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Sadik Batcha M
msbau@rediffmail.com

Chaturbhuj S B
Annamalai University, santosh79.chaturbhuj@gmail.com

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Sadik Batcha, M.
Associate Professor and Head, LIS wing, DDE, Annamalai University, Annamalainagar, Tamilnadu, India Email: - msbau@rediffmail.com
Chaturbhuj, S.B.
Research Scholar, Dept of Library and Information Science, Annamalai University, Annamalainagar South India Email: - santosh79.chaturbhuj@gmail.com Mobile- 9822292366

Abstract

The study is aimed to find out the authorship pattern and the collaboration trends in the field of phonology. In the study, Collaborative index, Degree of collaboration, Collaborative Coefficient, Relative growth rate and Doubling time these Scientometric indicators were used. The study found that the Degree of Collaboration is 0.5 which reveals the average relationship between singled authored papers and muli-authored papers. Collaboration Coefficient and Modified Collaboration Coefficient is less than 0.5, it means there were fewer trends of authors collaboration. But the study found slight growth from 1013 to 2015 and again decreased. As per the study Goswami, U was the first ranked author, Lingua was the first ranked journal and USA was the first ranked Country between 2000 and 2017.

Keyword: Authorship pattern, Collaborative Coefficient, Collaborative Index, Modified Collaborative Coefficient, Relative growth rate, Phonology, Linguistic, Phonetics

1. Introduction

In the modern era of knowledge, research activities increased in every branch of knowledge. This made research market larger and complex. In this era, numerous globe and specialized sub-disciplines have emerged and continue to emerge. So the natures of research of any field become more and more complex. That's why Bibliometrics and Scientometrics have been taking considerable efforts to assess research output and productivity. The main objective of the Scientometric research is the quantitative characterization of scientific activity, In Scientometrics publication pattern of all forms of written communication is to measure and it indicates literature growth rate and pattern in macro and micro level. This type of research provides information about the structure of knowledge or a discipline the way it is communicated. It also gives the information of publication pattern, Authorship pattern, the collaboration of research and many more. These are the important tool to understand the utility of the documents and the relationship between documents and fields. In such studies, we describe author characteristics, authorship of articles and degree of collaboration of a specific group of authors.

In the present study, the authorship pattern along with the collaboration of authors in phonology has been studied. The duration of 18 years from 2000 to 2017 has taken and data is collected from the Web of Science. Total 5015 records of published documents were analyzed in this study.

The subject of the study is Phonology. Phonology is a sub-discipline of any language as a science. This is one of the prominent factors of linguistic. Any language has five basic elements which are called five system of language. These are a Phonological system, Morphological System, Semantic System, Syntactic system and Pragmatic system. In these systems, phonology deals with the linguistic sounds and its pronunciation. A phonological study not only deals with the linguistics point of view but also has been studied in rehabilitative, Psychological, Pediatrics, communication, Neurological, Educational fields. That's why this study of authorship pattern and collaboration in phonology is conducted to know the research trades and authors behavior pattern in this field.

2. Objectives of Study

1. To examine the nature of the authorship pattern in Phonology
2. To determine the degree of collaboration in Phonology
3. To measure the year wise distribution of publication and growth of literature
4. To identify ranking of the authors, Country-wise distribution and ranking of the Journal involved in Phonology
5. To measure the relative growth rate and double time of article in phonology

3. Review of Literature

For the study, many previous studies were reviewed

To know the theory of collaboration Subramanyam, K. (1982)[1] has given the review article on research collaboration. In this article, he stated that collaboration cannot be easily determined by traditional methods of survey and observation. Bibliometric methods offer convenient and non-reactive tools for studying collaboration in research. In this research paper, he gave detail mathematical theory behind the collaborative index, the degree of collaboration and collaboration coefficient.

Ajiferuke, Isola (1988)[2] in his research article reveals that the mean number of author per paper or the proportion of the multiple-authored paper is inadequate as a measure of the degree of collaboration in a disciple. That's why the use of collaboration coefficient is necessary for the analysis of collaboration. Probability technique is used in this indicator.

Bird(1997)[3], studied authorship pattern in Marine Mammal Science 1985-1993. The total number of 1308 papers published in the scientific journal was examined. There were weak but statistically significant trends in the number of author per paper as well as in the number of multi-authored paper written by the author from the different institution, with the passage time.

Karpagam et.al (2011)[4] analyzed the growth pattern of Nanoscience and Nanotechnology literature in India during 1990-2009. In this study authorship Pattern, collaboration index, collaboration coefficient, modified collaboration coefficient has been studied. Sivasubramaniyan and Sadik Batcha (2012)[5] conducted a survey and found that the uses of e-resources are key factors in the publication output of individual authors and institutional growth by which productivity increases.

Baskaran C and Sadik Batcha (2012)[6] studied that the Scietometrics study measures the performance based on several parameters, country annual growth rate and collaborative index. Singh (2013)[7] analyzed the various bibliometric components of the articles published in the Chinese librarianship between 2009 and 2012. The study revealed the quantitative growth of articles by number and year, the range of citation per article, authorship patterns, authorship productivity, most prolific author and authors by country.

Sadik Batcha (2013)[8] analysed in his study the scientometric approach in which revealed the result that it provides the researchers with various concepts, models, and techniques that may be applied to any discipline in order to explore its foundations, state, intellectual core, and potential future development.

4. Methodology

The data for this study has been collected from the web of Science. Total 5015 article was published from 2002 to 2017. For the classification of the data as per requirement was derived from Bibexcel software. Following are the Scientometrics Indicators used for the data analysis.

4.1 Collaboration index

Collaboration Index is nothing but the mean number of authors per joint paper. For the analysis of collaboration index, single-authored paper which is equal to one always omitted. So the formula for CI is CI =(Total author) /(Total joint paper) In statistical format the formula is

$$\mathrm{CI} = \frac{\sum_{j=1}^{A} jfj}{N}$$

Where,

fi = the number of J authored papers published

in a discipline during a certain period of time.
N= the total number of research papers published in a discipline during a certain period of time.

4.2. Degree of collaboration (DC)

This indicator was suggested by Subramanyam. It is defined as the ratio of the number of collaborative research papers to the total number of research papers in discipline during a certain period of time. DC is easy to calculate and easily interpretable as a degree gives zero weight to single-authored papers and always ranks higher a discipline with a higher percentage of multiple authored papers. The formula for the degree of collaboration is

$$\mathrm{DC} = \frac{Nm}{Nm + Ns}$$

Where,
Nm= Number of multiple authored papers
Ns= Number of single-authored papers

4.3. Collaborative Coefficients (CC)

This is a measure of collaboration in research that reflects both the mean number of authors per paper as well as the proportion of multi-authored paper. The formula for the collaborative coefficient is

$$\mathrm{CC} = 1 - \frac{\sum_{j=1}^{A}(\frac{1}{j})fj}{N}$$

Whereas,
Fj= the number of authored papers
N= Total number of research published
K= the greatest number of authors per paper
According to Ajiferuke, CC tends to zero as single-authored papers dominate and to 1-1/j as J-authored paper dominate. This implies that the higher the value of CC, higher the probability of multi-authored papers.

4.4. Modified Collaborative Coefficient (MCC)

The derivation of the new measure is almost the same as that of CC, as given in Ajiferuke et. al. Imagine that each paper carries with it a single "credit", this credit being shared among the authors. Thus if a paper has a single author, the author receives one credit, with two authors each receive 1/2 credits and in general, if we have X authors each receive 1/X credits. (This is the same as the idea of fraction productivity defined by Solla price and Beaver as the score of an author when he is assigned 1/n of a unit for one item for which n author have been credited.

Hence, the average credit awarded to each author of a random paper is E[1/X], a value that lies between 0 and 1. Since we wish 0 to correspond to single authorship, we define the modified collaborative coefficient (MCC). The formula for MCC is

$$\mathrm{MCC} = \frac{A}{A-1}\left\{\frac{\sum_{j=1}^{A}(\frac{1}{j})fj}{N}\right\}$$

Where A is a normalization constant to be determined. Setting A=1 yield the measure CC. The requirement that j=0 for single authorship does not restrict. The above equation is not defined for the trivial case when A=1, which is not a problem since collaboration is meaningless unless at least two authors are available. CC approaches MCC only when A ∞, but is otherwise strictly lass then MCC by the factor 1-1/A.

4.5. Relative Growth Rate (RGR)

The rate of growth is the main feature of any research activity. The information explosion in the form of an enormous publication represents the growth of scholarly communication. The relative Growth rate (RGR) is the increase in the number of articles/pages per unit of time. The mean Relative growth rate(R) over the specific period of the interval can be calculated from the following equation.

$$\bar{R}_{(1-2)} = \frac{w_2 - w_1}{T_2 - T_1}$$

R (1-2) = mean relative growth rate over the specific period of interval.

W_1 = Natural log of the initial number of articles/pages.
W_2 = natural log of the final number of articles/pages after a specific period of interval.
$T_2 – T_1$ = the unit difference between the initial time and the final time.

4.6. Doubling Time (DT)

There exists a direct equivalence between the relative growth rate and the doubling time. Doubling time is the time required for articles to become double of the existing amount. If the number of articles/pages of a subject doubles during a given period then the difference between the logarithms of numbers at the beginning and end of this period must be logarithms of number 2. If natural logarithm is used this difference has a value of 0.693. Thus the corresponding doubling time for each specific period of interval and for both articles and pages can be calculated by the formula

$$DT = \frac{0.693}{\bar{R}}$$

5. Results and Discussion

5.1. Documents type wise distribution of research output

Table 1 represents the document type distribution of research output. Out of 5015 document 4019 items are articles which comprised 80.14% of total documents. Second largest documents are book reviews having 7.92%. Proceedings papers which are equal to articles are 4.27%. The review was the next preferred category of document type which covers 194 documents (3.87%). Editorial material and Meeting abstract have 2.41% and 0.84% contribution in the publication of phonology other remaining categories are covered only 0.55% contribution in total publication.

Table-1 Type of Document wise distribution of Publications

Sr.No	Document Type	Records	% of 5015
1	Article	4019	80.14
2	Book Review	397	7.92
3	Proceedings Paper	214	4.27
4	Review	194	3.87
5	Editorial Material	121	2.41
6	Meeting Abstract	42	0.84
7	Correction	7	0.14
8	Book Chapter	9	0.18
9	Biographical-Item	5	0.1
10	Letter	5	0.1
11	Reprint	2	0.03
Total		**5015**	**100**

5.2. Year-wise distribution of the publication

Year wise research output in the field of phonology is given in table 2. It is observed that the research output in this field gradually increasing from 2000 to 2017. In 2000 the research output is only 3.45% and it increases 9.27% by the year 2017. It means in 18-year research output in Phonology increases by 5.82%. In the year 2001, 2002 and 2012 the research output is decreased slightly. From the year 2015 onwards the contribution in research of Phonology increased identically.

Table- 2 Year-wise distribution of the publication

Year	Number of Publication	% of 5015	cumulative	Cumulative % 5015
2000	173	3.45	173	3.45
2001	152	3.03	325	6.48

2002	165	3.29	490	9.77
2003	181	3.61	671	13.38
2004	175	3.49	846	16.87
2005	172	3.43	1018	20.30
2006	252	5.02	1270	25.32
2007	253	5.04	1523	30.37
2008	261	5.20	1784	35.57
2009	273	5.44	2057	41.02
2010	321	6.40	2378	47.42
2011	333	6.64	2711	54.06
2012	299	5.96	3010	60.02
2013	342	6.82	3352	66.84
2014	326	6.50	3678	73.34
2015	416	8.30	4094	81.64
2016	456	9.09	4550	90.73
2017	465	9.27	5015	100.00
Total	**5015**	**100**	**38945**	

5.3. Authorship pattern

The pattern of Authorship has been presented in table 3. It is observed that 41.81% are contributed by single author and 58.19 are contributed by multi-authored. The two authored papers are 23.39 where three authored papers are 15.29%. Four authored contribution in research 9.25%. Remaining 10.26% of papers are contributed with five or more authors. From the given statistic we can say that in the field of Phonology tendency of single-authored papers are published. The difference of percentage between single-authored and multi-authored is 16.38%. This is not a big difference as the 18 year period is concerned.

Table-3 Authorship Pattern

Authors	Article Frequency	% of 5015
1	2097	41.81
2	1173	23.39
3	767	15.29
4	464	9.25
5	241	4.81
6	112	2.23
7	56	1.12
8	45	0.90
9	21	0.42
10<above	39	0.78
Total	**5015**	**100.00**

5.4. Year-wise distribution of Co-authorship pattern and collaborative Indices

Table 4 represents the collaborative Index, Degree of collaboration, collaborative coefficient, and Modified collaborative coefficient

5.4.1. Collaborative Index

From the statistic given in table 4 highest collaboration index found in 2012. It is 2.70. It means that collaborations between two or more than two authors are involved in same discipline are highest in 2012. The average of collaboration index is 2.32. From 2013 to 2017 we found the collaboration index is at a higher level as compared to previous years.

5.4.2. Degree of collaboration

As per the information represents in table 4 the mean or average value of the degree of Collaboration is 0.57. During the year 2013, the degree of collaboration is highest. In the year 2010, 2013, 2014, 2015 the degree of collaboration is much similar i. e. 0.6. Apart from the year 2000, all the values of the degree of collaboration are closer to the mean value. Table 4 Year-wise distribution of Co-authorship Patter and Collaborative indices

Table – 4 Year wise distributions of Co-authorship pattern and collaborative indices

Year	Author wise distribution of Articles															
	1	2	3	4	5	6	7	8	9	10 & Above	Total Authors	Grand Total	CI	DC	CC	MCC
2000	89	41	26	10	3	1	1	2	0	0	333	173	1.92	0.49	0.3	0.3
2001	67	41	21	10	5	2	1	1	1	3	343	152	2.26	0.56	0.35	0.35
2002	77	45	19	11	1	8	1	2	0	1	354	165	2.16	0.53	0.33	0.33
2003	76	46	22	22	5	3	4	3	0	0	417	181	2.30	0.58	0.29	0.37
2004	82	40	21	19	2	8	1	1	1	0	383	175	2.19	0.53	0.34	0.34
2005	78	44	19	14	7	4	1	3	1	1	388	172	2.26	0.55	0.35	0.35
2006	114	66	27	20	9	8	3	2	0	3	567	252	2.25	0.55	0.34	0.35
2007	107	59	46	20	12	5	1	1	0	2	568	253	2.25	0.58	0.37	0.37
2008	117	66	33	24	16	0	3	2	0	0	561	261	2.15	0.55	0.35	0.35
2009	113	53	47	32	17	4	4	1	1	1	652	273	2.39	0.59	0.38	0.38
2010	125	81	51	29	16	7	3	3	3	3	780	321	2.43	0.61	0.39	0.39
2011	146	71	53	35	14	6	2	3	1	2	760	333	2.28	0.56	0.36	0.36
2012	120	67	55	26	19	6	3	2	0	1	701	299	2.34	0.60	0.38	0.39
2013	127	65	56	43	23	9	6	7	2	4	922	342	2.70	0.63	0.42	0.42
2014	115	75	65	32	16	9	1	2	5	6	850	326	2.61	0.65	0.42	0.42
2015	159	101	64	36	31	5	9	7	2	2	1039	416	2.50	0.62	0.40	0.40
2016	192	108	73	42	17	11	3	2	2	6	1061	456	2.33	0.58	0.37	0.37
2017	193	104	69	39	28	16	9	1	2	4	1129	465	2.43	0.58	0.38	0.38
Grand Total	**2097**	**1173**	**767**	**464**	**241**	**112**	**56**	**45**	**21**	**39**	**11808**	**5015**	**2.32 Mean**	**0.57 Mean**	**0.36 Mean**	**0.37 Mean**

5.4.3. Collaborative Coefficient

The collaborative coefficient is measuring the mean number of author per paper as well as the proportion of multi-authored papers. The CC is calculated from the formula explained in 4.4 sections. As per the statistical information is given in table 4 the mean that is average of the collaborative coefficient is 0.36. In the year 2011, we found the mean value of collaboration coefficient. In the year 2010 found the highest collaborative coefficient in the field of Phonology. The year 2000 is the lowest collaborative coefficient. As per the data, we found that there is less collaboration in the field of Phonology. This happened because of the dominance of single-authored papers. That's why the collaborative coefficient is less than 0.5.

5.4.4. Modified Collaborative Coefficient

Collaborative coefficient always lying between 0 and 1. 0 indicates as single-authored papers dominated. But the collaborative coefficient always remains less than 1. So that Modified Collaborative Coefficient was introduced by Ajiferuke. It smoothly tends to 1 as a degree of collaboration become maximal.

The statistical information given in table 4 shows that CC and MCC have the same value. The mean of MCC is 0.37. It means that single-authored papers are very much dominated in the field of Phonology. Collaborations of multi-authored papers were slightly greater in the years 2013, 2014 and 2015.

5.5. Relative Growth Rate and Doubling Time

Table 5 represents the chronological status of growth in research in the field of Phonology. It shows that relative growth rate starts with a high score in 2001 i. e. 0.631 and decreased in 2017 with a score of 0.005. The average relative growth rate is 0.07 in 18 years. The given value of RGR shows that in the year 2017 research in the field of Phonology is increase at the speed of 0.005 in relation to previous growth.

We find direct equivalence between relative growth rate and Doubling Time. As table 5 shows that Doubling time increased and decreased from 0.001 to 0.139 from 2000 to 2017. In the year 2015, the rate of doubling time is decreased identically.

Table-5 Year-wise Relative Growth Rate and Doubling Time of research productivity

Year	No. of Articles	Cumulative No. of Articles	w1	w2	RG	Mean of RG	DT	Mean of DT
2000	173	173	-	5.153	-	0.07	-	0.044
2001	152	325	5.153	5.784	0.631		0.001	
2002	165	490	5.784	6.194	0.205		0.003	
2003	181	671	6.194	6.509	0.105		0.007	
2004	175	846	6.509	6.741	0.058		0.012	
2005	172	1018	6.741	6.926	0.037		0.019	
2006	252	1270	6.926	7.147	0.037		0.019	
2007	253	1523	7.147	7.328	0.026		0.027	
2008	261	1784	7.328	7.487	0.020		0.035	
2009	273	2057	7.487	7.629	0.016		0.043	
2010	321	2378	7.629	7.774	0.015		0.046	
2011	333	2711	7.774	7.905	0.012		0.058	
2012	299	3010	7.905	8.010	0.008		0.087	
2013	342	3352	8.010	8.117	0.008		0.087	
2014	326	3678	8.117	8.210	0.007		0.099	
2015	416	4094	8.210	8.317	0.068		0.010	
2016	456	4550	8.317	8.429	0.007		0.099	
2017	465	5015	8.429	8.520	0.005		0.139	
Grand Total	**5015**	38945						

5.6. Ranking of authors contributed to the research of Phonology

Table 6 gives the information of the Rank list of authors who involved in the research of phonology. As per the table Goswami, U. was obtaining the first rank having 34 records on her name and her contribution during 18 years is 0.678%. of total papers published. In the same way Brent, I. has got second rank, Zeigler JC. Has got the third rank, Ralph Mal has got the fifth rank. These authors contributed 0.658%, 0.558%, 0.518% and 0.419% respectively. Table 6 provides the first 15 ranked authors with their contribution to the field of Phonology.

Table-6 Ranking of Author contributed to the research of Phonology

Sr.No.	Authors	records	% of 5016	Rank of Authors
1	Goswami U	34	0.678	1
2	Berent I	33	0.658	2
3	Ziegler JC	28	0.558	3
4	Ralph MAL	26	0.518	4
5	Mcleod S	24	0.478	5
6	Booth JR	21	0.419	6
7	Grainger J	20	0.399	7
8	Hall TA	20	0.399	7
9	Kawahara S	20	0.399	7
10	Shriberg LD	18	0.359	8
11	Treiman R	17	0.339	9
12	Patterson K	16	0.319	10
13	Perfetti CA	16	0.319	10
14	Rubach J	15	0.299	11
15	Cao F	14	0.279	12
16	Jared D	14	0.279	12
17	Seidenberg MS	14	0.279	12
18	Van Der Lely HKJ	13	0.259	13
19	Weekes BS	13	0.259	13
20	Bitan T	12	0.239	14
21	Blevins J	12	0.239	14
22	Carreiras M	12	0.239	14
23	Dodd B	12	0.239	14
24	Jacobs AM	12	0.239	14
25	Joanisse MF	12	0.239	14
26	Nevins A	12	0.239	14
27	Tan LH	12	0.239	14
28	Blust R	11	0.219	15
29	Burman DD	11	0.219	15
30	Coltheart M	11	0.219	15
31	Damian MF	11	0.219	15
32	Heim S	11	0.219	15
33	Miozzo M	11	0.219	15
34	Monaghan P	11	0.219	15
35	Perea M	11	0.219	15
36	Prieto P	11	0.219	15

37	Schiller NO	11	0.219	15
38	Shu H	11	0.219	15

5.7. Ranking list of leading journals in the field of Phonology

Table 7 represents the information of journals in which the articles in the field of Phonology were published. As per the table 7, the first ranked journal is Lingua (An International Review of General Linguistics) having 192 articles published on Phonology from 2000 to 2017. It has a 3.83% contribution out of total 5015 research papers. The second rank has got to Clinical Linguistics and Phonetics. It contributed 111 papers which mean 2.21% of total papers. Similarly, the journal Language has got the third rank with 2.11% contribution. The journal Phonology has got the fourth rank with 2.05% contribution and the journal Brain and Language has got the fifth rank with 1.89% contribution. Table 7 provides the rank list of first 30 journals with 47 titles.

Table-7 Ranking list of leading Journals in the field of Phonology

Sr.No.	Name of the Journals	No of Articles	% of 5015	Rank of Journals
1	Lingua	192	3.83	1
2	Clinical Linguistics & Phonetics	111	2.21	2
3	Language	106	2.11	3
4	Phonology	103	2.05	4
5	Brain And Language	95	1.89	5
6	Journal of Speech-Language And Hearing Research	85	1.69	6
7	Journal of Phonetics	83	1.66	7
8	Frontiers In Psychology	74	1.48	8
9	Neuropsychologia	60	1.20	9
10	Language Sciences	59	1.18	10
11	Linguistic Review	59	1.18	10
12	Journal of Linguistics	58	1.16	11
13	Cognition	56	1.12	12
14	Natural Language & Linguistic Theory	54	1.08	13
15	Language And Speech	53	1.06	14
16	Journal of Memory And Language	50	1.00	15
17	Journal of Experimental Psychology-Learning Memory And Cognition	49	0.98	16
18	Reading And Writing	49	0.98	16
19	International Journal of Language & Communication Disorders	45	0.90	17
20	Oceanic Linguistics	42	0.84	18
21	Poznan Studies In Contemporary Linguistics	41	0.82	19
22	Psychonomic Bulletin & Review	41	0.82	19
23	Phonetic	41	0.82	19
24	Journal Of Psycholinguistic Research	39	0.78	20
25	Linguistic Inquiry	39	0.78	20
26	Language And Cognitive Processes	38	0.76	21

27	Neuroimage	38	0.76	21
28	American Journal of Speech-Language Pathology	36	0.72	22
29	Journal of Child Language	35	0.70	23
30	Applied Psycholinguistics	33	0.66	24
31	Journal of East Asian Linguistics	33	0.66	24
32	Journal Of The International Phonetic Association	32	0.64	25
33	Canadian Journal of Linguistics-Revue Canadienne De Linguistique	32	0.64	25
34	Aphasiology	31	0.62	26
35	Memory & Cognition	31	0.62	26
36	Human Brain Mapping	30	0.60	27
37	Second Language Research	30	0.60	27
38	Journal of Cognitive Neuroscience	29	0.58	28
39	Bilingualism-Language And Cognition	29	0.58	28
40	Cortex	29	0.58	28
41	International Journal of Speech-Language Pathology	28	0.56	29
42	Language Speech And Hearing Services In Schools	28	0.56	29
43	Journal of Neurolinguistics	28	0.56	29
44	Linguistics	28	0.56	29
45	Language And Linguistics	28	0.56	29
46	International Journal of American Linguistics	27	0.54	30
47	Journal of Communication Disorders	27	0.54	30

5.8. County wise distribution of articles with ranking list

In table 8 country-wise distributions of research papers in the field of Phonology is given. As per the table 8, the highest contributed country is the USA having 1928 research papers published from 2000 to 2017 in the field of Phonology. The USA Contributed 38.44% of the total papers published in the given specific period. The UK published 1302 i. e. 25.96% of total papers. The UK has got second position. The third rank has got to the Netherlands having 13.36%contribution. The fourth rank got to Germany having 7.28% contribution and the fifth rank got to Switzerland having 3.03% of contribution. Table 8 provides the first ranking list which contains 23 countries.

Table 8 Country wise distribution of articles with ranking list

Sr. No	Name of Country	Published Articles	% of 5015	Rank of Country
1	USA	1928	38.44	1
2	UK	1302	25.96	2
3	Netherlands	670	13.36	3
4	Germany	365	7.28	4
5	Switzerland	152	3.03	5
6	France	78	1.56	6

7	Spain	50	1.00	7
8	Canada	49	0.98	8
9	Italy	48	0.96	9
10	Poland	45	0.90	10
11	Brazil	36	0.72	11
12	Ireland	27	0.54	12
13	Hungary	21	0.42	13
14	South Africa	21	0.42	13
15	Peoples R China	20	0.40	14
16	Chile	20	0.40	14
17	Taiwan	19	0.38	15
18	Czech Republic	17	0.34	16
19	South Korea	17	0.34	16
20	Croatia	16	0.32	17
21	Turkey	13	0.26	18
22	Belgium	10	0.20	19
23	Malaysia	10	0.20	19

6. Finding and Conclusion

The study reveals that Articles, Book reviews, and proceedings papers are the major document types published in the field of Phonology. The research in Phonology is dominated by single-authored papers where 41.81% papered were published by single-authored. Year wise distribution indicates that the dominance of multi-authored papers increased in recent years i. e. from 2015 to 2017. The average of the collaborative index was 2.32 and found at a high level from 2013 to 2017. Average value of the degree of collaboration is 0.5. It shows the average relationship between single-authored and multi-authored papers.

The Collaborative Coefficient and Modified collaborative coefficient indicators were less than 0.5. It means that there was less collaboration in the field of Phonology. Single-authored papers are dominated. But still, the sign of slight growth found from 2013 to 2015 and again decreased in 2016 and 2017. Relative Growth rate starts at 0.623 in 2001 and decreased by 0.005 by 2017. Goswami U. was the first rank author having the contribution of 0.678%. Lingua was first ranked journal having 3.83% contribution and the USA was the first ranked country having 38.44% publications in the field of Phonological research. The study explores the authorship pattern and collaborative work of authors in the field of phonology in detail.

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