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## Research Output on Planning and Designing of academic library in the digital environment: Study based on web of science Database.

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### 1. ABSTRACT

*This study examines the publication trends of scholarly articles on the planning and design of academic libraries in the digital environment. Data for this research were retrieved from the Web of Science database, employing the keyword “Planning and Designing of Academic Library” within the subject category “Bibliography, Library Science, Information Resources” for the period 2005–2024. A total of 816 relevant articles were identified and analyzed to determine trends in publication growth, language distribution, journal impact based on Bradford’s Law, country-wise contributions, and key publishing entities. The findings indicate a consistent increase in research output over the study period, with 2021 emerging as the most prolific year, whereas 2005 recorded the lowest publication count. The vast majority (98%) of articles were published in English. Journals such as Library Hi Tech and The Electronic Library accounted for the highest number of publications in this domain. Additionally, the United States was identified as the leading contributor in terms of research output on this subject.*

**KEYWORDS:** Academic library, Library buildings, Planning of library buildings, Architecture of library Buildings, Academic Library Design, Space Planning in Libraries, Technology Integration in Library Design, Digital Integration in Libraries, Innovative Learning Environments, Innovation in Library Buildings Planning.

### 1. INTRODUCTION

In the context of higher education, academic libraries are essential because they act as knowledge hubs and intellectual hubs that support teaching, learning, and creativity. Academic libraries' planning and design play a crucial role in determining how well they can serve the various demands of researchers, teachers, and students. Libraries in academic institutions must constantly adapt to the ever-changing technical and pedagogical scene to remain relevant and give its users the best possible experience. It is vital to comprehend the patterns and trends in study pertaining to the planning and design of academic libraries to enhance and provide guidance for these crucial establishments in the future.

To shed light on the body of research around academic library planning and design, this research piece undertakes a thorough bibliometric analysis. Using bibliometrics as a tool, we can discover

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influential works, trace the development of research, examine academic publications quantitatively, and identify new trends. Using bibliometric analysis, we hope to shed light on the state of academic library research as it stands today, as well as on the major figures, most popular subjects, and geographic distribution of this research. The present paper is a bibliometric analysis of the papers on planning and design of academic libraries covering a nineteen-year period from 2005 to 2024. Analysis of current research trends in all the fields of planning and design of academic libraries related issues help us to understand the growth pattern of academic literature in these areas.

## 2. REVIEW OF LITERATURE

The literature on academic library planning and design encompasses a wide range of topics, including user-centered services, technological advancements, architectural considerations, and spatial utilization. However, a comprehensive review of existing studies reveals a significant gap in empirical research specifically addressing the planning and design of academic libraries within the digital environment. Only one notable study directly examines this subject: *Twenty-Five Years of Academic Library Building Planning* by David Kaser. This study analyzed changes in academic library building design over a twenty-five-year period, utilizing data from previously published sources on library planning and construction. The findings indicate a substantial increase in the construction of academic library buildings in the last quarter century. However, the study also highlights concerns among librarians regarding a perceived decline in the quality and functionality of these structures compared to earlier periods (Kaser, n.d.). Beyond this single study, no further empirical research has been identified that specifically focuses on bibliometric study of the planning and design of academic libraries in the digital era. This gap underscores the need for further investigation into the evolving requirements and challenges faced by academic libraries in adapting to technological advancements and digital transformations.

## 3. OBJECTIVES

The following are the specific objectives of the study:

- To find out the year wise growth of the articles on Library planning and designing in Web of Science from 2005 to 2024.
- To find out the language wise distribution of articles.
- To learn which journals publish papers on field of library planning and design and Bradford's law applicability
- To determine the well-known nations that publish research outputs in the field of library planning and design.
- To learn how journals and articles are distributed among publishers.
- To provide a comprehensive overview of the research output in the field of academic library planning and design through bibliometric analysis.

## 4. METHODOLOGY

This study employs a bibliometric approach to analyze publication trends in the planning and design of academic libraries. Data were systematically collected from the Web of Science database for the period 2005–2024. An advanced search was conducted using the keyword “Library Planning and Designing” within the subject category “Bibliography, Library Science, and Information Resources.” This search yielded a total of 816 articles published between 2005 and 2024. The retrieved documents were filtered by publication year to determine the annual research output. For each selected record, full metadata was extracted and stored for further analysis. The dataset was processed using Microsoft Excel and R software; however, nine records contained errors and were excluded from the analysis. This study aims to provide valuable insights into the evolving research landscape of academic library planning and design by analyzing key bibliometric indicators. The collected data was systematically organized and examined to identify thematic clusters, publication trends, regional distribution, and key publication sources. The final analysis was conducted using Microsoft Excel to ensure accurate and comprehensive bibliometric assessment.

### 5. Analysis and interpretations

This section gives the interpretations and analysis of the collected data.

#### **5.1** Annual Growth of research publications in Planning and Designing of academic libraries.

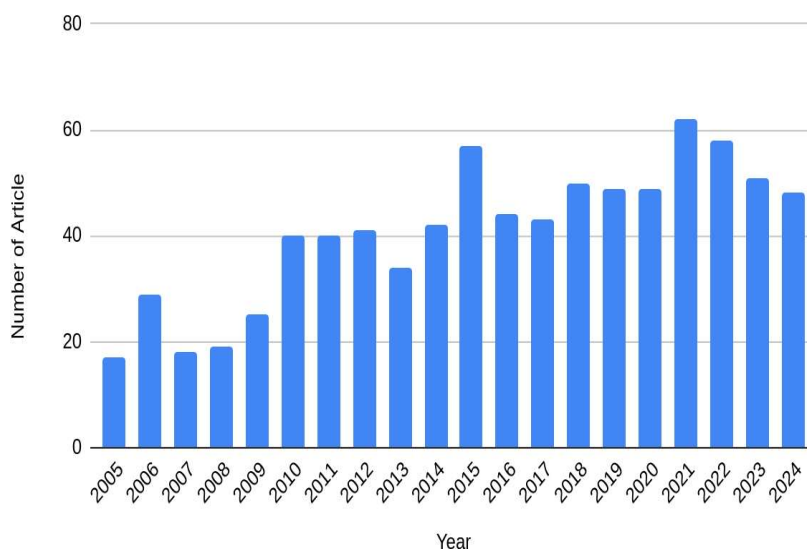
It is found that the number of articles on Planning and Designing of academic libraries has been increasing over the years since 2005. The most productive year is 2021 with 62 articles, which is

7.6% of the total articles and the least productive year is 2005 with 17 articles. The average number of articles published in a year is found to be 29.

Table 1 shows the Annual Growth of research publications in Planning and Designing of academic libraries.

Year	Number of Article	Percentage	Cumulative growth	Cumulative percentage
2005	17	2.08	17	2.08
2006	29	3.55	46	5.64
2007	18	2.21	64	7.84
2008	19	2.33	83	10.17
2009	25	3.06	108	13.24
2010	40	4.90	148	18.14
2011	40	4.90	188	23.04
2012	41	5.02	229	28.06
2013	34	4.17	263	32.23
2014	42	5.15	305	37.38
2015	57	6.99	362	44.36
2016	44	5.39	406	49.75
2017	43	5.27	449	55.02
2018	50	6.13	499	61.15
2019	49	6.00	548	67.16
2020	49	6.00	597	73.16
2021	62	7.60	659	80.76
2022	58	7.11	717	87.87
2023	51	6.25	768	94.12
2024	48	5.88	816	100.00
Total	816	100.00		

## Year wise distribution of articles



1.1 Fig.1. Year wise distribution of articles

## 5.2 Language wise Distribution.

Out of total 816 articles, 98.7% of articles are published in English, then comes Spanish which comprises 7% of total publication. 2% of the total articles were published in Portuguese. Fewest articles were published in German.

Table 2 Language wise Distribution of Articles on Digital Libraries.

Sl. No.	Language	No. of articles	Percentage
1	English	806	98.7745098
2	German	1	0.1225490196
3	Portuguese	2	0.2450980392
4	Spanish	7	0.8578431373
Total		816	100

## 5.3 Distribution of Data based on type of Documents.

Out of 816 research studies, 88.6% (723) research studies are articles, 4% is early access and 3% is review. Book review and editorial materials make the least contribution which gives only 1% of total research studies. 1.4% of total research studies comprise proceeding papers.

Table 3 Distribution of Data based on type of Documents.

Sl.No	Document Types	Count
1	ARTICLE	723
2	EARLY ACCESS	35
3	REVIEW	28

4	PROCEEDINGS PAPER	12
5	BOOK REVIEW	9
6	EDITORIAL MATERIAL	9
Total		816

Distribution of Data based on type of Documents.

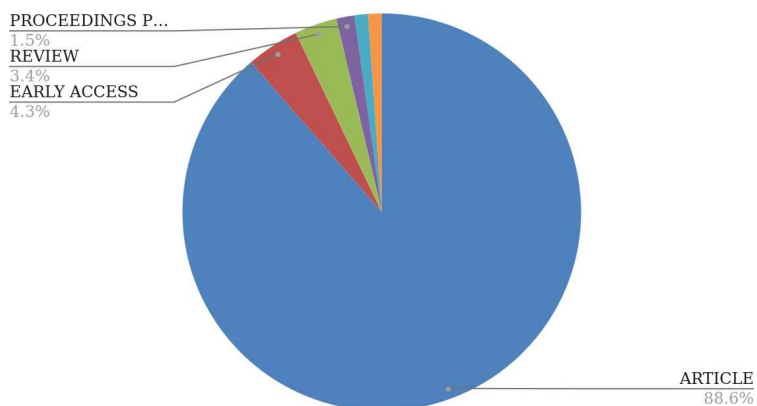


Fig.2. - Distribution of Data based on type of Documents.

#### 5.4 Country wise Distribution of Articles

Out of a total of 816 articles, 236 have been published from the USA alone. The least number of publications are from Brazil, Israel and Norway. From India, 28 articles have been published so far.

Table 4 Country wise Distribution of Articles.

Sl.No	Country	No.of. Article	Percentage
1	USA	236	28.92156863
2	PEOPLES R CHINA	73	8.946078431
3	TAIWAN	44	5.392156863
4	AUSTRALIA	40	4.901960784
5	ENGLAND	40	4.901960784
6	PAKISTAN	38	4.656862745
7	NIGERIA	36	4.411764706
8	IRAN	31	3.799019608
9	INDIA	28	3.431372549
10	CANADA	27	3.308823529
11	SPAIN	26	3.18627451
12	SOUTH KOREA	24	2.941176471

13	SOUTH AFRICA	23	2.818627451
14	GERMANY	18	2.205882353
15	MALAYSIA	15	1.838235294
16	FINLAND	12	1.470588235
17	GHANA	9	1.102941176
18	JAPAN	9	1.102941176
19	SCOTLAND	8	0.9803921569
20	SINGAPORE	8	0.9803921569
21	BRAZIL	7	0.8578431373
22	ISRAEL	7	0.8578431373
23	NORWAY	7	0.8578431373
24	other Countries	50	6.12745098
		816	100

Country wise Distribution of Articles

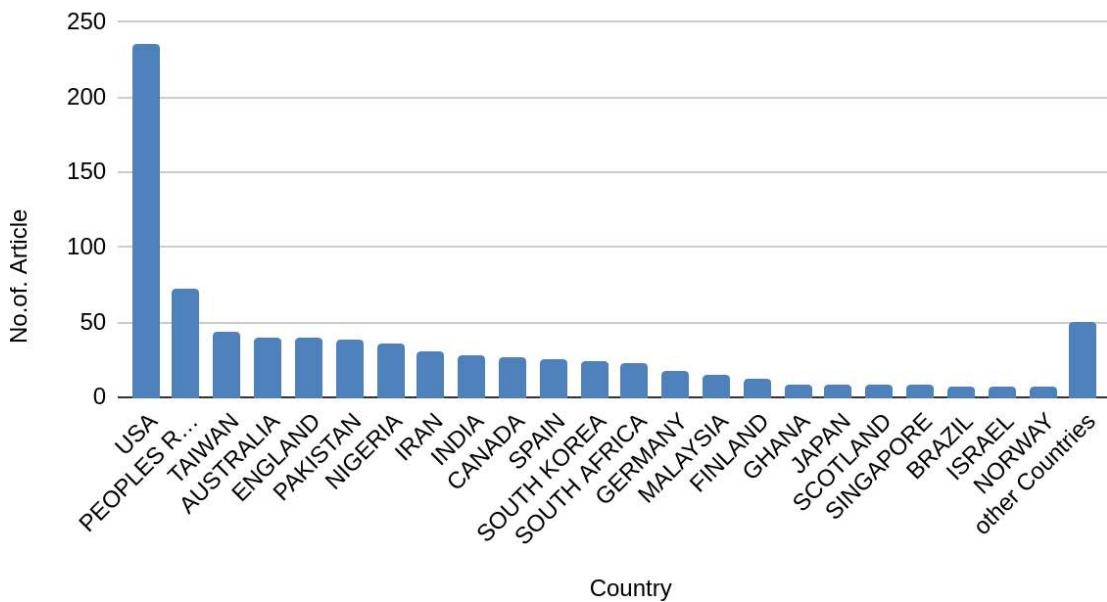


Fig.3. - Country wise Distribution of Articles

### 5.5 Journals Publishing Articles on Planning and Designing of academic libraries.

The journal list contains the top 55 journals. It was found that 'Library Hi Tech' publications are the major source of journal publishing research studies. It published 168 articles on the topic for the period of 2005-2024 and is 20.5% of total research studies. Next in the order is 'Electronic Library', it is about 18.5% (151) of total published research studies. Other leading publications are 'Journal of Academic Librarianship', 'Program electronic library and information systems', 'Reference services review', and 'Journal of Librarianship and information science'.

Table.5 Journals Publishing Articles on Planning and Designing of academic libraries.

<u>Sl.No</u>	Journals Publishing Articles on Planning and Designing of academic library	Number of articles	Percentage
1	LIBRARY HI TECH	168	20.58823529
2	ELECTRONIC LIBRARY	151	18.50490196
3	JOURNAL OF ACADEMIC LIBRARIANSHIP	72	8.823529412
4	PROGRAM ELECTRONIC LIBRARY AND INFORMATION SYSTEMS	33	4.044117647
5	REFERENCE SERVICES REVIEW	28	3.431372549
6	JOURNAL OF LIBRARIANSHIP AND INFORMATION SCIENCE	27	3.308823529
7	JOURNAL OF DOCUMENTATION	26	3.18627451
8	INFORMATION DEVELOPMENT	18	2.205882353
9	INTERLENDING DOCUMENT SUPPLY	18	2.205882353
10	INFORMATION TECHNOLOGY AND LIBRARIES	17	2.083333333
11	JOURNAL OF THE AMERICAN MEDICAL INFORMATICS ASSOCIATION	15	1.838235294
12	JOURNAL OF THE AMERICAN SOCIETY FOR INFORMATION SCIENCE AND TECHNOLOGY	15	1.838235294
13	JOURNAL OF THE MEDICAL LIBRARY ASSOCIATION	13	1.593137255
14	LIBRARY TRENDS	13	1.593137255
15	ASLIB JOURNAL OF INFORMATION MANAGEMENT	12	1.470588235
16	COLLEGE RESEARCH LIBRARIES	12	1.470588235
17	JOURNAL OF THE ASSOCIATION FOR INFORMATION SCIENCE AND TECHNOLOGY	11	1.348039216

18	LIBRARY INFORMATION SCIENCE RESEARCH	11	1.348039216
19	PORTAL LIBRARIES AND THE ACADEMY	10	1.225490196
20	AUSTRALIAN LIBRARY JOURNAL	9	1.102941176
21	JOURNAL OF THE AUSTRALIAN LIBRARY AND INFORMATION ASSOCIATION	9	1.102941176
22	LIBRARY QUARTERLY	9	1.102941176
23	LIBRI INTERNATIONAL JOURNAL OF LIBRARIES AND INFORMATION STUDIES	9	1.102941176
24	ASLIB PROCEEDINGS	8	0.9803921569
25	MALAYSIAN JOURNAL OF LIBRARY INFORMATION SCIENCE	8	0.9803921569
26	AUSTRALIAN ACADEMIC RESEARCH LIBRARIES	7	0.8578431373
27	ONLINE INFORMATION REVIEW	7	0.8578431373
28	SCIENTOMETRICS	7	0.8578431373
29	INVESTIGACION BIBLIOTECOLOGICA	6	0.7352941176
30	PROFESIONAL DE LA INFORMACION	6	0.7352941176
31	JOURNAL OF INFORMATION SCIENCE	5	0.612745098
32	LECTURE NOTES IN COMPUTER SCIENCE	5	0.612745098
33	LIBRARY JOURNAL	5	0.612745098
34	RESEARCH AND ADVANCED TECHNOLOGY FOR DIGITAL LIBRARIES	5	0.612745098



35	DATA TECHNOLOGIES AND APPLICATIONS	4	0.490196078 4
36	INFORMATION RESEARCH AN INTERNATIONAL ELECTRONIC JOURNAL	4	0.490196078 4
37	INTERNATIONAL JOURNAL OF GEOGRAPHICAL INFORMATION SCIENCE	3	0.367647058 8
38	LIBRI	3	0.367647058 8
39	RESTAURATOR INTERNATIONAL JOURNAL FOR THE PRESERVATION OF LIBRARY AND ARCHIVAL MATERIAL	3	0.367647058 8
40	AFRICAN JOURNAL OF LIBRARY ARCHIVES AND INFORMATION SCIENCE	2	0.245098039 2
41	INFORMATION CULTURE	2	0.245098039 2
42	INFORMATION PROCESSING MANAGEMENT	2	0.245098039 2
43	JOURNAL OF GLOBAL INFORMATION TECHNOLOGY MANAGEMENT	2	0.245098039 2
44	JOURNAL OF INFORMETRICS	2	0.245098039 2
45	JOURNAL OF KNOWLEDGE MANAGEMENT	2	0.245098039 2
46	JOURNAL OF SCHOLARLY PUBLISHING	2	0.245098039 2
47	LEARNED PUBLISHING	2	0.245098039 2
48	RESEARCH EVALUATION	2	0.245098039 2

49	CANADIAN JOURNAL OF INFORMATION AND LIBRARY SCIENCE REVUE CANADIENNE DES SCIENCES DE L INFORMATION ET DE	1	0.1225490196
	BIBLIOTHECONOMIE		
50	INFORMATION SYSTEMS RESEARCH	1	0.1225490196
51	INFORMATION TECHNOLOGY PEOPLE	1	0.1225490196
52	LIBRARIES THE CULTURAL RECORD	1	0.1225490196
53	PERSPECTIVAS EM CIENCIA DA INFORMACAO	1	0.1225490196
54	QUALITATIVE HEALTH RESEARCH	1	0.1225490196
	TOTAL	816	100

### Journals Publishing Articles on Planning and Designing of academic library

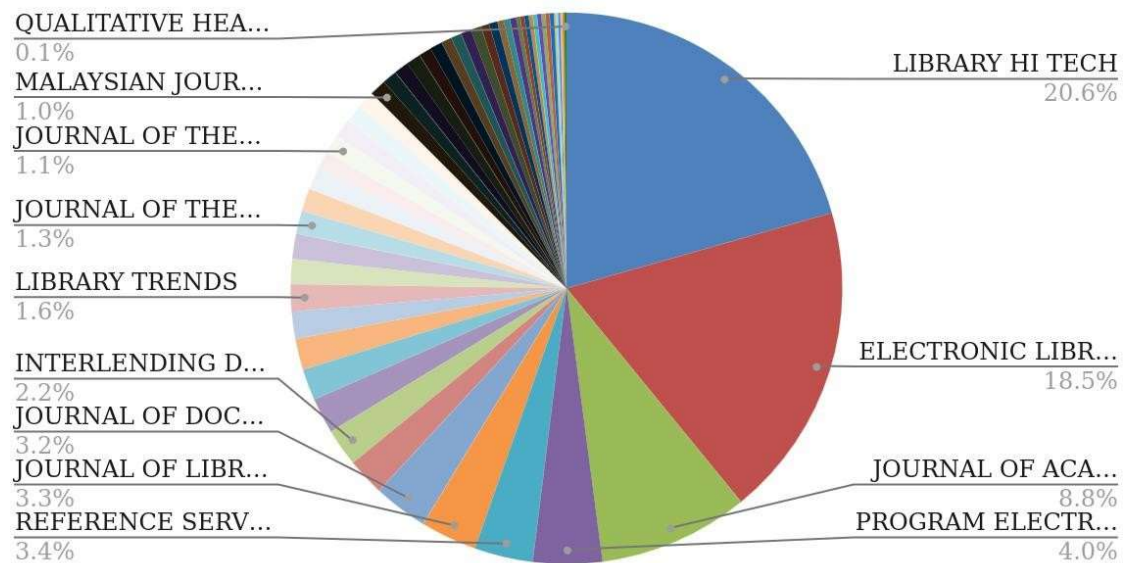


Fig.4 Journals Publishing Articles on Planning and Designing of academic libraries.

## 5.6 Publisher wise Distribution

Table contains major publishers publishing research articles. Emerald group publishing is the prime publisher, a UK based leading global publisher of academic journals and books, which publishes 'Library Hi Tech', and 'Electronic Library'. It published 458 articles, which is 56% of the total articles covered for the study. Elsevier is in the second position, a Dutch academic publishing company which published 89 articles. It is 10% of the total published articles.

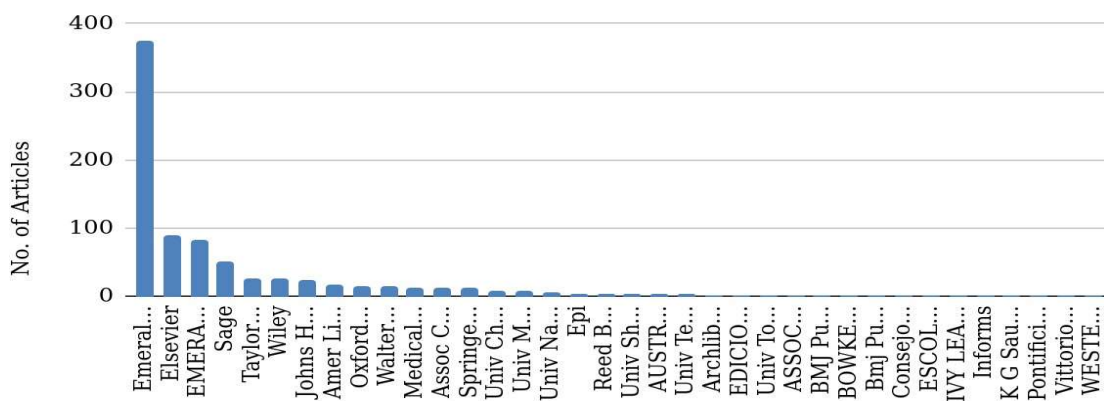
Table. 6  
Publisher wise Distribution of Articles on Planning and Designing of academic libraries.

<u>Sl.No</u>	Publisher wise Distribution of Articles on Planning and Designing of academic library	No. of Articles	Percentage
1	Emerald Group Publishing	376	46.07843 137
2	Elsevier	89	10.90686 275
3	EMERALD GROUP PUBLISHING	82	10.04901 961
4	Sage	51	6.25
5	Taylor & Francis	27	3.308823 529
6	Wiley	27	3.308823 529
7	Johns Hopkins Univ Press	23	2.818627 451
8	Amer Library Assoc	17	2.083333 333
9	Oxford Univ Press	14	1.715686 275
10	Walter De Gruyter	14	1.715686 275
11	Medical Library Assoc	13	1.593137 255
12	Assoc Coll Research Libraries	12	1.470588 235

13	Springer Nature	12	1.470588 235
14	Univ Chicago Press	9	1.102941 176
15	Univ Malaya, Fac Computer Science & Information Tech	8	0.980392 1569
16	Univ Nacional Autonoma Mexico	6	0.735294 1176
17	Epi	4	0.490196 0784
18	Reed Business Information	4	0.490196 0784
19	Univ Sheffield Dept Information Studies	4	0.490196 0784
20	AUSTRALIAN LIBRARY & INFORMATION ASSOC LTD	3	0.367647 0588
21	Univ Texas Press	3	0.367647 0588
22	Archlib & Information Services Ltd	2	0.245098 0392
23	EDICIONES PROFESIONALES INFORMACION SL-EPI	2	0.245098 0392
24	Univ Toronto Press Inc	2	0.245098 0392
25	ASSOC LEARNED PROFESSIONAL SOC PUBL	1	0.122549 0196
26	BMJ Publishing Group	1	0.122549 0196
27	BOWKER MAGAZINE GROUP CAHNERS MAGAZINE DIVISION	1	0.122549 0196
28	Bmj Publishing Group	1	0.122549 0196

29	Consejo Superior Investigaciones Cientificas-Csic	1	0.122549 0196
30	ESCOLA CIENCIA INFORM UFMG	1	0.122549 0196
31	IVY LEAGUE PUBL	1	0.122549 0196
32	Informis	1	0.122549 0196
33	K G Saur Verlag Kg	1	0.122549 0196
34	Pontificia Universidade Catolica Campinas	1	0.122549 0196
35	Vittorio Klostermann Gmbh	1	0.122549 0196
36	WESTERN LIBRARIES	1	0.122549 0196
	Total	816	100

No. of Articles vs. Publisher wise Distribution of Articles on Planning and Designing of academic library



Publisher wise Distribution of Articles on Planning and Designing of academic li...

Fig.5. - Publisher wise Distribution of Articles on Planning and Designing of academic libraries.

**5.7** Application of Bradford's Law of Scattering

Bradford's law deals with the scattering of articles in journals. Based on this law journals on a

subject can be divided into three zones. These three zones contain different numbers of articles in varying numbers of journals. The first zone is the core zone that contains a smaller number of journals that produce one third of the total number of articles (39.40%). These are very productive journals. The second zone contains a greater number of journals with 236 articles. These journals are moderately productive. The third zone contains many journals with 253 articles. This is the less productive zone.

In Bradford's law, the relationship between the three zones is expressed as, 1: n: n<sup>2</sup>

Table. 7 Bradford's Zones and Number of Journals

Zone	No. of Journals	Percentage	No. of Articles	Percentage
1	2	3.44	318	39.40
2	8	13.79	236	29.24
3	48	82.75	253	31.35

Here the number of journals in the first zone is 'n' and the second zone is 'n<sup>2</sup>'. Here zone 1 contains 2 Journals with 318 articles. Zone 2 contains 8 journals with 236 articles. Zone 3 contains 48 journals with 253 articles. According to Bradford's law the relationship between each zone is 1: n: n<sup>2</sup>. In the present study, the relationship between each zone is 2:8:48 Thus, it does not exactly follow Bradford's law.

#### FINDINGS AND DISCUSSION

- It is found that the number of articles on planning and designing of academic libraries is increasing from 2005 to 2024.
- The study found that 2021 is the most productive year for articles published. The least productive year is 2005.
- Major share of the articles written and published on planning and designing of academic libraries are in the English language (98%).
- Major part of research studies are articles.
- The journal which published the highest number of articles on planning and designing of academic libraries is Library Hi Tech and next comes Electronic Library.
- The most prolific publisher of digital libraries is Emerald Group of publishing. This publisher is highly productive which publishes 'Library Hi Tech' and 'Electronic Library'.
- The country which publishes the highest number of articles is the USA.

#### CONCLUSION

This bibliometric study presents a comprehensive analysis of publication trends in academic library planning and design from 2005 to 2024. The findings indicate a steady increase in research output over the years, with 2021 emerging as the most prolific year, while 2005 recorded the fewest publications. The dominance of English as the primary language of scholarly communication in this domain is evident, with 98% of the publications written in English. The study further reveals that journal articles constitute most research outputs, with *Library Hi Tech* and *The Electronic Library* being the most prominent publication sources. Emerald Group Publishing is identified as the leading publisher, making a significant contribution to research on digital libraries. The United States has the highest number of published articles, demonstrating its strong research presence in the field of academic library planning and design. Overall, these findings underscore the growing scholarly interest in this area and provide valuable insights into the evolving research landscape. Future studies should further investigate emerging trends, technological innovations, and regional variations to develop a more comprehensive understanding of this dynamic field.

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