Journal's Self Citations and its Impact on *h*5 index of Library and Information Science (LIS) Journals of Prominent Countries: A Statistical Analysis Based on Journal Scholar Metrics

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Abstract - *In this study, the impact of journal self-citation on h5 index of LIS journals of prominent countries taken from Journal Scholar Metrics is compared. For comparison of h5 Index and self citations of LIS journals, Wilcoxon Signed Rank Test is used. Significance of LIS journals' self-citations are also analyzed using the non-parametric test Wilcoxon Signed Rank Test. The study shows that there is significant impact of self citations of LIS journals on h5 index of the journals from United States of America and United Kingdom. Highly significant self citations can be seen in the LIS journals from Brazil, USA and UK. Significant self citation is also seen in LIS journals from Netherland and Spain. The study found that self-citations have a moderate but significant effect on the h-index.*

Keywords: Periodicals, Self-Citation, Journal h Index, Journal h5 Index, Journal Scholar Metrics, Library and Information Science Journals, Statistical Analysis.

1. Introduction

Citations are important and expected component of scholarly communication. All substantive citations can be assigned to one of three large categories depending on whether their primary function is: 1. connecting the present work to previous relevant work; 2. giving credit and paying homage; or 3. Providing supporting evidence and clarifications[1]. The idealistic aim of every journal is the dissemination in international famous indexes. Citation indexing databases entitle journals to index their citations if the journal's structure coincides with the platform of that database and on condition that the journal contains a valid number of citations. Journal self-citations show us how often a journal is cited by its own publications which can be used to manipulate the various metric based rankings which are currently being employed to assess the impact of a journal rankings like impact factor and h index of the journals. Journal self-citations can be due to several reasons such as narrowness of a specialty, lack of journal choices in a field or the need for the authors to reinforce a concept by citing a previous publication from the same journal. The aim of this study was to analyze the self citation of Library and Information Science (LIS) journals and its possible effect on their h5 index in Journal Scholar Metrics (JSM).

1.1 Journal Self Citation

Self- Citation is one of the disputed subjects in scientific evaluation or citation analysis. Self-Citation is a natural phenomenon but this cannot be neglected in citation analysis. Journal self-citation is the giving of reference to articles published in a certain journal. In other words publications in a journal cite previous publications in the same journal and it is known as journal self-citations. This phenomenon can be seen either positively or negatively[2]. Journal self-citations are citations of previous papers in the same journal. Since the cited object in journal self-citations is the paper, not the author, journal self-citations are different from other kinds of self-citations, which are related to the author's country, affiliation or research team. The characteristics and patterns of journal self-citation may completely differ from those of author self-citation. An author may never cite their own previously published papers, and yet still cite others' papers published in the same journal, creating an incidence of journal self-citing without author self-citation[3]. Caspar Chorus (2015) briefly categorizes the various types of journal self-citing.

1. Regular self-citations. It goes without saying, that journal self-citations are completely harmless when they are based purely on the author's belief that citing a particular paper (from a particular journal) improves the quality of the manuscript she is planning to submit to that journal.
2. Self-citations based on author self-censoring. Experienced authors will know that for some or most journals, it improves the probability of successfully passing the journal's review to add a number of citations to papers previously (recently) published in that journal.
3. Self-citations due to nudges or request from journals or editors. Some journals explain on their website that it is important for prospective authors to 'acknowledge' (i.e., cite) recently published papers in that journal. In other cases, editors may explicitly suggest or even demand that an author add to his or her paper citations to papers recently published in their journal. Or they may even present the author with a selection of 'potentially relevant papers' which the author is strongly encouraged or even requested to cite. This may occur at various points in the review process, but is most likely to happen after a paper has been conditionally accepted for publication in the journal. It is this type of journal self-citing which I frequently encounter, and which I strongly believe must stop. If it stops, the 'self-censoring' type discussed above will in due time vanish as well[4].

1.2 *h* Index

The *h*-index has been claimed to provide a simple way to compare objectively the scientific achievement of researchers and has rapidly become one of the most favored measures of scientific output. The *h*-index is an author's number of articles (*h*) that have received at least *h* citations[5] and thus depends on the number of a researcher's publications and their impact. Some recent articles have called for cautious use of the *h*-index. In particular; its robustness against self-citations has been disputed. As the enhancement of the *h*-index will often be impeded by the lack of a few citations only, it has been argued that the *h*-index might be susceptible to manipulation by self-citation of such articles. This practice is also common where publications in a journal cite previous publications in the same journal and it is known as journal self-citations.

1.3 Journal Scholar Metrics (JSM)

Journal Scholar Metrics (JSM) is a bibliometric tool that seeks to measure the performance of Art, Humanities, and Social Science journals by counting the number of bibliographic citations their articles have received according to Google Scholar. JSM focus exclusively on journals belonging to the areas of Arts, Humanities, and Social Sciences covered by Google Scholar Metrics (period 2010-2014). The journal databases were consulted by JSM are; Ulrich web, Web of Science Master Lists, SCImago Journal Rank (SJR) and other International Disciplinary-based databases including Library and Information Science Abstracts, Sociological Abstracts, Social Work Abstracts, MLA, Historical Abstracts, Econlit, Psychinfo, Communication & Mass Media Complete, Anthropological Online etc.

O**bjectives**

The Major objectives of the present study are;

1. To identify the impact of self-citations on *h*5 index of journals in LIS of prominent countries across the world.
2. To find out the significance of self citations in LIS journals of prominent countries across the world.
3. To find out the average increase in *h*5 index and average increase in *h*5 citations by self citationsin LIS journals of the countries.

2 Methodology

As a data source, the present study used Journal Scholar Metrics database platform. As per the database there are 222 LIS journals are included from different countries across the world. Out of 32 countries across the globe having been included in the database, only 9 countries are selected for the present study. Because the remaining countries' representation in LIS journals is below in four numbers. Thus 186 LIS journals from 9 countries are subjected to analysis (Figure 1).

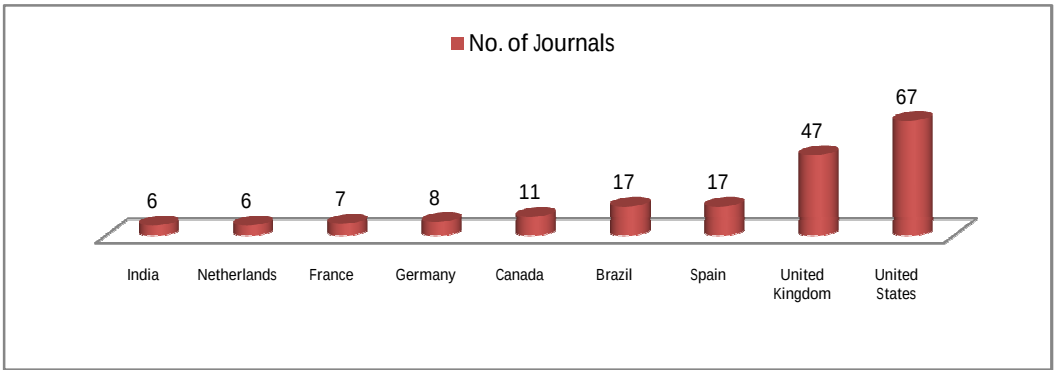
2.1 Definition of Key Terms

***h*5-index**: the h-index for articles published in the last 5 complete years. It is the largest number *h* such that *h* articles published in 2010-2014 have at least *h* citations each.
***h*5-citations**: sum of the number of citations received by all the articles that make up the journal's *h*5-index.
***h*5-index without journal self-citations**: computed in the same way as the *h*5-index, but excluding citations that come from articles published in the same journal.
h5-citations without journal self-citations: computed in the same way as the *h*5-citations, but excluding citations that come from articles published in the same journal.

3 Analysis and Discussions

3.1 Distribution of LIS Journals from Prominent Countries Across the World Studied

Figure 1. :Distribution of LIS Journals Studied from Different Countries Across the World



3.2 Impact of Self Citations by the LIS journals on *h*5 index of LIS journals of Prominent Countries

The non-parametric test Wilcoxon Signed Rank Test shows that among the prominent countries across the world from where LIS journals are published, United Kingdom and United States of American Library and Information Science journals' *h*5 index are highly affected by these journals self-citations since p value is almost zero ($p<0.01$). Thus the null hypothesis 'there is no difference in median of the groups in two situations' are rejected and alternative hypothesis 'there is difference in median of the groups in two situations' is accepted. There is statistically significant difference in median of *h*5 index after and before journal's self-citations. The other country's LIS journals' *h*5 index are not affected by journals' self-citations since p value is greater than 0.05 ($p>0.05$), (Table 1).

Table 1: Impact of Self-Citations on h5 index

Country	h5 Index after and before self citations	Mean	Std. Deviation	Minimum	Maximum	Percentiles			Z value	P value
						25th	50th (Median)	75th		
	*h*5IASC	5.41	3.242	1	13	2.50	5	8	0.000	1.000
Brazil	*h*5IBSC	5.41	3.242	1	13	2.50	5	8		
	h5IASC	4.55	4.083	1	11	1	2	9	-1.000	0.317
Canada	h5IBSC	4.55	3.934	1	10	1	2	9		
France	h5IASC	3.14	1.574	1	5	2	3	5	0.000	1.000
	h5IBSC	3.14	1.574	1	5	2	3	5		
Germany	h5IASC	4.87	3.603	1	11	1.50	4	8.25	-1.414	0.157
	H5IBSC	4.63	3.335	1	10	1.50	4	8.00		
India	h5IASC	6.00	4.147	2	12	2.75	4.5	10.5	-1.732	0.083
	h5IBSC	5.50	3.6742	2	11	2.75	4	9.5		
Netherlands	h5IASC	14.50	12.724	2	39	7.25	11.50	20.25	-1.633	0.102
	h5IBSC	13.33	11.776	2	36	6.50	10.00	19.50		
Spain	h5IASC	5.06	5.391	1	21	2	3	5.50	-1.414	0.157
	h5BSC	4.82	4.799	1	19	2	3	5.50		
United Kingdom	h5IASC	16.43	9.438	1	48	10	15	20	-4.654	0.000**
	h5BSC	15.68	9.201	1	46	9	14	19		
United States of America	h5IASC	10.49	7.670	1	54	6	9	14	-4.564	0.000**
	h5IBSC	10.10	7.382	1	52	6	8	14		

** Statistically significant at 1% level

3.3 The Significance of Self Citation in LIS Journals

Wilcoxon Signed Rank Test is used to identify whether there is difference in the median of the self-citations in two situations such as *h* citations after and before self-citations. The non-

parametric test shows that there is highly significant difference in mean of *h5* citations in the above said situations in the case of LIS journals of United Kingdom and United States of America since p value is almost zero. (p value<0.01). There is significant difference in mean of *h5*citations in the case of LIS journals of Brazil, Spain, Netherland, America and England since p value is less than 0.05 (p<0.05). (Table 2). The analysis shows that journal self-citations are more in the LIS journals of above countries. This may be due to the reasons as suggested by Caspar Chorus.

Table 2 : Significance of Self-citations in LIS Journals

Country	h5 Citations after and before self citations	Mean	Std. Deviation	Minimum	Maximum	Percentiles			Z value	P value
						25th	50th (Median)	75th		
Brazil	H5CASC	75.29	82.774	2	298	10.00	49.00	129.50	-2.588	0.010*
	H5CBSC	74.53	82.225	2	297	10.00	48.00	128.00		
Canada	H5CASC	69.09	83.385	1	221	2	26	132	-1.633	0.102
	H5CBSC	68.09	81.860	1	219	2	26	130		
France	H5CASC	22.71	19.542	2	49	6	14	41	-1.000	0.317
	H5CBSC	22.29	19.102	2	49	6	14	39		
Germany	H5CASC	67.87	75.067	1	192	4	44.50	145.75	-1.604	0.109
	H5CBSC	64.38	72.919	1	184	4	36	143.50		
India	H5CASC	72	80.930	5	198	12.50	33.50	159.75	-1.826	0.068
	H5CBSC	67.83	77.824	5	198	11.75	29	152.50		
Netherland	H5CASC	740.17	1171.280	8	3097	134.75	274	1232.50	-2.023	0.043*
	H5CBSC	664.83	1028.238	8	2726	134	241	1129.25		
Spain	H5CASC	87.41	171.120	1	672	5	17	89.50	-2.201	0.028*
	H5CBSC	80.76	154.697	1	611	5	16	87		
United Kingdom	H5CASC	699.60	950.870	1	5181	189	403	672	-5.843	0.000**
	H5CBSC	672.11	905.517	1	4999	188	399	641		
United States of America	H5CASC	314.73	717.958	1	5708	52	132	334	-6.227	0.000**
	H5CBSC	303.21	684.033	1	5427	52	132	327		

** Statistically significant at 1% level.
*Statistically significant at 5% level.

3.4 Average Increase in h5 Index and h5 Citations of LIS Journals of Prominent Countries

Average increase in *h*5 index and average increase in *h*5 citations are calculated by using the formula.

Average *h*5 Index=*h*5 index after journal self-citations-*h*5 index before journal self-citations/ Number of journals. Average *h*5 Citations = *h*5 citations after journal self-citations – *h*5 citations before journal self-citations/Number of journals. The highest average self-citations can be seen in the case of LIS journals from Netherland, United Kingdom and United States of America. The highest average growth in h5 index by journal self-citations can be seen in the case of LIS journals from Netherland, United Kingdom and Spain. (Table 3).Figures 1 and 2 show the graphical representation of the same.

Table 3:Average Increase in h5 Index and h5 Citations

Country	*h*5 Index and *h*5 citations	Minimum	Maximum	Mean	Std. Deviation
Brazil	*h*5 Index	0	0	0.00	0.000
	*h*5 Citations	0	4	0.76	1.091
Canada	*h*5 Index	0	1	0.09	0.302
	*h*5 Citations	0	7	1.00	2.145
France	*h*5 Index	0	0	0.00	0.000
	*h*5 Citations	0	3	0.43	1.134
Germany	*h*5 Index	0	1	0.25	0.463
	*h*5 Citations	0	17	3.50	6.141
India	*h*5 Index	0	1	0.50	0.548
	*h*5 Citations	0	9	4.17	4.262
Netherland	*h*5 Index	0	3	1.17	1.472
	*h*5 Citations	0	371	75.33	146.893
Spain	*h*5 Index	0	2	0.24	0.664
	*h*5 Citations	0	61	6.65	16.985
United Kingdom	*h*5 Index	0	3	0.74	0.793
	*h*5 Citations	0	349	27.49	56.337
United States of America	*h*5 Index	0	2	0.39	0.576
	*h*5 Citations	0	281	11.52	34.981

Figure 2: Mean increase in *h*5 index of LIS journals from different countries by their self-citations

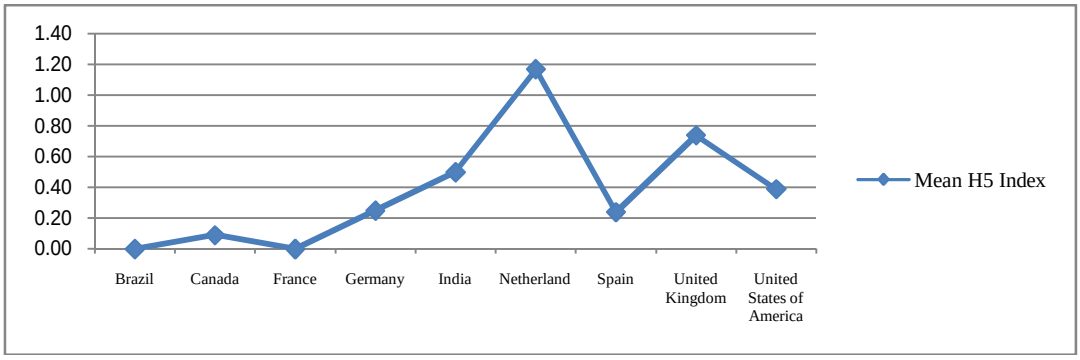
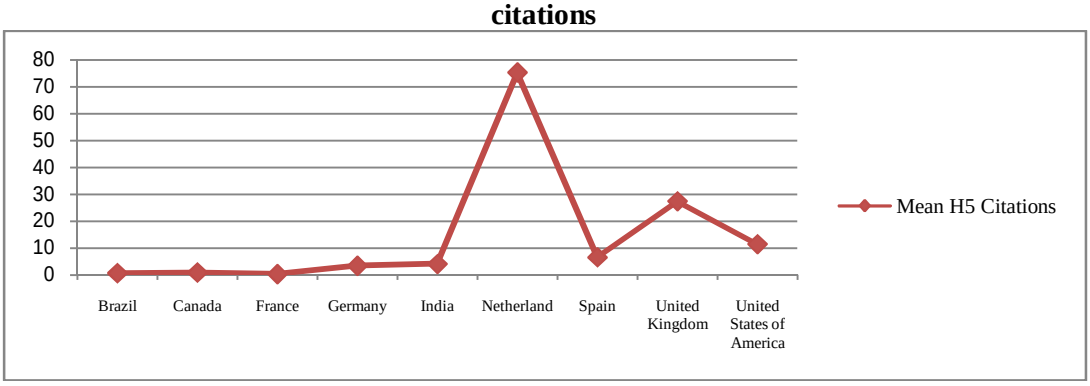


Figure 3: Mean increase in h5 citations of LIS journals of different countries by their self-citations



4 Findings

From the analysis discussed above, the following findings are arrived at;

- Among the journals in LIS, the self-citations of journals from United Kingdom and United States of America have highly significant impact on these journals' *h*5 index.
- High significance in self-citations is seen in the journals from United Kingdom and United States of America.

- Significance in self-citations is also seen in the journals from Spain, Netherland and Brazil.
- In the case of journals from UK, USA and Netherland, highest average self-citations are more in these journals. Whereas, average *h*5 index growth is more in the case of journals from Netherland, United Kingdom and Spain.
- The study found that self-citations have a moderate but significant effect on the *h*5 index.

5. Conclusion

It is clear that differences in self-citations in LIS journals make a difference in the *h*5 index outcome in the Journal Scholar Metrics database. The major point is that the effect of self-citations must be taken into account for a fair estimation of *h*5 index of core journals in any subject disciplines like LIS. In such cases self-citations of the journals must be valuable evaluation criteria in determining the *h*-index of the journals as *h*-index is included in the evaluation criteria for faculty appointment and promotion. Moreover, the results show that self-citations have a moderate but significant effect on the *h*5 index.

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