

Recency Pattern Of Citations In The Published Articles Of Forensic Pathology During 1989 To 2020

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Abstract

In this article, we investigate the trends of cited articles and their recency value, weighted recency, and average weighted recency for the articles published in the subject of Forensic Pathology from 1989 to 2020 by using statistical methods. It is clear from this study that articles published in 2019 had a greater weighted rate of recency of citation than those published in the other two years. As a result, the articles published in 2011 are more recent than those published in the previous two years.

Keywords: Analyzing citations, Recency, Weighted Recency, Recency Index, Citation Pattern

INTRODUCTION

Bibliometric analysis of citations is one of the older and more important branches of bibliometrics. An evaluation of article, a review paper, a technical communication, a thesis, a book, and other types of citation data is carried out. Bibliometrics can generate a rich landscape of connections relating to authors, works, journals, fields, or even nations, including those linking authors, works, journals, fields, or nations. In the literature, various citation analyses have been proposed. Citations have been discussed in relation to their various aspects. Reference analysis measures include bibliographic coupling, co-citations, impact factors, and citation impacts. Researchers do not place enough emphasis on recent citations. It is not only important to list recent citations of a topic to reflect its origin, relevance now or in the past, but also to indicate the journal's quality.

CITATION ANALYSIS

A study of citations is called citation analysis. Citation analysis analyses the frequency, patterns, and graphs of citations in articles and books. Citations in scholarly works are used to

establish links to other works and researchers. Citation analysis is one of the most widely used bibliometric methods (Rubin, 2010).

SURVEY OF LITERATURE REVIEW

Bibliometrics is now being pursued vigorously. The research in library and information science journals has been estimated to be 25 percent devoted to bibliometrics. In addition to articles in social science journals, there are often articles in bibliometrics journals. There have been several articles and books published on bibliometric development. Bibliometric publications dating back over two decades were collected by Alan Pritchard (1981). He and Wittig (1981) edited a book containing 600 items published during 1874-1959. There were 3225 items counted by Peritz (1988), of which 2675 were journals and proceedings. Rest 550 consisted of dissertations, reports, collected works, and monographs, etc.

In 1987 (written in 1985), the Encyclopaedia of Library and Information Science published the most comprehensive historical review. However, Hertzels history has some obvious flaws. As for the status of publications from 1874 to 1917, Prichard does not mention Campbell's work (1898) or cite it. Despite the reviewer's assertion, Estoup did not also anticipate the Zipf relation in 1916. Fairthorne noted this in 1969, in an article that was not regarded as seminal, but considered important. Bibliometrics has a rich historical record from 1917 to 1973 as summarized by Hertzels in his historical review. They examined Cole and Eales' History of comparative anatomy, a book on statistics from Hulme. In Lotka, Gross & Gross, Garfield's citation index for science in 1955, Small's article on concept symbols in 1978, and Cronin's 1981 paper on citing, the citation count was first cited. In 1985, a citation context analysis of articles from neuro-pharmacology and the sociology of science was investigated., Bandopadhyas paper on Citation analysis used to analyze doctoral dissertations in mathematics in 1996, Singh's paper on bibliographical citation styles in 2004, PillaiRajan and Shudhier's paper on citations in physics dissertations in 2007, Verma and Thakur's paper., A study of the recency of cited items in the articles appended to articles published in Journal of Documentation in 2012. This type of Studies is rare. In the field of Library Science, it represents a new aspect of worthwhile research. Though incomplete, the lists provide a good indication of trends.

ORGANIZATION OF THE PAPER

First, we frame the objectives of the study and briefly describe the data collection methodology, limitations, and method of analysis. In addition, explain what citation means, why cited works are necessary, and how the researcher used different references. Recency value and weighted recency must be calculated from the cited references. For further analysis, the collected data is converted to a tabular format and then a graphical representation is generated. The chart in the title shows the year-by-year results for the total sample of years (1989 to 2020). The last step is to pull together a bar chart showing the weighted average of the weighted recency over the years.

OBJECTIVES

Our study aims to accomplish the following:

1. To determine number of articles published each year.
2. To find out how many references are cited each year.
3. To determine the number of citations in each year.
4. To Determining the recency value and weighted recency value of cited references.
5. To Determine the average weighted recency of references appearing in forensic pathology articles for 1989-2020.

DATA COLLECTION

The data was collected from Web of Knowledge database on the month of November 2020, so its shows the 2020 year publications is less than the previous year publications. Forensic Pathology is the key term during the time period of 1989 to 2020. In the references, various types of cited items are included, such as books, theses, dissertations, websites, etc. For this study, all types of cited items have been included. No citations without a publication year were included in this analysis, and no citations for reviews or editorials were analyzed. This study includes self-citations from the authors as well as co-author citations with a total of 2766 published articles, 78564 cited references, and 32184 global citations. Among the 2766 articles in 2019, there were 197 articles with 6630 cited references. Table 1 provides a detailed description of the collected data.

Table-1: Year wise collection of articles and citations

Year	Art ls.	cited ref	GCS	Year	Article s	cited ref	GCS
1989	8	34	9	2005	66	1934	2008
1990	11	111	24	2006	51	1186	1294
1991	23	313	411	2007	80	2091	1403
1992	27	506	559	2008	92	2230	1379
1993	31	556	532	2009	103	2845	1347
1994	36	551	941	2010	120	3622	1715
1995	23	383	428	2011	124	3364	1252
1996	48	991	1884	2012	154	4200	1632
1997	46	910	1204	2013	144	4296	1465
1998	67	1373	1311	2014	153	4818	1272
1999	45	1047	1068	2015	161	4659	1134
2000	45	1031	862	2016	189	6325	883
2001	64	1188	1049	2017	158	6100	718
2002	48	1138	1043	2018	179	5747	494
2003	48	1090	1613	2019	197	6630	278
2004	45	860	897	2020	180	6435	75
				Total	2766	78564	32184

In Table 1, find data for 32 years of published articles in the area of Forensic Pathology, total global citations, and cited references. The year 2019 has the highest number of publications and cited references, followed by 2020. The year 2005 has the most global citations.

Most productive authors

Table2: Most productive authors of Forensic Pathology

Authors	Artl s.	cited ref	GCS	Authors	Article s	cited ref	GCS
Maeda H	48	1841	859	Zoja R	35	1020	102
Thali MJ	42	1229	1514	Byard RW	33	800	181
Ishikawa T	38	1864	684	Cattaneo C	33	1022	246
Michiue T	38	1646	679	Zivkovic V	33	685	129
Gentile G	36	1095	116	Zhu BL	32	1126	499
Nikolic S	36	751	140	Kondo T	31	1415	756
				Total	435 (15.73)	14494 (18.4)	5905 (18.35)

The table 2 represents the most prolific authors (7293 authors were contributed 11939 times) of the area of forensic pathology during 1989 to 2020. Only 12 (0.1%) of authors were identified the most productive authors due to their highest publications (above 30 articles). Those mentioned authors only published 435 (15.73%) of articles, 14494 (18.44%) of cited references and 5909 (18.35%) total global citations also identified the most prolific authors are “Maeda H”, “Thali MJ” and “Ishikawa T” respectively.

Most productive journals

Table 3: Most productive Journals of Forensic Pathology

Journals	Artls.	cited ref	GCS
Journal of Forensic Sciences	738	15351	9607
Forensic Science International	285	8702	3723
American jrl. of forensic medicine and pathology	251	5018	2173
International Journal of Legal Medicine	165	6393	2076
Forensic Science Medicine and Pathology	140	3663	776
Total	1579 (57.1)	39127 (49.8)	18355 (57.03)

The table 3 represents the most prolific journals (462 different sources), only 5 (1.08%) of journals were identified the most productive journals due to their highest publications (above 100 articles). Those mentioned journals were published 1579 (57.1%) of articles it is more than 50 percent of articles, 39127 (49.8%) of cited references and 5909 (57.03%) total global citations also identified the most prolific journal is “Journal of Forensic Sciences” respectively.

Most productive countries

Table 4: Most productive Countries of Forensic Pathology

Countries	Artl s.	cited ref	GCS	Countries	Artic les	cited ref	GCS
USA	670	17156	9335	UK	144	4780	2295
Italy	298	10175	2343	France	141	4067	1389
Japan	175	5519	2453	Switzerland	135	5629	2812
China	167	5013	1031	Canada	124	3531	2097
Germany	156	6197	2048	Australia	121	3390	1303
				Total	2131 (77.0)	65457 (83.3)	27106 (84.2)

The table 4 represents the most prolific Countries (90 countries), only 10 (11.1%) of countries to their highest publications (above 100 articles) for analysis. Those mentioned countries were published 2131(77.04%) of articles it is more than 75 percent of articles, 65457 (83.3%) of cited references and 27106 (84.2%) total global citations also identified the most prolific Country is “USA” respectively.

Highly cited references

Table 5: highly cited sources from Forensic Pathology research

Journals	Authors	cited times	Year
Journal of Forensic Sciences	Thali MJ	73	2003
Knights Forensic Pat	Saukkp P	50	2004
Radiographics	Dirnhofer R	42	2006
Forensic Pathology	Dimaio VJ	40	2001
Lancet	Roberts ISD	38	2012
Legal Medicine	Kondo Toshikazu	35	2007

The table 5 represents the most cited resources, only 6 resources were taken here based on their cited times (above 30 articles) for analysis. Those mentioned countries were published 2131(77.04%) of articles it is more than 75 percent of articles, 65457 (83.3%) of cited references and 27106 (84.2%) total global citations also identified the most prolific Country is “USA” respectively.

NUMERICAL EXPLANATION OF RECENCY AND WEIGHTED RECENCY

For citing articles, the citation year (i.e., the year of publication of cited items) is subtracted from the article year (the year of publication of the article containing cited items) and 1 is then divided by each such difference. The following implications follow from this formula for recency. As more recency is present, so larger is the value of recency, and vice versa. Alternatively, when the recency is less, the recency value is smaller and vice versa. In addition, the recency is always between 0 and 1 (except for an exceptional case discussed below). The following example illustrates what we have said about the definition of recency above. If a citation year is 1998 with an article year 2020, then the difference is 22 years and the recency of the article for the citation is $\frac{1}{22} = 0.045$.

Based on recent citation frequency and recency, weighed recency is computed. If the weighted recency of a particular citation year is known, then the frequency of the citation year can be easily calculated, for example. if the publication year 2012 and the citation year is 2020 the weighted recency for the year 2020 is w then the frequency of the citation is =

$$\frac{w}{recency} = \frac{w}{0.5} \left(0.5 = \frac{1}{2020 - 2012} \right)$$

TABULAR REPRESENTATION OF DATA:

Here the following tabular values are present the year wise recency of articles published in Forensic Pathology for sample consecutive years (1989 to 2020). Let us explain some of the notations used in the following tables. R_{cy} stands for the recency of citations for the year Y , Y_{a18} for the Article Year 2018, Y_c for the Citation Year and F_{c20} for the Frequency of

citations. Then $Recency = \frac{1}{Y_{a20} - Y_c}$, $Weighted\ Recency = F_{c20} \times \frac{1}{Y_{a20} - Y_c}$

Table - 6: Showing Recency of citation for the articles published during 1989-2020

Y_c	F_{c20}	$Y_{a20} - Y_c$	$\frac{1}{Y_{a20} - Y_c}$	$F_{c20} \times \frac{1}{Y_{a20} - Y_c}$	Y_c	F_{c20}	$Y_{a20} - Y_c$	$\frac{1}{Y_{a20} - Y_c}$	$F_{c20} \times \frac{1}{Y_{a20} - Y_c}$	Y_c	F_{c20}	$Y_{a20} - Y_c$	$\frac{1}{Y_{a20} - Y_c}$	$F_{c20} \times \frac{1}{Y_{a20} - Y_c}$
1276	1	744	0.001	0.001	1868	4	152	0.007	0.026	1945	21	75	0.013	0.280
1316	1	704	0.001	0.001	1869	1	151	0.007	0.007	1946	16	74	0.014	0.216
1543	3	477	0.002	0.006	1870	1	150	0.007	0.007	1947	48	73	0.014	0.658
1555	1	465	0.002	0.002	1871	3	149	0.007	0.020	1948	36	72	0.014	0.500
1564	1	456	0.002	0.002	1872	2	148	0.007	0.014	1949	46	71	0.014	0.648
1628	1	392	0.003	0.003	1873	2	147	0.007	0.014	1950	61	70	0.014	0.871
1633	1	387	0.003	0.003	1874	3	146	0.007	0.021	1951	85	69	0.014	1.232
1650	1	370	0.003	0.003	1875	4	145	0.007	0.028	1952	45	68	0.015	0.662
1684	1	336	0.003	0.003	1876	3	144	0.007	0.021	1953	51	67	0.015	0.761
1689	1	331	0.003	0.003	1877	6	143	0.007	0.042	1954	72	66	0.015	1.091
1707	2	313	0.003	0.006	1878	6	142	0.007	0.042	1955	53	65	0.015	0.815
1719	1	301	0.003	0.003	1879	5	141	0.007	0.035	1956	58	64	0.016	0.906
1737	1	283	0.004	0.004	1880	10	140	0.007	0.071	1957	69	63	0.016	1.095
1741	1	279	0.004	0.004	1881	8	139	0.007	0.058	1958	97	62	0.016	1.565
1761	2	259	0.004	0.008	1882	9	138	0.007	0.065	1959	87	61	0.016	1.426
1772	1	248	0.004	0.004	1883	6	137	0.007	0.044	1960	104	60	0.017	1.733
1780	1	240	0.004	0.004	1884	7	136	0.007	0.051	1961	118	59	0.017	2.000
1787	2	233	0.004	0.009	1885	12	135	0.007	0.089	1962	115	58	0.017	1.983
1794	1	226	0.004	0.004	1886	7	134	0.007	0.052	1963	178	57	0.018	3.123
1795	2	225	0.004	0.009	1887	7	133	0.008	0.053	1964	169	56	0.018	3.018
1797	2	223	0.004	0.009	1888	7	132	0.008	0.053	1965	168	55	0.018	3.055
1798	1	222	0.005	0.005	1889	7	131	0.008	0.053	1966	138	54	0.019	2.556

1799	2	221	0.005	0.009	1890	8	130	0.008	0.062	1967	167	53	0.019	3.151
1801	2	219	0.005	0.009	1891	2	129	0.008	0.016	1968	185	52	0.019	3.558
1802	2	218	0.005	0.009	1892	7	128	0.008	0.055	1969	202	51	0.020	3.961
1805	1	215	0.005	0.005	1893	12	127	0.008	0.094	1970	214	50	0.020	4.280
1806	1	214	0.005	0.005	1894	5	126	0.008	0.040	1971	224	49	0.020	4.571
1808	1	212	0.005	0.005	1895	8	125	0.008	0.064	1972	275	48	0.021	5.729
1809	1	211	0.005	0.005	1896	5	124	0.008	0.040	1973	227	47	0.021	4.830
1812	2	208	0.005	0.010	1897	10	123	0.008	0.081	1974	278	46	0.022	6.043
1814	4	206	0.005	0.019	1898	19	122	0.008	0.156	1975	317	45	0.022	7.044
1816	2	204	0.005	0.010	1899	7	121	0.008	0.058	1976	278	44	0.023	6.318
1817	3	203	0.005	0.015	1900	6	120	0.008	0.050	1977	345	43	0.023	8.023
1818	1	202	0.005	0.005	1901	9	119	0.008	0.076	1978	407	42	0.024	9.690
1819	1	201	0.005	0.005	1902	7	118	0.008	0.059	1979	342	41	0.024	8.341
1820	2	200	0.005	0.010	1903	5	117	0.009	0.043	1980	551	40	0.025	13.775
1821	1	199	0.005	0.005	1904	14	116	0.009	0.121	1981	386	39	0.026	9.897
1822	1	198	0.005	0.005	1905	21	115	0.009	0.183	1982	615	38	0.026	16.184
1825	5	195	0.005	0.026	1906	13	114	0.009	0.114	1983	563	37	0.027	15.216
1826	3	194	0.005	0.015	1907	10	113	0.009	0.088	1984	646	36	0.028	17.944
1828	1	192	0.005	0.005	1908	8	112	0.009	0.071	1985	718	35	0.029	20.514
1829	1	191	0.005	0.005	1909	10	111	0.009	0.090	1986	903	34	0.029	26.559
1830	5	190	0.005	0.026	1910	11	110	0.009	0.100	1987	820	33	0.030	24.848
1832	2	188	0.005	0.011	1911	15	109	0.009	0.138	1988	1026	32	0.031	32.063
1833	3	187	0.005	0.016	1912	13	108	0.009	0.120	1989	1149	31	0.032	37.065
1834	2	186	0.005	0.011	1913	9	107	0.009	0.084	1990	1363	30	0.033	45.433
1835	3	185	0.005	0.016	1914	9	106	0.009	0.085	1991	1343	29	0.034	46.310
1836	1	184	0.005	0.005	1915	7	105	0.010	0.067	1992	1322	28	0.036	47.214
1837	2	183	0.005	0.011	1916	10	104	0.010	0.096	1993	1667	27	0.037	61.741

1838	3	182	0.005	0.016	1917	37	103	0.010	0.359	1994	1449	26	0.038	55.731
1839	1	181	0.006	0.006	1918	9	102	0.010	0.088	1995	1429	25	0.040	57.160
1840	1	180	0.006	0.006	1919	6	101	0.010	0.059	1996	1462	24	0.042	60.917
1841	1	179	0.006	0.006	1920	14	100	0.010	0.140	1997	1390	23	0.043	60.435
1842	3	178	0.006	0.017	1921	17	99	0.010	0.172	1998	2076	22	0.045	94.364
1843	3	177	0.006	0.017	1922	18	98	0.010	0.184	1999	1604	21	0.048	76.381
1844	4	176	0.006	0.023	1923	17	97	0.010	0.175	2000	2363	20	0.050	118.150
1845	1	175	0.006	0.006	1924	22	96	0.010	0.229	2001	2224	19	0.053	117.053
1846	1	174	0.006	0.006	1925	22	95	0.011	0.232	2002	2396	18	0.056	133.111
1847	1	173	0.006	0.006	1926	15	94	0.011	0.160	2003	2496	17	0.059	146.824
1848	2	172	0.006	0.012	1927	22	93	0.011	0.237	2004	2873	16	0.063	179.563
1849	2	171	0.006	0.012	1928	29	92	0.011	0.315	2005	2892	15	0.067	192.800
1851	1	169	0.006	0.006	1929	24	91	0.011	0.264	2006	3060	14	0.071	218.571
1852	1	168	0.006	0.006	1930	34	90	0.011	0.378	2007	2988	13	0.077	229.846
1853	2	167	0.006	0.012	1931	22	89	0.011	0.247	2008	2857	12	0.083	238.083
1854	2	166	0.006	0.012	1932	26	88	0.011	0.295	2009	2798	11	0.091	254.364
1855	8	165	0.006	0.048	1933	33	87	0.011	0.379	2010	2774	10	0.100	277.400
1856	3	164	0.006	0.018	1934	35	86	0.012	0.407	2011	2779	9	0.111	308.778
1857	4	163	0.006	0.025	1935	23	85	0.012	0.271	2012	2661	8	0.125	332.625
1858	1	162	0.006	0.006	1936	21	84	0.012	0.250	2013	2495	7	0.143	356.429
1860	4	160	0.006	0.025	1937	25	83	0.012	0.301	2014	1969	6	0.167	328.167
1861	12	159	0.006	0.075	1938	28	82	0.012	0.341	2015	1921	5	0.200	384.200
1862	6	158	0.006	0.038	1939	31	81	0.012	0.383	2016	1766	4	0.250	441.500
1863	4	157	0.006	0.025	1940	36	80	0.013	0.450	2017	1159	3	0.333	386.333
1864	5	156	0.006	0.032	1941	30	79	0.013	0.380	2018	841	2	0.500	420.500
1865	2	155	0.006	0.013	1942	28	78	0.013	0.359	2019	328	1	1.000	328.000
1866	4	154	0.006	0.026	1943	25	77	0.013	0.325	2020	227	0	0	0

1867	3	153	0.007	0.020	1944	38	76	0.013	0.500				5.978	6329.66 7
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Using the table 6 analyses for recency of citations in forensic pathology articles published during 1989 to 2020, the following results are observed: The Weighted Recency Values (WRC) for articles published up to 1982 are very small (0.001 to 0.010). Between the years of 1853 and 1867, the WRC ranged from 0.012 to 0.20. From 1868 to 1948 there is a range of 0.0266 to 0.500 for WRC. There were no statistically significant differences in WRC between 1949 and 1956 except 1951 and 1954. In the years 1957 to 1961 except for 1962, WRC values range between 1.095 and 2.000; from 1963 to 1981 except for 1980, WRC values range from 3.123 to 9.897. Between 1982 and 1987, the WRC ranges from 16.184 to 24.848, except for 1986. During the years 1988-1999, the WRC ranges between 32,063 and 76,381. The citation level has steadily increased over 100 WRC since 2000. For articles published in the year 2020, the table 3 analyses for recency of citation show that 1276 is the oldest cited year. The WRC values from 1960 to the starting year were very small (i.e., below 1). There has been an increase of more than tenfold in WRC values since 1980. On the basis of weighted recency, this cross the 100 mark since 2000. It can be deduced that the highest weighted recency value was achieved in 2016 and the next highest value is just a little above that which is attained in 2018 and 2017. Therefore, that period from 2011 to 2019 provided more information to the authors. Thus, it appears that topics on Forensic Pathology of which articles will be written and considered in 2016 are of current interest. Therefore, the Weighted Recency of Citation for the years of 1989 to 2020 WRC₂₀₂₀.

$$\text{So, } WR_{c2020} = \sum F_{c20} \times \frac{1}{Y_{a20} - Y_c} = 6329.667$$

Total number of citation (N) = 78564 (where N = (ΣFc₂₀))

Average Weighted Recency of Citation (AWRC₂₀₁₅) = WRC₂₀₂₀/N = 3403.2904/14616 = 0.081.

CONCLUSION

Based on this study, we conclude the following: Citation analysis deals with various characteristics (including recency) of the cited and citing items compared to the researchers of Forensic Pathology. Library professionals can use the Recency of the published articles when weeding out and can get easy access to the topically citing articles based on the recency cited items, the availability of the used documents, the discipline, and the currentness of the topics/subjects they cover. Similar studies can be conducted to predict some other new things from citation patterns in different journals. Recency indexes can be made by adding up the recency points of all published articles in a journal. Recency indexes are useful for gauging the recency of articles, analyzing the impact of articles over time, comparing articles among themselves, and determining an author's importance on recency. Alternative journals rankings can be calculated using the recency indexes of all journals devoted to a subject.

REFERENCES

1. Amsaveni, N & Harikrishnan C A (2018). A scientometric Analysis of Environmental Management Research Output during 1989 to 2014. *Library Philosophy and Practice* (e – journal). 1846. June issue. <https://digital commons.unl.edu/libphilprac/1846>
2. Amsaveni, N.,& Ramesh K. (2016). Mapping of Research Productivity in Forensic Science: A Scientometric Analysis. *Journal of Advances in Information Science*, Vol. No. 5, Issue No. 4. Pp.372-378.
3. Amsaveni, N.,& Manikandan, M. (2014). Management Information System Research output: A Scientometric Study. *Journal of Current Trends in Library and Information Science: International Refereed Journal*. Vol. No. 1, Issue No. 1 & 2 April & October 2014. Pp.51 - 55. ISSN 2348 – 8395.
4. Amsaveni, N & Shivashankar KR (2019). A Study of Recency of Cited items appended in the Articles published in the journal of *Scientometrics*. *Think India (Quarterly Journal)*, SSN:0971-1260, Vol-22. Issue-3, July-September 2019. Pages, 2297 to 2411.
5. Amsaveni, N & Shivashankar KR (2019). Publication Trends in *Journal of Scientometrics During 2007-2016: A Scientometric Study*. *Think India (Quarterly Journal)*, SSN: 0971-1260, Vol-22. Issue-2, April - June 2019. Pages, 277 to 284.
6. Bandopadhyay, A. K. (1996). Citation analysis of doctoral dissertations in mathematics using dbase III+. *Annals of Library Science and Documentation*, 43(3): 81-107
7. Garfield, E. (1979). *Citation indexing: Its Theory and application in science, technology and humanities*. New York: Wiley
8. Khan, Swapan. (2012). A Study of recency of cited items appended in the articles published in *Journal of Documentation*, 19:88-96.
9. Lotka, A. J. (1926). The Frequency distribution of scientific productivity. *Journal of Washington Academy of Science*, 16: 317-323
10. Nikhil Kumar Sardar, (2014). A study of recency of cited items appended in the articles published in *Journal of Algebra and Discrete Mathematics*, *International Refereed Research Journal*, Vol. V, Issue 1, Jan. 2014 [86-98].

11. Ravichandra Rao, I. K. (1983). Quantitative methods for library and information science. New Delhi: Wiley-Eastern.