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Citation Mapping of Advances In Anthropology

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Abstract: *The study is based on the articles published in the open access journal, Advances in Anthropology during the year 2013-2014 covering 59 articles in 8 issues having 1750 citations. Data has been collected from* ***Advances in Anthropology*** *from the* ***Directory of Open Access Journals****. Data has been analyzed by using excel sheet by year, types of document, trend of research, author productivity, journal productivity etc. The citation study has been carried out to find out the various sources of literature used by the researchers in the field of Anthropology. A rank list of journals is also prepared to find out the core journals based on the citation frequencies. Applicability of Bradford's Law of scattering is tested here to identify the core journals in the field of anthropology. Lotka's Law of Author Productivity is also tested to find out the most active authors in anthropology. Authorship Pattern has been studied to know whether collaborative or individual research is mostly done in the field of Anthropology. In this way trend of research, growth of research, type of documents, etc are analyzed. It has been observed that the articles published in the year 2007 have been cited maximum number of times i.e. 140 times and the journal Nature is the most popular journal for the anthropologists. Bradford's Law of Journal Productivity is applicable but Lotka's Law of Author's Productivity does not follow here. From the study it has also been identified that individual research is more prominent than collaborative research and Physical Anthropology is the most promising field of research.*

Key words: Citation Study, Citation Analysis, Bradford's Law, Lotka's Law, Anthropology

1. Introduction:

Bibliometrics is statistical analysis of written publications, such as books or articles. Bibliometric methods are frequently used in the field of library and information science, including scientometrics. For instance, bibliometrics are used to provide quantitative analysis of academic literature. Citation analysis and content analysis are commonly used bibliometric methods. Many research fields use bibliometric methods to explore the impact of their field, the impact of a set of researchers, or the impact of a particular paper. Bibliometrics also has a wide range of other applications, such as in descriptive linguistics, the development of thesauri, and evaluation of reader usage. The term bibliometrics was coined by Alan Pritchard in a paper published in 1969, titled *Statistical Bibliography or Bibliometric* [13]. He defined the term as "the application of mathematics and statistical methods to books and other media of communication". Although citation analysis is not new (the Science Citation Index began publication in 1961), before it could be calculated by computers it was done manually and so was time-consuming. Automated algorithms are making it much more useful, versatile, and widespread. This led to the creation of the new field of computational bibliometrics. The first such algorithm for automated citation extraction and indexing was by Cite Seer. Google's Page Rank is based on the principle of citation analysis. Patent citation maps are also based upon citation analysis (in this case, the citation of one patent by another).

Advances in Anthropology[12] (AA) is an international peer reviewed journal dedicated to report the latest advances in anthropology and related disciplines. The present study reveals the citation study of the journal *Advances in Anthropology* for the year 2013-2014. It has revealed the journal productivity, types of document, year wise distribution of citations, and growth of literature and author productivity in the field of anthropology .

2. Review of related literatures:

Garfield [5] (1972) observed that the 2200 journals covered by the SCI in 1969, about 500 published about 70 percent of all articles published. Martyn [8] (1975) stated that citation in the primary literature expressly states a connection between two documents, one which cites and the other which is cited, whereas citation in other listings does not usually imply any connection between documents other than that effected by the indexing machinery. Martyn [10] (1975) referred that citation in the primary literature states a connection between two documents, one which cites and the other which is cited, whereas citation in other listings does not usually imply any connection between documents other than that affected by the indexing machinery. Scales [15] (1976) clarified that ranked lists produced by analyses of citations do not constitute valid guides for journal selection by libraries. Cronin [2] (1981) pointed that citations are frozen footprints in the landscape of scholarly achievement; footprints which bear witness to the passage of ideas. Gupta [6] (1983)concluded that there is a relationship in quantity, quality and recognition of original contributions of excellence which get diffused into the common stock of scientific knowledge; and there is a positive relationship in rewards, citedness and quality of contributions. Subramanyam, [16] (1983) identified that scientific research is becoming an increasingly collaborative endeavour. The nature and magnitude of collaboration vary from one discipline to another, and depend upon such factors as the nature of the research problem, the research environment, and demographic factors. Arvinda and Reddy [1] (1989) analyzed 1215 references cited in the review articles of Archaeological Anthropology published in Annual Review of Anthropology during the year 1980-1982 reveals that most of the Archaeological literature (57.78%) is published in the form of books and remaining in other bibliographic forms. Verma [18] (1994)observed that Indian Econometricians give equal importance to journal and non-journal materials for their research work and depend upon non-current research materials. Dutta and Sen [3]in the year 2001 conducted a study with 1011 citations appended to 27 research articles of the January-March 2000 issue of the Indian Journal of Chemistry, Sections contributed by 61 authors. Dutta, Das and Sen [4] (2002) studied 2800 citations appended to 152 articles published in 2001 in eight scholarly journals published by National Institute of Science Communication & Information Resources. Zafrunnisha, N and Reddy, P [20] (2009) studied the authorship pattern and degree of collaboration in psychology and identified that degree of collaboration in psychology is 0.53 and majority of cited journals of psychology (94.34%) are in English Language. William [19] (2011) revealed that most zoological, general biological and veterinary journals use Havard Citation system, whilst most biomedical journals use some form of numeric end reference system. Monoj and Moorthy [9] (2011) conducted the bibliometric study on DESIDOC journal of library and information technology during the year 2001-2010. Tsay [17] (2013) revealed the highly cited subjects of LIS journals encompass searching, online information retrieval, information work, subject indexing, World Wide Web, technical services, citation analysis, information seeking behaviour, etc. Maiti and Dutta [7] (2013) concluded as titles are assumed as a most concise abstract of an article, it is customary to assume words in title as true reflector of central theme of the same.... Reddy and Reddy [11] (2014) observed journal usage pattern by researchers in mathematics does not satisfy the verbal formulation of Bradford's Law of Scattering. Sahoo ,Maiti and Mahata [14](2015) studied on the department wise faculty publications and their h index and found that the Cryogenic Department has got highest number of citations where as it has published only 87 articles throughout the last five years.

3. Objectives:

The objectives of the study are:

- to find out the range of citations per article;
- to find out the quantitative growth of articles and distributions of citations and self-citations by number and year under study;
- to know the authorship pattern of articles;
- to examine the geographical affiliations of authors;
- to study the contribution of Government Organizations in Anthropology.
- to find out the number of web citations.
- to examine the Bradford's Law of Scattering in the field of Anthropology
- to prepare a rank list of core journals in the field of Anthropology
- to calculate Lotka's law of author productivity.
- to examine the research trend in anthropology.

4. Scope and Methodology:

Scope and methodology of the present study are as follows..

4.1. Scope

Two volumes covering 8 issues of the year 2013-2014 of Advances in Anthropology, has been chosen from Directory of Open Access Journal (DOAJ) in September 2015. There are total 59 articles having 1750 citations. These 1750 citations are used as data source and analyzed accordingly.

4.2 Methods of Data analysis

After collecting data, all are plotted into excel spread sheets and then according to year, most productive journals, most active authors, authorship pattern have been analyzed. After plotting those all are arranged in ascending order and a bar graph and line graph is prepared for showing the different areas of study.

5. Data Analysis and Interpretation:

Data analysis has been carried out to find out the growth of literature in anthropology, to study about the journal productivity in the area of anthropology, to identify core journals and applicability of Bradford's Law in anthropology on one hand, and to test the Lotka's Law of Author Productivity, forms of literature, trends of research work in the other hand in the field of anthropology.

5.1. Year wise range of citations and distribution of web citations by per article.

The articles have been numbered according to their depictions in the volumes i.e. first article in Vol. No 3, Issue 1 is designated as Article 1 and 2nd article in Vol. No 3is designated as 2

Table1: Year wise range of citations and distribution of web citations per article

Article Number	Number of total Citations	Range of Citation	Year with Maximum Number of Citations	Number of Web Citation	Percentage of Web Citation
Article1	12	1972-2011	2011	1	8.33
Article2	36	2008-2013	Each year have single citation	26	72.22
Article3	31	1981-2012	1999	24	77.42
Article4	37	1977-2012	2007	35	94.59

Article5	20	1973-2009	2005	6	30.00
Article6	47	1981-2009	2004	25	53.19
Article7	95	1859-2011	2010	85	89.47
Article8	35	1908-2001	1989	0	0.00
Article9	21	2004-2011	2001	16	76.19
Article10	20	1965-2012	2002	9	45.00
Article11	12	1993-2010	2009	10	83.33
Article12	8	1999-2010	2010	5	62.50
Article13	22	1991-2009	1999	21	95.45
Article14	13	1955-1988	Each year have single citation	5	38.46
Article15	21	1761-2013	2013	9	42.86
Article16	14	1929-2011	1967	9	64.29
Article17	51	1979-2011	2008	22	43.14
Article18	40	1982-2011	2009	1	2.50
Article19	40	1924-2012	2010	24	60.00
Article20	19	1998-2002	Each year have single citation	11	57.89
Article21	35	1924-2011	2009	16	45.71
Article22	55	1983-2003	2007	47	85.45
Article23	65	1953-2013	2008	54	83.08
Article24	55	1984-2011	1985	31	58.18
Article25	11	1958-2007	Each year have single citation	6	54.55
Article26	12	1956-2007	2007	5	41.67
Article27	53	1986-2011	2007	8	15.09
Article28	30	1937-2009	2005	21	70.00
Article29	13	1998-2011	2000	7	53.85
Article30	31	1995-2012	2001	17	54.84
Article32	48	1993-2009	2004	43	89.58
Article33	12	1993-2012	2007	10	83.33
Article34	22	1999-2005	2001	17	77.27
Article35	19	1985-2007	1996	13	68.42
Article36	14	1936-2013	1995	9	64.29
Article37	80	1891-2014	2007	63	78.75
Article38	40	1892-2011	2010	9	22.50
Article39	16	1946-2002	2002	2	12.50
Article40	35	1850-2011	2007	13	37.14
Article41	13	1960-2014	2007	7	53.85
Article42	34	1995-2013	1999	21	61.76
Article43	12	1996-2012	2011	9	75.00
Article44	25	1925-2013	2013	19	76.00
Article45	32	1963-2014	2008	22	68.75
Article46	23	1800-2004	2003	4	17.39
Article47	75	1998-2009	2007	26	34.67
Article48	37	1886-2009	1998	9	24.32

Article49	55	1993-2013	2007	35	63.34
Article50	32	2008-2011	2012	13	40.63
Article51	43	1973-2012	2011	34	79.07
Article52	11	2001-2013	2011	7	63.64
Article53	10	1998-2009	2007	2	20.00
Article54	7	1993-2012	1999	2	28.57
Article55	20	1852-2013	1997	12	60.00
Article56	23	1820-2012	2008	12	52.17
Article57	7	1993-2012	2007	1	14.29
Article58	10	1996-2011	2008	5	50.00
Article59	41	1995-2011	2011	22	53.66

Table 1 focuses on the overall number of citations and range of citations by year and number of web citations. It has been found that Article 4 has cited most of the web documents (94.59%).The average number of citations in each article is 29.66.Article 55 has cited very old document of the year 1800. The numbers of web citations are more than that of the conventional citations.

5.1. Distribution of citations by year.

Here all citations are distributed by the year and plotted into a bar graph.

Figure 1: Distribution of citations by year

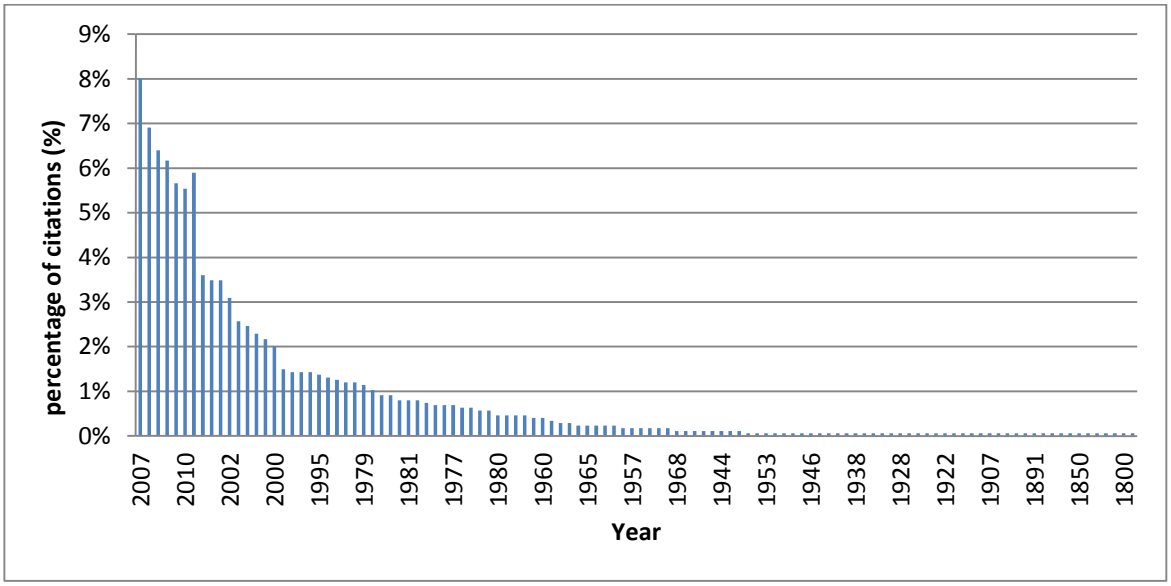


Figure 1 describes the year wise distribution of cited articles and it has been found that in 2007, total 8% articles have been published and then it gradually decreased in the following years. The articles in the journal cited articles from 1960 onwards. Citations of articles prior to 1960 was negligible i.e. 1 citation per year till 1800

5.2 Applicability of Bradford's Law of Scattering

The productivity of journals has been analyzed after dividing all the journals into three major groups. The number of citations in each group are equal i.e. the total number of citation received by the all the journals is 547, then they are divided into three equal zone i.e. 399. The distribution of citations according to Bradford's Zone is presented in Table 3.

Table3: Bradford's scattering of Journals

Zone	Citations	No. of journal	Journal percentage (%)
1	399	30	5.48
2	399	117	21.39
3	400	400	73.13
Total	1198	547	100

It is observed that from the Table3, there are 30 journals are in nucleolus and they are the most productive journal in the field of Anthropology sharing 5.48% citation of total citation. In allied zone total 117 journals contributing 21.39 % and in alien zone 400 journals have 73.13% citation. According to Bradford's Law of Scattering in each zone number of journals should be increased geometrically *i.e.* 1: n: n^2. The relationship of each zone in present study is 30:117:400

$=30:30*4:30*4^2$

$=30:120:480$

Hence the citations in each zone have almost increased geometrically and it follows the Bradford's Law of Scattering. Here 4 is the Bradford's multiplier.

5.3 Journal Productivity:

Here most productive journals in the area of anthropology are identified. It also helps to understand which journal is the most popular among the authors to publish their research articles. Here is a list of most productive journals in the area of anthropology.

Table 4: Most productive journals in the field of anthropology

Sl. No	Name of the Source Journals	Publishing Country	Number of Articles Cited by the authors	Percentage
1.	Nature	UN	48	4.07
2.	American Journal of Physical Anthropology	USA	36	3.05
3.	Science	USA	36	3.05
4.	Journal of Anthropological Sciences	ITALY	17	1.44
5.	Journal of Human Ecology	USA	16	1.36
6.	Advances in Anthropology	CHINA	15	1.27
7.	Fertility and Sterility	USA	14	1.19
8.	American Human Biology	USA	14	1.19
9.	Molecular Biological Evolution	USA	14	1.19
10.	American Journal of Human Genetics	USA	13	1.10

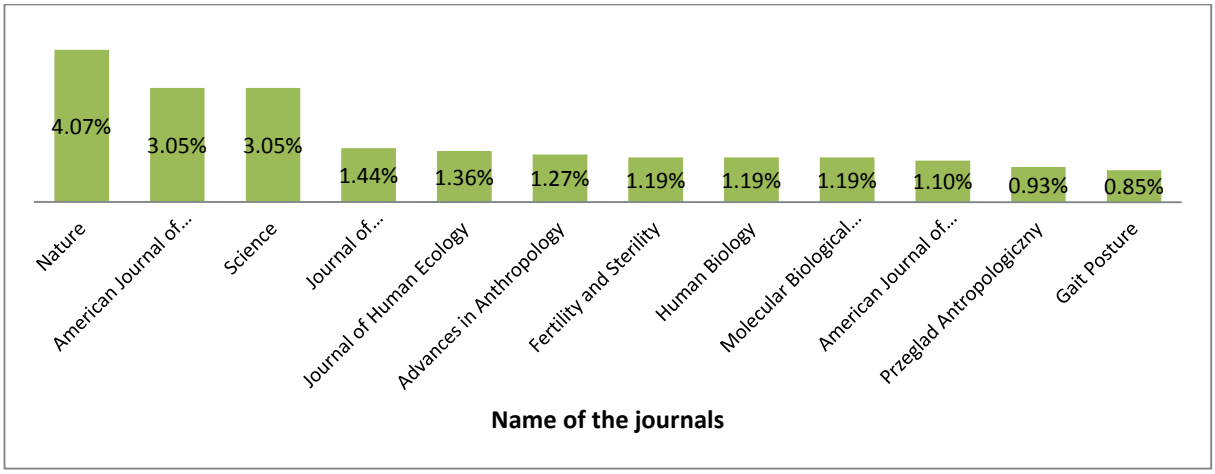
11.	Przeglad Antropologiczny	AUSTRALIA	11	0.93
12.	Gait Posture	USA	10	0.85
13.	Biological Sciences	SAUDI ARABIA	9	0.76
14.	Chungara	SPAIN	9	0.76
15.	Reproductive BioMedicine Online	USA	9	0.76
16.	European Journal of Orthodontics	USA	8	0.68
17.	Journal of Athletic Training	TEXAS	8	0.68
18.	British Medical Journal	UK	7	0.59
19.	Current Biology	USA	7	0.59
20.	Genetics	USA	7	0.59
21.	Human Genetics	USA	7	0.59
22.	Neurosurgical Focus,	USA	7	0.59
23.	Social Science & Medicine	USA	7	0.59
24.	Journal of Electromyography & Kinesiology	USA	6	0.51
25.	Memórias do Instituto Osvaldo Cruz	LATIN AMERICA	6	0.51
26.	Amercican Anthropologist	USA	5	0.42
27.	Annals of Human Genetics,	USA	5	0.42
28.	Evolutionary Anthropology	USA	5	0.42
29.	International Journal of Health Services	USA	5	0.42
30.	Journal of Genetic Genealogy	RUSSIA	5	0.42
31.	Journal of Neo-Victorian Studies, .	USA	5	0.42
32.	Lancet	UK	5	0.42
33.	Neuroimage	USA	5	0.42
34.	Revista da Sociedade Brasileira de Medicina Tropical	UK	5	0.42
35.	American Journal of Orthodontics,	USA	4	0.34
36.	Annals of Anatomy	USA	4	0.34
37.	Annals of Human Biology	USA	4	0.34
38.	Anthropos	GERMANY	4	0.34
39.	American Antiquity	USA	4	0.34
40.	Computers in Human	USA	4	0.34

	Behavior,			
41.	Current Anthropology	USA	4	0.34
42.	Evolution	USA	4	0.34
43.	Genetica,	USA	4	0.34
44.	HOMO - Journal of Cor Human Biology	USA	4	0.34
45.	Human Reproduction	USA	4	0.34
46.	Journal of the American Medical Association	USA	4	0.34
47.	Journal of Vestibular Research	USA	4	0.34
48.	Journal of World Prehistory	USA	4	0.34
49.	Psychosomatic Medicine	USA	4	0.34
50.	Quaternary Science Reviews	USA	4	0.34
51.	Scandinavian Journal of Medicine & Science in Sports	USA	4	0.34
52.	Scientific American	USA	4	0.34
53.	Spine	USA	4	0.34
54.	Sportverletz Sportschaden	USA	4	0.34
55.	Vegetation History and Archaeobotany	USA	4	0.34
56.	American Journal of Community Psychology,	USA	3	0.25
57.	American Journal of Human Biology	USA	3	0.25
58.	American Journal of Preventive Medicine,	USA	3	0.25
59.	Anthropologie	USA	3	0.25
60.	Anthropologist	INDIA	3	0.25
61.	Biological Psychology	USA	3	0.25
62.	Cell	USA	3	0.25
63.	Ceylon Journal of Medical Science,	SRILANKA	3	0.25
64.	European Journal of Human Genetics	USA	3	0.25
65.	Evolution and Human Behavior,	USA	3	0.25
66.	Hawaiian Archaeology	HAWAI	3	0.25
67.	Human Heredity	USA	3	0.25
68.	International Journal of Nautical	USA	3	0.25

	Archaeology			
69.	JAMA	USA	3	0.25
70.	Journal of Biosocial Science	USA	3	0.25
71.	Journal of Dental Research	INDIA	3	0.25
72.	Journal of the Royal Asiatic Society (Ceylon Branch)	GREAT BRETAIN	3	0.25
73.	Mediterranean Archaeological Review	EUROPE	3	0.25
74.	Neuroreport		3	0.25
75.	Rock Art Research	AUSTRALIA	3	0.25
76.	SAA Archaeological Record	AMERICA	3	0.25
77.	Social Cognitive and Affective Neuroscience	BARLIN	3	0.25
78.	Studia Lednickie	GREAT POLAND	3	0.25
79.	The American Journal of Bioethics,	USA	3	0.25
80.	The Anatomical Record	USA	3	0.25
81.	The Brazilian Journal of Infectious Diseases	BRAZIL	3	0.25
82.	The British Journal of Psychiatry,	UK	3	0.25
83.	The Journal of Craniofacial Surgery	USA	3	0.25
84.	Journal having less than 2 articles		567	48.05
85.	Total number of journals		1180	100

Table 4 focuses on the mostly cited anthropological journals by the researchers. It was found that Nature journal is the most popular journal and 48 articles(4.07%) are cited from that journal followed by American Journal of Physical Anthropology (3.05%), Science Journal (3.05%),Journal of Anthropological Sciences (1.44%),Journal of Human Ecology (1.36%) . There are 567 journals (about 48.05%) which are cited only once by the researchers of Anthropology. **The journal Advances in Anthropology contains self citation and it has been cited 15 times by the authors in these two volumes.**

Figure2: Top Ten Most Popular Journals in the field of anthropology



5.4 Authorship pattern:

In this area authorship pattern that means collaboration of the authors in the field of anthropology has determined.

Table: 5 Authorship pattern in Anthropology

Authorship Pattern	Number of articles	Percentage
Single Author	827	44.17
Two Author	433	23.13
More than three Author	612	32.69
Total	1872	100

From Table 4 it is observed that single authors are highest in number, accounting 47.74% of the total citations, two authors have 25.00% article in total citations followed by three authors, 35.33% of total citation.

Degree of collaboration in a discipline is computed using by the formula given by Subramanyam[16].

$C=N_m/ (N_s +N_m)$

Where C = Degree of collaboration in a discipline

N_m= Number of Multi-authored research papers

N_s=Number of Single Authored research papers

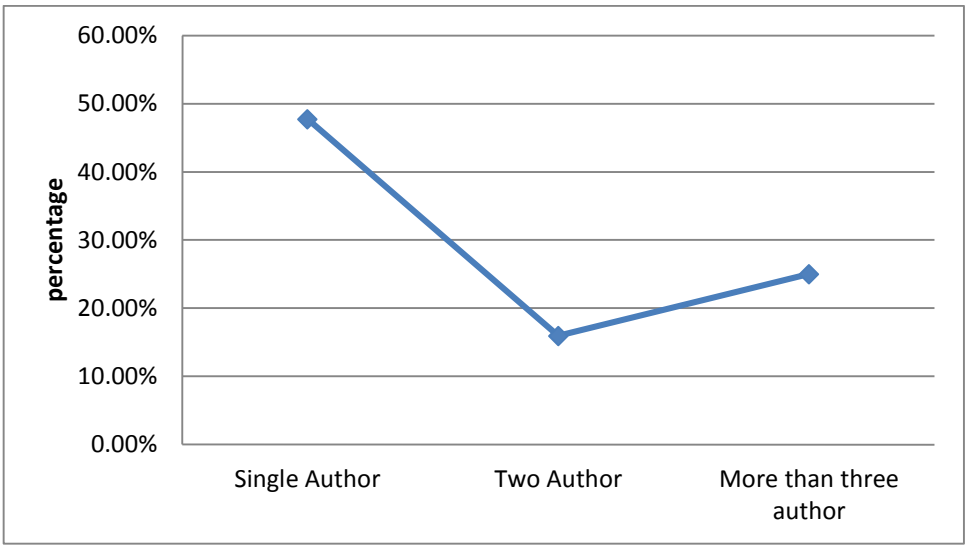
From table 5

C=1045/ (827+1045)

=0.55

Hence degree of collaboration in the field of anthropology is 0.55 that means degree of collaboration in the field of anthropology is no so high. Here till now single research is high rather than the collaborative research

Figure4: Authorship Pattern



5.5 Mostly cited authors in the field of anthropology.

Mostly cited authors and their country in the field of anthropology during the year 2013-2014 in the journal *Advances in Anthropology* has calculated here.

Table 6: Mostly cited authors in Anthropology:

Sl. No	Name of the Authors	Country Name	No. Of citations received	Rank
1	Klyosov, A, A	Russia	27	1
2	Bednarik, R. G	Australia	21	2
3	Masali, M.	Belgium	13	3
4	Kamm, F. M	New York	12	4
5	Liczbińska G	Poland	12	4
6	Adali, S. F.	Turkey	11	5
7	Ambreen, M	Pakistan	11	5
8	Chaudhry, H. R.	Pakistan	11	5
9	Henneberg, M	Australia	11	5
10	Micheletti Cremasco, M	Tornio	10	6
11	Mohyuddin, A	Pakistan	10	6
12	Perrin, P	France	10	6
13	Schlacht, I. L.,	Berlin	10	6
14	Cocilovo, J. A	New York	9	7
15	Frost, P	USA	8	8
16	Martinez Jr., C. R.	USA	8	8
17	Underhill, P. A	USA	8	8
18	Aron, A.,	Canada	7	9

19	Hammer, M. F	Tucson	7	9
20	Husserl, E	Germany	7	9
21	Keyes, C.	Michigan	7	9
22	Sturm, R. A	Australia	7	9
23	Authors having less the 6 citation		2511	10

Table 5 focuses that Klyosov, A, A who is from Russia, has received highest number of citations i.e. 27 times followed by Bednarik, R. G from Australia receiving 21 citations and occupying 2nd rank. Masali, M. from Belgium receiving 13 citations and occupying 3rd rank. There are 2511 authors from different countries have less than equal 6 citation.

5.6 **Author's self citation:**

Table 7: Author's self citation

Name of the Author	Total Citations received	Self Citation
Klyosov, A, A	**27**	**8**

Table 7 shows that only one author has self citation. Klyosov, A, A who has highest number of citation cited his own paper for 8 times. No other author has cited their own article during these two years.

5.7 Contribution of Corporate Bodies in the field of anthropology.

Authors of the journal *Advances In Anthropology* not only cited only the authors but the different corporate bodies also. Here is a list of such corporate bodies.

Table 8: Corporate Body

Sl. No	Name of the Organization	Country	Citation Received
1	World Health Organization	United States	3
2	American Cancer Society	United States	2
3	CDC (Centers for Disease Control)	United States	2
4	Central Disaster Management Council	Japan	2
5	Komoro Municipal Disaster Management Council	Japan	2
6	The Chimpanzee Sequencing and Analysis Consortium	United States	2
7	The Harvard-Yenching Institute	China	2
8	The International HapMap Consortium	United States	2
9	United Nations International Strategy for Disaster Reduction	United States	2
10	American Association of Medical Colleges	United States	1
11	FAO	Rome	1
12	Federal Republic of Nigeria	Nigeria	1
13	Groningen Institute of Archaeology	Netherlands	1
14	Group CPW	London	1
15	Institute for Environment and Development Studies	London	1
16	International Council of Tanners	Northampton	1

17	International Labor Organization	Geneva	1
18	Joint Commission	United States	1
19	Ministry of Internal Affairs and Communications	Japan	1
20	Native American Ethnobotany Database	United States	1
21	Progressive Youth Forum	India	1
22	Society for Assisted Reproductive Technology	United States	1
23	The Institute of Ethnology and Anthropology	Russia	1
24	The Urban Institute	United States	1

Table6 focuses on the government organization's report which are cited by the authors in different times .World Health Organization's heath report has cited 3 times by the authors of physical anthropology ,then American Cancer Society, CDC (Centers for Disease Control), Central Disaster Management Council, Komoro Municipal Disaster Management Council, The Chimpanzee Sequencing and Analysis Consortium , The Chimpanzee Sequencing and Analysis Consortium , The Harvard-Yenching Institute, The International HapMap Consortium, United Nations International Strategy for Disaster Reduction reports have cited 2 times specially by the physical anthropological researcher. The corporate bodies of United States have cited 15 times by the authors.

5.8Applicability of Lotka's Law

According to Lotka's Law the number of authors making n contributions is about $1/n^a$ of those making one contribution, where *a* nearly always equals two.

The general formula says:

$X^n \cdot Y=C$ Or $Y=C/X^n$ [Equa: 1]

Where *X* is the number of publications, *Y* the relative frequency of authors with *X* publications, and *n* and c are constants depending on the specific field.

Table9: **Lotka's Law of Author Productivity**

Number of Papers(X)	**Number of Authors(Y)**
1	1577
2	751
3	318
4	188
5	13
6	19
7	5
8	3
9	1
10	4
11	4
12	2
13	1
14	0
15	0
16	0
17	0
18	0
19	0

20	0
21	1
22	1

Here x=1, Y=1577

$X^a*Y=C$

1*1577=C

C=1577

From column 2 the value of a is

$X^a*Y=C$

Here x=2,Y=751

$2^a*751=1577$

2a=1577/751

$2^a=2.1$

alog2=log 2.1

a=0.32/0.31

a=1.1

Table 10: Observed value and expected values with data set in the field of anthropology

Number of papers(x)	**Number of authors(y)**	**Number of authors with the value of a=1.1 (expected value)**
1	1577	1577
2	751	735
3	318	470
4	188	343
5	13	268
6	19	219
7	5	225
8	3	160
9	1	140
10	4	125
11	4	112
12	2	102
13	1	121
14	0	Error
15	0	Error
16	0	Error
17	0	Error
18	0	Error
19	0	Error
20	0	Error
21	1	75
22	1	71

From Table8 it has found that observed value and expected value of authors and number of publication are totally different from each other, hence Lotka's Law of Author Productivity does not applicable here.

5.9Types of Documents cited by authors:

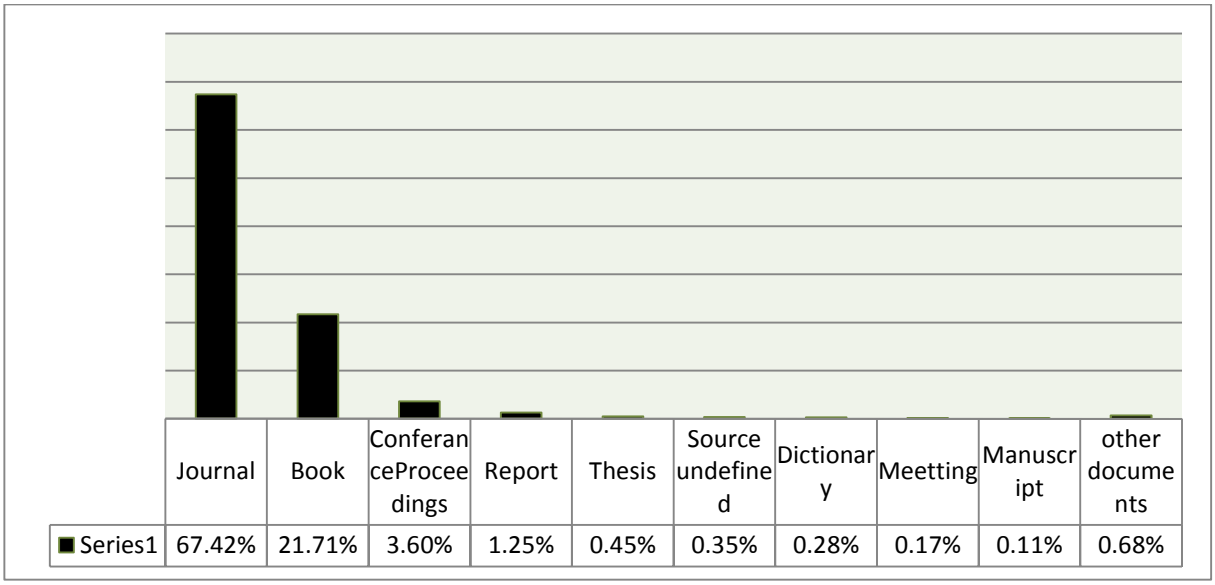
In any research work different types of documents are cited by the authors. From this analysis it can be understand whether researcher are mostly focuses on the primary document or in the secondary document**.**

Table 11 Types of Documents cited by authors

Sl. No	Types of Documents	Number cited	Percentage (%)
1	Journal	1180	7O.20
2	Book	380	22.60
4	Conference Proceedings	63	3.75
5	Report	22	1.31
6	Thesis	8	0.47
7	Source undefined	6	0.36
8	Dictionary	5	0.30
9	Meeting	3	0.18
10	Manuscript	2	0.12
11	others documents like atlas, hand book, health statistics, magazine etc having single citation	12	0.71
12	Total	1681	100

It is observed from the Table 11 that journal articles are mostly cited by the authors 67.42 percent. This indicates that primary literature like journals are the most preferred source of information used by the researcher in the field of anthropology. Next general books are the second most cited source accounting for 21.71%.Conferance Proceedings with 3.60%, Report with 1.25%, thesis with 0.45%, other documents like atlas, handbook, health statistics, magazine etc has 0.71% contribution in the field of anthropology.

Figure5: Types of Document



5.10Trend of researches in Anthropology:

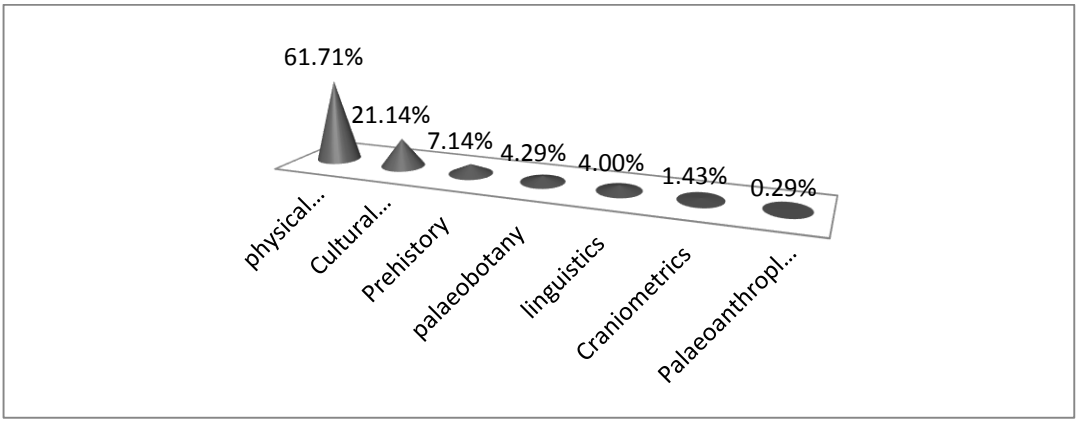
In this area trend of research in the area of anthropology are analyzed here..

Table12: Area of research works Anthropology

Sl. No	Subject Name	Number of article published	Percentage
1	Physical Anthropology	1080	61.71
2	Cultural Anthropology	370	21.14
3	Prehistory	125	7.14
4	Palaeobotany	75	4.29
5	Linguistics	70	4.00
6	Craniometrics	25	1.43
7	Palaeoanthropology	5	0.29
8	Total	1750	100

Table 12 focuses on in which area research work of anthropology has done mostly. It has found that 61.71% Physical Anthropological research has done followed by Cultural Anthropology (21.14%),Pre History (7.14%),Palaeobotany (4.29%),Linguistics (4.00%), Craniometrist (1.43%), Palaeo Anthropological (0.29%) research.

Figure 6 Area of research works in the field of anthropology



5.9 Findings and Conclusion:

The study has carried out 1750 citations presented in the 59 articles in the open access journal Advances in Anthropology. Findings that have been observed after thorough inspection of all citation are given bellow

1. According to year wise distribution of citations it is found that most of the articles are cited from the year 2007, 2009 and in 2011, another most important findings is that very old document of year 1800 also cited by the researcher in the field of anthropology

2. *Nature* journal is the most productive journal in Anthropology as it is cited 48 times by the authors, then American Journal of Physical Anthropology is cited 36 times, the journal Science, has been cited 36 times, Journal of Human Ecology is cited 16 times by the researchers of Anthropology. These five journals are contributing 12.97% of total citation. There are 567 journals having less than 2 citations.

3. The journal Advances in Anthropology has self citation it has cited 15 times by the authors.

4. Total 547 journals having 1198 citation and all are plotted into three zones and it is observed that the number of journals in each zone has increased geometrically so in this study Bradford's Law of Journal Productivity is applicable.

5. Single Author research (44.17%) is higher than the collaborative research. The degree of collaboration is 0.55 that is very low in the field of anthropology.

6. Klyosov, A, A who is from Russia has received the highest number of citations and occupied 1st rank with 27 citations followed by Bednarik, R. G from Australia with 21 citation in 2nd rank. Masali, M. from Belgium with 13 citations in 3rd rank and so on. There are 2511 authors from different countries have received less than 6 citation.

7 .Klyosov, A, Awho has highest number of citation and he has cited his own paper with 8 times.
No another author have cited their own article during these two years.

8. Different government organizations like World Health Organization, American Cancer Society, and Centres for Disease Control, Central Disaster Management Council, Komoro Municipal Disaster Management Council, and The Harvard Yenchiy Institute are the most important organizations whose reports are cited by the authors of anthropology in different times.

9. Lotka's Law of Author Productivity is not applicable in this study due to the small number of sample size.

10. Journal articles are mostly cited by the authors i.e. 70.20% and followed by Books 22.60%, Conference Proceedings 3.75%, Reports 1.31% and thesis 0.47% have cited.

11. In this study it is observed that Physical Anthropological Researches (61.71%) research is mostly done. followed by Cultural Anthropology 21.14%, Prehistory 7.14%, and Palaeontology (4.29%) Linguistics (4.00%) Craniometrist 1.43% and Palaeoanthropology 0.29% are carried on.

5.10 Limitation of study:

After completion of work it has found that Lotka's Law of Author's Productivity does not applicable here because sample size is quite small and it is very important for applicability of such kind of bibliometric laws. Webometric study can also be done here as maximum number of authors cited web documents rather than the other documents.

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References:

1. Aravinda, P & Reddy P.V. (1989). Literature of Archaeological Anthropology: a citation analysis, Annals of Library Science and Documentation.36:85-90
2. Cronin,B.(1981). The need for a theory of citing. Journal of Documentation. 37:16-24.
3. Dutta,B &Sen,B.K.(2001). Indian journal of Chemistry section A-an analysis of citation pattern. Annals of Library and Information Studies.48:121-127.
4. Dutta, B, Das A.K, & Sen B.K. (2002).A comparative study of citation patterns among eight scholarly journals published by National Institute of Science Communication and Information Recourses. Annals of Library and Information Studies. 49:127-134
5. Garfield, E. (1972). Citation analysis as a tool in journal evaluation. Science. 178:471-479
6. Gupta,D.K(1983).Chndarasekhar: winner of the 1983 Nobel Prize for Physics a citation analysis of his works. Annals of Library and Information Studies.30:177-184
7. Maiti, D.C & Dutta,B.(2013). Comparative Study between words in titles and Keywords of some articles on Knowledge organization. DESIDOC Journal of Library & Information Technology, 33: 498-508
8. Martyn, J. (1975). Citation analysis. Journal of Documentation, 31, 4; 1975.p290-297.
9. Monoj,K and Moorthy,A.L(2011). Bibliometric analysis of DESIDOC Journal of Library and Information Technology during 2001-2010. DESIDOC Journal Of Library And Information Technology.31:203-208.
10. Okiy , R. B. (2003).A citation analysis of education dissertations at the Delta State University, Abraka, Nigeria. Collection Building. 22:158-161.
11. Reddy,C.K, Reddy,C.A.P.(2014). Bibliometric study of citation in Ph. D theses in Mathematics accepted by Sri Venkateswara University, Tirupati. IASLIC Bulletin, 59:31-143.
12. Retrieved from http://www.scirp.org/journal/aa/
13. Retrieved from https://en.wikipedia.org/wiki/Bibliometrics
14. Sahoo,S, Maiti D.C & Mahato B.(2015). Department wise citation and h index analysis of IIT Kharagpur during the year 2010-2014,International Journal of Innovative Knowledge Concept,1: 51-61
15. Scales,P. A.(1976).citation analyses as indicators of the use of serials: a comparison of ranked title lists produced by citation counting and from use data. Journal of Documentation.32:17- 25.
16. Subramanyam,K.(1983).Bibliometric studies of research collaboration: A review. Journal of Information Science. 6:33-38
17. Tsay,M.(2013). Knowledge input for the domain of information science: A bibliometric and citation analysis study. Aslib Proceedings. 65:203-220.
18. Verma,M. (1994).Citation analysis of some selected journals in Economics. Annals of Library and Information Studies.41:33-39
19. Williams, R.B. (2011). Citation systems in the biosciences: a history, classification and descriptive terminology. Journal of Documentation.67:995-1014.

20. Zafrunnisha, N & Reddy, P. (2009).Authorship pattern and degree of collaboration in psychology. Annals of Library and Information Studies.56:255-261