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Growth and Research Productivity on Library Automation: A Bibliometric Analysis

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Abstract

Purpose: This study examined the research productivity of library automation from 2015-to 2020. The study's objectives were to access the publications based on various parameters such as year-wise distribution, authorship pattern, the total count of citations, most cited publications and the most prolific authors.

Methodology: The bibliometric method was applied in the study to analyze the characteristics and trends of papers published on library automation during the years 2015-2020. The data for the study was extracted from Google Scholar by using the bibliometric analysis software “Publish or Perish” and was further analyzed with MS Excel 365.

Key Findings: It was found that 342 authors wrote a total of 190 papers during the study period. The results show that the highest number of publications (45) were published in 2019. The single personal authors' pattern was dominant, with 50.52% publications. A total of 355 citations were received by the papers and 118 (33.2%) citations were received in 2017. The paper also highlighted information about the most cited on the topic papers during the study period.

Keywords: Library Automation, Bibliometric, Research Productivity

1. Introduction

The rapid growth and uses of emerging technologies have changed the traditional library into an automated, electronic, virtual, and digital library. This revolution has completely changed the library scenario, especially in an academic setup (Surwade & Patil, 2021). It is the need of the hour to make research more productive, disseminate information, and establish a robust network system among all libraries to quench the information thirst of the clientele (Ngozi, 2020). Ahmad and Bakhshi (2020) opined that a modern library's wish and desire to apply and enjoy the benefits of emerging technologies in its library's daily, housekeeping, routines and future developments. Developments in emerging technologies have a tremendous impact on all kinds of libraries and information resource centers over the last two and half decades. Simpson & Weiner (1989) defines automation as the “application of automatic control to any branch of industry or science by extension, the use of electronic or mechanical devices to replace human

labor.” As stated by Gavit (2019), library automation is the general term for Information Communication Technologies (ICT) trends and techniques used to replace the manual system in the library. ‘Bibliometrics’ is derived from the two Greek words, ‘Biblio’ and ‘metrikos,’ meaning book and measurement. Bibliometrics is the science of measurement relating to books. The word measurement means applying mathematical and statistical techniques to find outgrowth of documents, scattering literature in various types of documents, the publication of documents by an author, impact of document et. (Zafrunnisha, 2017).

The term ‘Bibliometrics’ was first coined by Pritchard in 1996 and stated that it is ‘the application of the mathematical and statistical method to book and other media of communication’ (Salam & Kirtania, 2019; Senel & Demir, 2018). Bibliometric is a type of research method used by the library & information science professionals and researchers by applying mathematical and statistical techniques to analyze and measure literature output of a particular subject, through language-wise, geographical wise, document type wise, institution wise, topic wise, etc. (Hussain & Saddiqa ,2020; Kannan & Thanuskodi, 2019).

2. Literature Review

Hussain and Saddiqa (2020) reported that 137 articles were published in the research journal “PAKISTAN” from 2005 to 2018, while 2017 was the most productive year. Most of the papers were contributed by male and single personal authors and most of the papers were of 11-15 pages. The University of Peshawar contribute the maximum number of papers to the journal, while Dr. Fakhr ul Islam was the most prolific. Hussain and Saddiqa (2020) reviewed the publications published in the research journal “Peshawar Islamicus”. The study found that 290 articles were published from 2010 to 2020, and 2019 was the most productive year with 34 papers. The trend of male and two personal authors pattern was dominant and most of the papers were published in length 11-15 pages. The most prolific author was Dr. Miraj ul Islam with 14 articles, and the maximum number of articles were published in the Urdu language.

Nath and Jana (2020) studied the bibliometric analysis of the journal “Annals of Library and Information Studies (ALIS)” from 2008 to 2018. The findings showed that 723 authors wrote 377 articles in the journal. India was the most productive country with 62.86% papers while B. K. Sen was the most prolific author with 26 articles. Peter, Samuel, Idhris and Subbarayalu (2020) found that 47346 authors contributed 12866 papers in the top four Medical Journals of Saudi Arabia from 2002 to 2019. The multiple authorship pattern was dominant with

10774 papers, while the least publications were published in 2018. Okeji (2019) studied the research output in library and information science from Nigeria from 2000-to 2018. A total of 1,106 documents were identified, and the highest number of articles (151) were published in 2011, and more than one-third (35%) of the research was published in an online journal “Library Philosophy and Practice”. The University of Ibadan was the most institution with 195 articles, and Baro, E. Emmanuel was the most productive author with 29 articles. Most of the articles were contributed by single personal authors with 527 articles, followed by two personal authors with 398 articles.

Ahmad, Sheikh and Rafi (2019) presented an overview of LIS literature published in the journals, indexed in the Web of Science from 2003 to 2017. The growing tendency was found from 200 publications in 2014 to 450 in 2017. The most productive countries were the United States (1453), followed by England (215) and Canada (198). The journal with the highest impact factor was “Journal of Medical Library Association” Indiana University was the most productive institution, while “Wall, M.” was a prolific author with 29 publications.

Haq and Al Fouzan (2019) evaluated the research output of “Pakistan Library and Information Science Journal from 2007 to 2018. The study highlighted various aspects of the publications of the journal. Jabeen, Yun, Rafiq and Jabeen (2015) assessed 18,371 papers published in 40 core LIS journals indexed in Web of Science from 2003 to 2012. Single personal authors produced most publications, and 43% of the total LIS research was produced by authors affiliated with the United States. Han et al. (2014) measured the collaboration trends in 8,570 documents published in 15 LIS journals from 2000 to 2011. It was found that two-thirds (66%) of the total research resulted from the collaboration. The pattern of collaboration among institutions within the countries was greater than that of international collaboration. Barik and Jena (2013) analyzed 180 publications of the Journal of Knowledge and Management Practice from 2008-2012. The publications were checked in terms of year-wise distributions, authorship pattern, country-wise distribution, citations, and length of articles. The single authorship (42.7%) pattern was dominant, and the United States produced the highest number of articles (18.8%).

Khurshid (2013) replicated the study of Mahmood (1996) and reported that 72 Pakistani authors wrote 516 articles in foreign LIS journals from 1957 to 2011. It was also identified that out of 516 articles, 151 were published in impact factor journals. Naseer and Mahmood (2009) scrutinized the 236 articles published in “Pakistan Library and Information Science Journal”

from 1998 to 2007. Chang and Huang (2012) used three bibliometric methods to investigate the interdisciplinary approach in LIS from 1978 to 2007, using direct citation, bibliographic coupling, and co-authorship. The research findings were interesting, demonstrating that library professionals have encouraged citing their research articles in the same field.

Sethi and Panda (2012) compared two LIS journals, International Information & Library Review (IILR) and Library & Information Science Research (LISR), from 2000-2010, consisting of growth, citation analysis, and geographical contributions of the authors. Two famous laws were implemented to check out the author's research productivity. It was found that Subramanyam's law statistically proved to be more factual rather than Lotaka's law. An exponential growth throughout the previously mentioned period was found in the LIS publication. An investigation by Mukherjee (2010) looked at the contributions made by Asian countries to LIS journals published between 2001 and 2007 and indexed by Web of Knowledge. It was discovered that China ranked first, followed by Taiwan and South Korea, with South Korean authors receiving the highest citation rate, followed by Taiwanese authors. Davarpanah and Aslekia (2008) studied the research productivity of Iranian authors in 56 journals indexed in Social Science Citations Index (SSCI) from 2000 to 2004. It was observed that 89.9% of the authors published only one paper, while the average number of authors per paper was 1.52%.

3. Objectives of the Study

The study was designed to achieve the following objectives

- ✚ To find the number of publications published on library automation during the years 2015 to 2020
- ✚ To identify the year-wise distribution of publications
- ✚ To investigate the authorship pattern and collaborative efforts
- ✚ To identify the total citations received by the publications
- ✚ To explore the most cited papers
- ✚ To trace the citations per year of the publications
- ✚ To point out the most prolific authors

4. Research Methodology

The quantitative research design was used, and the bibliometric research method was applied to conduct the study. The required data for the study was collected from the articles published on library automation during 2015-2020. The phrase "Library Automation" was

searched in Google Scholar using bibliometric analysis software “Publish or Perish” on 03/07/2020. A total of 210 publications were retrieved, out of which 20 articles missed some information; therefore, these were not considered for data analysis. The remaining 190 articles were assessed as per the objectives of the study. The collected data was then exported to Microsoft Excel, and further analysis was done with Microsoft Excel.

5. Data Analysis and Interpretation

The data was analyzed according to the study's objectives, and the data is presented in tabular form, which is further interpreted.

5.1 General Information of the Publications

The data in Table 1 illustrate some basic information about the articles published on "Library Automation" during 2015-2020. A total of 190 papers were published in six years. All the papers were cited 355 times, while the citation per paper was 1.87%.

Table 1

General Information

Period of Publications	2015-2020
Citation years	6
Number of Papers:	190
Total Citations	355
Cites/Year:	59.17%
Cites/Paper	1.87%
Authors/paper	1.8%

5.2 Year-wise Distribution of Publications

Table 2 gives year-wise distribution of publications on library automation during the study period. A total of 190 publications were published; the highest number of 45 (23.64%) publications were produced in 2019, followed by 41 (21.57%) in 2017. As demonstrated in the Table 2, 32 (16.84%) publications were published in 2015, 30 (15.78%) were published in 2016, and only 24 (12.63%) papers were published in 2018. The least number of 18 (9.47%) articles were produced in 2020.

The study findings are consistent with Rahman and Khare's (2020) finding that 288

articles (19.44 %) were published in 2019.

Table 2

Year-wise Distribution of Publications

Year	No. of Publications	Percentage (%)
2015	32	16.84
2016	30	15.78
2017	41	21.57
2018	24	12.63
2019	45	23.68
2020	18	9.47
Total	190	100

5.3 Authorship Pattern of Publications

The authorship pattern of publications is shown in Table 3. As mentioned in the Table 3, 342 authors produced 190 articles on the topic during the study period. The data shows that single personal authors contributed 96 (50.52%) articles while 84 (49.48%) were by two or more than two authors, out of 84 articles, 28 (14.73%) publications wrote by three authors, followed by 12 (6.31%) papers by four authors, and 2 (1.05%) papers were written by five authors.

Table 3

Authorship Pattern of Publications

S. No.	No. of Authors	No. of Publications	Percentage (%)	Total No. of Authors
1	One	96	50.52	96
2	Two	52	27.36	104
3	Three	28	14.73	84
4	Four	12	6.31	48
5	Five	2	1.05	10
	Total	190	100	342

5.4 Year-wise Citations of Publications

Table 4 stipulates year wise citations received by the papers. As shown in Table 4, 355 citations received by the publications. The highest number, 118 (33.23%) citations were received in

2017, followed by 77 (21.69%) in 2018 and 76 (21.40%) in 2015, 72 (20.28%) citations in 2016, 4 (1.12%) citations were received in 2020 which is the least numbers, followed by 8 (2.25%) citations in 2019.

Table 4

Year-wise Citations of Publications

S. No.	Year	Citations	Percentage (%)
1	2015	76	21.40
2	2016	72	20.28
3	2017	118	33.23
4	2018	77	21.69
5	2019	8	2.25
6	2020	4	1.12
Total		355	100

5.5 Most Cited Publications

The top ten most cited papers are listed in Table 5. The data illustrate that these ten papers received a total number of 203 citations. The paper at serial No. 1 received 52 citations, the paper at serial No. 2 received 29 citations and the paper at serial No.3 received 26 citations. The papers at serial No.08, 09 and 10 received 10 citations each which is the least number of citations. The highly cited paper appeared in the Anuario ThinkEPI Journal in 2017.

Table 5

Most Cited Publications

S. No.	Authors	Title	Year	Source	Citations
1	M. Breeding	Perceptions 2016: An international survey of library automation	2017	Anuario ThinkEPI	52
2	M. Clayton and C. Batt	Managing library automation	2018	Routledge, Taylor & Francis	29
3	D. Das, and P. Chatterjee	Library Automation: An overview	2015	International Journal of Research in Library Science	26
4	M. Bayani, A. Segura, M. Alvarado and M. Loaiza	IoT-based library automation and monitoring system: developing an implementation framework of implementation	2018	E-Information Sciences	20
5	C. R. Hildreth	Library Automation in North America	2017	De Gruyter Saur	19
6	A. Mishra, S. Thakur and T Singh	Library automation: Issues, challenges and remedies	2015	Times International journal of research	14
7	A.K. Tyagi and V. Senthil	Library Automation in India: Assessment of Library Services Platforms.	2015	DESIDOC Journal of Library & Information Technology	13
8	C.L. Naveen and R. Nagesh	Status and problems of library automation in Govt. first grade colleges of Hassan district, Karnataka: A study	2016	International Journal of Library & Information ...	10
9	M. Yuvaraj	Library automation with cloud based ILMS Librarika: case study of Central University of South Bihar	2016	Library Hi Tech News	10
10	A. Gade, Y. Angal	Automation in library management using LabVIEW	2016	IEEE Transactions	10

5.6 Most Prolific Authors

Table 6 lists information about the most prolific authors who contributed publications on Library Automation. Mukhopadhyay and Mubofu each contributed three papers to the topic, and eight authors contributed two papers each.

Table 6

Most Prolific Authors

S. No	Authors	No. of Publications
1	P. Mukhopadhyay	3
2	C. Mubofu	3
3	R. Singh	2
4	P. Chatterjee	2
5	S. Girakaduwa	2
6	S. Singh	2
7	W. Wasala	2
8	D. Rathnayaka	2
9	S. Thakur	2
10	CR. Hildreth	2

The major Findings

The major findings of the study are as under: -

- ❖ A total of 190 articles were published on Library Automation from 2015 to 2020.
- ❖ The highest number of 45 (23.68%) papers published in 2019 and the least number of 18 (9.47%) papers appeared in 2020.
- ❖ The highest numbers of 96 (50.52%) articles were written by single personal authors, followed by 52 (27.36%) by two personal authors and 28 (14.736%) publications by three personal authors.
- ❖ The maximum number of 118 (33.23%) citations were received by the papers in 2017, followed by 77 (21.69%) in 2018 and 76 (21.40%) in 2015, while only 4 (1.12%) citations were received by the publications in 2020.
- ❖ The most cited papers were also identified; the paper of M. Breeding was ranked first with 52 citations, the paper of M. Clayton and C. Batt was cited 29 times and ranked second, and the paper of D. Das and P Chatterjee was ranked third with 26 citations.
- ❖ P. Mukhopadhyay and C. Mubofu were the most prolific authors; each contributed three papers on the topic.

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