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Growth Trend of Cloud Computing Publications - A Bibliometric View

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ABSTRACT

The aim of the study is to survey the trend of global cloud computing publications. The Cloud computing is a recent trend, facilitating new perspectives with profound implications in the area of Information and communication networks, raising new issues of architecture, design, and implementation. The study has tried to apply the different metric indicators like that growth rate, year wise distribution, author productivity, and Time series analysis of cloud computing publications. The study has found the Cloud computing literature trend as well as its found that after 2014 publication's growth rate has slightly increased and then decreased.

KEYWORDS: Cloud computing, Bibliometric

INTRODUCTION

Cloud computing is a term that has served as an important role over the last few decades. With the exponential increase in data use that has accompanied society's transition into the digital 21st century. The Cloud Computing is structured based on similar principles of web-based email clients. It allows the users to access all the features and files of the system without having to keep the bulk of that system on their own computers. The E based sources like that G mail, Google Drive, TurboTax, Facebook and Instagram are cloud-based applications. In all of these services, users are sending their personal data to a cloud-hosted server that stores the information for later access. A useful as these applications are for personal use, the users were even more valuable for a business that they need access to large amounts of data over their secure.

RESEARCH QUESTIONS:

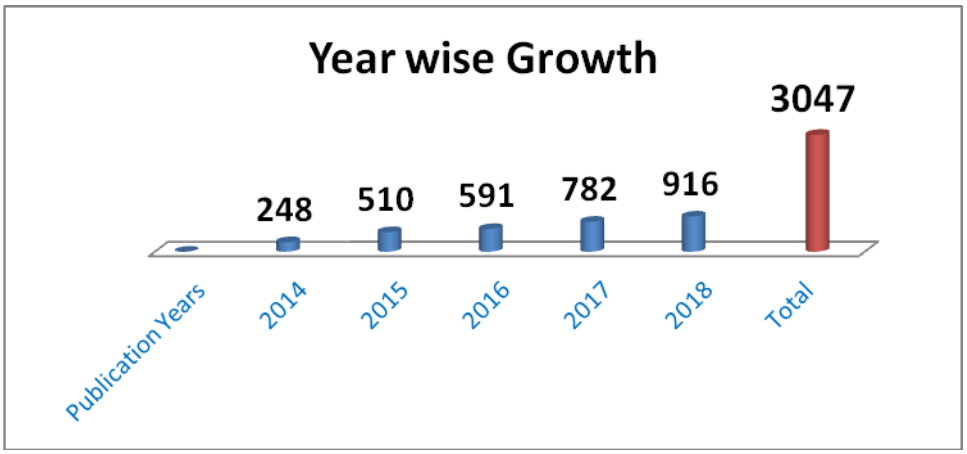
- The Growth rates of cloud publications are increasing trend?
- The Time series analysis results will go Negative possession Cloud computing publications?

DATA COLLECTION

The study used the secondary sources from ISI web of knowledge database and used the search string cloud computing for extracting the data from the database. This is used for downloading the data, which is available on the web of knowledge online database. This is used for downloading the data, which is available on the web of knowledge online database. The study period is from2014–2018. And the data have included the papers of countries, organizations.

Table: 1 Year wise distribution of Cloud computing productivity during the year 2014-2018

S .No	Publication Years	Records	Percent
1	2014	248	8.14
2	2015	510	16.74
3	2016	591	19.40
4	2017	782	25.67
5	2018	916	30.06
Total		3047	100.00



The Table 1 indicates year wise distribution of cloud computing research productivity during the period of 2014-2018. The year 2018 has the highest number of publications 916 (30.06%). It occupies the first position, among these years. And the year 2017 followed by 782 (25.67%), records are standing in the second position of total productivity.

Table: 2 Top 10 Most Prolific Author Output of Cloud computing productivity:

S .No	Authors	Records	Percent
1	BUYYA R	33	1.08
2	RANJAN R	33	1.08
3	LI J	29	0.95
4	CHANG V	27	0.89
5	ZOMAYA AY	23	0.76
6	CHOO KKR	22	0.72
7	KHAN SU	21	0.69
8	POP F	17	0.56
9	CHEN XF	16	0.53
10	LI KQ	16	0.53

Most Prolific Author Output of Cloud computing productivity

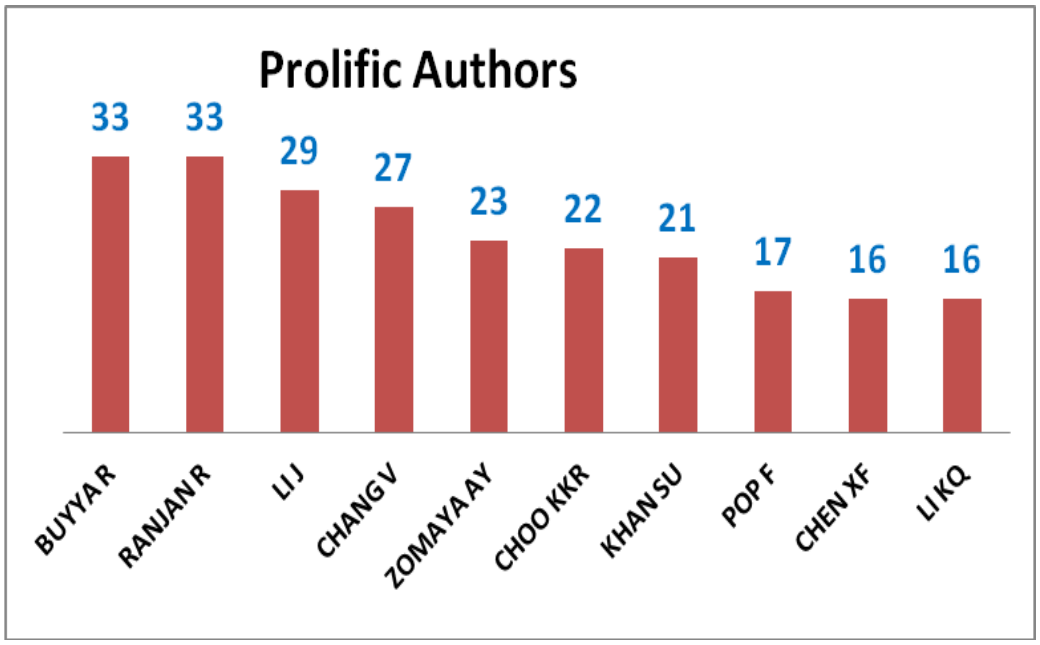


Table 2 indicates the most prolific top 10 authors in count of the total records. The table reveals that highest record is shared by BUYYA R and RANJAN with 33(1.08%) records, which is followed by the author LI J getting the second highest record of 29 (0.95%).

Table3: Top 10 Global wise Organizations in the field of Cloud computing productivity:

S .No	Organizations	Records	Percent
1	CHINESE ACADEMY OF SCIENCES	81	2.66
2	ISLAMIC AZAD UNIVERSITY	50	1.64
3	XIDIAN UNIVERSITY	49	1.61
4	VELLORE INSTITUTE OF TECHNOLOGY	45	1.48
5	CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE CNRS	40	1.31
6	HUAZHONG UNIVERSITY OF SCIENCE TECHNOLOGY	38	1.25
7	UNIVERSITY OF MELBOURNE	38	1.25
8	INRIA	36	1.18
9	KING SAUD UNIVERSITY	36	1.18
10	SHANGHAI JIAO TONG UNIVERSITY	34	1.12

The table 3 gives the details of the research productivity in information technology CHINESE ACADEMY OF SCIENCES has got 81 (2.66%) records with first place and the ISLAMIC AZAD UNIVERSITY 50 (1.64%) has got a second place of Global wise organizations. An interesting note globally The VELLORE INSTITUTE OF TECHNOLOGY has to got 45 1.48 fourth place. This institute has belonged to the state of Tamilnadu.

Table: 4 Top 10 Highly Referred Core Journals in Cloud computing:

S. No	Journal	Records	Percent
1	FUTURE GENERATION COMPUTER SYSTEMS THE INTERNATIONAL JOURNAL OF ESCIENCE	473	15.52
2	INTERNATIONAL JOURNAL OF ADVANCED COMPUTER SCIENCE AND APPLICATIONS	153	5.02
3	CLUSTER COMPUTING THE JOURNAL OF NETWORKS SOFTWARE TOOLS AND APPLICATIONS	143	4.69
4	INFORMATION SCIENCES	83	2.72
5	IEEE CLOUD COMPUTING	81	2.66
6	JOURNAL OF GRID COMPUTING	81	2.66
7	JOURNAL OF PARALLEL AND DISTRIBUTED COMPUTING	71	2.33
8	JOURNAL OF CLOUD COMPUTING ADVANCES SYSTEMS AND APPLICATIONS	68	2.23
9	FUTURE GENERATION COMPUTER SYSTEMS THE INTERNATIONAL JOURNAL OF GRID COMPUTING AND ESCIENCE	66	2.17
10	INTERNATIONAL JOURNAL OF COMPUTER SCIENCE AND NETWORK SECURITY	65	2.13

The table 4 shows the research productivity in Information Technologies FUTURE GENERATION COMPUTER SYSTEMS THEINTERNATIONAL JOURNAL OF ESCIENCE has got first place473 (15.52%) and followed by INTERNATIONAL JOURNAL OF ADVANCED COMPUTER SCIENCE AND APPLICATIONS which has got second place153 (5.02%).Remaining the journal CLUSTER COMPUTING THE JOURNAL OF NETWORKS SOFTWARE TOOLS AND APPLICATIONS has got third place with a score of 143(4.69%).

Table: 5 Global wise Research performance of Cloud computing

S .No	Countries/Regions	Records	% of 3047
1	PEOPLES R CHINA	751	24.65
2	USA	481	15.79
3	INDIA	353	11.59
4	AUSTRALIA	211	6.93
5	ENGLAND	198	6.50
6	SPAIN	174	5.71
7	ITALY	168	5.51
8	FRANCE	122	4.00
9	SAUDI ARABIA	119	3.91
10	SOUTH KOREA	115	3.77

The table 5 indicates the status of research output of Cloud Computing, which has contributed a good number of articles on this subject. Overall 95 countries have contributed with 301 journals. According to country wise analysis of the research output related to information technology, China has 751 records (24.65 %) which has the highest productivity. U.S.A in the followed second place with 481 (15.79) and India in the third place with 353 (11.59%) records.

Table: 6 Global wise Language Cloud Computing

S .No	Languages	Records	% of 3047
1	ENGLISH	3025	99.28
2	ROMANIAN	8	0.26
3	PORTUGUESE	4	0.13
4	SPANISH	4	0.13
5	GERMAN	2	0.07
6	ITALIAN	2	0.07
7	CHINESE	1	0.03
8	POLISH	1	0.03

The table 6 reveals the status of language output of Information technology. The analysis shows that the English language is 3025 (99.28%) records predominate to other languages and followed by the Romanian has got 8(0.26%) in the second place.

Table: 7 Growth of Research Productivity of Cloud Computing – Time Series analysis

S. No	Year	Count (Y)	X	X^2	XY
1	2014	248	-2	4	496
2	2015	510	-1	1	510
3	2016	591	0	0	0
4	2017	782	1	1	782
5	2018	916	2	4	1832
		3047	0	10	3620

Straight Line equation Yc = a + bX

Since $\sum x = 0$

$a = \sum Y/N = 3047/5 = 609.4$ $b = \sum XY/\sum x2 = 3620/10 = 362$

Estimated literature in 2020 is when X = 2020 – 2016= 4

X = 4

Yc = a + bx

= 609.4 + 362*4 = 609.4 + 1448= 2057.4

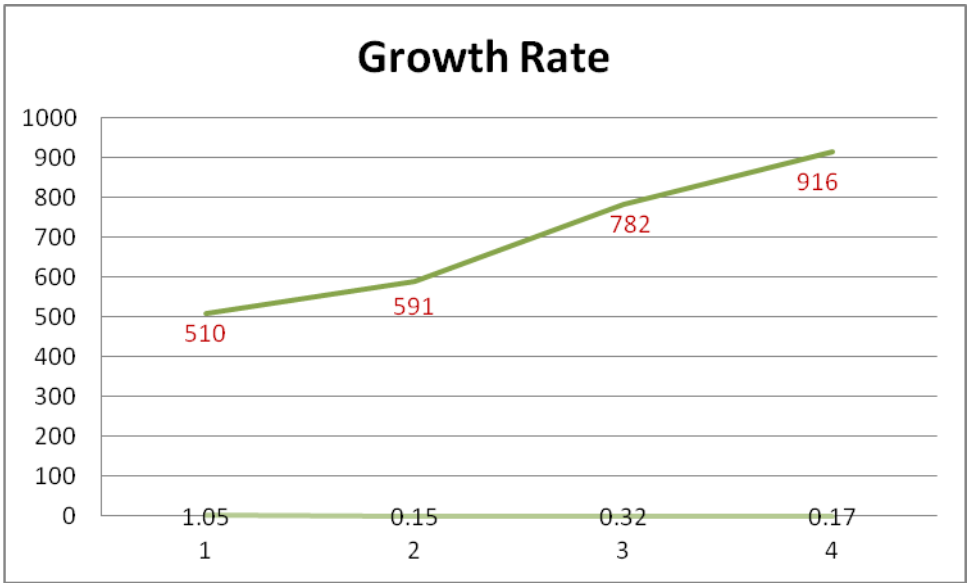
Estimated literature in 2025 is when X = 2025 – 2016 = 9

= 609.4 + 362*9 = 609.4 +3258= 3867.4

On the application of Time Series Analysis and subsequently, from the results obtained separately for the years 2020 and 2025 , it is found that the future trend of growth in information Technology research output takes an increasing trend during the years to come.

Table: 8 Growth Rate of cloud computing:

S. No	Year	Count	Growth Rate
1	2014	248	---
2	**2015**	510	**1.05**
3	2016	591	0.15
4	2017	782	0.32
5	2018	916	0.17
		3047	



The Table 8 reveals the Growth rate of the overall publication on Cloud Computing during Five years between 2014 – 2019. The highest growth rates 1.05% were found during the year 2015 with 510 publications. It shows that after 2014 publication's growth rate has slightly increased and then decreased.

CONCLUSION

The Bibliometrics research plays a vital role in giving proper and adequate information for scientific and economic progress of the society. The study broadly examines journal wise appropriate Statistical tools with Bibliometrics indicators on research publication of Cloud computing. This Study is extracted to facts analysis as a result it supports, decision making processes in the field of Cloud Computing. The study found that in the year 2014 to 2018 there was a increasing trend in Cloud Computing productivity. The highest records was shared by the authors BUYYA R and RANJAN R Y with 33 (1.08%). The highly referred journal is Future generation computer systems, international journal of sciences. The result also indicates the highest growth rates 1.05% was found during the year 2015 with 510 publications. After the 2015 publication's growth rate has slightly increased and then decreased. The Time series analysis indicates it will not go that in a Negative possession Cloud computing publication.

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