RFID USE IN LIBRARY: A SCIENTOMETRIC STUDY

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Abstract

Radio Frequency Identification (RFID) systems have been use in libraries for book identification, for self checkout, for antitheft control, for inventory control, and for the sorting and conveying of library books and AV materials. These applications can lead to significant savings in staff costs, enhance service, lower book theft and provide a constant update of media collections. The technical features of a modern RFID system are described to provide a guideline for the evaluation of different systems. The present study is based on the Scientometrics Profiles of RFID use in Library: A Scientometric Study. The present study is based on over all 226 articles during 2001-2019. All these articles analyzed the result is the highest contributed countries is India 89 (39.38%), and it is observed that the International Journal for Scientific Research and Development" Ranked in 1st Position with 9 (3.98 %). Research article ranks the top position emerald group publishing limited with 11 (4.87 %) publication contribution for RFID Use in Library.

Keywords: RFID Use; Library; Scientometric.

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Introduction:

(Kern, 2004) RFID (Radio Frequency Identification) is the latest technology to be used in libraries to ensure security and facilitate innovative services it is an automatic radio communications (ADC) technology which functions through wireless radio communication to identify people or items. Its basic components include a reader or interrogator, and radio frequency (RF) transponder that transfers data by radiating electro-magnetic carriers RFID system can also be used to store data suitable by use of tags (transponders) on which information can be written and updated. This means information stored in RFID chips can be read and updated from remote distances. This data can be retrieved, transferred by use of machine-readable equipment for various application systems.

(**Chachra, 2003; Yu, 2008)** The RFID software work using the data of patrons and reading materials which is stored in the LMS database and instruct the RFID components to perform the above tasks. Through radio frequency transmissions RFID technology interacts with the library management system (LMS) to enhance the efficiency of library processes and facilitate extended related services in the context of the key functions of the library. Self-check in/out stations are used by patrons to issue library materials to themselves as well as return. Using these stations patrons can also check their library accounts for borrowing trends as well connect to e-payment systems to clear their overdue fines.

1.2.1 Scientometrics:

According to bankapur, M.B. and Kumabar, (1993) "Scientometrics is a more general that Bibliometrics. It is interesting to know, that both disciplines have a large overlap. It is surprised to learn certain comments stating that both disciplines have a large overlap. It is surprised to learn certain comments stating that Scientometrics, using Bibliometrics techniques id a part of Bibliometrics".

1.2.2 Scientometric Analysis:

According to (2006), wouters, a cart intension has always existed between academic Scientometrics and political /practical, Scientometrics, the letter of which has been described as a hybrid of social science and bur rerate expertise (2006).

1.3 J-Gate

J-Gate is an electronic **gateway** to global e-journal literature. ... **J-Gate** also plans to support online subscription to journals, electronic document delivery, archiving and other related services.

Open J-Gate was a free database of open access journals, launched in February 2006, and hosted by Informatics Ltd. of India.

Informatics started metadata aggregation from open access journals as part of the development of J-Gate. Open J-Gate claimed to aggregate metadata from more than 4,000 open access journals published in the English language around the globe. Open J-Gate indexed articles from available e-journals in the open access domain, both from the scholarly and popular domains. It indexed peer-reviewed and non-peer reviewed professional magazines, as well as trade and industry journals.

1.4 Review of Literature

Fawaz Abdullah Alhamdi and Khaparde Vaishali (2015) made study on Authorship and Collaborative Patterns in the Annals of Library and Information Studies, 2007-2013: A Scientometric Study. It consists of the Relative Growth Rates [R(c)] and Doubling Time [Dt(c)] for publication, Geographical distribution of contributions by state. Found that the whole study period records the mean relative growth rate of 0.307. Contrarily, the doubling time for publication of all sources of output has increased from 0.855in 2007 to 4.125 in 2010. The doubling time for publications at the aggregate level has been computed as 2.339 years**. (Para, 1)**

Garfield (2007) "Scientometrics" is the English translation of the title word of Nalimov's classic monograph Naukometriy in 1969, which was relatively unknown to western scholars even after it was translated into English. Without access to the internet and limited distribution, it was rarely cited. However, the term became better known once the journal Scientometrics appeared in 1978 . **(Para, 2)**

Tague-Sutcliffe (1992) defines Scientometrics as "the study of the quantitative aspects of science as a discipline or economic activity. It is part of the sociology of science and has application to science policy-making. It involves quantitative studies of scientific activities, including, among others, publication, and so overlaps bibliometrics to some extent". **(Para, 3)**

Dongare Sudesh N. and Khaparde Vaishali .S. (2015) made study on Scientometric Analysis of Library Herald Journal. Focussed on geographical distribution, highly contributed authors in journal. That of the most contributions are from India with 75.49% and the rest 24.50% only from foreign sources.**(Para, 4)**

Hood & Wilson, 2001). Scientometrics is related to and has overlapping interests with Bibliometrics and Informetrics. The terms Bibliometrics, Scientometrics, and Informetrics refer to component fields related to the study of the

dynamics of disciplines as reflected in the Scientometric Analysis of the production of their literature .**(Para, 5)**

❖ History of RFID in Libraries

1.RFID Use in Libraries

Libraries across the United States and around the world have begun to use RFID technologies to streamline the materials handling, inventory control, and check-out, check-in process. The technology used in libraries is the same technology used in other applications of passive tag RFID. In the library setting, RFID is used to reach two key goals: sightless identification for a variety of applications and theft detection.

2.RFID Tags in Libraries

The RFID tags used in libraries are passive tags so the tags do not need an energy source of their own, and therefore can be quite small. There are three different types of passive tags that can be used in a library, information center, or archive. Each of these types of tags has an antenna etched onto a microchip that has at least a 64 bit capacity. The tags differ in how the information to the tag is written. Read only tags are not re-writable and the unique identification code is encoded when the tag is manufactured. Write once-read many (WORM) tags, can be encoded at the library to match the bar code numbers if those numbers are currently in use. This tag cannot be rewritten but information about the book title and author can be added. Read/write tags are the most commonly used tags for libraries because they have the ability to have information added and changed as needed. Data concerning the library branch can be updated. Additionally, these tags can have a security bit encoded that can be turned on and off by the reader.

3. RFID readers in Libraries

RFID readers create an electromagnetic field around them. When the tag passes through this field it is read. The position of the tag within this field is irrelevant, so long as the tag is within the 1-3 ft. range of the reader. Readers have the ability to deal with a number of tags at the same time. Libraries can use readers in different locations in the library to accomplish different functions. Readers at the staff work stations of the circulation desk will allow the staff to check items into and from the library's collection. Readers at patron self check out station allow the patron to do the same. Larger walk-through readers at the exits of the library can be used for theft control. There are two types of readers that can be used at the exits, one that communicates with the Integrated Library System (ILS) to determine the circulation status of the item, and another type that reads the security bit written onto the tag at checkout. Readers at the book drop can be used to return items to the library's collection. Additionally, the book drop readers can be part of a larger system that includes conveyor belts and sorters to separate the items for return to different locations in the library. Readers can also be portable to read groups of items to complete an inventory of the library. The readers can determine if an object is present, and if an object is in the correct location without having staff actually touch the object.

4.RFID Security in Libraries

by using read/write tags in combination with exit readers, libraries will be able to use the RFID system for theft detection. The security bit can be deactivated at checkout. Then, the exit readers will not react to the security bit. If the bit is active, because the item was not checked out, the item will set off the alarm at the exit sensors. Some libraries use a surveillance system that is triggered by this alarm so the person taking the item though the exit will be caught on video. When the item is returned to the library, this security bit is reversed.

2.0 Objectives of the Study:

The primary objective of this study is to RFID use in Library: A Scientometric Study. and their research output in global during the period 2001 - 2019. More specific objectives are as follows:

1. To study the Journal-wise distribution of articles.
2. To study the year-wise distribution of articles.
3. To study Authorship pattern of contribution.
4. To study Most productive Author
5. To find out Institution wise distribution of contribution.
6. To find out country-wise distribution of contribution.
6. To find out Subjects -wise distribution of contribution.

3.0 Scope and Limitation of the Study:

The present study is based on the Scientometrics Profiles of RFID use in Library: A Scientometric Study. The present study is based on over all 226 articles during 2001-2019.

4.0 Data Collection:

Data can be numerically expressed that is quantified quantifiable or objective (Fasibs off and Dely, 1990) the data was collected from RFID use in Library, with the help of Excel. total 226 articles, during 2001-2009.

5.0 Methodology

Scientometrics analysis is a branch of bibliometrics. It is an important research tools for understanding of the subject it aims at measuring the utility of documents and relationship between documents and fields.

The present study is based on the Scientometrics Profiles of RFID use in library. The present study is based on over all 226 articles during 2001-2019.

Data Analysis

1. Top Ten Journal -wise Distribution of Contributions

Sr. No	Journal wise	Frequency	Percent %
1	International Journal for Scientific Research and Development	9	3.98
2	Library Philosophy and Practice	7	3.1
3	DESIDOC Journal of Library and Information Technology	4	1.77
4	Australasian Public Libraries and Information Services	3	1.33
5	Electronic Library	3	1.33
6	IEEE/ACM Transactions on Networking	3	1.33
7	International Journal of Engineering and Computer Science	3	1.33
8	International Journal of Information Dissemination and Technology	3	1.33
9	International Journal of Library and Information Science	3	1.33
10	Others Journal wise	58	25.66
	Journal having frequency (1 x 65)	65	28.76
	Not metional	65	28.76
Total		**226**	**100**

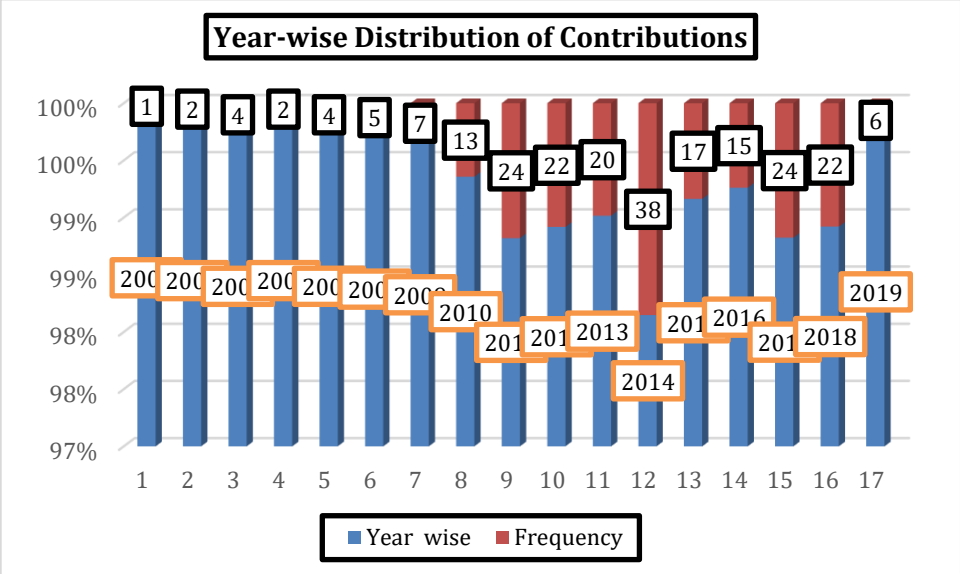
Table no. 1 shows that, the total 226 Journals has published the papers in the J-Gate databases on RFID during 2001-2019, It can be observed from out of 226 journals, the "International Journal for Scientific Research and Development" Ranked in 1st Position with 9 (3.98 %) articles, "Library Philosophy and Practice" II nd Position with 7 (3.10%) articles, "DESIDOC Journal of Library and Information Technology" III rd Position with 4 (1.77%) articles. each and so on. It may be revealed that the authors more likely publish their work in different journals with their respective subject areas / disciplines.

2. Year-wise Distribution of Contributions

Year wise	Frequency	Percent %
2001	1	0.44
2004	2	0.88
2005	4	1.77
2006	2	0.88
2007	4	1.77
2008	5	2.21
2009	7	3.10
2010	13	5.75
2011	24	10.62
2012	22	9.73
2013	20	8.85
2014	**38**	**16.81**
2015	17	7.52
2016	15	6.64
2017	24	10.62
2018	22	9.73
2019	6	2.65
Total	**226**	**100**

The Distribution of contributions (year- wise) is shown in Table No. 2 and Figure No. 1 out of the total 226 contributions majority of the contributions i.e. 38 (16.81%) contributio ns were contributed in 2014 were as minimum contributions i.e. 1 (0.44%) contributions were contributed in 2001.

Sr.no	First of Authors	Frequency	Percent %
1	Lori Bowen Ayre	3	1.33
2	Mickle Marlin H	3	1.33
3	Neeraj Kumar Singh	3	1.33
4	Noriko Sugie	3	1.33
5	Ogirala Ajay	3	1.33
6	Sai Vyasa	3	1.33
7	Andrew Walsh	2	0.88
8	BonifacioCastano	2	0.88
9	C KalyanaSundaram	2	0.88
10	Others Authors wise	125	55.31
	Single Author Publication 1 x 77	77	34.07
Total		**226**	**100**



3. Top Ten Most Productive Author

Table Number. 3 Shows the most top ten productive author was Lori Bowen Ayre, Mickle Marlin H, Neeraj Kumar Singh,Noriko Sugie,Ogirala Ajay,Sai Vyasa ranked the top position with 3 (1.33%) contribution followed by two Andrew Walsh, Bonifacio Castaño,C Kalyana Sundaram authors with 2(0.88%) authors with single publication. whereas 77 (34.07 %)

4. Top ten countries of distribution of the contribution.

Sr. No	Country wise	Frequency	Percent %
1	India	89	39.38
2	United States of America	54	23.89
3	United Kingdom	20	8.85
4	Netherlands	12	5.31
5	Switzerland	7	3.1
6	South Korea	5	2.21
7	Germany	4	1.77
8	Iran	4	1.77
9	Japan	3	1.33
10	Others Country wise	15	6.64
	Single country having frequency (1 x 13)	13	5.75
Total		**226**	**100**

It can be observed from Table Number 4 with a contribution out of 27 countries is tabulated in alphabetical listing for the country. India ranks at top position with 89 (39.38%) contribution followed by United States of America with 54 (23.89%) contribution with 2nd position ,United Kingdom with 20 (8.85%) with 3rd position, and other country with 15 (6.64). and 13 (5.75%) countries contributed single contribution.

5. .Publishers wise distribution of the contribution

Sr. No	Publishers wise	Frequency	Percent %
1	emerald group publishing limited	11	4.87
2	elsevier science	10	4.42
3	international journal for scientific research and development	9	3.98
4	institute of electrical and electronics engineers	8	3.54
5	university of idaho press	7	3.1
6	john wiley and sons Itd	6	2.65
7	defence scientific information and documentation centre	4	1.77
8	diva enterprises pvt. ltd	4	1.77
9	american library association	3	1.33
10	others	77	34.07
	Publishers having frequency (1 x 58)	58	25.66
	Not Metional	29	12.83
Total		**226**	**100**

Table Number. 5 shows that, Research article ranks the top position emerald group publishing limitedwith 11 (4.87 %) publication contribution Followed by Elsevier science with 10 (4.42) publication and others publishers with 77 (34.07%) and 58 countries contributed single contribution. whereas 29 (12.83 %) publishers did not mentioned their name.

6. Subjects -wise distribution of contribution.

Sr. No	Subjects wise	Frequency	Percent %
1	Information Science and Systems	37	8.4
2	Computer Science (Hardware & Networks)	25	5.7
3	Electronics	25	5.7
4	Librarianship and Libraries	25	5.7
5	Digital Libraries	23	5.2
6	Electrical Engineering	23	5.2
7	Communication Networks & Technology	16	3.6
8	Mechanical Engineering	15	3.4
9	Civil Engineering	14	3.2
10	other Subjects wise	197	44.6
	Subjects having frequency (1 x 42)	42	9.5
Total		**442**	**100**

The Table no.6 with an in alphabetical listing along Contribution of Top Ten subject authority "Information Science and Systems" most popular with 37, with 2nd position , "Computer Science (Hardware & Networks)" with 25, with Singles subject authority 42 other Subject authority 197 other.

Findings:

1. The "International Journal for Scientific Research and Development" Ranked in 1st Position with 9 (3.98 %) articles
2. 38 (16.81%) contributions were contributed in 2014 were as minimum contributions
3. The most top ten productive author was Lori Bowen Ayre, Mickle Marlin H, Neeraj Kumar Singh,Noriko Sugie,Ogirala Ajay,Sai Vyasa ranked the top position with 3 (1.33%) contribution

4. India ranks at top position with 89 (39.38%) contribution
5. Research article ranks the top position emerald group publishing limitedwith 11 (4.87 %) publication
6. Top Ten subject authority "Information Science and Systems" most popular with 37(8.4%),

CONCLUSION

Scientometrics is concerned with the quantitative features and characteristics of science and scientific research. Emphasis placed on the investigation in which statistical, mathematical methods study the development and mechanism of science. An overview of important findings of the analysis revealed that Out of 226 articles published during the period 2001 – 2019 on RFID Use in Library, In top ten countries the highest contributed countries is India 89 (39.38%), and it is observed that the International Journal for Scientific Research and Development" Ranked in 1st Position with 9 (3.98 %). Research article ranks the top position emerald group publishing limited with 11 (4.87 %) publications. contribution for RFID Use in Library.

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