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A BIBLIOMETRIC ANALYSIS OF CONTRIBUTIONS IN THE JOURNAL "NATURE"

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ABSTRACT

The present study Bibliometric analysis of the Journal "Nature" covers 13499 articles of 59 volumes in five years from 2013 to 2017. The aim of study was to analyze the year wise distribution of articles & citations, authorship pattern of articles, group co-efficient values for collaborative author's publications, ranking of authors based on publications and h-index score, most productive countries and institutions, type of document published, keyword distribution, impact factor and future growth of journal. Form the analysis the following Results has been found that, in the year 2015 highest number of 2944(21.81%) articles was published out of 13499 articles in five years. Average numbers of citations per article are 33.70. Single author contribution has more dominant with 7063(52.3%) articles. A total number of 88670 authors around the globe are contributing articles in this journal. The anonymous author has been ranked top contributing maximum 987 articles. Witze A is in the second position with 179 articles. Wang J has been influenced author contributed in "Nature" journal, who produced 54 articles with having h-index 41 with 17031 citations and ranked in first place. It is identified that distribution number of references is gradually decreased year by year. In geographical distribution articles, United States of America has contributed highest number of 5815 articles with 31.07%. Majority of the participants are from University of California with 980 (7.25%) articles. The maximum number of 4719(34.96%) records is Editorial Materials which is more than one-fourth of total publications. The word "Expression" was most occurred keyword in 359(2.65%) articles. Impact Factor of the previous year (2017) is 25.95 and five-year impact

factor is 33.70. The future trend of growth of research articles in “Nature” journal may take increasing for upcoming years.

Keywords: Bibliometrics, Quantitative analysis, Qualitative study, Nature, Multidisciplinary science, Authorship pattern, Citation.

1. INTRODUCTION

Literature is the body of thought expressed in published writings. The primary role of literature is to record and transmit ideas or discoveries that bring in the advancement of knowledge. In the field of Science and Technology, the growth of literature is in an exponential manner. Therefore, the process of selecting the appropriate and relevant literature becomes critical and difficult.

Bibliometric analysis is the quantitative description of literature and helps in the measurement of the patterns of all forms of recorded information and their producers. It has extensive applications in the field of library and information science particularly with regard to studying the trends in a subject. It helps in formulating need-based development policy and provides objective data to inform managers to take timely decisions. The first recorded study of the bibliometric subject matter was in 1917 by Cole & Eales with the ‘Statistical analysis of the literature of the history of comparative anatomy’ which served as a model for applying the counting technique in the evaluation of international activities. Alan Prichard first introduced the term ‘Bibliometrics’ in 1969 to men ‘the application of mathematics and statistical methods to books and other media of communications’. Roy has defined bibliometrics as a ‘study process of information use by analyzing characteristics of documents and their distributions by statistical methods. (Jena, K.L. 2012).

Bibliometrics is a new branch of information science. It has emerged as a handy managerial tool for library professionals to study collection building and evaluating, ranking of journals, identification of core literature, to know the structure of literature, to identify prolific authors in a discipline, to observe obsolesce of literature, to study user behavior and forecast their future needs. It helps in bibliographic control and in preparing trend reports. It can also evaluate the research and other activities of the institutions. Started with simple statistical bibliography/librametrics, it has developed as informetrics, scientometrics. The latest information technology and online availability of data developed the area into webometrics.

The journal Nature distribute high-quality, spontaneously peer-reviewed research and reviews, as well as remark and reports, for the scientific research communities community. The Nature journal uses advanced technologies, innovative formats and first-class editing to grant cutting-edge, timely yet readable information for researchers in the public and private sectors, government agencies, educators, clinicians and the general public.

Nature journal has a close relationship with the wide range of the scientific community. By functioning with scientists, observing to what they say, and always placing insists on quality, nature journal is the foremost journal for innovative solutions to scientists information requirements.

The present study is a bibliometric analysis of the journal “Nature” for the period of 2013-2017. The journal was established itself as leading scientific journal around the world in the field of science. Nature is an international multidisciplinary scientific journal, founded by Alexander Macmillan and Daniel Macmillan published first on 4th November 1869, which is currently active from the UK. It is one of the topmost academic journals in the world. Nature is

one of the topmost scientific journals having the high impact factor (40.137 in 2016 as per journal metrics report) in the world. The journal endeavors to bring recent trend in the wide range of scientific field. The frequency of the journal publication is weekly i.e. it publishes twelve volumes in a year and each volume has four or five volumes. (Jena, K.L. 2012).

2. REVIEW OF LITERATURE

There is the number of bibliometric studies is accessed related to single journal bibliometric study. Single journal bibliometric studies are presented different types of bibliometric measures. It is identified that most of the studies are reveals, article growth pattern, authorship pattern, the ranking of authors, the ranking of countries, the ranking of institutions, the degree of collaboration among authors, co-occurrences of keywords and so on. Citation analysis also typically used in single journal studies based on analysis of number and distribution of citations referenced per article during the study period; authorship pattern of citations; most cited authors; types of the document cited etc.

Alamelu, J. (2014) in her article Analytical study of library and information science journals- Annals of Library and Information Studies (ALIS) and DESIDOC Journal of Library and information technology (DJLIT). The study shows in begging year wise distribution of both source journals. There is 371and 542 article were published in both journals ALIS and DJLIT respectively during the study period. The maximum contribution of 43 articles (11.59%) published on 2010 and least contribution of 26 articles (7.01 %) published in 2006 by the ALIS journal. And by DJLIT highest number of 65 (11.99%) articles were published in the year 2012 and least contribution of 18(3.32%) articles were published in the year 2006. There are 170(45.825) of publications with two authored paper which occupy first place in ALIS journal. Similarly, DJLIT also published two authored paper with 225 (41.51%) articles. from the analysis reveals that both of two journals, the authors tend towards collaborative research with others. ALIS published 91(24.53%) articles in Information Communication Technology, E-Resource depth subject and DJLIT published 95(17.53%) articles in Library and Information Science & Information Literacy & ICT. In ALIS there are totally 6981 citations received and highest citation received in the year 2010 with 990 (14.18%) and by DJLIT, totally 7210 citations received and highest citation received in the year 973 (13.50%) in the year 2013. Form the analysis it's clearly known as journals are the most prepared form of the cited document type for both journals.

Gudodagi, S. C. (2014) made a bibliometric study of the article published in the Indian Journal of Marketing. The period of eight years has been taken for the study (2005-2012). The study reveals the facts of journal publications. There are 701 articles are published during the study period. Average of 88 articles were published during the study period. Maximum of 318 (45.36%) contributions are by double authors, followed by 311(44.36%) contributions are by single authors, three authors contributions are 61(8.70%) and more than three authors contributions are less than one percent. India was the dominant country to produce more (94.492%) number of publications to the source journal. More than half (401(57.20%)) of the publications are pages range from 5 to 8.

Kanchan Dinkar Desai (2014) carried out the research on 'Bibliometric analysis of DESIDOC Journal of Library and Information Technology (DJLIT) during 2012". The study reveals various facts such as the issue-wise distribution of papers, subject-wise distribution, authorship pattern, reference sources, length of the papers, special issues, institute-wise distribution, country-wise distribution, major contributors, research method/type & the average

number of reference per paper, etc., Totally 65 articles were published during research period. There are 10.77% of articles were published related to open source followed by digital preservation 9.23% and so on. Form the research analysis majority (more than one authors were published 64%) of the authors were published their article in collaborative nature. Online resources are top most resources used by 28.85% of the authors for their research/study. And also the researchers found that facts about the length of the paper, special issues, institution-wise distribution, country-wise distribution and major contributors.

Kumar, T. (2013) conducted a study with 206 original contributions published in the journal of 'Library Trends' during 2007-2012, 'Library Trends' is the source journal for the study and they stated that among the year- wise distribution from 2007-2012, maximum number of articles 54(24.76%) published in 2007-2008 in volume 56 and minimum number of articles 37(17.96%) published in 2009 and 2011-2012 in volume 58 and 60 respectively. There are 41.2 average numbers of contributions per volume. Form the analysis majority of the authors preferred to publish their research results in single authorship mode i.e. 122 (59.22%). Production of single author's publication has more than multiple authors publications. The volume wise authorship pattern of contribution shows that more than 58% that individual work occupies more important place than the group work. The Subramanian's formula is used to drive the degree of collaboration. The DC value Library Trend is 0.41. It is known that the single-authored publications occupy the important place and also observed that collaborative trend varied from 0.27-0.62 so that there is least collaboration have appeared in the journal. When considering the page length of contributions most of the paper appears in length of 16-20, only one paper appear 41-45 and there is no article found that 1-5 length of pages. The average length of pages counted as 18 pages per article. Volume 56 has the highest number of 1895(28.79%) citation and volume 58 has least number of 828(12.58%) citation received.

Ramesh Pandita (2013) published an article entitled "Annals of Library and Information Studies (ALIS) Journal: A Bibliometric Study (2002-2012)". The source journal "Annuls of Library and Information Studies" published quarterly in nature and each volume has four issues. The study period covered ten years and 49 to 59 volumes are taken for analysis. There are 310 articles were published during the study period. From the tabulation, it's clearly known that average article per issue was steadily increased and 43.87% of the research output published with the collaboration of two authors which is greater than the single author, three authors and more than three authors. In this paper, through the bibliometric study, it is found that the Indian authors have contributed the maximum number of articles to the journal Annals of Library and Information Studies. B.K. Sen has maximum contributed with 4% articles, followed by B.M. Gupta with 2 % articles and K.C.Garg, with 1.50 %. Reference distribution pattern reveals that on the whole 5307 references were cited in 310 articles making it on average 17.11 references per article. There are 73 (13.93%) articles are published on the subject belongs to Aeronautics and Flight Mechanics followed by Applied Physics and Fluid Dynamics 58 (11.06%). There are 13 (25%) were published from China followed by the US were published 12(23.07%).

Neerja Verma and Rajnish Tamrakar (2009) in their article "Analysis of Contributions to Defence Science Journal" have analyzed and identified various results using different parameters. Defence Science Journal is a bimonthly journal. The researchers have undertaken to have a deep analysis of the DSJ during the period 1997-2006. The researchers framed certain objectives and revealed the results based on the objectives. There are 84(16.03%) papers were published in the year 2006 which is maximum of the study period. When considered the authorship pattern of publication double authored papers contains highest (149 (28.43 percent))

contributions out of 524(50.57%) publications. 265 articles have 1-10 reference per paper which is highest and 18(3.43%) articles appeared with no references. 330 (62.97%) papers covered 6-10 pages and also analyzed the length of the paper with year wise. High Energy Materials Research Laboratory (HEMRL), Pune has published 47(8.96%) articles, which is top institute comes under the institution- wise distribution. S N Dixit is the major contributor to the DSJ with 8(1.52%). There are 73(13.93%) papers are published the subject belongs to Aeronautics and Flight Mechanics followed by Applied Physics and Fluid Dynamics 58(11.06%). China has produced the highest number of papers with 13(25%) to the DSJ among the globe.

'A Bibliometric Analysis of the Chinese Librarianship: an International Electronic Journal' a study conducted by Singh, H. (2013). The study reveals the facts of journal publications. Four years have been taken for the study period (2009 to 2012). There are eight issues contains 55 articles, the maximum number of 17(30.90%) articles were published in 2012 and the minimum number of 11(20%) articles published in 2009. The number of publications was increased every year during the study period. Eight issues of 55 articles received 903 citations, the maximum number of 276 (30.56%) citations were received in 2012 and the minimum number of 178 (19.71%) citations received in 2009. the number of citations also increased year by year. There are the maximum number of 23(41.82%) contributions are from single authors, followed by two authors by 20(36.36%), three authors by 9(16.36%) and more than three authors by 3(5.45%). Multiple authors' contributions are dominating than the single author's contributions. There are one fourth (25.47%) of contributions are from Librarians. Dilip K. Swain and Khalid Mahmood both are placed in first ranked in the number of publications. India is the dominant country to participate in more number of contributions than other countries. Majority of (24 (43.64%)) the articles pages ranged from 6 to 10.

3. OBJECTIVES

The objectives of the study are as follows:

- Analyze the year wise distributions and citations
- To determine the year wise authorship pattern of articles
- To determine the Group Co-efficient values for collaborative authors publications
- Ranking the authors based on publications and h-index score
- To reveals the most productive countries and institutions
- To shows the types of the document published
- To identify the most frequently occurred keywords
- To estimate the impact factor and future growth of the journal

4. METHODOLOGY

The required data for the present study have been retrieved from Web of Science Core Collection published by Clarivate Analytics. The basic data relating to total publications during 2013-2017, has been collected on May 5, 2018, using Web of Science. The basic search strategy used for collecting data for Nature was as follows: "Publication Name = Nature and Publication Year =2013-2017. Fifty-nine volumes (vol. 493 to 552 including both volumes) containing 255 issues (from 7430 to 7685 including both issues) of "Nature" journal published 13499 records during 2013 to 2017 have been taken up for the study. The details with regard to each published article such as publication year, number of authors, the name of authors, geographical affiliation, institutions, number of references, the form of document type etc., were recorded an analyzed for making observations. All the retrieved results were saved in text files and then imported into

Micro Soft-Excel to arrange, evaluate and make the tables, charts, and graphs for final study. Bibexcel software, citation report of the journal also used for analyzing the data.

5. DATA ANALYSIS AND DISCUSSIONS

5.1 Growth pattern of "Nature" journal

During 2013-2017, authors/researchers from around the world published 13499 research results to the "Nature" journal. The pattern of research output and the annual growth rate are shown in figure-1. It indicates that fluctuated trend of research output during 2013 to 2017. There are 2944 papers were published in 2015 which is highest and 2605 papers were published in 2013 which is least production during the study period. The average publications per year are 2699; during 2013-2017 there is no significant growth or decline.

Citation analysis of the published papers indicates that these papers received 454956 citations when accessed the citation reports from Web of Science. The highest number of 161728 citations was received in 2013 and least number of citations was received in 2017. The citation per paper for the entire output was 33.70 during the study period. From the table-1 it is clearly known that citations are gradually decreased year by year.

Table-1 Year Wise Distributions of articles and Citations

S. No	Year	No. of Publications	%	No. of Citations	Average Citations per article
1	2013	2605	19.3	161,728	62.08
2	2014	2561	18.97	130,009	50.76
3	2015	2944	21.81	95,898	32.57
4	2016	2746	20.34	51,778	18.86
5	2017	2643	19.58	15,543	5.88
Total		**13499**	**100%**	**454956**	**33.70**
Average Publications Per Year: 2699					

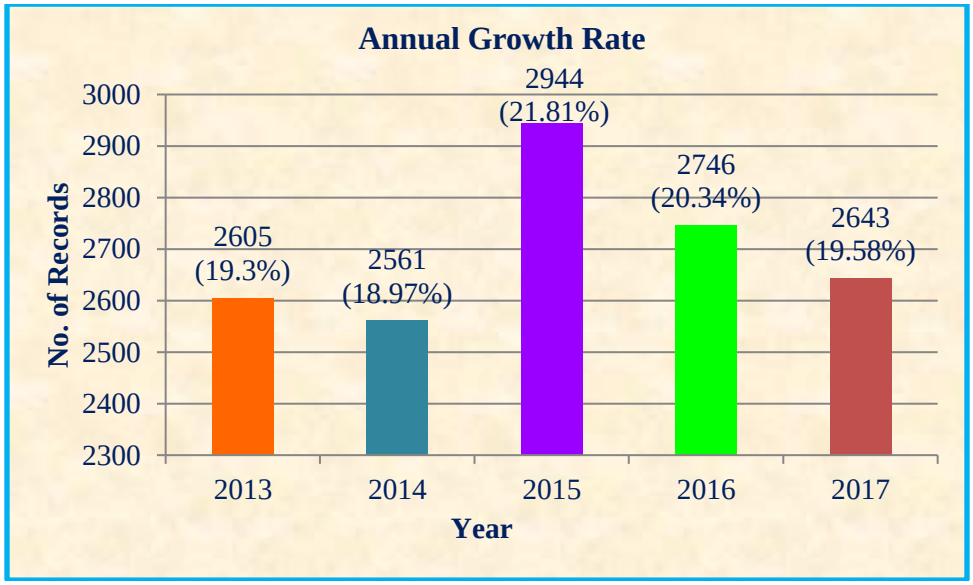

Figure-1 Annual Growth Rate

5.2 Authorship Pattern of Articles

For the study of authorship pattern, the journal publications are arranged separately as single, double, three, four, five and more than five authors. Publications under each category are counted and their percentage is calculated for showing trends of research, whether solo or collaborative research is prevailed (Jena, K.L. 2012). Year wise analysis of articles in "Nature" journal, in relation to the number of authors is presented in Table-2. It reveals that nearly half of total articles, i.e., 52.3%, were contributed by the single author while the rest of articles are contributed by more than one authors. Maximum articles are contributed by solo authors, accounting for 7063(52.3%) articles, followed by two authors' contribution accounting for 1449(10.7%) articles, three authors contributions accounting for 698(5.2%) articles, four authors accounting for 400(3%) articles, five authors accounting for 351(2.6%) and more than five authors are contributed accounting for 3538(26.2%). Table-2 clearly shows that most of the articles were published by single authors and least of the articles were published by five authors. Table-2 indicates that there exist the least number of collaborative contributions and collaboration trend of authors was decreased.

Table-2 Year wise authorship pattern

Number of Authors	Year					Total No. of Papers	%
	2013	2014	2015	2016	2017		
1	1351	1294	1608	1423	1387	7063	52.3
2	300	285	308	294	262	1449	10.7
3	137	135	145	136	145	698	5.2
4	84	77	74	95	70	400	3
5	81	61	77	77	55	351	2.6
More than 5	652	709	732	721	724	3538	26.2
Total	**2605**	**2561**	**2944**	**2746**	**2643**	**13497**	**100%**

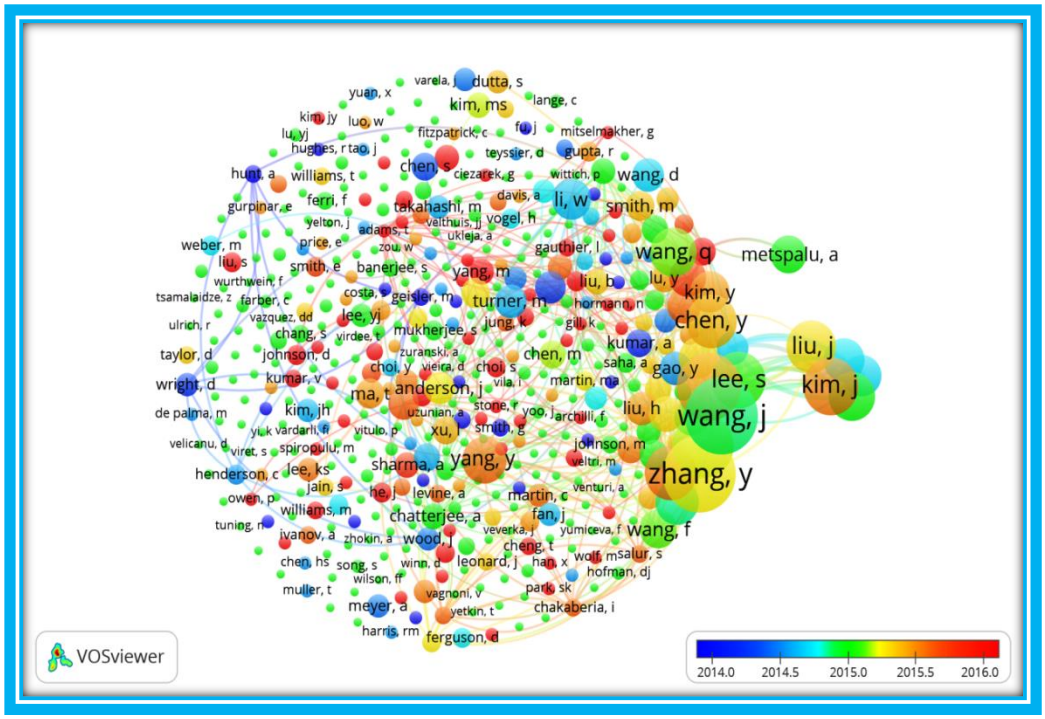

Figure-2 Network visualization of co-authorship with other authors

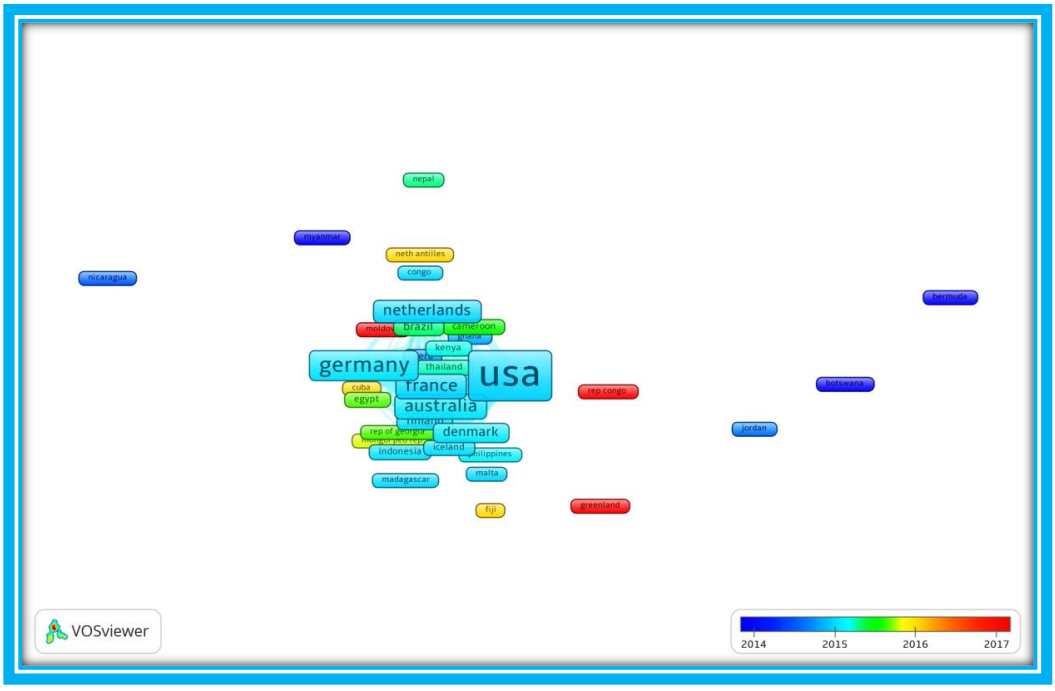

Figure-3 Network visualization of co-authorship with Countries

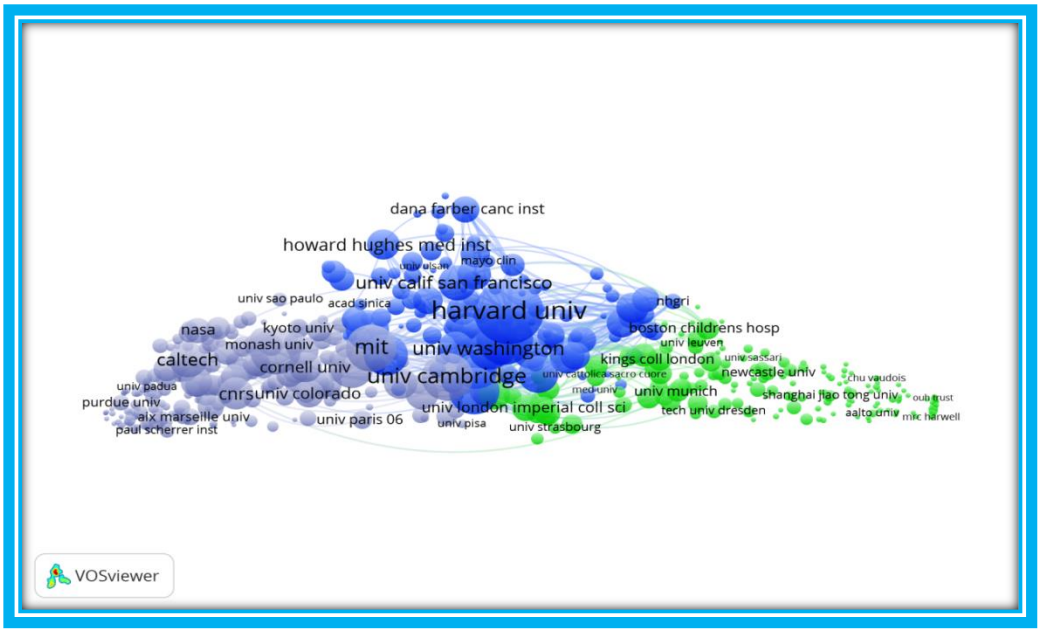

Figure-4 Network visualization of co-authorship with Institutions

5.3 Author's collaboration

Subramanyam (1983) proposed a mathematical formula for calculating author's degree of collaboration in a discipline. The degree of collaboration among authors is the ratio of the number of publications published in a discipline during a certain period of time. The values of the degree of collaboration can be calculated both for publications and citations. It is expressed mathematically as:

$$g = Nm / (Nm+Ns)$$

Where g = Group Coefficient of a discipline.

Nm = Number of multiple authors during a specific period in a discipline

Ns = Number of single-authored works in a discipline during a given period of time

The "g" for the publications may be represented as g_p and the "g" for the citations may be written as g_c. The degree of collaboration gives a picture of collaboration among the authors.

The degree of collaboration among the co-authors was minimum (0.02) in articles written by three & four persons both and maximum of (0.26) in more than five authored publications. Therefore collaborative publications are less than single author's publications. It reveals that the authors mainly prefer to work in alone. (Gayatri Mahapatra, 2009.)

Table-3 Group Co-Efficient Values for Collaborative Authors of Publications

Number of authors Article	**Number of publications**	**Percentage from total publications**	$\mathbf{g_p = \frac{Nm}{Nm+Ns}}$
Number of personal author publications	13499	-	
Number of single author publications (N_s)	7063	52.32	
Number of co-author publications (N_m)	6436	47.68	0.48
Two authors publications	1449	10.7	0.11
Three	698	5.2	0.05

authors publications			
Four authors publications	400	3	0.02
Five authors publications	351	2.6	0.02
More than five authors publications	3538	26.2	0.26

5.4 Ranking of authors based on productions

The ranking of authors is done according to their contributions in decreasing order. During the period of the study, 88670 authors contributed around the world to contribute 13499 papers in "Nature" journal. Generally, in a given subject, the majority of authors publish only a few articles whereas only some prolific authors publish many articles. Table-3 listed top ten prolific authors according to the number of publications they have made during 2013-2017. The first rank is occupied by an Anonymous author having 987 articles with 209 citations and author h-index was 6. Followed by Witze, A. having 179 articles with 120 citations and h-index is 4, Callaway E having 142 articles with 470 citations and h-index is 11 and reaming authors are having less than 136 records and ranked according to their productions. The authors published for less than 80 times were not listed in the table to avoid an unduly lengthy table.

Table-4 Ranking of authors based on productions

Rank	Authors Name	No. Contributions	No. of Citations	h-index
1	Anonymous	987	209	6
2	Witze A	179	120	4
3	Callaway E	142	470	11
4	Ledford H	136	701	13
5	Reardon S	132	604	13
6	Gibney E	126	198	7
7	Tollefson J	116	335	10
8	Abbott A	97	275	10
9	Hayden EC	93	518	10
10	Cyranoski D	82	537	12

5.5 Ranking of authors based on h-index

Table-4 shows that ranking of authors influenced in h-index. Wang J is the influenced author contributed in "Nature" journal, produced 54 articles with having h-index 41 with 17031 citations and ranked in first place. Followed by Zhang Y by 47 articles with having h-index 31 with 7770 citations and placed in the second rank, Getz G, Kim J, Zhang J etc. are ranked according to their h-index respectively showed in table-4.

Table-5 Ranking of authors based on h-index

Rank	Authors Name	No. Contributions	h-index	No. of Citations	No. of Citations with in h-core
1	Wang J	54	41	17031	16915
2	Zhang Y	47	31	7770	7562
3	Getz G	33	30	17893	17862
4	Kim J	37	28	9861	9752

5	Zhang J	39	25	6674	6561
6	Liu Y	31	24	3024	2953
7	Li Y	34	23	4849	4748
8	Gabriel SB	23	22	19382	19369
9	Lee S	29	21	7561	7503
10	Wang J	54	41	17031	16915

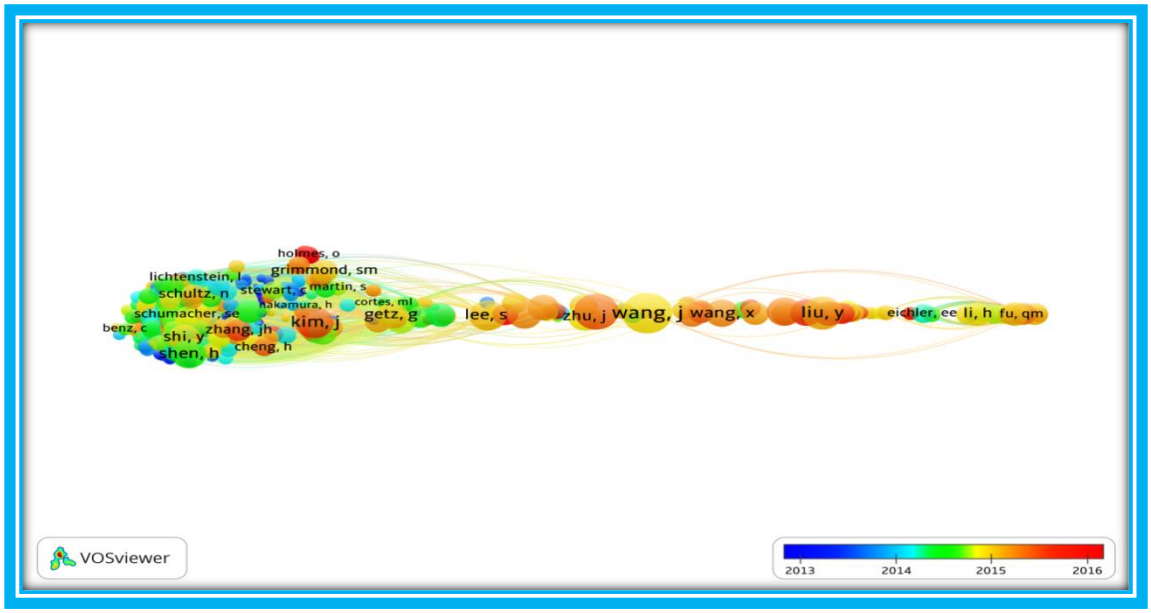

Figure-6 Network visualization of Citations with authors

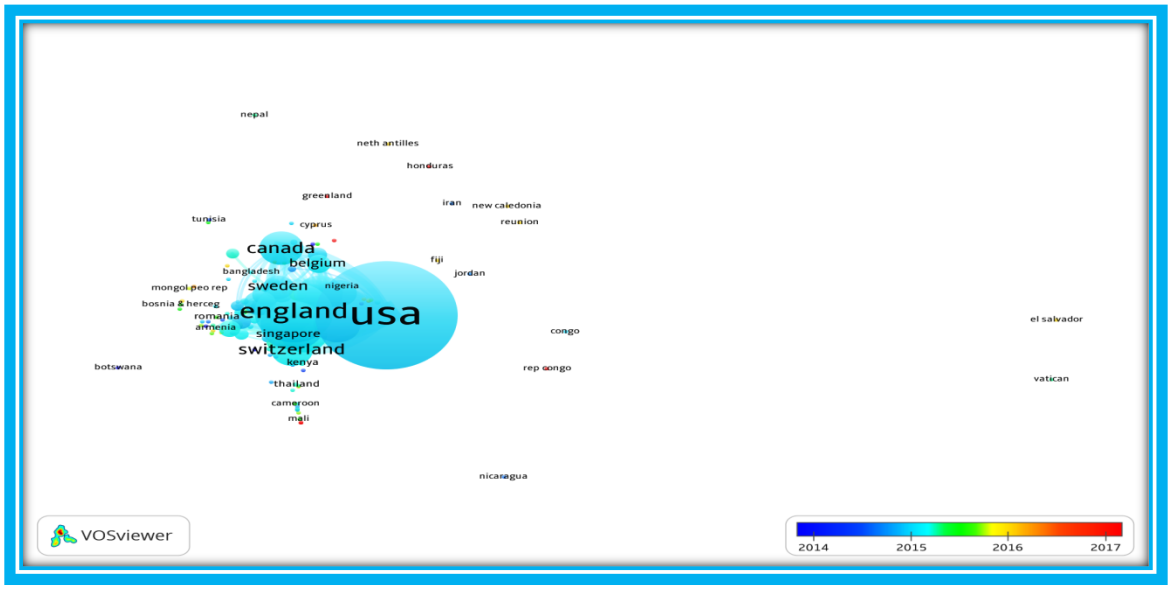

Figure-7 Network visualization of Citations with countries

5.6 Year wise distribution of References

There are 377343 references were founded at the time of accessing citation report. Out of the total number of reference, most of the references are taken from the year 2013 with 133179 references. From the table-5 it is known that distributions number of references is gradually decreased year by year.

Table-6 Year wise distribution of References

S.No	Year	No. of Publications	No. of reference	Cumulative Reference	Average reference per articles
1	2013	2605	133179	133179	51.12
2	2014	2561	108190	241369	42.24
3	2015	2944	79771	321140	27.09
4	2016	2746	43312	364452	15.77
5	2017	2643	12,891	377343	4.87
Total		**13499**	**377343**		**27.95**

5.7 Most contributed Country

There were various countries are contributed in the "Nature" journal during 2013-2017 and produced 13499 research results. Most of the participants are from the USA produced 5815(43.07%) articles with 324157 citations. followed by, England by 1714(12.69%) contributions with 103516 citations, Germany by 1174(8.69%) contributions with 101400 citations and rest of the countries are produced less than 5%b of research output to the "Nature" journal. The citations values are extracted from the web of science citation report, accessed on 11.05.2018.

Table-7 Most contributed Country

S. No.	Country	Records	%	Citations
1	USA	5815	43.07	324157
2	England	1714	12.69	103516
3	Germany	1174	8.69	101400
4	France	653	4.83	51349
5	Peoples R China	653	4.83	52257
6	Australia	624	4.62	47102
7	Canada	603	4.46	55558
8	Switzerland	529	3.91	46951
9	Netherlands	435	3.22	42138
10	Japan	389	2.88	34713

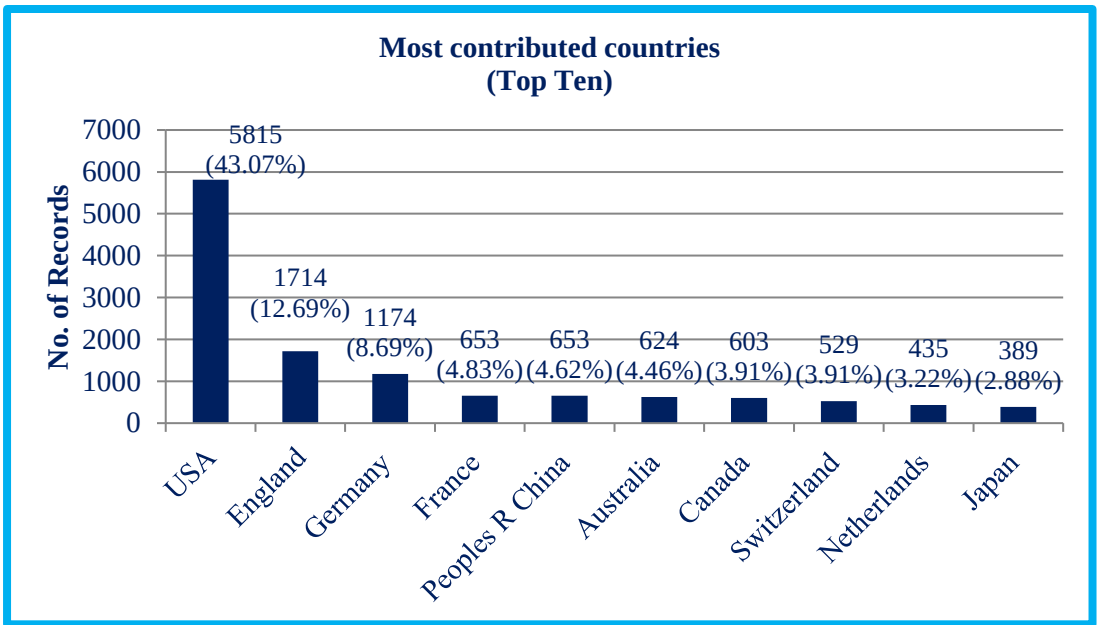

Figure-8 Most contributed Countries

5.8 Most contributed institutions in "Nature" journal

There are different institutions like universities, research institutions etc. are published their research results into "Nature" journal. In these top ten institutions are taking into the discussion and listed. Majority of the participants are from University of California with 980 (7.25%) articles followed by Harvard University by 784 (5.80%), Howard Hughes Medical Institute 559 (4.14%), Massachusetts Institute of Technology 429 (3.17%), Centre National De La Research Scientifique 406 (3.00%) and rest of the institutions are produced less than 3%. Table-7 is evident that the University of California is actively contributed to the "Nature" journal.

Table-8 Most contributed institutions in "Nature" journal

S. No.	Institution	Records	%
1	University of California	980	7.25
2	Harvard University	784	5.80
3	Howard Hughes Medical Institute	559	4.14
4	Massachusetts Institute of Technology	429	3.17
5	Centre National De La Research Scientifique	406	3.00
6	Max Planck Society	387	2.86
7	Stanford University	379	2.80
8	University of London	349	2.58
9	University of Cambridge	330	2.44
10	Va Boston Healthcare System	321	2.37

5.9 Type of Items distributed in "Nature" journal

Table-8 shows the types of items published by "Nature" journal during 2013-2018. Most of the publications are Editorial Material with 4719 (34.96%) items, followed by, Article 4157(30.79%), News Item counting 1872(13.87%), Letter counting 1387(10.27%) and other items are less than 10%. It is common fact that known form the earlier studies, articles are the most prepared form to share their research results. But in this journal, most of the items are editorial materials.

Table-9 Type of Items distributed in "Nature" journal

S. No.	Document type	Records	%
1	Editorial Material	4719	34.96
2	Article	4157	30.79
3	News Item	1872	13.87
4	Letter	1387	10.27
5	Correction	609	4.51
6	Book Review	462	3.42
7	Review	178	1.32
8	Biographical-Item	102	0.76
9	Article; Retracted Publication	8	0.06
10	Retraction	5	0.04
Total		**13499**	**100%**

5.10 Distribution of Keywords in "Nature" journal

Keywords play an important role in every research; it expresses simply the matter of research discussed. Table-9 shows the most frequency keywords appeared in the nature journal (top ten have been taken into the discussion). The word "Expression" occurred in 359(2.65%) articles followed by "Evolution" occurred in 329(2.43%) articles, "Activation" occurred in 235(1.74%) articles, "Protein" occurred in 228 (1.68%) articles, "Mice" occurred in 224(1.65%) articles, "Cells" occurred in 190(1.40%) articles, "Crystal-Structure" occurred in 196(1.45%) articles, "In-Vivo" occurred in 359(2.65%) articles, "Gene" occurred in 183 1.35%) articles and "Model" occurred in 174(1.28%) articles.

Table-10 Distribution of Keywords in "Nature" journal

S. No.	Keywords	Records	%
1	Expression	359	2.65
2	Evolution	329	2.43
3	Activation	235	1.74
4	Protein	228	1.68
5	Mice	224	1.65
6	Cells	220	1.62
7	Crystal-Structure	196	1.45
8	In-Vivo	190	1.40
9	Gene	183	1.35
10	Model	174	1.28

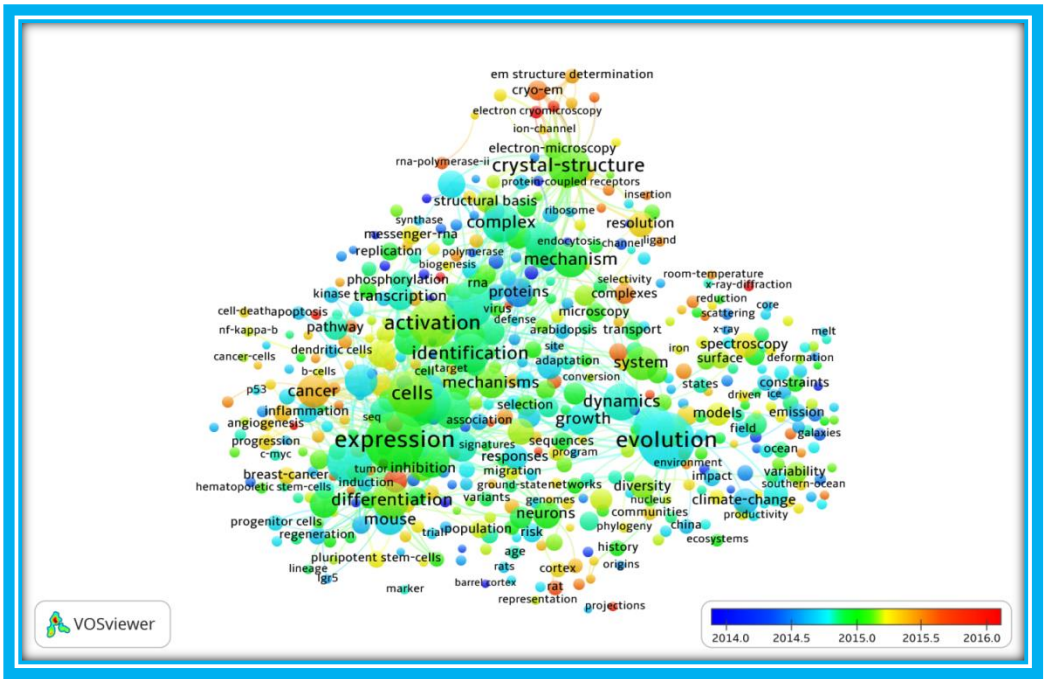

Figure-9 Network visualization of keywords occurrence

5.11 "Nature" Journal Impact factor

The Journal Citation Reports (JCR) of Garfield gives yearly impact factor for the journals covered by SCI that is the JCR impact factor is basically a ratio between citations received by a journal and citable items published in that journal. (Mahapatra, G. (2009)).

JCR impact factor mathematically is represented as:-

If (Ay) =X1+X2/Y1+Y2

Where

I_f (Ay) = Impact factor of the journal A for year Y.

X_1 = Number of citation received by Y1 source item in the year Y.

X_2 = Number of citation received by Y2 source item in the year Y.

Y_1 = Number of source item published in the journal A in the year Y-2.

Y_2 = Number of source item published in the journal A in the Y-1 year.

The value of X1 and X2 are related to a database and may change with the change of database.

The impact factor is explained more clearly in below.

The journal "Nature" published 2605 and 2561 source items in 2013 and 2014 respectively. The source items received 161728 and 130009 citations 2015 through the source journals covered manner by the Web of Science database.

The I_f "Nature" for the year 2015 calculated as:

I_f (Nature 2015) = 161728+130009/2605+2561

= 291737/5166

= 56.47

I_f (Nature 2016) = 130009+95898/2561+2944

= 225907/5505

= 41.03

I_f (Nature 2017) = 95898+51778/2944+2746

= 147676/5690

= 25.95

The impact factor is a quality measure of articles published in a journal on a particular year. Here "Nature" journal impact factor have been observed based on citations of a concern year. The impact factor of the "Nature" journal in 2015 have been identified as 56.47, followed by 41.03 in 2016 and 25.95 in 2017. It is identified that the impact factor values have been decreased year by year during the study period.

Table-11 "Nature" Journal Impact factor

Impact factor For the year	Article published in year	Total no. of cited articles	Total No. of published articles	I_f (A_y) =X_1+X_2/Y_1+Y_2
2015	2013 2014	291737	5166	**56.47**
2016	2014 2015	225907	5505	**41.03**
2017	2015 2016	147676	5690	**25.95**
Five Year Impact factor: 454956/13499 = 33.70				

5.12 The future growth rate of the "Nature" journal

The future growth rate of the "Nature" journal is calculated with using straight line equation of time serious analysis.

$Yc=a+bX$

Since $\Sigma X = 0$

$a = \Sigma Y/N=13499/5=2699.8$

$b= \Sigma XY/\Sigma X^2=261/10=26.1$

Estimated literature in 2020 is when X=2020 – 2015= 5

=2699.8+26.1*5= 13629.5

Estimated literature in 2025 is when X=2025 – 2015=10

=2699.8+26.1*10=27259

The calculated value of research output of the Journal "Nature" for the year 2020 is 13629.5 and research output for the year 2025 is 27259. With the application of the formula, the time serious analysis calculated from the results for the year 2020 and 2025, it is found that the future trend of growth of research articles in "Nature" journal research output may take increasing for upcoming years. The expectation from the calculations proved there is positive growth in research output of the Journal "Nature".

Table-12 Time serious analysis

Year	Number of Publications(Y)	X	X^2	Xy
2013	2605	-2	4	-5210
2014	2561	-1	1	-2561

2015	2944	0	0	0
2016	2746	1	1	2746
2017	2643	2	4	5286
Total	**13499**		**10**	**261**

6. FINDINGS

The findings of the study are summarised as follows;

- The number of journal publications is not constant and growth of citations also gradually decreased during the study period.
- Single author contributions are dominant in "Nature" journal. It constitutes alone 7063 (52.3%) of whole contribution of the journal, followed by two author and three author contributions. It reveals that the authors mainly prefer to work in alone.
- A total number of 88670 authors around the globe are contributing articles in this journal. Anonymous author has been ranked top contributing maximum 987 articles. Witze A is in second position with 179 articles and Callaway E in third place with 142 articles.
- Wang J has been influenced author contributed in "Nature" journal, who produced 54 articles with having h-index 41 with 17031 citations and ranked in first place, followed by Zhang Y by 47 articles with having h-index 31 with 7770 citations and placed in second rank
- It is identified that distribution number of references is gradually decreased year by year.
- United States of America (USA) has ranked top contributing maximum 5815 articles at a rate of 43.07%. England in second position with 1714 articles at 12.69% and Germany in third position with 1174 articles at 8.69%. More than hundred countries around the globe are contributing papers in "Nature" journal. Thus, the journal "Nature" is appears the repute and coverage of international journal.
- Majority of the participants are from University of California with 980 (7.25%) articles followed by Harvard University by 784 (5.80%), Howard Hughes Medical Institute 559 (4.14%), Massachusetts Institute of Technology 429 (3.17%), Centre National De La Research Scientifique 406 (3.00%) and rest of the institutions are produced less than 3%. Table-7 is evident that University of California is actively contributed to the "Nature" journal.
- In general, articles are most preferable form to communicate the research result. But in this study maximum number of 4719(34.96%) records is Editorial Materials which is more than one fourth of total publications, followed by articles with 4157(30.79%) records.
- Table-9 shows the most frequency keywords appeared in the nature journal (top ten have been taken in to discussion). The word "Expression" occurred in 359(2.65%) articles followed by "Evolution" occurred in 329(2.43%) articles, "Activation" occurred in 235(1.74%) articles, "Protein" occurred in 228 (1.68%) articles, "Mice" occurred in 224(1.65%) articles, "Cells" occurred in 190(1.40%) articles, "Crystal-Structure" occurred in 196(1.45%) articles, "In-Vivo" occurred in 359(2.65%) articles, "Gene" occurred in 183 1.35%) articles and "Model" occurred in 174(1.28%) articles.
- Impact Factor of the previous year (2017) is 25.95 and five year impact factor is 33.70. The impact factor values have been decreased year by year during the study period.

- ❖ The future trend of growth of research articles in “Nature” journal may take increasing for upcoming years.

7. CONCLUSION

The “Nature” is a top ranking journal in the field of science. The geographical coverage of journal is high with more than hundred countries. It was ranked the world’s most cited scientific journal by the Science Edition of the 2010 journal citation report. Indexation and impact factor of a journal is considered as a reflection of its quality. According to above context, the journal “Nature” is having high impact factor in last five years and indexed in (“Nature” journal indexed in Chemical Abstracts Service, Index Medicus/Medline, Scopus and so on) world class most precious indexing databases. All multidisciplinary science journals are not most reputable; however, nature is a reputable international science journal.

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