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Global Research in Library Management from 2010 to 2020: A Bibliometric Investigation based on Scopus

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Abstract

The present study is an attempt to investigate the research publications on Library management using performance metrics at global, national, institutional and author levels. Library Management is a core function to be performed by Librarians as custodian of information sources and services for the smooth functioning of libraries. So, research in this area is of utmost importance. The study uses data from Scopus indexed in the period 2010 to 2020 and analyze using MS-Excel and maps using Biblioshiny web application. The findings discovered 769 publications at global levels in which the USA has the major contribution of 145 papers. Growth in the number of publications is exponential. Library Philosophy and Practice is the most productive journal publishing quality articles on Library Management. University of Malaya and University of Novi Sad are two most productive affiliations while DKW Chiu is the most productive author. Library Management is the most occurring keyword with 100 occurrences. Followed by Libraries (47), Digital Libraries (36), Information Management (25) and Management (19). The trending areas of research in Library Management are software engineering, artificial intelligence, robotics, big data, library systems, information use, human experiment indicating transformation in traditional library management research to ICT driven one.

Keywords: Library Management, Bibliometric Investigation, Libraries, Global Publications, Scopus.

Introduction

It is very difficult to give an exact definition of management. There is no universally accepted definition of management. Management considers both acquisition and application of knowledge. It is an extension of common sense rather than rule of thumb or intuition. Hence, management is considered as both art and science. Different authors have provided different definitions of management from their own angles during the evolutionary process. To manage is to forecast, to plan, to organize, to command, to coordinate, and to control. (Fayol, 1930).

Therefore, management is the combination of all the functions like planning, organising, directing, staffing and controlling. It is required at all levels of an organisation. Management, therefore, cannot be defined or understood-let alone practiced-except in terms of its performance dimensions and of the demands of performance on it (Drucker, 1973). Thus, managers are managing the overall tasks of the organization which depends on their performance and the demand of performance. It is a process that refers to both the discipline as well as group which manages an organization. Management is an inevitable part of an organization.

Library management in the other hand refers to the efficient and effective utilisation of men, material (information resources), machinery, and money to meet the objectives of the library. The management theories, principles and procedures are very much relevant in library management. Libraries are basically paternalistic, service-oriented and not-for-profit organisations. In other words, it is that part of management which is called "service management" and which is more important to libraries than the management of industrial and profit-oriented organisations. Four important characteristics of service management can be illustrated as intangibility, inseparability, heterogeneity and perishability.

Management of a library is accomplished by a combination of basic management functions and skills as well as role of management. The three important roles for a library manager are: Interpersonal role, Informational role and Decisional role. Libraries has been growing with the passage of times in social, cultural, scientific and technological environments in which they have been developing and operating. Scientific management theories, principles and practices are, therefore, increasingly which are being applied to manage libraries and to provide effective and quality services. The important point to note is that library managers and workers should develop an attitude and approach to scientific management and cultivate a culture so essential to proper library management.

Library Management is a very necessary task to be carried out by Librarians for smooth functioning of Libraries as an organization. So, a lot of research is carried out worldwide. So, a bibliometric investigation of these research papers is of great importance to generate new information related to Library Management to facilitate the researchers working in this area. Hence, this study is quite relevant. Bibliometric investigation involves analysis of performance, science mapping and network analysis of publications in a specific discipline or source applying different parameters at global, national, institutional and author level (Borgohain et al. 2021). Bibliometric analysis is very common type of systematic review in present context contributing to interdisciplinary research. Lot of bibliometric analysis are encountered on may subject areas but bibliometric analysis on publications related to Library Management is quite rare. So, this study is a simple attempt to fulfil the research gap.

Literature review

Though bibliometric analysis of library management related publications is not discovered through simple google search but some related studies are encountered. These are reviewed with respect to methodology, scope, objectives and findings.

Araya and Mengstab (2020) analyzed in the designing Web-based Library Management System using parameters e Java Programming language, PHP, HTML, and Database MYSQL. Findings reveals that people are implementing this new technology to promote digital reading

habits for users and to advance the knowledge of the users in every aspect of the technology. The users of Asmara Community College of Education Library have diverse age groups and professions. They require different kinds of documents for different purposes, like research studies, educational purposes, general knowledge, and for recreation. The Web-based Digital Library Management System (DLMS) will help to create a limitless amount of digital information and make it accessible to the world in parallel.

Solomon etal. (2021) examined Design and Implementation of Digital Library Management System. A Case Study of the Niger Delta University, Bayelsa State using a standard procedure recognized worldwide for such purposes, known as "Structured System Analysis and Design Methodology" (SSADM). PHP Scripting Language and other software development tools such as HTML and CSS were used in building this system. The success of any library largely depends on proper management. Several libraries, including the Niger Delta University library, have suffered catastrophe as a consequence of insufficient administration and weaknesses in handling delicate information as regards members of the library, difficulty in storage space restraint, searching for, and finding desired books, availability of library and library materials at all times etc.

Prasanna and Gupta (2020) analyzed in the Online Library Management using System JAVA technologies. This has various technical areas. It includes WINDOWS XP as the operating System, Oracle as Database. The front end deals with GUI and source code deals with Oracle (Backend). Library Management System provides knowledge and practical perspectives all aspects of management of libraries and information services, which will prove invaluable to managing a library or information services cost effectively, while meeting the needs of its users. Library Management System is one of the most tedious processes, which involves the regular updating of many files and records. As new members enroll for membership the management has to issue a unique membership code for that member. For this they have to keep a track of many records such as student details, book details and maintain a number of registers. Doing this manually involves a lot of time and labor. Hence this can be made easy through automation.

P etal. (2020) analyzed in the paper Library Management System using Dot net technology, the C# language is used to build the front end application. Researcher revealed that The Library Management system (LMS) acts as a tool to transform traditional libraries into digital libraries. In traditional libraries, the students/user has to search for books which are hassle process and there is no proper maintenance of database about issues/fines. The overall progress of work is slow and it is impossible to generate a fast report. The librarians have to work allotted for arranging, sorting books in the book sells. At the same time, they have to check and monitor the lend/borrow book details with its fine. It is a tedious process to work simultaneously in different sectors. LMS will assist the librarians to work easily. The LMS supports the librarians to encounter all the issues concurrently.

Kadir etal. (2020) analyzed in the paper 'Library management system: impact of library environments' by integrating with all departments within the library shows how LMS is important in library environment and this conceptual paper will focus on the impact that the LMS brings to the library environment. Research found that with the advancement of technology, library need to be ready for changes and bring the technology to the library in order to retain their customer's interest in visiting the library. Thus, in this situation, library's system should be improved as well to facilitate staff or librarian in doing their work effectively.

Rifaudeen (2015) analysed in the paper 'Information Management in Libraries and Its Impact on Sustainable Library and Information Services with Special Reference to University Libraries of Sri Lanka' by developing information management skills and sustainable library programmes and activities such as resource sharing/ collaboration, create flexibility, reduce costs, social networking, distribution and marketing, strengthen ICT infrastructure to address the broader issues of a sustainable future for library resources and service provision to their patrons. Research found that Technological, Economic and Social changes have transformed the roles of libraries and information management in the recent past. These changes have a great impact on the existence and sustainability of the libraries. At the same time, it provides many opportunities and venues to manage the library and information services sustainably. y. The library professionals have to consider seriously these changing contexts and the new roles of the library and update and improve the information management and data computing skills. Hence, library professionals will improve the capabilities in order to lead the libraries towards the changing strategies to face the challenges brought by the digital age. Libraries face enormous challenges in managing information and have to tackles the challenges by managing the libraries effectively for tomorrow and transformation of the libraries to a sustainable future. Information Management skills play an important role in managing libraries and information services effectively and ensuring that the services continue to, the present and anticipated needs of patrons sustainably.

These studies implies that no bibliometric analysis of publications on library management has found. So, this study attempts to fulfil the following *objectives:*

1. To observe the annual growth of publications in Library Management during 2010 to 2020
2. To find out the most productive country
3. To reveal the most productive source and analyse the source impact
4. To list the most productive author and affiliation
5. To analyse the frequency occurrence of keywords in different aspects.

Scope of the study

The study is confined to the publications indexed in Scopus database only. Further, the study covers the publications from 2010 to 2020. Scopus is a abstract and citation database with largest coverage of bibliographic data in almost all subjects in the universe of knowledge. So, the selection of this database is justified. Moreover, this database is proved to be the most reliable and efficient database for bibliometric studies, many studies are discovered to use bibliographic information for bibliometric investigations like Borgohain and Singh (2020), Borgohain et al. (2021) and Borgohain (2020).

Methodology

The present study as informed is based on Scopus database which demands a search term for data retrieval. The data was retrieved on 14th October 2021. The search expression used for data retrieval is (TITLE-ABS-KEY ("Library Management" OR "Management of Libraries) AND (LIMIT-TO (PUBYEAR, 2010) OR …………OR LIMIT-TO (PUBYEAR, 2020))). The search operator "OR" is used to connect the key terms because use of "OR" gives a broad search scope covering maximum related publications increasing the accuracy of the study. Moreover, the number of publications is limited to years from 2010 to 2020 because maximum number of

publications are observed in this time period. The data is analysed using MS-Excel and the visualization is done using Biblioshiny (Aria and Cuccurullo, 2017) web interface.
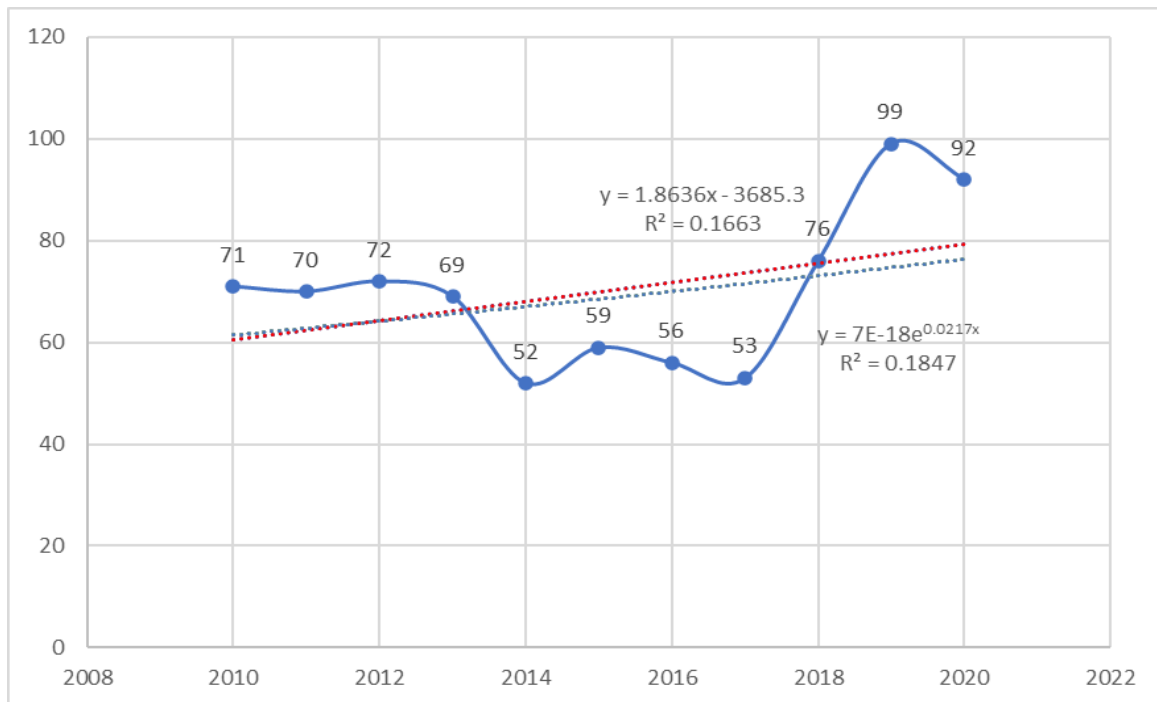
Results

Main Information about the publications in brief:

Description	
MAIN INFORMATION ABOUT PUBLICATIONS	
Timespan	2010:2020
Sources (Journals, Books, etc)	249
Documents	769
Average years from publication	5.73
Average citations per documents	4.13
Average citations per year per doc	0.5854
References	18488
DOCUMENT TYPES	
article	598
book chapter	31
conference paper	104
review	36
DOCUMENT CONTENTS	
Keywords Plus (ID)	1197
Author's Keywords (DE)	2129
AUTHORS	
Authors	1460
Author Appearances	1628
Authors of single-authored documents	250
Authors of multi-authored documents	1210
AUTHORS COLLABORATION	
Single-authored documents	280
Documents per Author	0.527
Authors per Document	1.9
Co-Authors per Documents	2.12
Collaboration Index	2.47

Annual publication growth

The cumulative publications in the time frame taken for this study 2010-2020 is 769. The Figure 1 listed the number of publications year wise. The growth of annual publications as observed in the figure is quite abnormal during the period 2010-2020. To analyse, the growth the Price Law (Price, 1963) is employed. Price law is satisfied when the correlation co-efficient r_1 for the exponential curve is greater than the correlation coefficient r_2 for the linear trendline. In the Figure 1 the line in dotted line in blue represents the exponential trendline with r_1 as 0.1847 while the dotted line in red represents the linear trendline with r_2 as 0.1663. Since, $r_1 > r_2$ hence, the Price law is fulfilled and the growth in number of publications is exponential.

The chart shows a line graph with a trend line. The equation $y = 1.8636x - 3685.3$ with $R^2 = 0.1663$ and $y = 7E{-}18e^{0.0217x}$ with $R^2 = 0.1847$ are shown. Data points: 71 (2010), 70 (2011), 72 (2012), 69 (2013), 52 (2014), 59 (2015), 56 (2016), 53 (2017), 76 (2018), 99 (2019), 92 (2020).

Productive Nation

Of the nations that participated in research on Library management, USA ranked 1st with 145 publications (18.86% share in cumulative publications 769). This is followed by China (13.26%), Nigeria (12.74%). India ranks 4th in the list with 84 papers (10.92%). The top 5 nations together contribute 506 papers 65.8% in cumulative papers (769).

Table 1: Top 10 most productive nations in Library Management Research during 2010-2020

Rank	Country	Number of Publications
1	USA	145
2	China	102
3	Nigeria	98
4	India	84
5	UK	77
6	Malaysia	70
7	Spain	61
8	Australia	54
9	Pakistan	48
10	Brazil	30

Productive Journal and Source Impact

Top 10 most productive journals involved in Library management research contributed 306 papers. These 10 journals contributed 93 to 13 papers which accounts for 39.79% share in global cumulative papers (769). *Library Philosophy and Practice* is the most productive journal contributing 12.09% share in the total output. Followed by *Library Management*, the journal publishing articles related to core areas of managing libraries with 7.8% share. Besides, *Journal of Library Administration, Library Review, Electronic Library* are some journals in the top 5 list contributing 29.65% share in the global publications during 2010 to

2020. Considering the impact of these journals, *Library Review* which is 4th in terms of number of articles ranks 1st in terms of Average Citations Per Paper (ACPP), 22.26. In terms of h-index, a performance metrics *Library Management* ranks 1st amounting to 11. The h-index of *Electronic Library* ties with that of *Library Review* which is 7 (Table 2).

Table 2: Top 10 most productive sources in Library Management research during 2010-2020

Journals	Articles	TC	ACPP	h_index
Library Philosophy and Practice	93	130	1.4	6
Library Management	60	360	6	11
Journal of Library Administration	30	97	3.23	5
Library Review	23	512	22.26	7
Electronic Library	22	136	6.18	7
VJESNIK BIBLIOTEKARA HRVATSKE	18	15	0.83	2
DESIDOC Journal of Library and Information Technology	17	33	1.94	4
Library Hi Tech News	16	69	4.31	5
Library Hi Tech	15	99	6.6	6
Bottom Line	13	17	1.3	2

Productive Authors and Affiliations

The authors with 4 or more publications find a place in the list of Top 10 most productive authors listed in Table 3. These authors contributed 5 to 4 papers and a total of 41 papers which shared 5.33% in cumulative publications (769). DKW Chiu is the most productive author ranking 1st followed by A Abrizah, RP Holley, M Koizumi and PA Kostagiolas which are in the top 5 in the list. These authors share same rank i.e., 2nd due to uniformity in their number of publications (4).

Table 3: Top 10 most productive authors

Author Name	Number of Papers
Chiu DKW	5
Abrizah A	4
Holley RP	4
Koizumi M	4
Kostagiolas PA	4
KRSTIÃ„â€¡EV DB	4
Onuoha UD	4
Saarti J	4
TEÃ…Â¡ENDIÃ„â€¡ D	4
Wilson K	4

University of Malaya and University of Novi Sad are the affiliation with maximum publications ranking 1st in the top 10 most productive affiliation sharing 2.21% in the cumulative publications (769). This is followed by Nanjing University and University of Delhi in the 2nd rank with 10 papers each. The top 10 productive affiliations contributed 105 papers in total taking 13.65% share in the global publications.

There are two anonymous affiliations in the list as University Libraries and University Library contributing 9 papers each.

Table 4: Top 10 most productive affiliations

Affiliations	Number of Papers
University of Malaya	17
University of Novi Sad	17
Nanjing University	10
University of Delhi	10
University Libraries	9
University Library	9
University of California	9
Babcock University	8
Ionian University	8
The university of Hong Kong	8

Keyword Analysis

Analysis of keywords is a reliable assessment technique to know the research hotspots and predicting future developments in a discipline or subject area. Here, the analysis is carried out in using three different ways:

a) Analysis of frequency of occurrence of keywords
b) Analysis of year-wise growth of keywords
c) Analysis of trending areas/topics of research in Library Management through the year wise growth of keywords.

Frequency of occurrence of keywords

The keyword with highest frequency is the area considered in our research topic i.e., Library Management with 100 occurrences. Followed by Libraries (47), Digital Libraries (36), Information Management (25) and Management (19) which are in top 5. Table 5 list the most 15 occurring keywords in the frequency range 100 to 8. Emergence of keywords like information management, information science Knowledge Management and Software Engineering implies transformation in the subject library science to information science that is more technology based and ICT driven.

Table 5: Top 15 most common keywords

Keyword	Frequency
Library Management	100
Libraries	47
Digital Libraries	36
Information Management	25
Management	19
Human	15
Radio Frequency Identification (RFID)	15
Information Science	11
Information Services	9

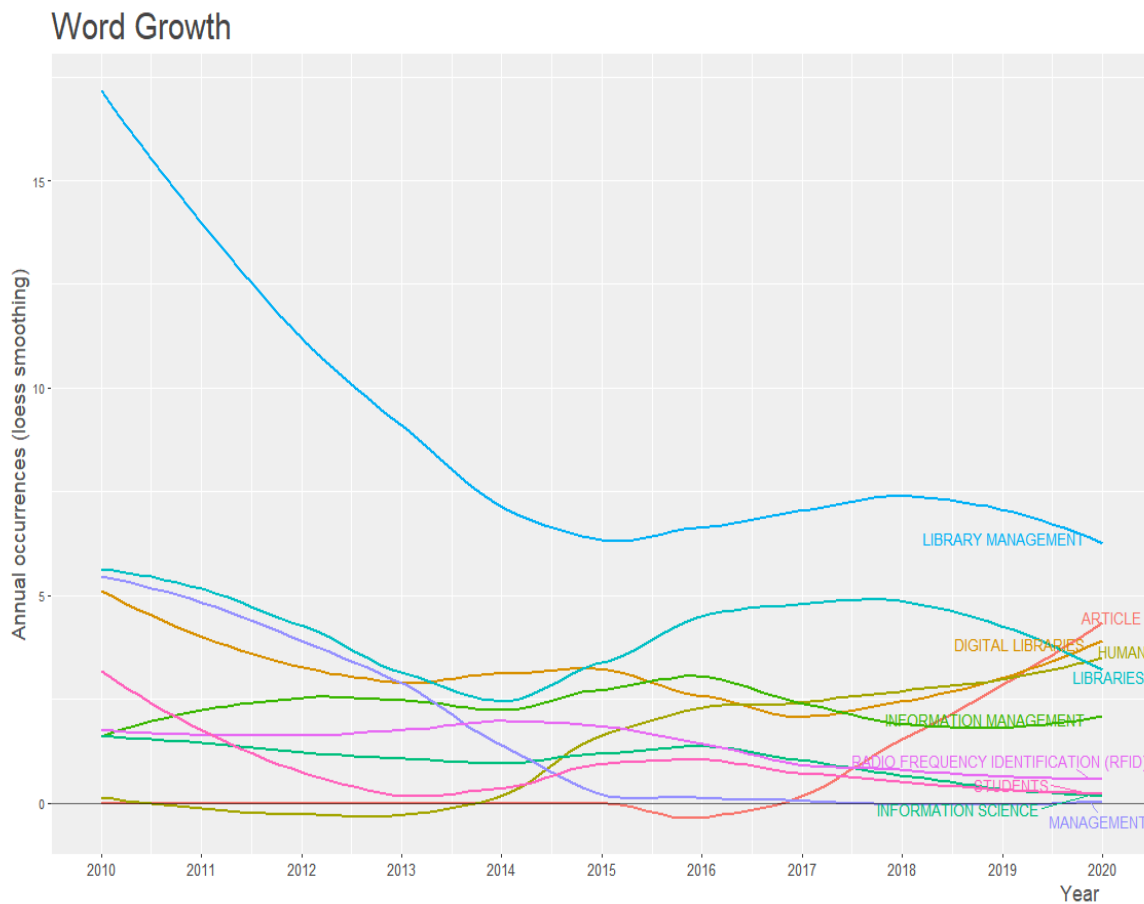|	
Library	9
Information Retrieval	8
Information Use	8
Knowledge Management	8
Librarian	8
Software Engineering	8

Analysis of year wise growth of keywords

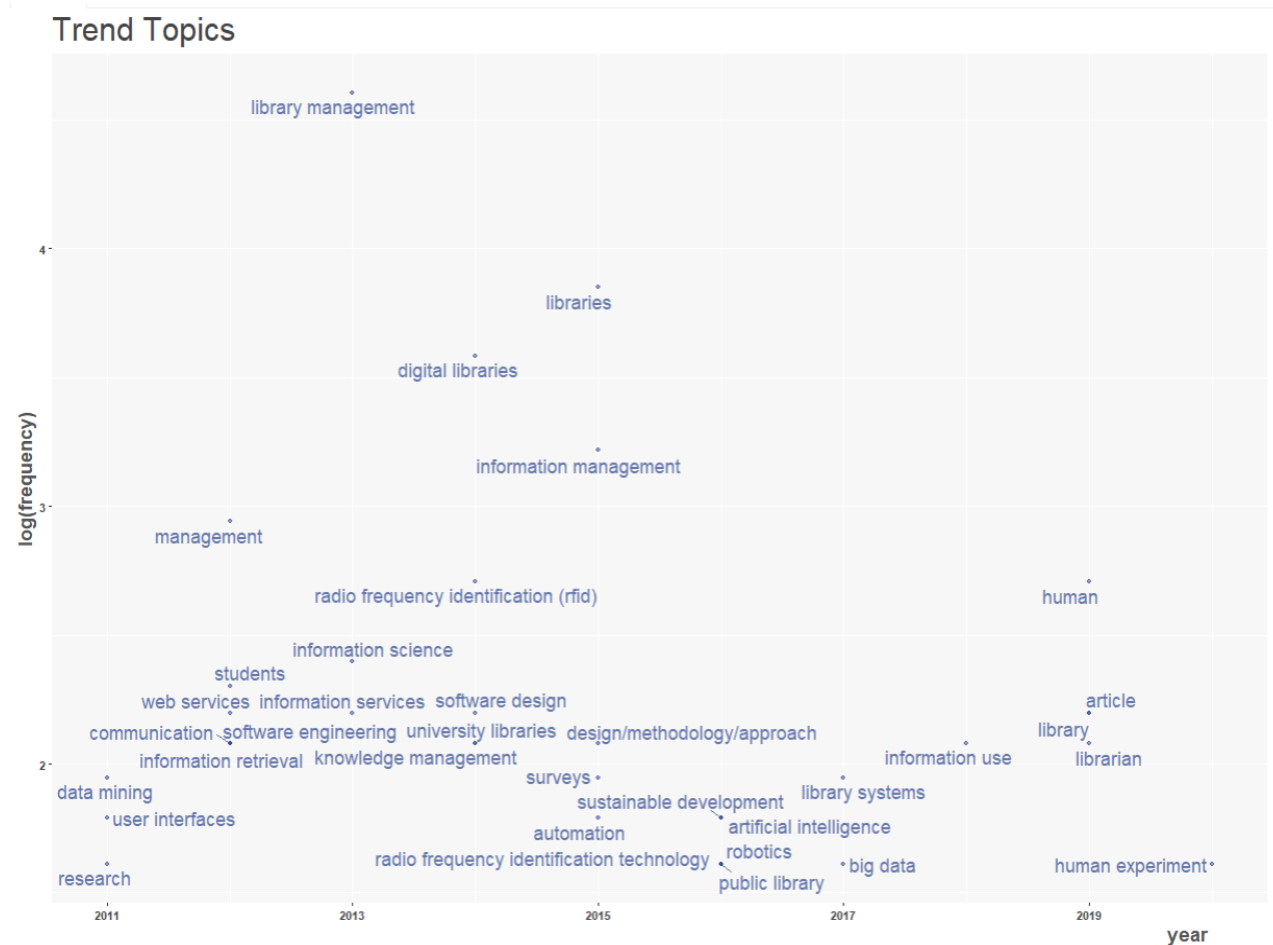Figure 2: Year wise growth of most occurring keywords

Table 6: Year wise occurrence of Top 5 keywords with highest frequencies of occurrence

Year	Library Management	Libraries	Digital Libraries	Information Management	Management
2010	18	5	5	1	6
2011	11	5	4	3	3
2012	15	8	4	4	6
2013	8	2	2	0	3
2014	6	0	3	4	0
2015	7	5	4	2	1
2016	7	6	3	3	0
2017	7	3	1	3	0
2018	6	4	2	2	0

| 2019 | 10 | 7 | 5 | 0 | 0 |
| 2020 | 5 | 2 | 3 | 3 | 0 |

Analysis of Trending Topics/Areas

Figure 3 reveals the research hot spots in the field of Library Management which clearly reveals that area of research has transformed from management, user interfaces (2010 to 2011) to information sciences, knowledge management, software engineering, information retrieval, RFID, Information management, digital libraries, automation (2012 to 2015), artificial intelligence, robotics, big data, library systems, information use, human experiment (2016 to 2020). This is a clear insignia of transformation in research areas of traditional library science to information science and data science.

Major findings of the study:

- A total of 769 publications are discovered in the period from 2010 to 2020 with an average of 69.91 papers per year.
- Publication growth in the field of Library Management is exponential (using Price Law).
- USA ranked 1st with 145 publications (18.86% share in cumulative publications 769).
- *Library Philosophy and Practice* is the most productive journal contributing 93 articles with 12.09% share in cumulative publications while *Library Review* is in 4th rank in terms of

number of articles ranks 1st in terms of ACPP, 22.26. In terms of h-index, a performance metrics *Library Management* ranks 1st amounting to 11.

- DKW Chiu is the most productive author ranking 1st with a maximum of 5 papers.
- University of Malaya and University of Novi Sad are the affiliations with maximum publications ranking 1st in the top 10 most productive affiliation sharing 2.21% in total publications with 17 papers each.
- Library Management is the most frequently occurring keyword with frequency 100 while the trending areas of research are artificial intelligence, robotics, big data, library systems, information use, human experiment.

Conclusion

Our study is limited to global publications on Library Management from 2010 to 2020 with data from Scopus database using performance metrics like Total citations, Number of Publications, h-index only which leaves ample scope future researchers to conduct an extensive bibliometric analysis using Science mapping techniques like Bibliographic Coupling, Co-authorship analysis and enrichment techniques of bibliometrics network analysis, cluster analysis and visualization using state-of-the-art tools and techniques. This study implies that very limited research has occurred in the area of Library Management as per the data from Scopus as the number of publications in a decade considered for this study is very little. The areas of research like artificial intelligence, robotics, big data which are trending indicates the good sign of transformation of traditional library practices to a more ICT driven one.

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