.
- Dr. Vaishali Khaparde (2011) , Use of Information by Library Science Professionals: A BibliometricStudy, British Journal of Humanities and Social Sciences, Vol. 1 (2) Page NO 1-13. British JournalsISSN 2048-1268.
- M.Y. Ali (2023). Bibliometric Analysis and M.Y. Ali (2023). Bibliometric Analysis and type . https://profileusuf.wordpress.com/bibliometric/
- Akhandanband Shukla& NG Thermi Mayon (2017) International Research - Journal of Library and digital Information Science: A Bibliometric Analysis University of Nebraska – Lincoln Library Philosophy and Practice (e-journal)page no 1-29.
- https://ec.linkedin.com/in/luis-enrique-lescano/en?trk=article-ssr-frontend-x-article
- K. K. Singh, Mohammad Asif (2019) Emerging trends and technologies for digital transformation of libraries , http://doi.org/10.18231/j.ijlsit.

