Bradford's Law Application in LISA during the perod, 2001 - 2014

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ABSTRACT: *The present study is based on LISA for the period of 14 years, i.e. 2001-2014. 11176 articles on the* ***Information Technology*** *covered by the subject. Application of Bradford's Law of Scattering is one of the bibliometric law, which is used most commonly in bibliometric research. Rank list was prepared and Computer Communication took top place with* ***871*** *citations followed by Computer Network with 802, and Information Today with 267 citations were the most preferred journals. The study identified that the maximum number of studies on Information Technology are published in English Language (****84.04 %).*** *The country–wise distribution of publication in the field revealed that majority of them are from* ***United Kingdom with 251 (38.4%).*** *The second position goes to* ***USA with 246 (37.46%),*** *Netherlands in the third position with* ***31 (4.71%).*** *India gets only 9th position in respect of publication on Information Technology.*

Keywords: Bradford's Law of Scattering, Core Journal, Bibliometrics Law, LISA (Library and Information Science Abstract)

Received: 8 June 2018, Revised 29 August 2018, Accepted 2 September 2018

1. Introduction

In every subject there are same journals which are frequently referred by the research because of the close relation between the subject of the journal and the areas of research work. These highly cited journals are listed as 'Core Journals' of a specific subject. The core Journals are considered as "Central set of Journals which most clearly reflects the conceptual essence of the research being reported in the discipline" (Summers, 1984). The core Journal always contains a higher concentration of relevant articles on a particular discipline and rest of the papers on the subject are scattered over a large number of Journals (Mahapatra).

The concept of 'Core Journals' is being derived from Bradford's Law. Samuel C. Bradford first formulated his law (Called as 'Bradford's Law of Scattering') in 1934. It describes law the literature on a particular subject is scattered or distributed in the Journal (Bradford, 1950). According to Garfield (1980) Bradford's law is one of several statistical expressions, which try to

describe the working of science by mathematical means. This law is considered as the best known of the entire bibliometric concept.

Scope and Limitations

The present study is confined to the literature published and cited in LISA in the subject Information Technology to related Communication & Information Technology, Communication & Information Technology-Networks, Library Technology, Networks, Information Communication, Information Work, Education and other related Information Technology subject in LIS. The scope of the study is limited to LISA from 2001 to 2014.

Objectives of the Study

Objectives of the research study are to uncover the genuineness study through extensive study at the problem. Objective of the research are considered as milestone that help researcher to reach conclusion with new results. Hence following objectives were decided for the present investigation:

- To prepare the list of core periodicals applying Bradford's law.
- To assess the language - wise distribution of publication.
- To identify the country-wise distribution of publication.

Research Methodology

Scientometric method of research is used for present study. The method is used in library and information science research. It utilizes quantitative analysis and statistics to describe pattern of publication within a given field or body of literature. This work is based on the Scientrometric analysis of LISA (Library and Information Science Abstract) covers almost all fields of LIS. The present study covers of the communication & Information Technology, Communication & Information Technology-Networks, Library Technology and others subject related to information technology from the year 2001 to 2014 (14 Years) containing 161 issues have been taken in to consideration to present study. A data-sheet was prepared in MS-Excel to record the data and then the data was entered manually. The details regarding number of papers, nature of authors, journals and subject are collected to fulfill the objective of the present study.

Periodicals and Journal carry recent research useful to the researchers and academicians. The multi angle analysis of periodicals have prepared and presented under following sub units.

1.1 Ranking of Journal

1.2 Bradford's Law

1.3 Language wise distribution of Journals

1.4 Country wise distribution of Journals

1. 1 Ranking of Journal

Scientometrics/Bibliometric studies are useful for the ranking of journals. This involves counting of articles journals wise and arranging them in the decreasing order. Rank list of journals is prepared and list of the 88 ranked journals is presented in Table 1.

Ranking of Journal is based on **11176** articles covered by **604** journals published all over the world and which have been abstracted in LISA.

Table 1 is a list of core journals according to number of articles covered by each journal and its rank (up to 88th rank).

It is evident from Table 1 that the journal **'Computer Communication' (871)** has covered highest number of articles. It can also be observed from the table that **75%** of articles have been covered by only first **70** journals in rank. The second and third positions go to Computer Networks with **802** articles and Information Today with **265** articles. Indian Journals viz-**SRELS Journal of Information Management** with 20 articles get 69th position.

S. No.	Journal Name	Total No. of Articles	Rank
1	Computer Communication	**871**	**1**
2	Computer Network	**802**	**2**
3	Information Today	**267**	**3**
4	Information Communication & Society	**244**	**4**
5	Computer in Libraries	**186**	**5**
6	Government Information Quarterly	**168**	**6**
7	Journal of the American Society for Information Science and Technology	**157**	**7**
8	Information World Review	**146**	**8**
9	Information Technology & People	**126**	**9**
10	E Content	**125**	**10**
11	International Journal of Wireless Information Networks	**116**	11
12	Information Society	**110**	12
13	Internet Research	**108**	13
14	Advanced Technology Libraries	**107**	14
15	Journal of Information Technology	**106**	15
16	The Electronic Library	**106**	15
17	Behavior & Information Technology	**103**	16
18	Online Information Review	**102**	17
19	Searcher	**96**	18
20	Information Polity	**95**	19
21	Journal of the China Society for Scientific and Technical Information	**94**	20
22	International Journal of Electronic Government Research	**93**	21
23	Library Hi Tech	**93**	21
24	Online	**92**	22
25	American Libraries	**91**	23
26	Telemetries & Informatics	**88**	24
27	European Journal of Information Systems	**87**	25
28	The Information society	**83**	26
29	Professional de la informacion	**74**	27
30	Journal of Network and Systems Management	**72**	28
31	Information Management & Computer Security	**70**	29
32	Information Studies	**70**	29
33	International Journal of Human-Computer Studies	**70**	30
34	Social Science Computer Review	**67**	31
35	Journal of Information Science	**66**	32
36	Aslib Proceedings : New Information Perspective	**62**	33
37	Library Hi Tech News	**61**	34

38	Telecommunication Policy	**61**	34
39	Information and Software Technology	**60**	35
40	Information Technology for Development	**60**	36
41	Information Development	**58**	37
42	International Journal of Information Management	**57**	38
43	Journal of Strategic Information Systems	**56**	39
44	Journal of Global Information Management	**54**	40
45	Electronic Library & Information Systems	**52**	41
46	Information Outlook	**52**	41
47	Interacting with Computer	**52**	41
48	Journal of Web Librarianship	**50**	42
49	Al Communications	**49**	43
50	Journal of Information Communication and Ethics in Society	**49**	43
	Total	**11176**	

Table 1. Rank List of Journals

1.2 Application of Bradford's Law

The law states that if a group of journals are arranged in an order of decreasing productivity i.e., the journal that yields the most relevant articles comes first and the most unproductive last, the journal will be grouped into a number of each zone producing a similar number of relevant articles. However the number of journals in each zone will be increasing rapidly. The relationship between the zones is **1: *n: n²***

Zone	No. of Articles	Cumulative No. of Articles	No. of Journals(observed)	Ratio(observed)	Ratio(expected)
I	3533	3533	15	1	1
II	3533	7066	74	5	2
III	4110	11176	515	34	4
Total	**11176**		**604**		

Table 2. Bradford's Law

The Total No. of 11176 articles where divide into 3 equal zones each zone containing-3533 in first zone, 3533 in second zone, and 4110 in third zone.

Corresponding the number of journals publishing the articles covered in first, second, and third zone as shown in the Table 2 are increasing which indicate the data verbally fit into the Bradford's law of scattering literature.

Accordingly, a graph was plotted for LISA data with log of journals on the *Y*- axis and cumulative number of articles on *X*-axis (figure 1). The cumulative number of articles was divided into three equal zones, which are indicated by the points X_1, X_2, and *X*3 on X- axis. Then from these three point a line parallel to *Y*- axis was drawn which meets the curve at the points P_1, P_2, and *P*3. Then lines were drawn viz, P_1Y_1, P_2Y_2, P_3Y_3 such that they are parallel to *X* axis resulting.

OY1 = First Zone covers first 15 Journals

OY2 = Second Zone Covers the next 74 Journals

No. of Journal	Cumulative No. of Journal	No. of Articles	Cumulative No. of Articles	Log
1	1	871	871	0
1	2	802	1673	0.30102
1	3	267	1940	0.47712
1	4	244	2184	0.60205
1	5	186	2370	0.69895
1	6	168	2538	0.77815
1	7	157	2695	0.84509
1	8	146	2841	0.90308
1	9	126	2967	0.95424
1	10	125	3092	1
1	11	116	3208	1.04139
1	12	110	3318	1.07918
1	13	108	3426	1.11394
1	14	107	3533	1.14612
2	16	106	3745	1.20411
1	17	103	3848	1.23040
1	18	102	3950	1.25527
1	19	96	4046	1.27870
1	20	95	4141	1.30102
1	21	94	4235	1.32222
2	23	93	4421	1.36172
1	24	92	4513	1.38021
1	25	91	4604	1.39794
1	26	88	4692	1.41497
1	27	87	4779	1.43136
1	28	83	4862	1.44715
1	29	74	4936	1.46239
1	30	72	5008	1.47712
3	33	70	5218	1.51851
1	34	67	5285	1.53147
1	35	66	5351	1.54406
1	36	62	5413	1.55630
2	38	61	5535	1.57978
2	40	60	5655	1.60205
1	41	58	5713	1.61278
1	42	57	5770	1.62324
1	43	56	5826	1.63346
1	44	54	5880	1.64345
3	47	52	6036	1.67209
1	48	50	6086	1.68124
2	50	49	6184	1.69897
1	51	48	6232	1.70757

2	53	47	6326	1.72427
1	54	46	6372	1.73239
1	55	45	6417	1.74036
2	57	44	6505	1.75587
1	58	42	6547	1.76342
1	59	41	6588	1.77085
1	60	40	6628	1.77815
1	61	39	6667	1.78532
1	62	38	6705	1.79239
6	68	37	6927	1.83250
2	70	36	6999	1.84509
1	71	34	7033	1.85125
1	72	33	7066	1.85733
3	75	32	7162	1.87506
6	81	30	7342	1.90848
5	86	29	7487	1.93449
4	90	28	7599	1.95424
3	93	27	7680	1.96848
3	96	26	7758	1.98227
6	102	25	7908	2.00860
3	105	24	7980	2.31175
7	112	23	8141	2.04921
6	118	22	8273	2.07188
5	123	21	8378	2.08990
8	131	20	8538	2.11727
12	143	19	8766	2.15533
7	150	18	8892	2.17609
6	156	17	8994	2.19312
10	166	16	9154	2.22010
5	171	15	9229	2.23299
11	182	14	9383	2.26007
14	195	13	9565	2.29003
5	200	12	9625	2.30102
13	213	11	9768	2.32837
16	229	10	9928	2.35983
11	240	9	10027	2.38021
23	263	8	10211	2.41995
22	285	7	10365	2.45484
25	310	6	10515	2.49136
27	337	5	10650	2.52762
38	375	4	10802	2.57403
45	420	3	10937	2.62324
56	477	2	11049	2.67760
127	604	1	11176	2.78103

Table 3. Graphical Representation of Bradford's Law

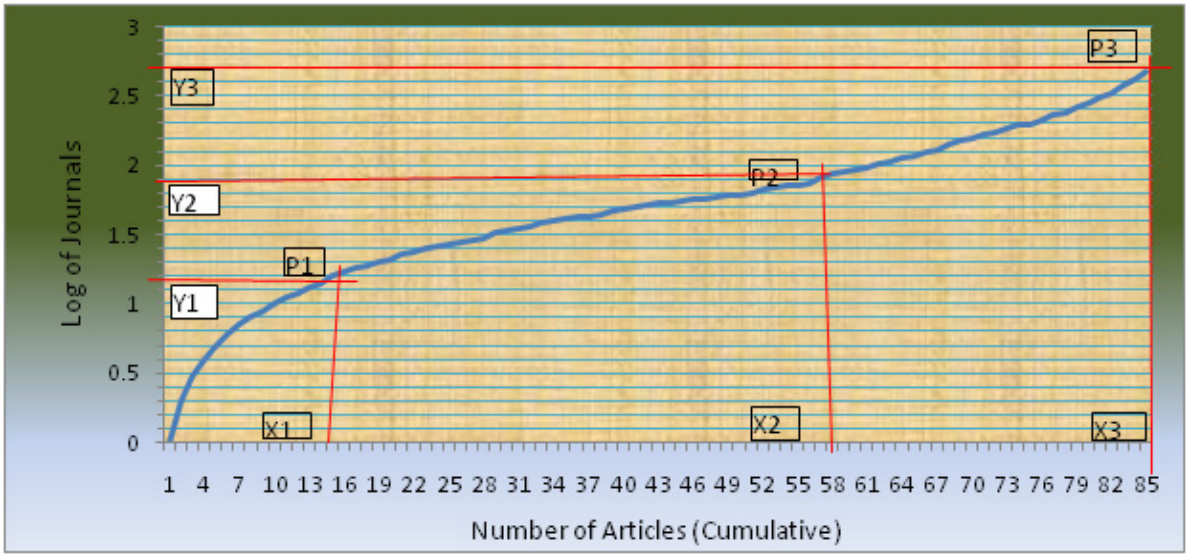

Figure 1. Bradford's Curve

OY3 = Third zone covers the rest of the 515 Journals

According to Bradford's the relationship between the zones in 1: *n: n*²

While the relation in each zone of the present study is 15:74:515 which do not fit the Bradford's Law of Scattering of literature.

1.3 Language wise Distribution of Journals

The importance of language related to a specific field of knowledge change from time to time. Spanish and Chinese were two most important languages of science during 19th - 20th centuries. English has now replaced them as the predominant language in many fields.

Attempts were made to analyses journals covering the articles on the subject under study according to the language of articles as shown in table 4. It is evident from Table 4 in maximum Journals covering the articles the subject under study are published from USA and UK English language by covering 84.04% Journals which means that there is a close relationship between country of publication and language of the journals.

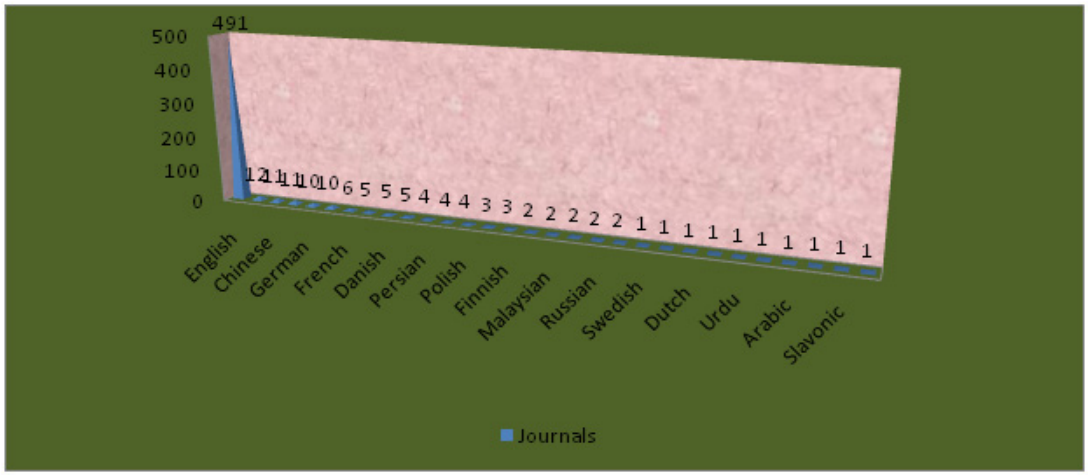

Figure 2. Language- wise Distribution of Journals

S.No.	Number of Language	Journals	Percentage
1	English	491	81,29%
2	Canadian	12	1,99%
3	Chinese	11	1,82%
4	Japanese	11	1,82%
5	German	10	1,66%
6	Spanish	10	1,66%
7	French	6	0,99%
8	Croatian	5	0,83%
9	Danish	5	0,83%
10	Portuguese	5	0,83%
11	Persian	4	0,66%
12	Italian	4	0,66%
13	Polish	4	0,66%
14	Turkish	3	0,50%
15	Finnish	3	0,50%
16	Hungarian	2	0,33%
17	Malaysian	2	0,33%
18	Mexican	2	0,33%
19	Russian	2	0,33%
20	Romanian	2	0,33%
21	Swedish	1	0,17%
22	Belgian	1	0,17%
23	Dutch	1	0,17%
24	Lithuanian	1	0,17%
25	Urdu	1	0,17%
26	Thai	1	0,17%
27	Arabic	1	0,17%
28	Jamaican	1	0,17%
29	Slavonic	1	0,17%
30	Icelandic	1	0,17%

Table 4. Language- wise Distribution of Journals

1.4 Geographical Distribution of Journal

Since maximum number of contributions of the subject computerized LIS belonged to Journal titles, it was felt necessary to determine the geographical scattering of Journals so as to decided which is the leading nation in producing maximum literature in the emerging discipline under study.

It is clear from Table 5 that nearly **75.78%** Journals giving maximum article on subject under study are published from USA.

While only **24.22%** journals covering articles on this subject are published from rest of the world, which means that UK and USA are the main producers of Journals giving maximum articles on the subject under the study.

S.No.	Country	No. of Publication	Percentage
1	United Kingdom	208	34.44%
2	United State of America	207	34.27%
3	Netherlands	32	5.30%
4	Canada	12	1.99%
5	Japan	11	1.82%
6	Germany	10	1.66%
7	Spain	10	1.66%
8	India	9	1.49%
9	Australia	8	1.32%
10	China	9	1.49%
11	France	6	0.99%
12	Taiwan	6	0.99%
13	Croatia	5	0.83%
14	Denmark	5	0.83%
15	South Africa	4	0.66%
16	Iran	4	0.66%
17	Italy	4	0.66%
18	Poland	4	0.66%
19	Brazil	3	0.50%
20	Finland	3	0.50%
21	Turkey	3	0.50%
22	New Jersey	2	0.33%
23	Austria	2	0.33%
23	Hungry	2	0.33%
24	Korea	2	0.33%
25	Malaysia	2	0.33%
26	Portugal	2	0.33%
27	Romania	2	0.33%
28	Russia	2	0.33%
29	Argentina	1	0.17%
30	Saudi Arabia	1	0.17%
31	Arlington ,VA	1	0.17%
32	Belgium	1	0.17%
33	Columbia	1	0.17%

34	Dutch	1	0.17%
35	Egypt	1	0.17%
36	Georgia	1	0.17%
37	Iceland	1	0.17%
38	Jamaica	1	0.17%
39	Kuwait	1	0.17%
40	Lithuania	1	0.17%
41	Mexico	1	0.17%
42	Nigeria	1	0.17%
43	Pakistan	1	0.17%
44	Rome	1	0.17%
46	Serbia	1	0.17%
47	Singapore	1	0.17%
48	Slovak Republic	1	0.17%
49	Sweden	1	0.17%
50	Switzerland	1	0.17%
51	Tanzania	1	0.17%
52	Thailand	1	0.17%
53	West Indies	1	0.17%
54	New Zealand	1	0.17%

Table 5. Geographical distribution of Journals

2. Conclusion

1. It is found that the core journal in Information Technology is Computer Communication with **871** articles. The second and third positions go to Computer Networks with **802** articles and Information Today with **265** articles. Indian Journals viz-**SRELS Journal of Information Management** with **20** articles gets **69th** position.

2. The country – wise distribution of publication in the field revealed that majority of them are from **United Kingdom with 251 (38.4%).** The second position goes to **USA with 246 (37.46%),** Netherlands in the third position with **31 (4.71%).** India gets only 9th position in respect of publication on Information Technology.

3. The study identified that the maximum number of studies on Information Technology are published in English Language (**84.04 %).** The non - English Language in the subject of Information Technology of German Language (**1.82%**), Chinese Languages (**1.67%**) and Japanese Language (**1.38%)** get second, third, and fourth positions respectively.

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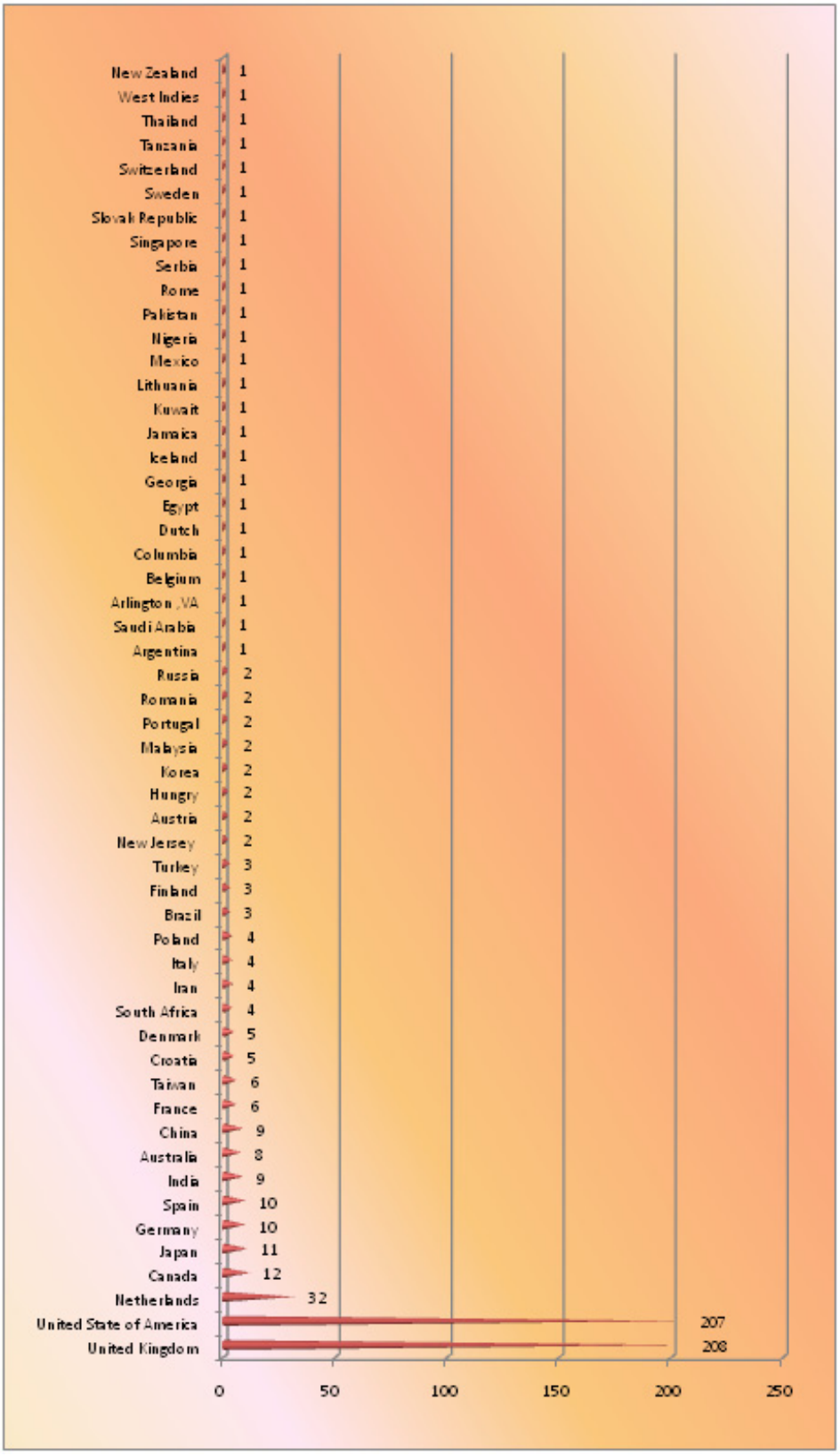

Figure 3. Geographical Distribution of Journals

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