

Bibliometric Assessment of the Archaeological Research output during the year 2008-2017

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ABSTRACT

The study aims to evaluate the archeology research output throughout ten years (2008-2017) retrieved from the source of Web of Science Citation Database, one of the prominent Indexing and abstracting databases from Clarivate Analytics and the same has been analyzed with the help of Bibliometrics Analysis tools such as Bibexcel, Pajek and Statistical Analysis tools like Microsoft Excel. The major indicators of bibliometrics such as Publication Productivity Analysis, Citation Analysis and Source Analysis were carried out with the sense of Statistical Bibliography and they are: i) Document type analysis, which shows the journal articles is outnumbered other publication types with 9046 (68.90 %) number, the second major output in terms of book reviews with a count of 2660 (20.26%), succeeding by editorial material 629 (4.79%); ii) Year-wise distribution: Among ten test years 2016 had the highest papers-1958 (14.91%) followed by the latest year of the study 2017 with 1842 (14.03%) and year 2015 shares 1683 publications of 12.82 %; iii) Country-wise distribution: The United States of America occupies the first place consisting of 4162 (31.70%) publications out of 13526 total records, England had been placed second position with 2421 (18.44%) records and surprisingly Australia stands on third place with 787 (5.995) documents; Other significant analyses were prolific authors and their h-index, authorship pattern, research area and major subjects, open-access publication types, reprint authorship and cities from where majority publication has been achieved etc.

KEYWORDS: Archaeology, Bibliometrics, BibExcel, h-index, Co-citation Analysis.

1. INTRODUCTION

Archaeology is one of the traditional subjects, simply understanding past ideas through the materials remained viz., artifacts, architecture, bio-facts or eco-facts and cultural landscape, which were excavated and analyzed for the cultural values to learning of past and near past (ancient and medieval) life pattern, activities and their human relationships would be studied.

1.1 Some of the branches of the archaeology are

Archaeology itself is a branch of Anthropology and now archaeology can be classified as follows:

1. Classical Archaeology: Examination of ancient Greek and Roman Civilization during the period of 500 BC-300 BC.
2. Historical Archaeology: Understanding the human Origin and developments to current status of the human development and its culture might be known by examining the writings and records available through dating science which are inscriptions and documentations of the pertinent periods.
3. Under water Archaeology: Concept of investigating buried cities underwater over a period to portray Coastal cities and their cultural heritages might be known by the present generation. This study includes risk and danger while excavation, whereas territorial landscape is having less hindrances because here the excavators need not undergo suffocations and tidal swings tend to happen while digging and finding the remaining underwater.
4. Etho-Archaeology: Investigating the groups of people living in a natural environment and their hunting habits, marital traditions, cultural activities if any, so that the ethnicity of a particular group can be known to the present generation.

1.2 Literature in Archaeology

The significant research Publications and their growth is seen in the field of archaeology in terms of heritage study, human behavior and its evolution, architectural analysis of the ancient history through Rock art, Paintings, etc. The awareness and quantum of research publications are well developed over a period and they are classical and modern.

1.3 Bibliometrics

Bibliometrics is the study of measurement or quantification of any written documents/published work, in terms of its productivity, pattern, and citations and so on. It is evident that metrics are highly related to mathematics and statistics so understanding the formulas and averages are important aspects while executing these kinds of research.

The term bibliometrics was introduced by Allan Pritchard in the year 1969, with the meaning of quantitative methods for scholarly communications which were written and documented. Later the advent developments and branches of its kind are Librametrics by Indian Library Science Legend and Mathematician Dr. S R. Ranganathan, Scientometrics depicted by the Russian Statistician Nalimov and MulchenKo, Informatics propounded by Nacke and Webometrics by Almind & Ingwersen. Now the second important part of the bibliometric analysis is indicators or its broader perspectives of Parameters, indicators are measuring tools to quantify and qualify any system and its operations. Bibliometric indicators especially to calculate every publication and its nuances, the authoritative person responsible for the document published and his/her citations in terms of total citation received, h-index, g-index, i-10 index, co-citation, bibliographic coupling, the journal where the content is published and its growth rate, the quality of the journals through impact factors and comparison etc. The third vital section in bibliometric and scientometric studies are bibliometric software or tools for the treatment of the data. Today we have several advanced tools to analyze for interpretation and to visualize for the presentation of the data, such tools are:

Bibexcel, b) Publish or Perish, c) R d) Pajek, e) CiteSpace, f) BiblioTool, g) VOSviewer, h) Sci², i) SciMAT, j) CiteSpace.

The above-mentioned tools are very useful for quantitative analysis of the indexing and citation databases, specifically downloaded as plain text or RIS file formats from Web of Science and Scopus respectively.

2. REVIEW OF LITERATURE

Literature review is a descriptive analysis of the literature relevant to the particular field through which the outlines of the earlier research of the same field or the topic would be known, The purpose of this part is to identify the methods, techniques, inferences and findings made in the earlier study so that the research gap and area to be focused on shall be known by the current investigator of the same domain. This can have two parts one is a literature survey, where the pertinent literature can be searched at various places and persons, like library, information centers and documentation centers, data centers and experts in the same area etc. then it could go for thorough reading so that the syntax and semantics will be understood. Later the researcher has to write his red literature in a critically systematic way.

Following are the background literature with their headings under which they are discussed for this study:

Brugemann et al. studied the ovarian cancer literature over a period; it was started from 1900 to 2004. A total of 23378 articles on ovarian cancer were found, and the items were analyzed to identify the date of publications, country of origin, journal prepared, authors productivity, subject categories etc. The other important analysis was the socioeconomic analysis where the author evaluated the research productivity about gross domestic product (GDP) per capita, and total economic power index GDP per 1000 billion US dollars and the last parameter is population size, and the results were observed and tabulated.

Groneberg et al. analyzed the Telemedicine literature and its density during the period 1900 to 2006. 3,290 field items were identified related to this topic telemedicine, with the first being published in 1964. The studies originate from 101 countries, with the USA, Great Britain and Canada being the most productive suppliers participating and placed in 56.08 % of all published items. With the threshold limit of 10 items, the country, Ireland ranked first and New Zealand ranked second (9.5/item) followed by Finland (9.04/item). In the subject category, “Health Care Science & Services” ranked first by occupying 36 % out of all others. The data categorization is based on the publishing countries, languages, publication years, source titles, subject categories, etc.

Liu et al conducted a Scientometric profiling of global rice research during 1985-2014. They retrieved the data from SCI Expanded of Web of Science on 26th May 2015 and articles were only chosen and the language also only English, the importance is given to the title rather than topic. The analysis was done by parsing the data into the SQL server for specific analysis like trends in publishing , related journals, top countries in productivity and active institutions and authors were studied.

Li et al examined the fracking (hydraulic) scientific literature of Web of Science including SCI, SCIE, SCI&CPCI, the study has identified that terms of fracking can be divided into three main clusters, related to “drilling methods”, “exploitation/extraction process” and the “geo-science aspects”. During the period 1953–2013 highly cited papers were found based on their impact factor. The categorization of the data viz., publication type, authors, affiliation, title, source, language, document type, abstract and the cited references. The data analysis through HistCite, VOSviewer, and other tools like Excel, and Cart DB. The results were seen as publication trend, geographic area

and distribution, etc. At last, the findings were predicted which were Trends of fracking research, Core-Research strength, Hotspot and main research area of fracking, and high-impact papers in fracking literature.

Ramakrishnan investigated the Literature on hepatitis during the period 1984- 2003. The study covered three databases MEDLINE, CINAHL and IPA. The total number of 82,617 records was in three databases. MEDLINE covered of maximum of 75,750 records followed by CINAHL and IPA databases. After removing duplicate 3305 records only 79,312 records is found without double entries, one one-third of the papers have more than 5 authors. Collaborative research is high in the study.

Natarajan studied the growth pattern as well as the overall trend in literature output on the retina during 2002-2007. Secondary data collection from CD-ROM sources of MEDLINE the results indicate variability in the authorship pattern and the English language as the major medium in literature output for the retina. The contribution of the US is higher in this subject when compared to other countries. The paper also highlights the need for more research in retina-related research in the future.

Vijaylakshmi studied Remote Sensing – A Bibliometrics analysis aims to study a quantitative distribution of remote sensing literature from the Scopus database using bibliometric analysis covering a period of five years from 2006 to 2010. The study focuses on the broader objectives, methodology, intricate analysis and findings. The study explains the concepts using various tables and figures for easy comprehension.

Subramanian analyzed the nature and magnitude of collaboration varies from one new discipline to another, and depends upon factors such as the nature problem, the research environment and demographic factors. Further, he studied a high degree of correlation between collaboration and research productivity, and between collaboration and financial research support. Bibliometric methods offer a convenient and non-reactive tool for studying collaboration in research has been identified.

Patra and Chand did a bibliometrics study of Library and Information science emanating from India based on the data abstracted in Library and Information Science Abstracts (LISA) for the period 1967-2004. Core journals in which Indian authors published their research papers were identified. Authors with one publication have a major share (74.63%)

Hazarika et al conducted Bibliometric analysis of articles Indian Forester during the period 1991-2000, The threshold is 10 volumes, the categorization on year wise, author wise, country wise and Institution wise distribution. According to **Thanuskodi (2010)**, the majority of articles in bibliometric studies contain bibliographic references to journals, books, conference proceedings, dissertations, etc. Verma, Tamrakar and Sharma (2007) revealed that the majority of articles in journals published in India have two authors and that the majority of the contributions are from New Delhi.

Krishnamoorthy et al studied the diabetic literature from 1995 to 2004, the source data had been retrieved from the MEDLINE CDROM database, one of the premier biomedical and science and technological bibliographic databases. Analysis was done by SPSS tools and they categorized them viz. Relative growth rate (RGR), Doubling time, Core journals, citations received for the journals etc.

Chandrashekara et al analyzed the digital library literature published on Emerald Database popular publisher of information science literature, and they have taken only 454 articles and they were put into the category of authorship pattern and most of them are single-authored papers (307), country-wise distribution where the USA takes the first place with 145 articles (31.94%), ranking of journals and articles are the other categorizations.

3. METHODOLOGY

3.1 Type of the research

This is simply a quantitative research focusing on mapping the growth rate and pattern of publication of the archaeology literature. This investigation is to explorative in nature to portray the quantum of records, their relative growth rate, pattern of publication citation counts, etc.

3.2 Research approach

This research is detective in nature rather than inductive, why because the specification of the authors, source, subject and other categorizations for the particular period and limited to one single database i.e. Web of science only. The citations are also considered based on the journals indexed by the source database; it may vary in other kind of citation databases like Scopus, Google Scholar and Indian Citation Index etc. The concept of deductive research is to general to specific whereas inductive is to moving from specific to general. So, exclusive and inclusive phenomena will be the major ideology in modern research whether it is social science like economics, commerce, psychology and humanities like history, ancient history and archaeology, anthropology and philosophy.

3.3 Data source and period

The data has been retrieved from the Web of Science citation database by the keyword 'archaeology' in the topic search field and later limited to the year 2008 to 2017 (10 years). The total records are counted as 13526 and they were systematically downloaded as plain text format as well as tab delimit file for the analysis as each record contains labels viz. author, title, source journal, document type, total citations received, and year of publications etc.

3.4 Data categorization

The data extracted were categorized according to their variety viz. year of publication, document type, country-wise distribution, source title, citation analysis includes h-index, cited references and more cited journals by these authors retrospectively etc, The tools used to categorize are Excel, Bibexcel and pajeck softwares. Bibliometric softwares/tools like Bibexcel, Pajeck and others are highly commendable in terms of field (lab) analysis of the bibliographic data, which might be clearly understood by the readers for interpretation and knowledge, the visualization tools help for easy in taking of the concept that the researcher try to portray.

4. OBJECTIVES

The primary and secondary objectives of this particular study are:

- ✓ To display the year-wise distribution of the archaeological research
- ✓ To portray the document wise distribution
- ✓ To identify the countries proportion
- ✓ To determine the prolific authors among the authors
- ✓ To learn source journals and their citations

- ✓ To understand the research areas and its branches
- ✓ To make visible the organizations enhanced in active research of this field
- ✓ To know authors productivity based on citation techniques

5. LIMITATIONS

This particular study is confined to the data indexed in ISI-Thomson Reuter's Web of Science bibliographic data retrieved on the date. The analysis and presentation depends on the data fetched from the source database and this is only a quantitative investigation which tends to learn the literature growth and pattern only.

6. SIGNIFICANCE OF THE STUDY

The significant point of this study is to enable the research literature based on the major citation database and its primary aim to make aware of the concerned future researchers and existing researchers to learn its metrics to research proliferation, productivity, area of research and its relationships in sub-fields and collaborations to be understood. Even though many previous studies on other literature, this study is an eye-opener for the bibliometric investigators using tools and techniques for analysis and categorization of the data in some other ways and means.

7. Scope and Coverage

Area of study includes only the topic archaeology for the period 2008 to 2017. The source database is Web of Science core collections, the language is only English, literature published nationally and internationally. The coverage is only archaeological literature indexed in the source database WoS, which was found on the data retrieved on 23.03.2018. The concept of literature analysis is according to the data found as and when at source databases and the results depend accordingly.

8. TOOLS AND TECHNIQUES FOR THE ANALYSIS

The downloaded file formats both (tab-delimited) text (plain text) for the purpose of analysis through regular MS-Excel to know the quantum, authorship, etc. Bibexcel-the modern bibliometric analysis software was used for citation analysis and then the Pajek -the graphical visualization software to import files (.net) from Bibexcel and analysis of network, vectors, cluster, hierarchy etc. so that the visual presentation can be achieved.

9. DATA ANALYSIS AND INTERPRETATION

The following data analyses were accomplished with the retrieved data accordingly

Table 1 Bibliographic distribution of publication

S. No	Document types	Records	Percentage
1	Article	9046	68.901
2	Book review	2660	20.26
3	Editorial material	629	4.791
4	Review	551	4.197
5	Proceedings paper	320	2.437
6	News item	106	0.807
7	Book chapter	78	0.594
8	Letter	33	0.251

9	Biographical item	31	0.236
10	Art exhibit review	23	0.175
11	Meeting abstract	23	0.175
12	Correction	16	0.122
13	Film review	4	0.03
14	Bibliography	3	0.023
15	Poetry	3	0.023
	Total	13526	103.022

Table 1 shows the document types distribution and the majority of the publications of the archaeological research are journal articles which stands for 9046 records and its percentage is 68.90. The second major publication is a book review and its proportions are 20.26 percent of 2660 records. The third and fourth items are editorial materials and reviews with 629 and 551 records respectively.

Table 2. Year-wise distribution of publications

S. No	Year	Records	Percentage	Cumulative Percentag
1	2017	1842	14.03	14.03
2	2016	1958	14.91	28.94
3	2015	1683	12.82	41.76
4	2014	1273	9.70	51.45
5	2013	1140	8.68	60.14
6	2012	1084	8.26	68.39
7	2011	1106	8.42	76.82
8	2010	996	7.59	84.40
9	2009	1049	7.99	92.39
10	2008	999	7.61	100.00
	Total	13130	100	

Table 2 represents the year-wise distribution of publications, it is found that the year 2016 possesses the major portion of the publication of 1958 records (14.914%) and 2017 places second position with 1842 records (14.03%). The other followers are the year 2015 consists 1683(12.82%), 2014 holds 1273 records (9.70%), and the year 2013 has 1140 publications (8.68%) etc. Out of 13130 documents the years 2016 and 2008 occupies maximum and minimum outputs.

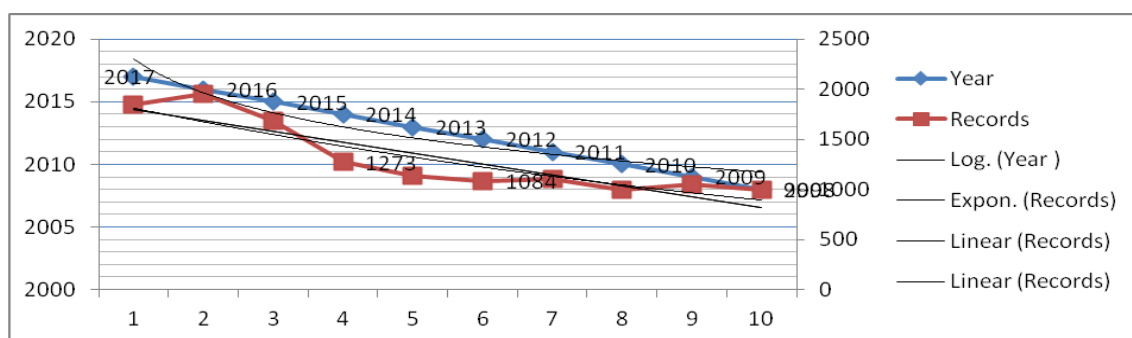


Figure 1 graphical distributions of the year wise data

Figure 1 displays that, the figurative description of the data for year-wise distribution of the period 2008 to 2017. It is obvious that the year 2016 secure the maximum records of 1958. Excel is the fine and advanced calculating and graphical means for the basic and sophisticated analysis of descriptive and diagrammatic presentations. This figure contains four values; one is the x-axis and y-axis as the year and records representations, then the leaner and exponential growth rate is been exposed through the black color lines.

Table 3 Country wise distribution of publications

S. No	Countries/Regions	Records	Percentage
1	Usa	4162	31.701
2	England	2421	18.44
3	Australia	787	5.994
4	Spain	722	5.499
5	France	603	4.593
6	Germany	578	4.402
7	Canada	562	4.281
8	Italy	4.075	4.075
9	South Africa	347	2.643
10	Sweden	268	2.041
11	Scotland	263	2.003
12	Argentina	257	1.957
13	Peoples R China	248	1.889
14	Netherlands	229	1.744
15	Belgium	198	1.508
16	Israel	184	1.401
17	Denmark	163	1.242
18	Russia	156	1.188
19	Brazil	140	1.066
20	New Zealand	138	1.051

Table 3 explains the top 25 countries and their contributions among other nations in archaeological literature output. USA stands first contributing 4162 records whereas England stays in second position with 2421 records. Surprisingly, a small nation Switzerland occupies the top 25 place at last rank, rather, with 117 records which is almost one percent.

Table 4 Prolific authors and their record counts

S. No	Name of the authors	Records	Percentage
1	[Anonymous]	79	0.006
2	Hummler M	47	0.004
3	Witcher R	40	0.003

4	Erlandson JM	27	0.002
5	Rick TC	25	0.002
6	Fuller DQ	23	0.002
7	Masini N	22	0.002
8	Balter M	22	0.002
9	Braje TJ	21	0.002
10	Dominguez-Rodrigo M	20	0.002
11	Lasaponara R	20	0.002
12	Kennett DJ	20	0.002
13	Levy TE	19	0.001
14	Lawler A	19	0.001
15	Iriarte J	17	0.001
16	Spivey N	17	0.001
17	Chirikure S	17	0.001
18	Ramsey CB	16	0.001
19	Moshenska G	16	0.001
20	Thompson VD	16	0.001

Table 4 witnesses for the authors who are very active in publication on this topic. The anonymous author stands on the top, which does not have proper authority over the document. The second prolific author is Hummler M, published 47 papers in these ten years and the third one is Witcher R produced 40 records. The field and its indexing system in this WoS database are very much limited for the humanities which could have been the reason for this level of publications.

Table 5 Preferred Source Titles

S. No	Source Journals	Counts	%
1	Journal of Archaeological Science	523	3.98
2	Antiquity	386	2.94
3	Quaternary International	314	2.39
4	American Antiquity	236	1.80
5	International Journal of Historical Archaeology	216	1.65
6	Historical Archaeology	203	1.55
7	World Archaeology	196	1.49
8	Cambridge Archaeological Journal	189	1.44
9	Archaeologies-Journal Of The World Archaeological Congress	181	1.38
10	Medieval Archaeology	162	1.23
11	European Journal Of Archaeology	157	1.20
12	Journal Of Anthropological Research	156	1.19
13	Journal Of Archaeological Science-Reports	155	1.18

14	Journal Of Archaeological Method And Theory	147	1.12
15	Journal Of Anthropological Archaeology	145	1.10
16	International Journal Of Nautical Archaeology	136	1.04
17	Post-Medieval Archaeology	122	0.93
18	Journal Of Field Archaeology	122	0.93
19	American Anthropologist	121	0.92
20	Azania-Archaeological Research In Africa	110	0.84

Table 5 identifying the top 20 source journals preferred for the publications and the Journal Of Archaeological Science places first with 523 records of 3.98%, and the journal ANTIQUITY stands at second place containing 386 records of 2.94% the remaining journals follows with the decanting order of records compare to above two.

Table 6 Subject (clusters) categories and its records

S.No	Documents	Title
1	17	Art and Archaeology
2	14	The Archaeology of Ethno- genesis: Race and Sexuality in Colonial San Francisco
3	9	FROM PARIS TO POMPEII: FRENCH ROMANTICISM AND THE CULTURAL POLITICS OF ARCHAEOLOGY
4	9	The archaeology of collective action
5	8	Illusions in Motion: Media Archaeology of the Moving Panorama and Related Spectacles
6	7	The Oxford handbook of Anglo-Saxon archaeology
7	7	Entangled: an archaeology of the relationships between humans and things
8	7	Archaeology as Political Action
9	7	The Pueblo Revolt and the Mythology of Conquest: An Indigenous Archaeology of Contact
10	7	Inventing Africa: history, archaeology and ideas
11	7	Historical Archaeology: Why the Past Matters
12	7	The nation and its ruins: antiquity, archaeology, and national imagination in Greece
13	7	The Archaeology of Native-Lived Colonialism: Challenging History in the Great Lakes
14	7	The Lives of Ordinary People in Ancient Israel: Where Archaeology and the Bible Intersect
15	6	The Oxford handbook of African archaeology
16	6	Judah in the Neo-Babylonian Period: The Archaeology of Desolation
17	6	The Quest for the Historical Israel: Debating Archaeology and the History of Early Israel
18	6	Himiko And Japan's Elusive Chieftdom of Yamatai: Archaeology, History, And Mythology
19	6	The archaeology of islands
20	6	Writing about Archaeology

Above table is a categorization of the subject categorization of the archaeological research that depicted art and archaeology is the major sub-theme in archaeological research which had publications of 17 records and the

following that The Archaeology of Ethnogenesis: Race and Sexuality in Colonial San Francisco had 14 records to make clusters is enabled.

Table 7 Research areas

S. No	Research Areas	Records	% of 13130
1	Archaeology	6694	50.986
2	Anthropology	3138	23.901
3	Geology	1694	12.903
4	History	988	7.525
5	Arts Humanities Other Topics	818	6.23
6	Physical Geography	622	4.738
7	Science Technology Other Topics	428	3.26
8	Chemistry	289	2.201
9	Environmental Sciences Ecology	279	2.125
10	Religion	235	1.79
11	Art	225	1.714
12	Paleontology	204	1.554
13	Spectroscopy	184	1.401
14	Social Sciences Other Topics	171	1.302
15	Asian Studies	157	1.196

Table 7 displays the top 20 research areas and their names; the majority is pure archaeology possesses 6694 records and the second one anthropology as we know that, archaeology itself is a branch of anthropology so the research tends to its mother subject influence so 3138 records is almost 24% of the total publications in this study period.

Table 8 Citations and source journals

S. No	Citations	Journal name
1	259	Antiquity
2	140	Medieval Archaeology
3	128	Journal of Anthropological Research
4	118	American Antiquity
5	103	European Journal of Archaeology
6	101	Cambridge Archaeological Journal
7	98	Historical Archaeology
8	88	Post-Medieval Archaeology
9	87	International Journal of Nautical Archaeology
10	85	Journal of Archaeological Science-Reports
11	69	Archaeologies-Journal of The World Archaeological Congress
12	69	American Anthropologist

13	64	International Journal of Historical Archaeology
14	59	Quaternary International
15	58	Journal of Field Archaeology
16	58	Azania-Archaeological Research In Africa
17	51	Australian Archaeology
18	50	Quaternary International
19	44	Archaeology
20	44	Journal of Archaeological Science-Reports

This particular analysis is to learn the citations per journal so as to journal value and standards according to the citation appended can be known by the enthusiastic future investigator. While the impact factor itself is having its own critiques front matter of the journal, field demarcations/specifications, skewness of the citations received for the period i.e. some journals of its articles receive high citations at the beginning but some will fetch later. So impact factor calculations and its period (two years) to publish is very much concern to qualify one journal.

Table 9 h-index analysis with citations received for the articles

S. No	Name	h-index	Citation sum within h-core	All citations	All articles
1	Fuller DQ	16	1038	1066	23
2	Rick TC	13	499	530	25
3	O'Brien MJ	11	422	429	15
4	Lycett SJ	11	327	329	13
5	Erlandson JM	11	505	572	27
6	Dominguez-Rodrigo M	11	309	331	20
7	Kennett DJ	10	323	356	20
8	Lasaponara R	10	195	237	20
9	Masini N	10	208	241	22
10	Braje TJ	10	395	427	21
11	Eren MI	9	236	250	15
12	Ramsey CB	9	519	546	16
13	Iriarte J	8	134	174	17
14	Kohler TA	8	184	196	13
15	Fleisher J	8	153	162	15
16	Bar-Yosef O	8	465	483	13
17	Peeples MA	8	201	207	12
18	Shahack-Gross R	8	224	226	10
19	Voss BL	8	152	164	14
20	Madella M	8	101	127	13

Above table clearly depicts the h-index of the top 20 authors, and the first and second authors Fuller DQ and Rick TC possess 16 and 13 h-index respectively. It is relatively good all twenty five authors have 7 and more grade in terms of h-index.

Table 10 Authorship pattern

S. No	Authorship	Counts	Cumulative total
1	Single	7530	7530
2	Double	1959	9489
3	Three	1149	10638
4	Four	807	11445
5	Five	569	12014
6	Six	363	12377
7	seven	220	12597
8	Eight	190	12787
9	nine	89	12876
10	ten	69	12945
11	Eleven and above	185	13130
	Total	13130	

Above table explains the authorship pattern viz. single author's documents are 7530, double authored papers are 1959, triple authors are 1149 and the four author records are 807 records. This is an example of single authored topic highly, because most of the science and technological research papers are joint authored.

Table 11 Language wise distribution of the data

S. No	Language	Records	Percentage
1	English	11805	89.91
2	Spanish	500	3.81
3	French	215	1.64
4	German	166	1.26
5	Italian	83	0.63
6	Russian	82	0.62
7	Croatian	53	0.40
8	Czech	48	0.37
9	Portuguese	37	0.28
10	Turkish	30	0.23
11	Swedish	23	0.18
12	Chinese	18	0.14
13	Slovene	13	0.10

14	Serbian	9	0.07
15	Slovak	9	0.07
16	Polish	8	0.06
17	Estonian	6	0.05
18	Dutch	6	0.05
19	Catalan	5	0.04
20	Greek	3	0.02
21	Lithuanian	3	0.02
22	Japanese	2	0.02
23	Norwegian	2	0.02
24	Afrikaans	1	0.01
25	Bulgarian	1	0.01
26	Rumanian	1	0.01
27	Korean	1	0.01
	Total	13130	

Table 11 shows the language wise distribution of the documents across the countries and across the native researchers. English is the main language medium to communicate this scholarly communications to the people all over the world. The first language occupies 11805 records and the second prepare language is Spanish with 500 records.

Table 12 Co-citation Analysis

S. No	Authors I	Authors II	Co-citation
1	Bourdieu P, 1977, Outline Theory Pract	Giddens A, 1984, Constitution Soc Out	52
2	Ramsey C, 2009, V51, P337, Radiocarbon	Reimer P, 2013, V55, P1869, Radiocarbon,	47
3	Henshilwood C, 2003, V44, P627, Curr Anthropol	Mcbrearty S, 2000, V39, P453, J Hum Evol,	42
4	Latour B, 1993, We Have Never Been M	Latour B, 2005, Reassembling Social	41
5	Ramsey C, 2009, V51, P337, Radiocarbon	Reimer P, 2009, V51, P1111, Radiocarbon	40
6	Hodder I, 2012, Entangled Archaeolog	Latour B, 2005, Reassembling Social	39
7	Gell A, 1998, Art Agency Anthr The	Latour B, 2005, Reassembling Social	38
8	Bronk R, 2009, V51, P337, Radiocarbon	Reimer P, 2013, V55, P1869, Radiocarbon	36
9	Bourdieu P, 1990, Logic Practice	Bourdieu P, 1977, Outline Theory Pract	36
10	Ingold T, 2000, Perception Env Essay	Tilley C, 1994, Phenomenology Landsc	35
11	Hodder I, 2012, Entangled Archaeolog	Olsen B, 2010, Defense Things Archa	34
12	Latour B, 2005, Reassembling Social	Witmore C, 2007, V39, P546, World Archaeol	34
13	Latour B, 2005, Reassembling Social	Olsen B, 2010, Defense Things Archa	34
14	Bourdieu P, 1977, Outline Theory Pract	Giddens A, 1979, Central Problems Soc	33
15	Gosden C, 1999, V31, P169, World Archaeol	Kopytoff I, 1986, P64, Social Life Things C	32
16	Ingold T, 1993, V25, P152, World Archaeol	Tilley C, 1994, Phenomenology Landsc	32

17	Olsen B, 2012, P1, Archaeology: The Discipline Of Things	Olsen B, 2010, Defense Things Archa	30
18	Bennett J, 2010, Vibrant Matter Polit	Latour B, 2005, Reassembling Social	27
19	Hodder I, 2012, Entangled Archaeolog	Olsen B, 2012, P1, Archaeology: The Discipline Of Things	27
20	Lightfoot K, 1995, V60, P199, Am Antiquity	Silliman S, 2005, V70, P55, Am Antiquity	27



Figure Co-citation analysis through Bibexcel .net file and Pajek

Table 12 and Figure demonstrate the co-citation relationships of the topic through the authors and their respective journal names. Co-citation analysis is the standard Bibliometric analysis will decide and depict the strength of two or more authors and journals are semantically related to one another, which means the chain of core subjects are to be examined and portrayed. This study found that authors Bourdieu P and Giddens A have been cited 52 times jointly in the research topic investigated.

Table 13 Highly cited journals analysis

S.No	Cited	Documents
1	204	Bourdieu P, 1977, Outline Theory Pract.
2	191	Reimer Pj, 2013, V55, P1869, Radiocarbon, Doi 10.2458/Azu_Js_Rc.55.16947
3	183	Tilley Christopher, 1994, Phenomenology Landsc
4	147	Reimer PJ, 2009, V51, P1111, RADIOCARBON, DOI 10.1017/S0033822200034202
5	144	Ramsey CB, 2009, V51, P337, RADIOCARBON, DOI 10.1017/S0033822200033865
6	137	Latour Bruno, 2005, Reassembling Social
7	131	Ingold Tim, 2000, Perception Env Essay
8	127	Hodder Ian, 2012, Entangled Archaeolog
9	123	Gell Alfred, 1998, Art Agency Anthr The
10	120	Reimer PJ, 2004, V46, P1029, RADIOCARBON
11	118	Schiffer M. B., 1987, FORMATION PROCESSES
12	111	Mcbrearty S, 2000, V39, P453, J Hum Evol, Doi 10.1006/Jhev.2000.0435
13	102	Latour Bruno, 1993, We Have Never Been M
14	101	Smith Laurajane, 2006, Uses Heritage

15	100	Kopytoff I., 1986, P64, SOCIAL LIFE THINGS C, DOI DOI 10.1017/CBO9780511819582
16	98	Giddens A, 1984, CONSTITUTION SOC OUT
17	96	Binford Lr, 1980, V45, P4, Am Antiquity, Doi 10.2307/279653
18	94	Jones S., 1997, ARCHAEOLOGY ETHNICIT
19	93	Lyman R., 1994, Vertebrate Taphonomy
20	93	Ingold T, 1993, V25, P152, World Archaeol, Doi 10.1080/00438243.1993.9980235

Table 13 shows that the article OUTLINE THEORY PRACT written by Bourdieu P, (1977) is been cited by these source authors 204 times, which means this is one of the most popular and valid articles for this field and the second one also received 191 citations that deal with radiocarbon, which is dating chemicals in the field of archaeology.

Table 14 the publisher and their proportions

S. No	Records	Publishers
1	1190	ROUTLEDGE JOURNALS, TAYLOR & FRANCIS LTD
2	942	SPRINGER
3	868	CAMBRIDGE UNIV PRESS
4	673	WILEY-BLACKWELL
5	655	MANEY PUBLISHING
6	554	ACADEMIC PRESS LTD- ELSEVIER SCIENCE LTD
7	456	PERGAMON-ELSEVIER SCIENCE LTD
8	360	ELSEVIER SCIENCE BV
9	341	SAGE PUBLICATIONS LTD
10	248	SOC AMER ARCHAEOLOGY
11	242	ANTIQUITY
12	205	WILEY
13	203	SOC HISTORICAL ARCHAEOLOGY
14	196	UNIV CHICAGO PRESS
15	164	ACADEMIC PRESS INC ELSEVIER SCIENCE
16	124	OXFORD UNIV PRESS
17	114	ARCHAEOLOGICAL INST AMERICA
18	104	ELSEVIER SCI LTD
19	104	NATL ACAD SCIENCES
20	96	AMER ASSOC ADVANCEMENT SCIENCE

Table 14 is absolute proof for the publishers and their records of these source journals. RROUTLEDGE JOURNALS, TAYLOR & FRANCIS LTD stands in first place with 1190 records and this tells us the archaeologists are given much importance by this publisher. Springer and Cambridge University Press are the second and third players in terms of the quantum of publications.

MAJOR FINDINGS

This particular study has its own unique interpretations and findings. They are classified as follows:

1. The search 'archaeology' at topic field captured 13130 records (after duplication is omitted) which were taken for analysis
2. The document wise distribution was done first and it exposes the journal articles are stands maximum with the number of 9046 records and the next one is a book review which contains 2660 records for its count.
3. The year wise distribution of the documents conducted as displayed the year 2016 has 1958 records of 15% and the year 2017 has a declined mode of 1842 records which is 14 percent of the overall percentage.
4. The country wise categorization based on its quantum of publication shows that the United States of America 4162 records, England has 2421 records, Australia has 787 and the fourth one is Spain which possess 722 records for its portion. This is evident that USA stands always first in many research field like science and technology, social sciences, now in humanities also.
5. The top twenty authors and their publication productivity is studied by their quantum of publications, among them these are the four highly prolific authors: Anonymous-unknown author have 79 records, Hummler M has 47 publications, Witcher R holds 40 publications and Erlandson JM has 27 publications among the all.
6. The top source titles were found as Journal of Archaeological Science having 523 records in its content, Antiquity journal has 386 records, Quaternary international possess 314 documents and the International Journal of Historical Archaeology holds 216 papers for its part.
7. Top four clusters of subjects are Art and Archaeology (17 records), The Archaeology of Ethnogenesis: Race and Sexuality in Colonial San Francisco (14 records), Form Paris to Pompeii: French Romanticism and the cultural politics of archaeology (9 records) and the archaeology of collective action insists (9 records)
8. According to research area categorization the following four top fields are identified as prolific fields and they are as follows: Archaeology 6694 records of 51 %, Anthropology of 3138 records which is 24%, Geology has 1694 records it is 13% and the fourth one is History which contains 988 records this should be 7.5% of the total. Now the interpretation can be made like this; the archaeology is the core subject so without any collaboration the pure the archaeological part of the research is 51 %, whereas the mother field from where this core literature was born so that the impact is playing as second major research area i.e. Anthropology, the third one is Geology, without geology the landscaping, excavating, research, and findings is impossible so this topic is stands third place with 1694 records, the history and archaeology is the sister subjects, one can't survive without another so History has 988 documents for its part.
9. It is interesting to see that the journals which were not in the first place of number of documents but secure first place in a number of citations i.e. Antiquity Journal secure 259 citations over the period-test period, and the Medieval Archaeology scored 140 citations, journal of anthropological research fetched 128 citations. Whereas American antiquity received 118 credits.
10. Of the authors of this study data, the highly active authors in terms of total publications and their citations (h-index) along with citations were found through Bibexcel software. The top four authors are Fuller DQ first, Following him are Rick Tc, O'Brien MJ and Lycett SJ with 16, 13, 11 and 11 h-index and 23, 25, 15,13 records respectively.

11. The overall interpretation can be made, the literature in archaeological research is significantly growing in terms of publications and the awareness of the journal article publishing to make national research visible in international domain of access and acceleration.
12. Archaeology is the study of past ideas through remains, so the historical studies are very much limited and are sensitive, this could be the reason for the average number of papers and its citations seen over a period.
13. Understanding the national and international research output in this particular topic is driving force to the new and curiosity-filled archaeologists to further excavation and documentation of the pre-historic values and heritages.
14. Language wise, authorship patterns are the other significant findings that impress the single author records are more rather than joint authors, English and Spanish are the first and second holders of the records

CONCLUSION

Bibliometrics is to be considered the metric study in the information science field, it has its developments in terms of webometrics and altmetrics today. These metrics are used to analyze the archaeological research output through performance. The results show that the increasing publications in this particular field also, which is to be appreciated in humanities and social sciences research. As authors in this topic are mainly seen from the United States of America, England and Australia, which are English-speaking nations, that shows their economical background and its influence in past knowing study like history and archaeology, whereas developing countries like India seem to growing in nature in this literature output, that is the reason that India is not making the 25 top position in science and technological research output. So it is evident that the country like India and its sub-continentals should concentrate archaeological research like Keeladi and Athichanallur in Tamilnadu so that the cultural heritage of the pertinent area can be known and will be documented for the future generation to know its evolution through proper evaluation of the art and artifacts kept intact by museums, libraries and publications on the related topic collected and preserved in either print or digital formats as cultural heritages in terms of documents for future generations.

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