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Scientometric Analaysis on the Literature Output on Unemployment

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Abstract - **The social problem of "Unemployment" has been taken as research topic for the scientometric study. The data has been downloaded from Web of Science and the span of years has been selected from 2008 to 2012. Hypotheses are assumed and appropriate statistical tool has been utilized to the test the hypotheses. The interpretation has been given along with relevant data in tabular form. It was identified that the majority of the communicating format of language in the research output is of English. The journal articles dominated all the other type of publications. The prediction of Alfred Lotka on author productivity was not suitable for this research work.The findings reveal that enormous literatures related to the "Unemployment" are published to alarm the policy makers about the up-coming danger. It is requested the policy makers of the global countries to lay new policies to see the human beings to be employable. It is suggested that the society to raise the standard of their employable skills to be worthy for being employable. It it also suggested to the respective educational authorities towards the revival in the curriculum of the educational system of global countries.**
Key words: Scientometric, Unemployment, Regression, Lotka's Law, Kolmogorov Smirnov Test

I. INTRODUCTION

"Unemployment" is a drastic social problem which increases from day to day in the contemporary world. It is the practice or a dream of either a lower class or middle class family members of an under-developed and developing country to migrate to a developed countries or rich countries in search of fortune. The media of every day strikes with news related to the coming back of such migrated citizens because of the diminishing employment opportunities in developing countries. There may be many valid factors behind the diminishing of employment opportunities both in abroad or in a home country such as population growth, political changes, policy revival, high expectation from the employer and competition among the employee, increasing growth of knowledge, rapid growth of technologies which reduce the human interface, growth of terrorism, but the loss of job affects the contemporary society very badly and threatens the future generation about un-employability. Therefore, to correlate the present situation of the society and the intellectual output of the researchers or literates, it was decided to measure the research impact of the same with scientometric techniques. For which, data has been downloaded from the database "Web of Science". A few scientometric related literatures are reviewed. Appropriate research design has been designed. The downloaded data are processed and tabulated for easy understanding. Statistical tools are utilized to prove the hypothetical assumptions.

II. REVIEW OF LITERATURE

The scientometric study was about the research activities of lake sediment analysis for ten years from 2000 to 2009 on the basis of the data downloaded from Science Citation Index. The top ten journals were retrieved on the basis of productivity. Year wise publications related to trace elements in lake sediments were retrieved. It was identified that the majority articles published on the topic "Science of the Total Environment". The scientomentric study helps to segregate and analyse the papers related to the elements of Zn, Pb, Cu, Cr, Cd, Mn and Ni. The study further supports to get papers related to depths of sediment layers from 2 cm to 193 cm. Finally it was identified that the methods of sample analysis plays pre dominant role.[1] The research was a quantitative analysis about the literature growth on "Bluetongue", a disease of cattle. The span of years taken for the study was from 1970 to 2012. Related literatures were reviewed. It was found that an average of 59 papers was published every year. The year 2009 was most prolific with a record count of 171 papers. USA was most prolific with a record count of 223(8.79%).

India was placed in the third place with a record count of 152(5.99%) papers. The most productive journal was identified as "VeterinariaItaliana" with 121 papers. "English" language reign over the communication format during the stipulated study period. Most productive author was identified as B.I. Esburn with 213 papers. The author's expectation was that this research article will support the research scholars, scientists, academicians and policy makers of Veterinary Science to be more vibrant in the implementation of new starategies.[2]Scientometric analysis was done on the topic "Oceanography" literature output from 2011 to 2015. The data were downloaded from the database, Web of Science. The study reveals that the researchers were very much interested to publish their research papers in journal articles; as such 96.45% were articles. It was identified that the overall citation was 2.32 per papers. National Institute of Oceanography published more number of papers with 110 publications. The journal entitled "Indian Journal of Geo Marine Science" published more number of papers with 412 publications. India published more number of publications with 985 research papers. At the outset, it was assessed that there are

possibilities for the country "India" to dominate the global countries with the majority of publications on "Oceanography" in mere future.[3]

III. NEED FOR THE STUDY

The alarm has to be raised to the knowledge of the governing council of all the countries to protect the global citizens from disaster through "Unemployment". This can only be done by the literates through their powerful eye-opening literary contributions, as they only act as a back bone from generation to generation to the enlightment of the society. To raise such alarm of awareness this study of scientometric analysis on "Unemployment" has been carried out.

IV. LIMITATIONS OF THE STUDY

The applications of scientometric techniques are limited to the following limitations

1. Percentage Analysis of the year wise publications
2. Regression Test
3. Percentage Analysis of the Type of Documents
4. Application of the Bradford Law of Scattering
5. Percentage Analysis of the Language wise Publications
6. Identification of Top ten Countries with h-Index
7. Ranking of Top ten Authors
8. Application and Testing of Lotka's Law

V. METHODOLOGY

Data related to the literature output on "Unemployment" indexed in the "Web of Science" has been downloaded for ten years from 2008 to 2012. Appropriate Statistical tool has been utilized to test the hypotheses with the help of Microsoft Excel. On the basis of the results retrieved through the analysis, relevant interpretation has been specified. The article is concluded with a suggestion.

VI. HYPOTHESES

The following two hypotheses are framed and to be tested with relevant statistical tool:

A. Hypothesis No.1

H_0: There is a significant variance between the numbers of publications published from 2008 to 2012 and from 2013 to 2017

B. Hypothesis No.2

H_0: There is no significant variance between the actual productivity and the Lotka's Law of productivity

VII. ANALYSIS AND INTERPRETATION

A. Percentage Analysis of the Year wise Publications of Records

TABLE I PERCENTAGE ANALYSIS OF THE YEAR WISE RESEARCH PUBLICATIONS

S. No.	Publication Year	No. of Records	Percentage Analysis	LCS	GCS
1	2008	1049	6.48%	4015	23334
2	2009	1120	6.92%	4527	23654
3	2010	1218	7.53%	3294	21361
4	2011	1318	8.15%	3088	16975
5	2012	1493	9.23%	2987	18467
6	2013	1628	10.06%	2488	16730
7	2014	1607	9.93%	1646	11468
8	2015	2119	13.10%	1189	8696
9	2016	2313	14.30%	475	5597
10	2017	2311	14.29%	87	2025
Total		16176	100.00%	23796	148307

The table I reveals the number of records published from 2008 to 2017. A total of 16176 numbers of records were published during the above cited period. A slight deviation in the growth of records is clearly visible in the table; however it has to be confirmed only with the regression test. The year 2016 was most prolific with a record count of 2313(14.30%).

The total number of publications gained a Local Citation Score of 23796 and 148307 of Global Citation Score. The year 2009 was most prolific for gaining 4527 Local Citation Score and 23654 Global Citation Score.

B. Regression Test Results

The Regression Test is the foremost activity of testing the variance between the year wise numbers of publications in an intention to check the validity of the frequency of the publications to assess the doubling time of the records. Since, the P-value of 0.045 is lesser than the critical value of 0.05, the null hypothesis framed as

H_0: There is a significant variance between the numbers of publications published from 2008 to 2012 and from 2013 to

2017 is rejected and the alternate hypothesis is accepted. The alternate hypothesis is as follows:

*H_1:*There is no significant variance between the numbers of publications published from 2008 to 2012 and from 2013 to 2017. Further, the R Square value of 0.78 reveals that the relationship between the number of publications from 2008 to 2012 and 2013 to 2013 is 78%. Therefore, the frequency of the data is capable for the statistical calculation of the doubling time of the records published on "Unemployment"

C. Percentage Analysis of the Type of Documents

The table III clearly shows that 13 numbers of different type of documents were involved towards the publication output of 16176. The type of document "articles" played vital role by dominating the whole research of ten years with a maximum record count of 15022 (92.87%) research articles, for which these articles gained 21991 numbers of Local Citation Score and 134104 numbers of Global Citation Score.

TABLE II REGRESSION TEST

Regression Statistics				
Multiple R	0.88598951			
R Square	0.78497741			
Adjusted R Square	0.71330321			
Standard Error	93.3024504			
Observations	5			
X Variable 1	**Coefficients**	**Standard Error**	**t Stat**	**P-value**
	0.435980 42	0.13174065 8	3.309383 992	0.04541 31

TABLE III PERCENTAGE ANALYSIS OF THE TYPE OF DOCUMENTS

Sl. No.	Type of Documents	No. of Records	Percentage Analysis	LCS	GCS
1	Article	15022	92.87%	21991	134104
2	Review	339	2.10%	592	7640
3	Article; Proceedings Paper	256	1.58%	678	3765
4	Editorial Material	187	1.16%	172	1013
5	Book Review	155	0.96%	0	12
6	Meeting Abstract	119	0.74%	0	8
7	Letter	34	0.21%	39	91
8	Article; Book Chapter	30	0.19%	72	787
9	Correction	11	0.07%	1	3
10	News Item	11	0.07%	1	18
11	Review; Book Chapter	6	0.04%	250	845
12	Article; Retracted Publication	3	0.02%	0	21
13	Poetry	3	0.02%	0	0
Total		16176	100.00%	23796	148307

D. Application of Bradford's Law of Scattering:

TABLE IV BRADFORD'S LAW OF SCATTERING

Zone	No. of Journals	No. of Articles
1	95	5014
2	384	5010
3	3140	4998
Total	3619	15022

The table IV shows very clearly about the zone wise segregation of journal articles through the application of Bradford's Law of Scattering. The application of the law was limited to the published journal articles alone. From the previous table 4.3, it was very clear that 15022 articles were published and these articles were segregated into three segments on the application of Bradford's Law. It was identified through the Zone 1 that 95 journals were most prolific with 5014 articles. The Zone 2 consists of 384 journals with 5010 articles. The last zone consists of 3140 journals with 4998 articles.

E. Top Ten Journals of Zone 1 identified through Bradford's Law

The table V clearly shows that the journal entitled "Labour Economics" was placed first for being most prolific among all the journals involved towards publishing articles on "Unemployment". The journal entitled "Labour Economics" published 226 records, authored by 414 numbers of authors, gained 735 Local Citation Score and 2154 Global Citation Score. 8635 references were cited by those journals. The h-index gained by the journal was 10.

TABLE V TOP TEN JOURNALS OF ZONE 1 IDENTIFIED THROUGH BRADFORD'S LAW

S. No.	Title of the Journal	No. of Authors	No. of Records	LCS	h-Index	GCS	h-Index	Cited References
1	Labour Economics	414	226	735	10	2154	20	8635
2	Applied Economics	347	164	151	6	772	14	6444
3	Economic Modelling	306	151	240	8	728	14	5851
4	Social Indicators Research	310	135	137	6	1198	20	6962
5	Plos One	717	134	0	0	1166	18	5883
6	Economics Letters	245	131	240	7	504	11	1689
7	Social Science & Medicine	420	124	919	15	3252	28	6081
8	Applied Economics Letters	237	123	67	4	202	6	1569
9	BMC Public Health	634	116	0	0	1152	19	5227
10	European Journal Of Public Health	403	92	333	10	1222	19	2514

D. Percentage Analysis of the Language wise Publications

TABLE VI PERCENTAGE ANALYSIS OF THE LANGUAGE WISE PUBLICATIONS

Sl. No.	Language	No. of Records	Percentage Analysis	LCS	GCS
1	English	15059	93.09%	23613	146272
2	Spanish	354	2.19%	19	464
3	German	197	1.22%	96	662
4	French	149	0.92%	16	214
5	Russian	86	0.53%	1	29
6	Portuguese	79	0.49%	3	202
7	Czech	63	0.39%	32	242
8	Turkish	33	0.20%	2	15
9	Croatian	27	0.17%	5	25
10	Polish	23	0.14%	0	8
11	Italian	21	0.13%	6	83
12	Slovak	14	0.09%	2	34
13	Dutch	11	0.07%	0	22
14	Swedish	9	0.06%	0	4
15	Afrikaans	7	0.04%	0	0
16	Lithuanian	7	0.04%	1	16
17	Hungarian	6	0.04%	0	1
18	Greek	5	0.03%	0	0
19	Icelandic	4	0.02%	0	3
20	Ukrainian	4	0.02%	0	3
21	Korean	3	0.02%	0	1
22	Slovene	3	0.02%	0	4
23	Catalan	2	0.01%	0	0
24	Malay	2	0.01%	0	0
25	Rumanian	2	0.01%	0	3
26	Serbian	2	0.01%	0	0
27	Danish	1	0.01%	0	0
28	Estonian	1	0.01%	0	0
29	Japanese	1	0.01%	0	0
30	Norwegian	1	0.01%	0	0
Total		16176	100.00%	23796	148307

Accordingly, the journals ranked from serial number 2 to 10, all information such as publication count, number of authors involved, number of local citation score, number of global citation score, h-indices and references cited by the journals are clearly tabulated in table number V.

The table VI reveals the language wise publications. A total of 30 languages were involved in publishing 16176 publications on "Unemployment". The language "English" played a majority role by publishing 15059(93.09%) records and placed first in the table with a gain of 23613 Local Citation Score and 146272 Global Citation Score. It is proved that the language "English" dominates the global countries in the medium of communication. All the remaining publications published in 29 languages were below than 2.20%. The details of the language wise publications along with citation score are clearly tabulated in table VI.

TABLE VII TOP TEN COUNTRY WISE PUBLICATIONS

S. No.	Country	No. of Authors	No. of Records	LCS	h Index	GCS	h Index	Cited References
1	USA	13684	4301	9229	36	57543	88	187853
2	UK	6904	2128	4613	24	28828	66	95889
3	Germany	5182	1693	3721	19	16589	51	73002
4	Spain	3053	956	1550	18	7631	38	40693
5	Australia	2795	824	906	12	8169	38	36617
6	Canada	2719	811	1144	13	9258	41	36433
7	France	2338	665	1094	14	5898	36	27337
8	Italy	2411	665	1066	12	6459	38	31711
9	Sweden	2264	644	1327	16	6678	39	27899
10	Netherlands	2545	642	1269	16	8806	43	29667

TABLE VIII RANKING OF TOP TEN AUTHORS WITH H-INDEX

Ranking	Author	No. of Records	TLCS	h Index	TGCS	h Index	Cited References
1	Hammarstrom A	41	167	8	482	12	1572
2	McKee M	34	547	10	2144	16	1417
2	Stuckler D	34	544	10	2276	16	1412
3	Virtanen P	28	111	5	319	10	982
4	Feldmann H	25	48	3	112	5	1204
4	van Ours JC	25	108	6	358	10	702
5	Burdorf A	23	126	6	542	11	879
5	Sahin A	23	262	10	403	11	865
6	Sala H	22	73	5	127	7	986
6	Zenou Y	22	95	6	433	11	1234
7	Brahler E	21	24	3	330	10	776
7	Janlert U	21	102	5	329	10	688
7	Martikainen P	21	47	3	211	10	953
8	Reeves A	20	87	6	351	10	856
9	Milner A	19	65	5	263	9	828
10	Gunnell D	18	141	7	644	12	720

E. Top Ten Country wise Publications, Citations and h-Index

The table VII denotes the top ten country wise publications among 147 countries, who were involved towards publishing 16176 records on "Unemployment". The United States of America placed first in the table with a record count of 4301 contributed by 13684 authors with 9229 Local Citation Score and 57543. 187853 References were cited by the United States of America. The USA gained an h-Index of 36, which is the highest among the other countries. The United Kingdom placed in the second place with a publication count of 2128 contributed by 6904 authors, for which 4613 local citation score and 28828 Global Citation Score. 95889 References were cited by the United Kingdom. The UK gained h-Index of 24 numbers. Germany is placed in the third place with a publication count of 1693 contributed by 5182 authors. A Local Citation Score of 4613 and 28828 Global Citation Score was gained by Germany. 73002 References were cited by Germany and at the same time, h-Index of 19 was gained. Likewise, 4th place has been occupied by Spain, 5th place has been occupied by Australia, 6th place has been occupied by Canada, 7th place has been occupied by France, Italy, Sweden and Netherlands were placed in 8th, 9th and 10th respectively. All the records published by these countries, the number authors contributed, number of Local Citation

Score, Global Citation Score, Cited References and h-Indices has been tabulated very clearly in table number VII.

F. Ranking of Top Ten Authors with h-Index

The table VIII reveals the ranking of top ten authors on the basis of number of publications published. The author, M. Hammarstrom leads the table with the publication count of 41 numbers of records, for which he secured 167 Local Citation Score, 482 Global Citation Score and h-Index of 8. But the authors, M. McKee and D. Stuckler though, they are placed in the second on the basis of the number of publications, these two authors gained more Local Citation Score, Global Citation Score and h-Indices than M.Hammarstrom. The author, P. Virtanen secured the third publications with a publication count of 28 records, for which he secured 111 Local Citation Score and 5 as h-Index; 319 Global Citation Score and 10 as h-Index. Likewise, the top 10 authors are tabulated with their respective publication counts, Local Citation Scores, Global Citation Scores, h-indices and the number of references cited by them in the table VIII.

G. Application and Testing of Lotka's Law

The author productivity has been calculated for the publications indexed in Web of Science. A sample of ten author productivity count has been taken for the test. The authorship has been marked as 'x'. The number of records has been stated as 'y'. The following value has been ascertained during the process of application and testing of Lotka's Law with the statistical test of Kolmogorov Smirnov Test.

N value = 4.50
C value = 1.05
Threshold Value = 0.012
Dmax Value = 6.93

TABLE IX APPLICATION AND TESTING OF LOTKA'S LAW WITH KOLMOGOROV SMIRNOV TEST

x	y	X	Y	XX	XY	Average of 'y'	Cum. Aver. of 'y'	fe	Cum. fe	D
1	4544	0	3.65744	0	0	0.285	0.285	0.27144	0.27144	0.01357
2	4748	0.30103	3.67651	0.09062	1.10674	0.298	0.583	0.55507	0.82652	0.24369
3	3085	0.47712	3.48926	0.22764	1.6648	0.194	0.776	0.73936	1.56588	0.78955
4	1402	0.60206	3.14675	0.36248	1.89453	0.088	0.864	0.82311	2.38899	1.52472
5	797	0.69897	2.90146	0.48856	2.02803	0.050	0.914	0.87072	3.25971	2.34545
6	586	0.77815	2.7679	0.60552	2.15384	0.037	0.951	0.90573	4.16543	3.21442
7	356	0.8451	2.55145	0.71419	2.15623	0.022	0.973	0.92699	5.09243	4.11908
8	208	0.90309	2.31806	0.81557	2.09342	0.013	0.986	0.93942	6.03185	5.04546
9	135	0.95424	2.13033	0.91058	2.03286	0.008	0.995	0.94748	6.97933	5.98447
10	82	1	1.91381	1	1.91381	0.005	1.000	0.95238	7.93171	6.93171
Total	15943	6.55976	28.553	5.21516	17.0443					

H_0: There is no significant variance between the actual productivity and the Lotka's Law ofProductivity. As the maximum deviation of 6.93 is greater than the Threshold Value of 0.012, the null 'H0' hypothesis originally assumed is rejected and an alternate hypothesis of 'H1' is accepted.

H_1: There is a significant variance between the actual productivity and the Lotka's Law of Productivity. Therefore, it is interpreted that the prediction of the Alfred Lotka's Law of author productivity cannot be accepted for this particular research productivity.

VIII. CONCLUSION AND SUGGESTION

The major findings of the study is that the awareness given by the literates about the threat of "Unemployment" is continuous, but with slight deviation in the middle years. It was identified that the majority of the communicating format of language in the research output was in English. The journal articles dominated all the other type of publications. The prediction of Alfred Lotka on author productivity was not suitable for this research work. The findings reveal that enormous literatures related to the "Unemployment" are published to alarm the policy makers about the up-coming danger. It is requested the policy makers of the global countries to lay new policies to see the human beings to be employable. As additional concluding remarks, it is further suggested that each and every citizens should grew with employable skills and that too they should be trained in such a way which should be right from their school education. Therefore, there should be a revival in the traditional pattern of the curriculum of educational system of each and every country so that the employable opportunities may be increased in each and every country to provide hope for the growing young contemporary generation and this can be a firm platform for the future generations to live and lead a peaceful and prosperous living environment without the fear of "Unemployment".

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