

A Study Of Recency Of Cited Items Appended In The Articles Published In The Journal Of Scientometrics**Dr.N.Amsaveni* & K.R.Shivashankar****

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Abstract

The aim of this paper is to study recency, weighted recency and average weighted recency of the cited items in the articles published in the Journal of Scientometrics during 2015 to 2017 by using statistical methods based on sampling. This study reveals that the average weighted recency of the citations of the articles published in 2011 are more than those of the other two years. This indicates that the articles published in 2011 are of more recent origin than those of other two years.

Keywords: Citation Analysis, Recency, Weighted Recency, Average Weighted Recency, Recency Index, Citation pattern

INTRODUCTION

Citation analysis is one of the important and quite old branches of bibliometric study. It examines the different frequencies, their patterns and graphs of citations given in articles, review papers, technical communication, thesis and books. Citation analysis uses citations in scholarly works to establish links to other works or other researchers. Many different links can be ascertained, such as links between authors, between scholarly works, between journals, between fields, or even between countries. A number of such citation analyses have been proposed and citations have been analyzed with their various aspects. For example, bibliographic coupling, co-citation, impact factor, citation impact, and citation index and so on are measures based on citation analysis. Recency of citation has not given adequate attention by the researchers. Recency not only reflects the origin, relevance in the present time or in recent past of the topic on which the paper is written but also gives an indication of the standard of the concerned journal.

CITATION ANALYSIS

Counting citations is often called "citation analysis". Citation analysis is the assessment of the frequency, patterns, and graphs of citations in various sources. It uses citations in scholarly works to establish links to other works or other researchers. Citation analysis is one of the maximum used and using method of bibliometrics for measurements (Rubin, 2010).

LITERATURE REVIEW

Garfield E (1979) has analysed there are a number of publications describing and reviewing citation indexing including a number of books and a good number of collected works and special issues of journals. Ravichandra Rao, I. K. (1983) has written an

introductory text book on quantitative methods, second part of which deals with bibliometrics. Peritz (1988) has analysed period from 1960-1985 the bibliographies prepared 3225 items of which 2675 were papers in journals and proceedings. Rests 550 were reports, dissertations, collected works, monographs etc. Singh SP (2004) has elaborated discussed on Styles of bibliographical citation. Nikhil Kumar Sardar, (2014) has discussed detailed study of recency of cited items appended in the articles published in journal of algebra and discrete mathematics. Khan Swapan (2012) has discussed A Study of recency of cited items appended in the articles published in Journal of Documentation. These types of study are not done very much .It is a new aspects of worthwhile area of research in the field of library science. The lists are obviously incomplete but sufficiently good enough for an indication of the trends.

THE SCIENTOMETRIC JOURNAL

Scientometrics journal is an International Journal for all Quantitative Aspects of the Science of Science, Communication in Science and Science Policy. ISSN: 0138-9130 (Print) 1588-2861 (Online). Totally 115 volumes and 354 issues were produced 5491 articles found from the respective journal website:<https://link.springer.com/journal/11192>.its starts from 1978 for research publication from various science disciplines. The journal publishes original studies, short communications, preliminary reports, review papers, letters to the editor and book reviews on scientometrics. Due to its fully interdisciplinary character, the journal is indispensable to research workers and research administrators. It provides valuable assistance to librarians and documentalists in central scientific agencies, ministries, research institutes and laboratories. Scientometrics includes the Journal of Research Communication Studies. Consequently its aims and scope cover that of the latter, namely, to bring the results of such investigations together in one place. This journal's impact factor is 2.173 on 2018.

OBJECTIVES OF THE STUDY

The following are the objectives of the study:

1. To find the number of cited documents of references per articles.
2. To find the number of articles published in each year.
3. To find the number of citations appeared in each year.
4. To find the year wise collection of articles and citations.
5. To find the recency of cited documents.
6. To find the weighted recency of cited documents.
7. To find the average weighted recency of references appeared in the articles published in the Journal of Scienometrics for a period of three years 2015-2017

DATA COLLECTION

The articles published in the Journal of "Scienometrics" for the period from 2015 to 2017 has been taken into consideration. There are various types of cited items like books, thesis, dissertations, websites etc. in the references of articles. Here all types of cited items have been included for this study. Total number of published articles and citations are respectively 1141 and 45884 during the period mentioned. Due to complication of data analysis using this large number of population, a representative of sample size has been taken. Out of 1141 articles, 366 articles which contain

14616 citations have been selected for 2015 using stratified sampling method. The detail descriptions of the collected data are given in a table -1 below.

Table-1: Year wise collection of articles and citations

Year	No. of Articles	Cumulative	No. of citations	Cumulative
2015	366 (32.08)	366	14616 (31.85)	14616
2016	379 (33.22)	745	14730 (32.10)	29346
2017	396 (34.71)	1141	16538 (36.04)	45884
Total	1141		45884	

NUMERICAL EXPLANATION OF RECENCY AND WEIGHTED RECENCY:

In order to find out the recency of cited articles, each of the citation years (i.e., the years of publication of cited items) is subtracted from the article year (the year of publication of the article which contains cited items) individually and then 1 is divided by each such difference. This formula for recency has the following implication. The more is the recency the larger is the recency value and vice - versa. On the other hand, the less is the recency the smaller is the recency value and vice - versa. Also the recency values lies between 0 to more than one thousand.

What we have said about the definition of recency above is illustrated below by taking a particular case. If a citation year is 1995 with an article year 2017, then the difference is 22 years and the recency of the article for the citation is $\frac{1}{22} = 0.0455$.

On the other hand if the recency, for a citation for article year 2017, is 0.2 then the difference between the citation and the article year is 5 years (Thus one can easily determine the recency if the difference between the publication year and citation year are known & in the opposite direction one can easily determine the difference if the recency is known. But if the frequency of a particular citation year is taken into consideration then one obtains the weighted recency.

Weighted recency is defined as the product of recency and the frequency of the citation year. For a particular publication year if the weighted recency of a citation year is known then frequency of the citation year can be easily determined e.g. if the publication year 2012 and the citation year is 2010 the weighted recency for the year 2010 is w then the frequency of the citation is $= \frac{w}{\text{recency}} = \frac{w}{0.5} (0.5 = \frac{1}{2012 - 2010})$

INTERPRTATION OF DATA:

The below Table 2 indicated in tabular form the year wise recency of the articles published in Journal of “Scientometrics” for three consecutive years (2015, 2016 and 2017).

R_{cy} stands for the recency of citations for the year Y , Y_{a17} for the Article measuring Year 2017, Y_c for the Citation Year and F_{c17} for the Frequency of citations.

Then Recency = $\frac{1}{Y_{a17} - Y_c}$, Weighted Recency = $F_{c17} \times \frac{1}{Y_{a17} - Y_c}$

Table -2: Showing recency of citation for the articles published in the year 2017

Y_c	F_{c17}	$Y_{a17} - Y$	$\frac{1}{Y_{a17} - Y_c}$	$F_{c17} \times \frac{1}{Y_{a17} - Y_c}$	Y_c	F_{c17}	$Y_{a17} - Y$	$\frac{1}{Y_{a17} - Y_c}$	$F_{c17} \times \frac{1}{Y_{a17} - Y_c}$
1701	1	316	0.0032	0.003	1965	40	52	0.0192	0.769
1776	1	241	0.0041	0.004	1966	20	51	0.0196	0.392
1799	1	218	0.0046	0.005	1967	34	50	0.0200	0.680
1805	1	212	0.0047	0.005	1968	28	49	0.0204	0.571
1831	7	186	0.0054	0.038	1969	19	48	0.0208	0.396
1832	1	185	0.0054	0.005	1970	24	47	0.0213	0.511
1866	2	151	0.0066	0.013	1971	25	46	0.0217	0.543
1870	1	147	0.0068	0.007	1972	26	45	0.0222	0.578
1881	1	136	0.0074	0.007	1973	64	44	0.0227	1.455
1891	1	126	0.0079	0.008	1974	36	43	0.0233	0.837
1896	1	121	0.0083	0.008	1975	25	42	0.0238	0.595
1901	1	116	0.0086	0.009	1976	48	41	0.0244	1.17
1904	2	113	0.0088	0.018	1977	39	40	0.0250	0.98
1911	1	106	0.0094	0.009	1978	43	39	0.0256	1.10
1916	1	101	0.0099	0.010	1979	72	38	0.0263	1.89
1917	1	100	0.0100	0.010	1980	44	37	0.0270	1.19
1920	3	97	0.0103	0.031	1981	42	36	0.0278	1.17
1921	2	96	0.0104	0.021	1982	50	35	0.0286	1.43
1926	10	91	0.0110	0.110	1983	62	34	0.0294	1.82
1927	3	90	0.0111	0.033	1984	53	33	0.0303	1.61
1932	2	85	0.0118	0.024	1985	53	32	0.0313	1.66
1934	7	83	0.0120	0.084	1986	72	31	0.0323	2.32
1935	4	82	0.0122	0.049	1987	65	30	0.0333	2.17
1936	2	81	0.0123	0.025	1988	92	29	0.0345	3.17
1937	2	80	0.0125	0.025	1989	94	28	0.0357	3.36
1938	2	79	0.0127	0.025	1990	129	27	0.0370	4.78
1939	5	78	0.0128	0.064	1991	108	26	0.0385	4.15
1940	2	77	0.0130	0.026	1992	112	25	0.0400	4.48

1941	5	76	0.0132	0.066	1993	101	24	0.0417	4.21
1942	5	75	0.0133	0.067	1994	151	23	0.0435	6.57
1943	7	74	0.0135	0.095	1995	150	22	0.0455	6.82
1944	4	73	0.0137	0.055	1996	173	21	0.0476	8.24
1945	7	72	0.0139	0.097	1997	211	20	0.0500	10.55
1946	1	71	0.0141	0.014	1998	231	19	0.0526	12.16
1947	2	70	0.0143	0.029	1999	232	18	0.0556	12.89
1948	8	69	0.0145	0.116	2000	258	17	0.0588	15.18
1949	5	68	0.0147	0.074	2001	306	16	0.0625	19.13
1950	3	67	0.0149	0.045	2002	396	15	0.0667	26.40
1951	3	66	0.0152	0.045	2003	424	14	0.0714	30.29
1952	3	65	0.0154	0.046	2004	478	13	0.0769	36.77
1953	2	64	0.0156	0.031	2005	609	12	0.0833	50.75
1954	5	63	0.0159	0.079	2006	638	11	0.0909	58.00
1955	14	62	0.0161	0.226	2007	679	10	0.1000	67.90
1956	7	61	0.0164	0.115	2008	760	9	0.1111	84.44
1957	9	60	0.0167	0.150	2009	841	8	0.1250	105.13
1958	8	59	0.0169	0.136	2010	975	7	0.1429	139.29
1959	11	58	0.0172	0.190	2011	924	6	0.1667	154.00
1960	12	57	0.0175	0.211	2012	1003	5	0.2000	200.60
1961	11	56	0.0179	0.196	2013	1089	4	0.2500	272.25
1962	14	55	0.0182	0.255	2014	1240	3	0.3333	413.33
1963	27	54	0.0185	0.500	2015	1362	2	0.5000	681.00
1964	18	53	0.0189	0.340	2016	1529	1	1.0000	1529.00
						16538			3637.494

Therefore, the Weighted Recency of Citation for the year 2017 WR_{c2017} , So, $WR_{c2017} = \sum F_{c17} \times \frac{1}{Y_{a17} - Y_c} = 3637.494$

Total number of citation (N) = 16538 (where $N = (\sum F_{c17})$).

Average Weighted Recency of Citation (AWRc2017) = $WR_{c2017}/N = 3637.494/16538 = 0.2415$

The highest value of weighted recency is 1529, achieved in the year 2016 and the next highest weighted recency is little more than which is attained in the 2015 and 2014. Thus we can say that the authors have collected more information from this period. This

indicates that the topics on which the articles are written in the journal under consideration in the year 2017 are very much of recent interest.

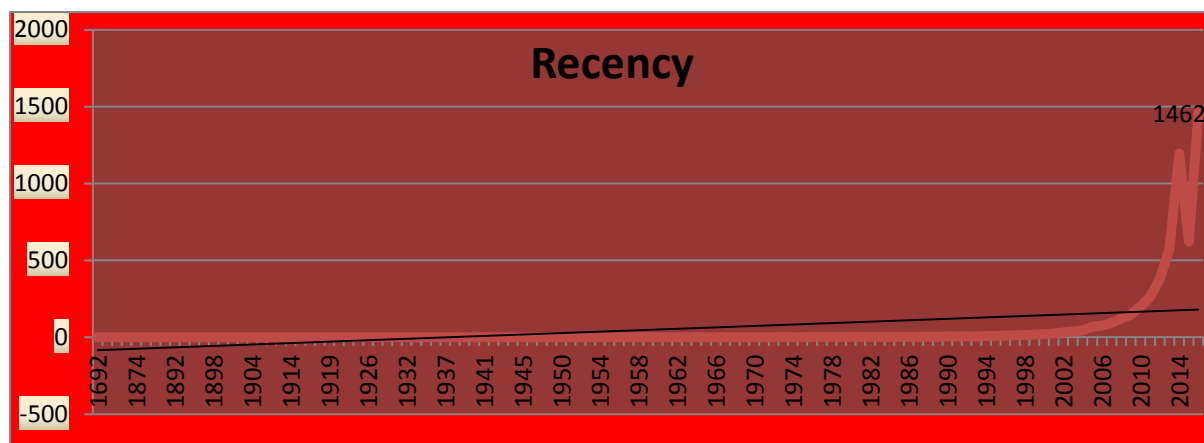


Figure 1: Weighted recency for articles in the year of 2017

The following results have been detected from the above table 2 and figure 1:

- The graph shows the classification of 50 years gap. The oldest cited year is 1701
- Till the year 1957 starting from the year 1903, the weighted recency is very small and from the graph it appears to be 0.
- 1973 onwards the weighted recency appears to take nonzero values.
- From the year 1976 onwards the weighted recency crosses the value 1
- From the year 1986 onwards the weighted recency crosses the value 2
- From the year 1988 onwards the weighted recency crosses the value 3
- From the year 1990 onwards the weighted recency crosses the value 4
- From the year 2000 onwards the weighted recency crosses the value 15

From the graph it is clear that weighted recency is significant (≥ 1) from the year 1976 onwards. It is more or less steadily increasing. The highest value of weighted recency is 1529, achieved in the year 2016 and the next highest weighted recency is little more than which is attained in the 2015 and 2014. Thus we can say that the authors have collected more information from this period. This indicates that the topics on which the articles are written in the journal under consideration in the year 2017 are very much of recent interest.

Table -3: Showing recency of citation for the articles published in the year 2016

Y_c	F_{c16}	$Y_{a16} - Y$	$\frac{1}{Y_{a16} - Y_c}$	$F_{c16} \times \frac{1}{Y_{a16} - Y_c}$	Y_c	F_{c16}	$Y_{a16} - Y$	$\frac{1}{Y_{a16} - Y_c}$	$F_{c16} \times \frac{1}{Y_{a16} - Y_c}$
1713	1	303	0.0033	0.0033	1959	11	57	0.0175	0.1930
1781	1	235	0.0043	0.0043	1960	10	56	0.0179	0.1786
1785	1	231	0.0043	0.0043	1961	10	55	0.0182	0.1818
1805	1	211	0.0047	0.0047	1962	15	54	0.0185	0.2778
1868	1	148	0.0068	0.0068	1963	27	53	0.0189	0.5094
1880	1	136	0.0074	0.0074	1964	19	52	0.0192	0.3654
1881	1	135	0.0074	0.0074	1965	24	51	0.0196	0.4706
1882	1	134	0.0075	0.0075	1966	11	50	0.0200	0.2200
1884	1	132	0.0076	0.0076	1967	11	49	0.0204	0.2245
1886	3	130	0.0077	0.0231	1968	23	48	0.0208	0.4792
1893	1	123	0.0081	0.0081	1969	20	47	0.0213	0.4255
1895	1	121	0.0083	0.0083	1970	30	46	0.0217	0.6522
1896	3	120	0.0083	0.0250	1971	11	45	0.0222	0.2444
1900	2	116	0.0086	0.0172	1972	35	44	0.0227	0.7955
1901	2	115	0.0087	0.0174	1973	44	43	0.0233	1.0233
1902	1	114	0.0088	0.0088	1974	21	42	0.0238	0.5000
1903	2	113	0.0088	0.0177	1975	22	41	0.0244	0.5366
1904	4	112	0.0089	0.0357	1976	34	40	0.0250	0.8500
1907	1	109	0.0092	0.0092	1977	43	39	0.0256	1.1026
1908	1	108	0.0093	0.0093	1978	41	38	0.0263	1.0789
1909	1	107	0.0093	0.0093	1979	70	37	0.0270	1.8919
1911	2	105	0.0095	0.0190	1980	36	36	0.0278	1.0000
1912	2	104	0.0096	0.0192	1981	36	35	0.0286	1.0286
1913	1	103	0.0097	0.0097	1982	32	34	0.0294	0.9412
1914	2	102	0.0098	0.0196	1983	47	33	0.0303	1.4242
1917	1	99	0.0101	0.0101	1984	54	32	0.0313	1.6875
1923	1	93	0.0108	0.0108	1985	66	31	0.0323	2.1290

1925	1	91	0.0110	0.0110	1986	65	30	0.0333	2.1667
1926	6	90	0.0111	0.0667	1987	47	29	0.0345	1.6207
1927	7	89	0.0112	0.0787	1988	74	28	0.0357	2.6429
1928	1	88	0.0114	0.0114	1989	78	27	0.0370	2.8889
1929	1	87	0.0115	0.0115	1990	116	26	0.0385	4.4615
1931	1	85	0.0118	0.0118	1991	121	25	0.0400	4.8400
1932	3	84	0.0119	0.0357	1992	133	24	0.0417	5.5417
1933	1	83	0.0120	0.0120	1993	104	23	0.0435	4.5217
1934	4	82	0.0122	0.0488	1994	157	22	0.0455	7.1364
1935	3	81	0.0123	0.0370	1995	136	21	0.0476	6.4762
1936	3	80	0.0125	0.0375	1996	200	20	0.0500	10.0000
1937	3	79	0.0127	0.0380	1997	202	19	0.0526	10.6316
1938	3	78	0.0128	0.0385	1998	239	18	0.0556	13.2778
1939	4	77	0.0130	0.0519	1999	216	17	0.0588	12.7059
1940	1	76	0.0132	0.0132	2000	262	16	0.0625	16.3750
1941	1	75	0.0133	0.0133	2001	364	15	0.0667	24.2667
1942	1	74	0.0135	0.0135	2002	374	14	0.0714	26.7143
1944	5	72	0.0139	0.0694	2003	408	13	0.0769	31.3846
1945	4	71	0.0141	0.0563	2004	462	12	0.0833	38.5000
1947	2	69	0.0145	0.0290	2005	548	11	0.0909	49.8182
1948	13	68	0.0147	0.1912	2006	579	10	0.1000	57.9000
1949	6	67	0.0149	0.0896	2007	688	9	0.1111	76.4444
1950	6	66	0.0152	0.0909	2008	708	8	0.1250	88.5000
1951	6	65	0.0154	0.0923	2009	788	7	0.1429	112.5714
1952	2	64	0.0156	0.0313	2010	906	6	0.1667	151.00
1953	9	63	0.0159	0.1429	2011	1018	5	0.2000	203.60
1954	1	62	0.0161	0.0161	2012	982	4	0.2500	245.50
1955	12	61	0.0164	0.1967	2013	1074	3	0.3333	358.00
1956	4	60	0.0167	0.0667	2014	1244	2	0.5000	622.00
1957	7	59	0.0169	0.1186	2015	1462	1	1.0000	1462.00
1958	11	58	0.0172	0.1897		14730			3676.1398

Therefore, the Weighted Recency of Citation for the year 2016 WRc2016. So, $WRC_{2016} = \sum F_{c16} \times \frac{1}{Y_{a16} - Y_c} = 3676.1398$

Total number of citation (N) =14730 (where N= (ΣF_{c16}))

Average Weighted Recency of Citation (AWRc2016) =WRc2016/N=3676.1398/14730=0.249568

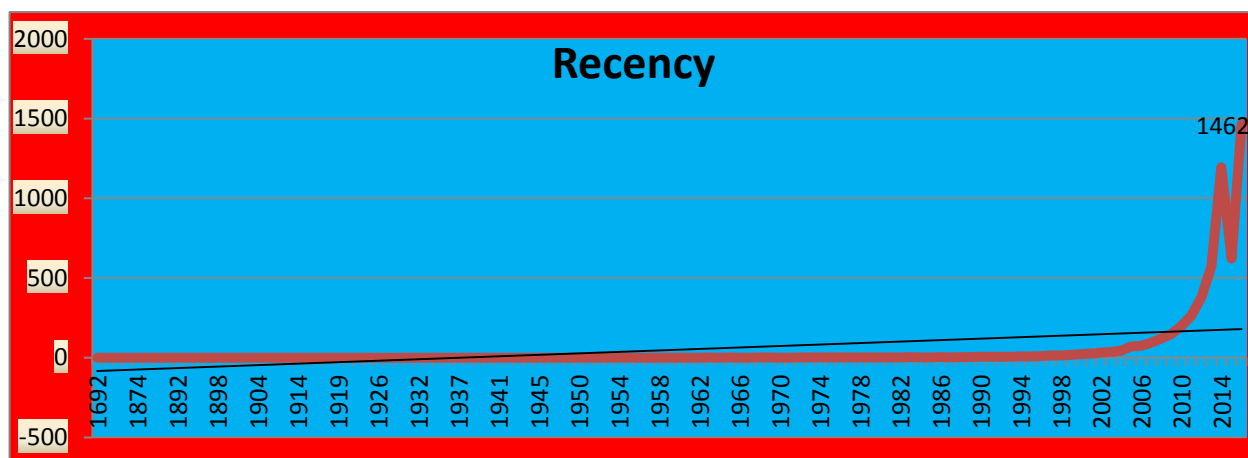


Figure 2: Weighted recency for articles in the year of 2016

The following results have been detecting from the above table 3 and figure 2:

- The graph shows the classification of 50 years gap. The oldest cited year is 1713
- Till the year 1957 starting from the year 1903, the weighted recency is very small and from the graph it appears to be 0.
- From the year 1977 onwards the weighted recency crosses the value 1
- From the year 1984 onwards the weighted recency crosses the value 2
- From the year 1990 onwards the weighted recency crosses the value 4
- From the year 1996 onwards the weighted recency crosses the value 10
- From the year 2000 onwards the weighted recency crosses the value 15

From the graph it is clear that weighted recency is significant (≥ 1) from the year 1976 onwards. It is more or less steadily increasing. The highest value of weighted recency is 1462, achieved in the year 2015 and the next highest weighted recency is little more than which is attained in the 2014, 2013 and 2011. Thus we can say that the authors have collected more information from this period. This indicates that the topics on which the articles are written in the journal under consideration in the year 2016 are very much of recent interest.

The following results have been detecting from the above table 4 and figure 3:

- The graph shows the classification of 50 years gap. The oldest cited year is 1692
- Till the year 1692 starting from the year 1975 except 1973, the weighted recency is very small and from the graph it appears to be 0.
- From the year 1977 onwards the weighted recency crosses the value 1
- From the year 1984 onwards the weighted recency crosses the value 2
- From the year 1988 onwards the weighted recency crosses the value 3
- From the year 1990 onwards the weighted recency crosses the value 5
- From the year 1997 onwards the weighted recency crosses the value 12

Table -3: Showing recency of citation for the articles published in the year 2015

Y_c	F_{c15}	$Y_{a15} - Y$	$\frac{1}{Y_{a15} - Y_c}$	$F_{c15} \times \frac{1}{Y_{a15} - Y_c}$	Y_c	F_{c15}	$Y_{a15} - Y$	$\frac{1}{Y_{a15} - Y_c}$	$F_{c15} \times \frac{1}{Y_{a15} - Y_c}$
1692	1	323	0.00310	0.00310	1959	8	56	0.01786	0.14286
1776	1	239	0.00418	0.00418	1960	6	55	0.01818	0.10909
1845	1	170	0.00588	0.00588	1961	7	54	0.01852	0.12963
1871	1	144	0.00694	0.00694	1962	19	53	0.01887	0.35849
1874	2	141	0.00709	0.01418	1963	33	52	0.01923	0.63462
1880	1	135	0.00741	0.00741	1964	16	51	0.01961	0.31373
1882	1	133	0.00752	0.00752	1965	31	50	0.02000	0.62000
1884	1	131	0.00763	0.00763	1966	19	49	0.02041	0.38776
1892	1	123	0.00813	0.00813	1967	17	48	0.02083	0.35417
1893	1	122	0.00820	0.00820	1968	27	47	0.02128	0.57447
1896	2	119	0.00840	0.01681	1969	31	46	0.02174	0.67391
1897	1	118	0.00847	0.00847	1970	20	45	0.02222	0.44444
1898	1	117	0.00855	0.00855	1971	15	44	0.02273	0.34091
1900	1	115	0.00870	0.00870	1972	35	43	0.02326	0.81395
1901	3	114	0.00877	0.02632	1973	59	42	0.02381	1.40476
1903	1	112	0.00893	0.00893	1974	36	41	0.02439	0.87805
1904	1	111	0.00901	0.00901	1975	27	40	0.02500	0.67500
1905	1	110	0.00909	0.00909	1976	45	39	0.02564	1.15385
1906	1	109	0.00917	0.00917	1977	44	38	0.02632	1.15789
1912	1	103	0.00971	0.00971	1978	45	37	0.02703	1.21622
1914	1	101	0.00990	0.00990	1979	86	36	0.02778	2.38889
1915	2	100	0.01000	0.02000	1980	43	35	0.02857	1.22857
1916	1	99	0.01010	0.01010	1981	52	34	0.02941	1.52941
1917	1	98	0.01020	0.01020	1982	47	33	0.03030	1.42424
1919	1	96	0.01042	0.01042	1983	87	32	0.03125	2.71875
1921	1	94	0.01064	0.01064	1984	53	31	0.03226	1.70968
1922	3	93	0.01075	0.03226	1985	66	30	0.03333	2.20000
1923	1	92	0.01087	0.01087	1986	78	29	0.03448	2.68966
1926	15	89	0.01124	0.16854	1987	64	28	0.03571	2.28571
1927	1	88	0.01136	0.01136	1988	93	27	0.03704	3.44444

1928	1	87	0.01149	0.01149	1989	80	26	0.03846	3.07692
1929	1	86	0.01163	0.01163	1990	137	25	0.04000	5.48000
1932	1	83	0.01205	0.01205	1991	122	24	0.04167	5.08333
1933	3	82	0.01220	0.03659	1992	132	23	0.04348	5.73913
1934	15	81	0.01235	0.18519	1993	114	22	0.04545	5.18182
1935	4	80	0.01250	0.05000	1994	177	21	0.04762	8.42857
1937	2	78	0.01282	0.00000	1995	157	20	0.05000	7.85000
1938	4	77	0.01299	0.05195	1996	187	19	0.05263	9.84211
1939	7	76	0.01316	0.09211	1997	237	18	0.05556	13.16667
1940	3	75	0.01333	0.04000	1998	247	17	0.05882	14.52941
1941	2	74	0.01351	0.02703	1999	270	16	0.06250	16.87500
1942	3	73	0.01370	0.04110	2000	324	15	0.06667	21.60000
1943	3	72	0.01389	0.04167	2001	355	14	0.07143	25.35714
1944	3	71	0.01408	0.04225	2002	406	13	0.07692	31.23077
1945	2	70	0.01429	0.02857	2003	438	12	0.08333	36.50000
1947	3	68	0.01471	0.04412	2004	479	11	0.09091	43.54545
1948	10	67	0.01493	0.14925	2005	690	10	0.10000	69.00000
1949	8	66	0.01515	0.12121	2006	669	9	0.11111	74.33333
1950	2	65	0.01538	0.03077	2007	750	8	0.12500	93.75000
1951	6	64	0.01563	0.09375	2008	844	7	0.14286	120.57143
1952	4	63	0.01587	0.06349	2009	891	6	0.16667	148.500
1953	9	62	0.01613	0.14516	2010	995	5	0.20000	199.000
1954	3	61	0.01639	0.04918	2011	1053	4	0.25000	263.250
1955	11	60	0.01667	0.18333	2012	1134	3	0.33333	378.000
1956	5	59	0.01695	0.08475	2013	1144	2	0.50000	572.000
1957	11	58	0.01724	0.18966	2014	1195	1	1.00000	1195.00
1958	5	57	0.01754	0.08772		14616			3403.29045

Therefore, the Weighted Recency of Citation for the year 2015 WR_{c2015}. So, $WR_{c2015} = \sum F_{c15} \times \frac{1}{Y_{a15} - Y_c} = 3403.2904$

Total number of citation (N) =14616 (where N= (ΣF_{c15})

Average Weighted Recency of Citation (AWR_{c2015}) =WR_{c2015}/N=3403.2904/14616 = 0.2328.

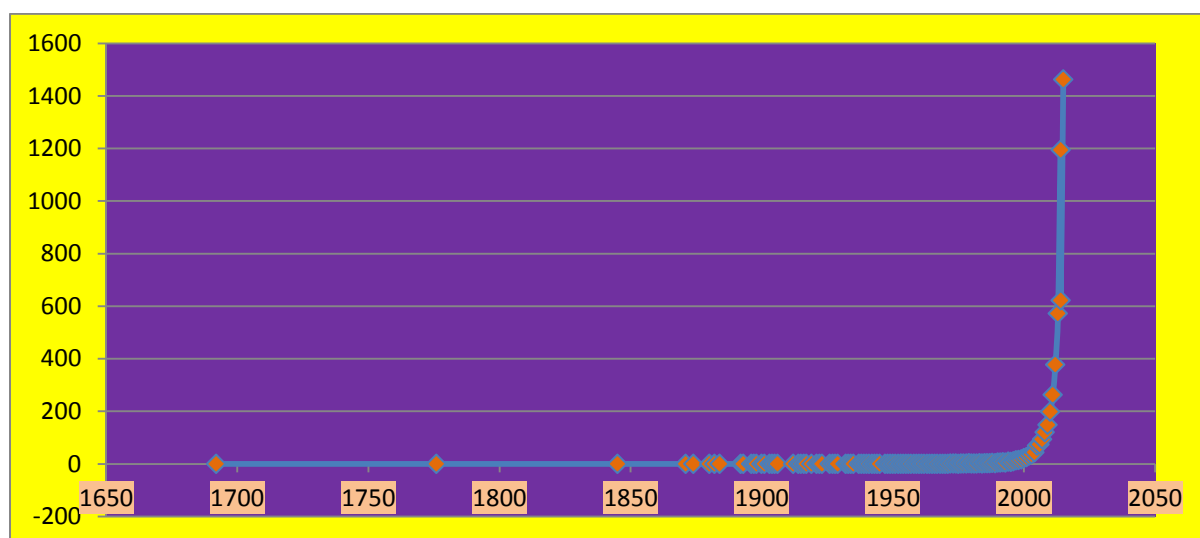


Figure 3: Weighted recency for articles in the year of 2015

From the graph it is clear that weighted recency is significant (≥ 1) from the year 1976 onwards. It is more or less steadily increasing. The highest value of weighted recency is 1195, achieved in the year 2014 and the next highest weighted recency is little more than which is attained in the 2013, 2012 and 2011. Thus we can say that the authors have collected more information from this period. This indicates that the topics on which the articles are written in the journal under consideration in the year 2015 are very much of recent interest.

Table-4: Year wise total citation and average weighted recency

Year	Number of Citations (N)	WR _{cy}	AWR _{cy}
2015	14616 (31.85)	3403.29045	0.2328
2016	14730 (32.10)	3676.1398	0.2496
2017	16538 (36.04)	3637.494	0.2415

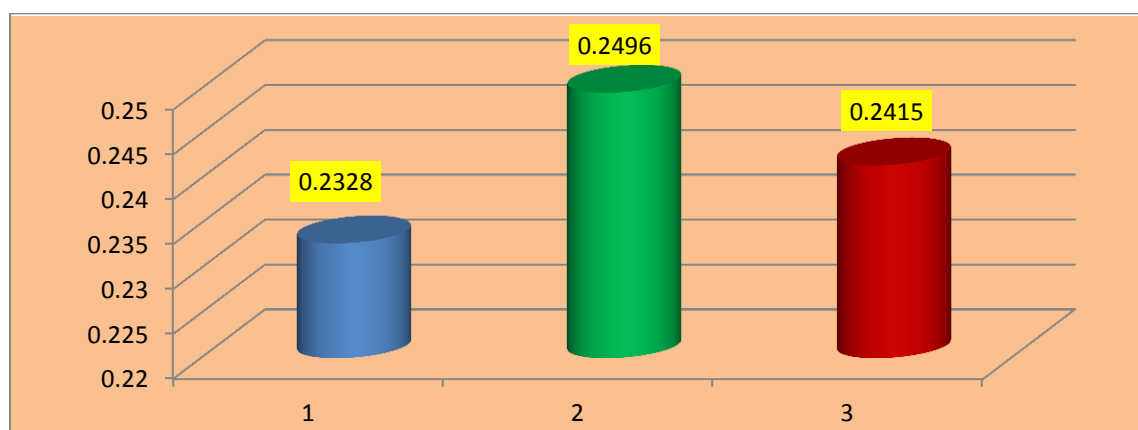


Figure 4: Year wise Average Weighted recency for articles

The above diagram gives a comparative picture of average weighted recency for the 3 years (2015, 2016&2017) Total number of citations (N) is more in 2017 than other two years. As total weighted recency (WR_{cy}) is indirectly dependent on N, the average weighted recency

(AWRcy) is the best tool to compare year wise recency of citation. Average Weighted Recency is high in 2016 which means the citations of the articles published in 2016 are of more recent origin than those of other two years.

CONCLUSION

Citation analysis covers many aspects of the citing and cited items. The present study has covered one of the aspects of it namely recency. Recency can be viewed as an indicator to Information seeking behaviour of researchers, Availability and accessibility of the used documents, Nature of the discipline, Currentness of the subjects/topics on which articles are written and One can make similar studies to foresee some more new things from citation pattern in different journals. There is a scope to make recency index by taking all the recency point of the published articles in a journal. This recency index will be useful to measure recency of articles, year-wise impact of an article, comparison among articles, author's impact in recency or authors rank and so on. Recency index of all journals on a particular subject can also be used for alternative journal ranking.

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