

The Impact Factor and self citation trend of German journals indexed in the JCR (2000 - 2005)

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Keywords: Bibliometrics, Impact factor, self-citation, German, English, Multilanguage, journal citation, German journals.

Abstract:

A total number of 432 German journals in 2000 and 427 journals in 2005 listed in the Science Edition of the Journal Citation Reports (JCR) were analysed. The study showed that the proportion of German journals entering material to the JCR data bank in 2005 counted 4%. From a total number of 6,088 journals in the JCR, 427 (7%) were published in Germany. The 6,088 journals in the JCR produced 847,114 articles, 50,276 (6%) appeared in the German journals. Of the 22,353,992 citations in 2005, 861,190 (4%) came from German journals. Analysis of data showed that there is a correlation between total-citation and Impact Factors of German journals indexed in the JCR. 32.9% of all total-citation by German journals in the JCR in 2005 belong to the 7% of journals with $IF > 3$, and 67.1% of total-citation belong to 93% of journals with $IF < 3$. From a total number of 433 German journals in 2000 indexed in the JCR, 91% of all population has self-citation rate from 1% to 79%, and from all 427 German journals 96% of all population in 2005 has self-citation rate from 1% to 72%. The study further showed that the self-citation rates of all German journals in 2000 as well as in 2005 stayed at 12%. The number of total citation and self-citation in 2005 with compare to the same set of journals in 2000 has respectively 26.78% and 22.45% increased. The mean value of all German journals IFs in 2005 showed 0.31 increase with compare to the mean value of all German journals IFs in the year 2000.

Introduction:

Scientific journals play an important role in managing and distributing of knowledge in the scientific community; therefore it is crucial to be aware about the role of journals in the knowledge community.

There are some important indicators for evaluating the journals capacities; among them the Impact Factor has got its place as a general evaluation factor. Journals IF depends directly on two elements:

1. The citations that the journal receive in the fiscal year.
2. The articles that published in the 2 previous years.

Although the Impact Factor should be used cautiously, “I expected that it would be used constructively while recognizing that in the wrong hands it might be abused.”¹ But on the whole it is a feasible measurement in the hand of bibliometricians and librarians.

Such indicators make it possible to judge relatively fair about the importance of a journal among other journals in the same field. It may help the librarians and the administrators of libraries in decision to choose journals for their patrons use in the libraries as well as to register the electronic journals to facilitate their patrons’ access to information retrieval more effectively and attractively via remote access.

In spite of some authors’ eager tendency in the interdisciplinary fields to publish their works in the journals with high IFs, to get higher prestige among their colleagues at institutes due the reason that their work published in the journals with high IF may receive more citations; There are still many authors in different fields, that they don’t have enough information about the IF.

“The Impact Factor was devised by Eugene Garfield, the founder of the Institute for Scientific Information, now part of Thomson, a large worldwide US-based publisher. Impact factors are calculated each year by the Institute for Scientific Information for those journals which it indexes, and the factors and indices are published in Journal Citation Reports. Some related values, also calculated and published by the same organization, are:

- The immediacy index: the average citation number of an article in that year
- The journal cited half-life: the median age of the articles that were cited in Journal Citation Reports each year. For example, if the A journal's half-life in 2005 is 5, that means the citations from 2001-2005 are 50% of all the citations from that journal in 2005.
- The aggregate impact factor for a subject category: it is calculated taking into account the number of citations to all journals in the subject category and the number of articles from all the journals in the subject category.”²

With an example the calculation of the IF seems easier.

For example the German journal of Endoscopy in 2005 has an IF equalled to 4.072.

It is calculated as the following formula:

Number of article published in 2003= 152 (A)

Number of article published in 2004= 138 (B)

Number of cites in 2005 to articles published in 2003= 661 (C)

Number of cites in 2005 to article published in 2004= 520 (D)

$$IF = \frac{C + D}{A + B} = \frac{661 + 520}{152 + 138} = \frac{1181}{290} = 4.072$$

Analysis of data showed that there is a correlation between total-citation and IFs of journals, 32.9% of all total-citation in the JCR in 2005 belong to the 7% of journals with IF > 3, and 67.1% of total-citation belong to 93% of journals with IF < 3.

The study showed that 91% of all German journals indexed in the JCR in 2000 has self-citation rate from 1% to 79%, and 96% of all population in 2005 has self-citation rate from 1% to 72%.

From a total of 427 German journals indexed in the JCR in 2005, 89% of all population are published in English or multi-language, and only 11% is published in German-language.

¹ E. Garfield (1999). Journal Impact Factor: a brief review. JAMC 19 OCT. 1999. Retrived December 14, 2006 from <http://www.ecmaj.com/cgi/reprint/161/8/979>.

² Wikipedia, the free encyclopedia. http://en.wikipedia.org/wiki/Impact_factor

Method:

This study endeavours to illustrate and compare the trend of Impact Factor (IF) and self-citation rate of all German journals indexed in the JCR in 2000 and 2005. All journals indicators extracted from the Journal Citation Reports (JCR) science edition.

In order to compare the German journals characters with all journals indexed in the JCR, the whole journals indexed in the JCR was divided into 3 groups:

1. High rank journals, the journals with IF higher than 9.846.
2. Middle rank journals, the journals with IF between 4.352 and 5.
3. Low rank journals, the journals with IF lower than 0.052.

the reason of choosing the journals with IF higher than 9.846 as the first group is that after sorting all journals in the JCR in 2005, the first 100 journals IFs levelled higher than 9.846, and the last 100 journals IFs levelled lower than 0.052. In consequence the second group stayed in the JCR between two other groups.

To show the trend of IFs for German journals, the Impact Factor of all German journals indexed in the JCR throughout 2000-2005 were extracted, and the mean value of IFs was calculated...

The self-citation rate specified as the percentage of the journal self-citation from total citation of the journal in the year of under study.

Findings:

Table1: The portion of German journals entering material in the JCR database in 2005

All journals in the JCR				German journals in the JCR					
Year	No. of journals	Articles	Citations	No. of journals		Articles		Citations	
2005	6,088	847,114	22,353,992	427	7%	50,276	6%	861,190	4%

As the table indicates, the portion of German journals entering material to the JCR database in 2005 counted 4%. From a total number of 6088 journals in the JCR, 427 (7%) were published in Germany. The 6088 journals in the JCR produced 847,114 articles, 50,276 (6%) appeared in the German journals. Of the 22,353,992 citations in 2005, 861,190 (4%) came from German journals.

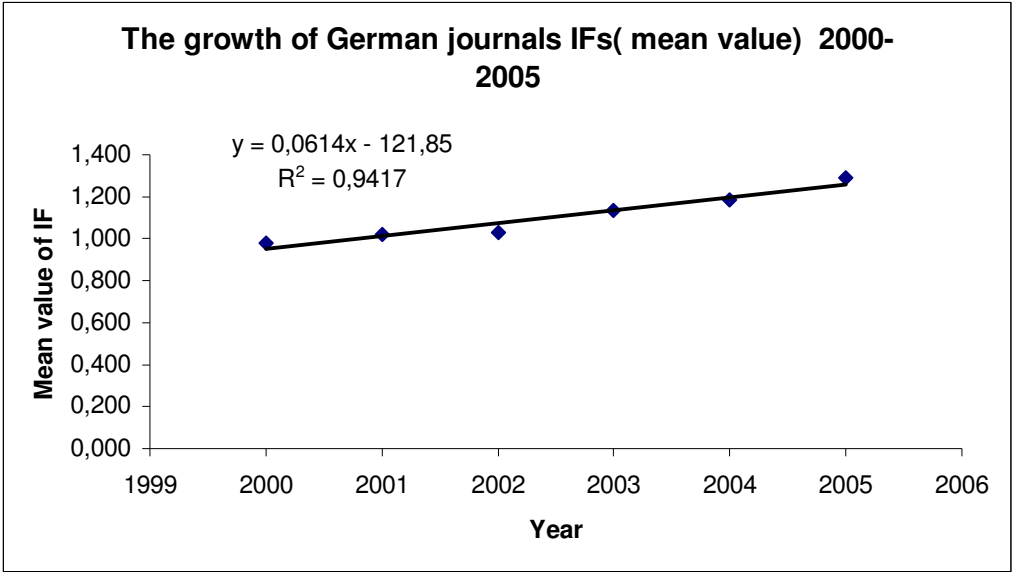


Fig.1: The growth of journals IFs (mean value) for all German journals indexed in the JCR 2000-2005

Graph shows a lineal correlation between the mean values of German journals IFs and the year of publication.

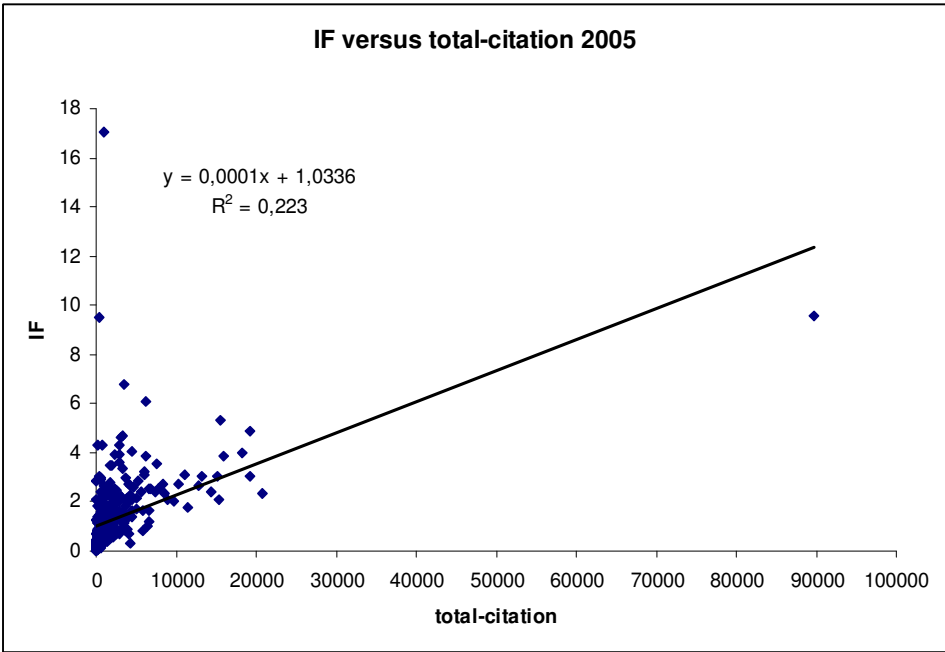


Fig.2 Impact Factor versus total-citation in 427 German journals in 2005

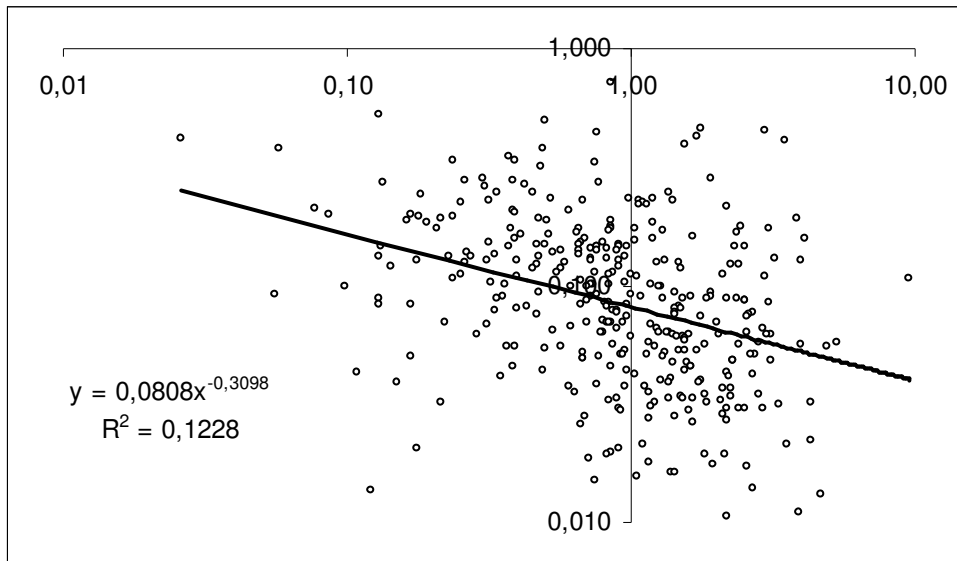


Fig.3: Impact Factor versus self-citation in 345 German journals in 2005

Table 2: self-citation rate of German journals in 2000

Self-citation rate	No. of journals	Percent
0- 5%	97	22.40 %
5-10%	121	27.94 %
10-15%	68	15.70 %
15-20%	62	14.32 %
20-25%	36	8.31 %
25-30%	23	5.31 %
30-35%	6	1.39 %
35-40%	9	2.08 %
40-45%	7	1.62 %
45-50%	0	0.00 %
>50%	4	0.92 %
Total	433	100.00 %

As the table indicates 77.60% of all German journals in 2000 have self-citation rate at or more than 5%, and 19.63% of all population has self-citation rate more than 20%

Table 3: self-citation rate of German journals in 2005

Self-citation rate	No. of journals	Percent
0- 5%	100	23.4 %
5-10%	134	31.38 %
10-15%	74	17.33 %
15-20%	53	12.41 %
20-25%	23	5.39 %
25-30%	19	4.45 %
30-35%	6	1.41 %
35-40%	6	1.41 %
40-45%	5	1.17 %
45-50%	2	0.47 %

>50%	5	1.17 %
Total	427	100.00 %

As the table shows from a total number of 427 German journals indexed in the JCR in 2005, 76.58% of them has at or more than 5% citation to their own and 15.46% of total population has self-citation rate more than 20%.

Table 4: the mean value of self-citation rate and IF of all German journals indexed in the JCR (2000 and 2005)

Year	No. of journals	Mean value of self-citation rate	Mean value of IF
2000	433	12%	0.98
2005	427	12%	1,29

The mean value of self-citation rate in 2000 as well as in 2005 is 12% of all citations. The mean value of all journals IFs in 2005 with compare to the 2000 has 0.31 increased.

Table 5: the mean value of 360 German journals IFs in 2000 and the same set of journals in 2005.

Year	No. of journals	Mean value of self-citation rate	Mean value of IF
2000	360	13%	1.02
2005	360	11%	1,29

As table illustrates the mean value of IF for German journals in 2005 with compare to the same set of journals in 2000 has 0.27 increased. The self-citation rate of German journals in 2005 shows 2% decrease with compare to the same set of journals in 2000.

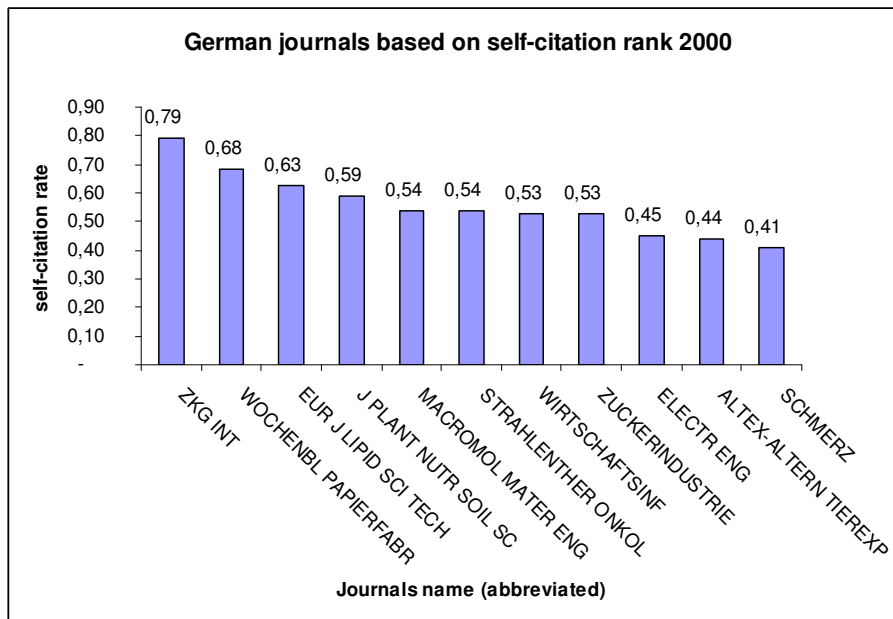


Fig. 4: German journals based on self-citation rank 2000

As graph shows the journal of ZKG INTERNATIONAL with 79% of self-citation rate get the first rank, followed by WOCHENBLATT FUR PAPIERFABRIKATION and EUROPEAN JOURNAL OF LIPID SCIENCE AND TECHNOLOGY with 68% and 63% of self-citation rate respectively. The table restricted to the eleven high self-citation rank journals (self-citation rate > 40%).

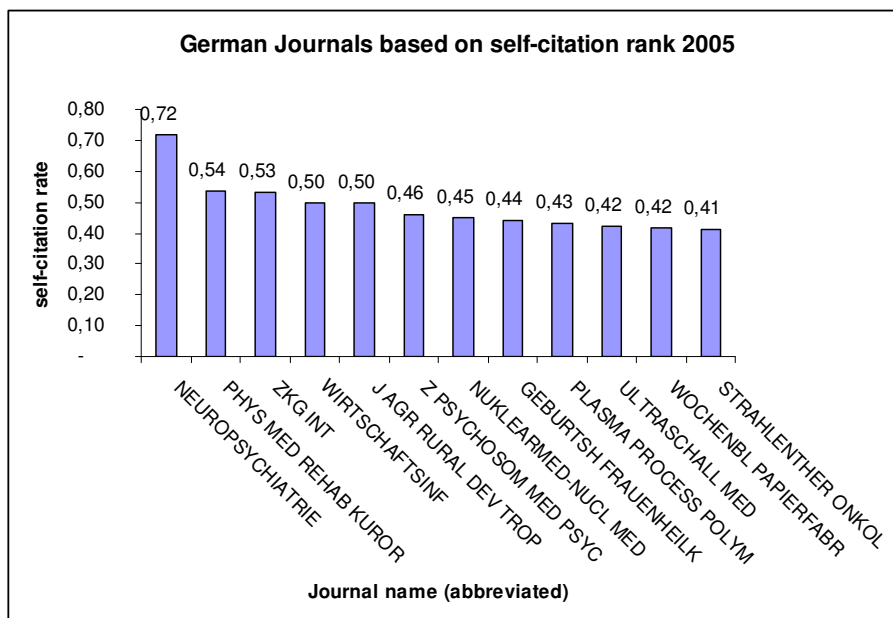


Fig. 5: German journals based on the self-citation rank in 2005

As graph shows the journal of NEUROPSYCHIATRIE with 72% of self-citation rate get the first rank followed by Physikalische Medizin Rehabilitationsmedizin Kurortmedizin and ZKG International with 54% and 53% of self-citation rate respectively. The table restricted to the 12 journal with self-citation rate of > 40%.

The comparison of self-citation rate in 2000 and the same set of journals in 2005 (360 journals) showed that the self-citation rate of 32% of all journal has increased and the self-citation rate of 61% of all of them decreased and the self-citation rate of 7% stayed unchanged.

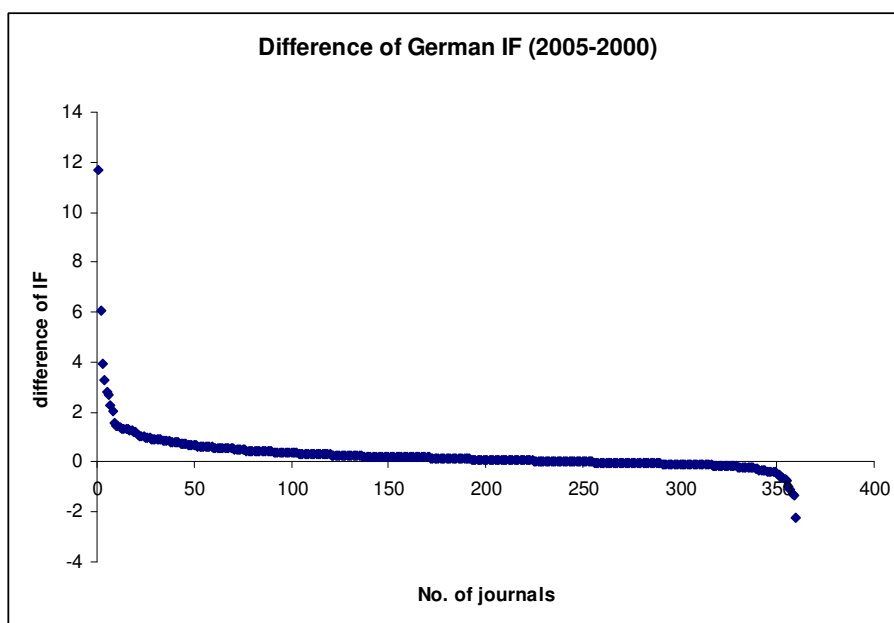


Fig6: Difference of 360 German journals Impact Factors in 2005 with the same set of journals in 2000 in the JCR

As graph illustrates 70.83% of German journals IF indexed in the JCR shows positive growth in 2005 with compare the same set of journal in 2000. The journal of “Review of Physiology Biochemistry and Pharmacology” shows dramatic increase in the term of IF, its IF increased from 5.389 in 2000 to 17.053 in 2005, and the journal of “European Physical Journal C” shows dramatic decrease throughout the period of study its IF decreased from 5.408 in 2000 to 3.209 in 2005.

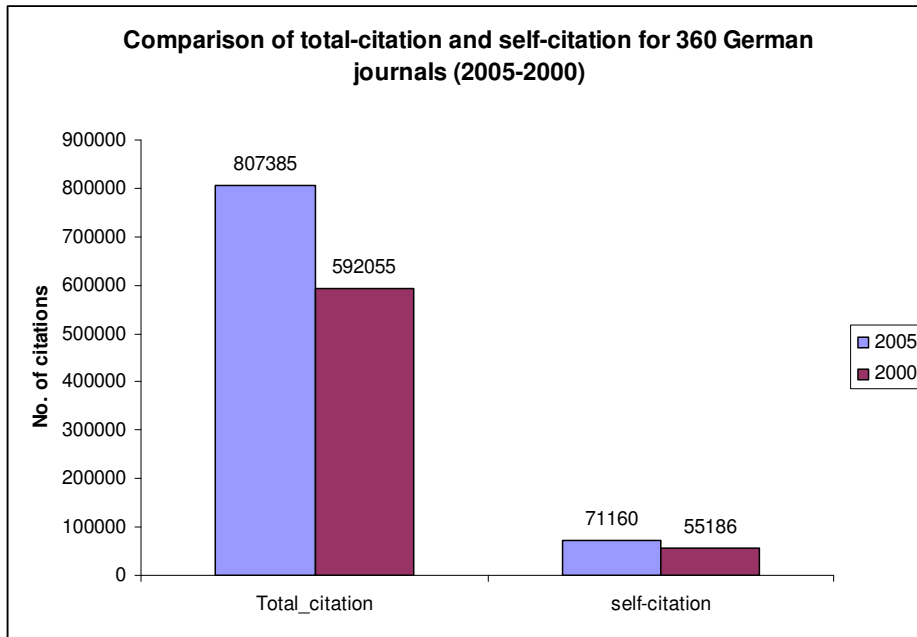


Fig. 7: Comparison of total-citation and self-citation for 360 German journals in 2000 and the same set of journals in 2005 indexed in the JCR.

As graph shows the number of total citation as well as self-citation for the German journals in 2005 with compare to the same set of journal in 2000 has increased. Total citation in 2005 shows 26.67% growth in compare to the same set of journals in the year 2000, and self-citation shows 22.45% growth.

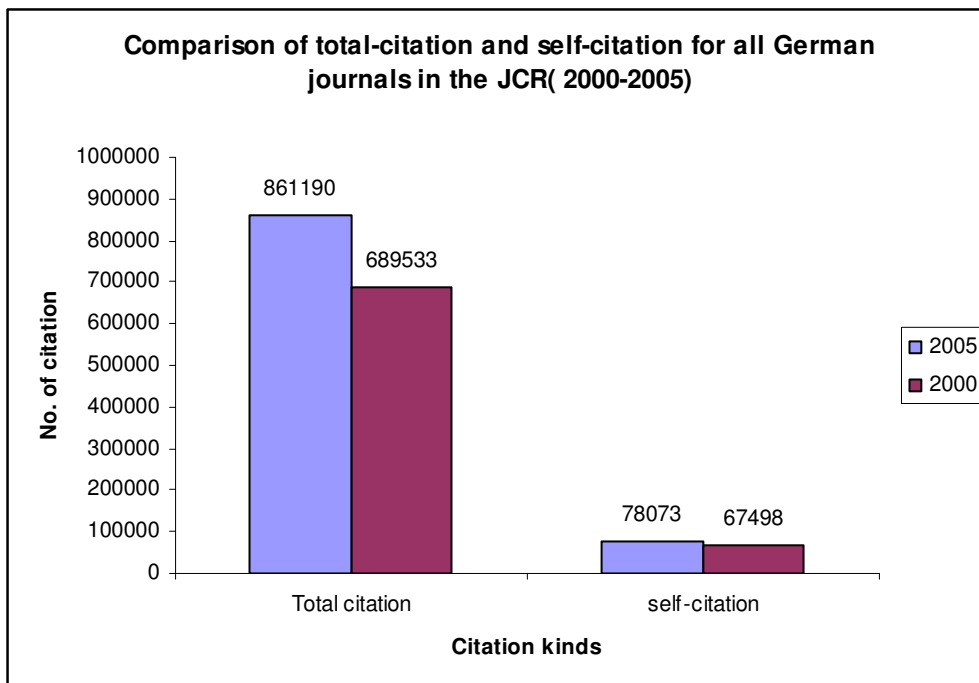


Fig.8: Comparison of total citation and self-citation for all German journals indexed in the JCR 2000-2005.

As graph shows, the number of total citation in 2005 shows 19.93% increase with compare to the all German journals citation in 2000. The number of self-citation for all German journals in 2005 shows 13.55% increase with compare to the self-citation of journals in 2000.

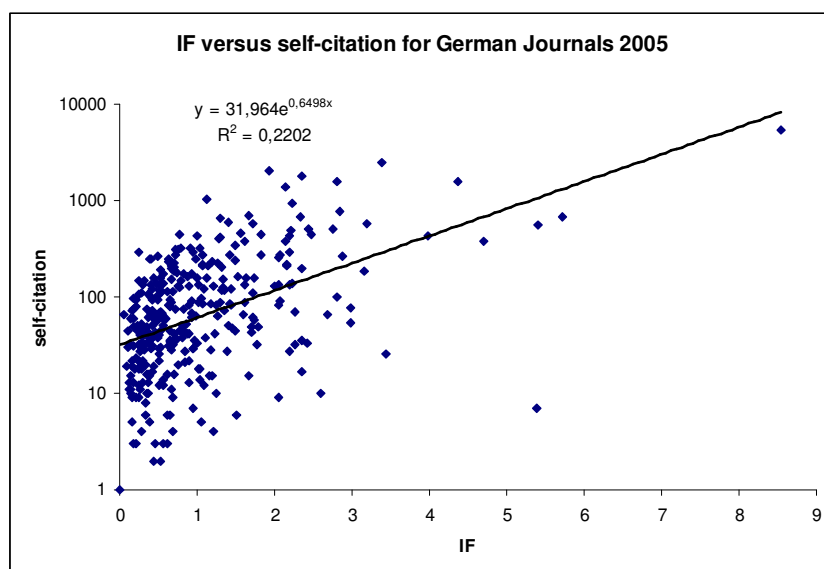


Fig. 9 self-citation versus IF (Pearson's correlation = 0, 57)

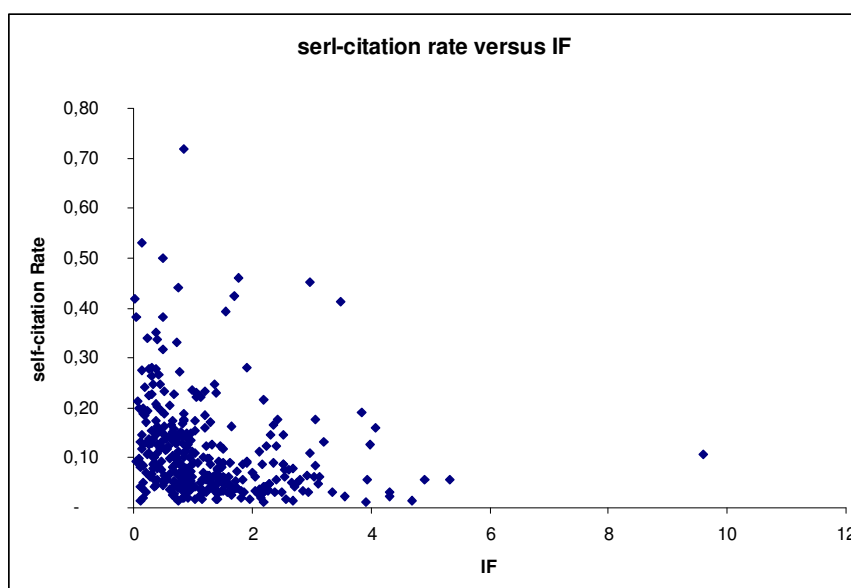


Fig. 10 self-citation rate versus IF (Pearson r = 0.22)

Table 6: Mean value of journals self-citation rate for 3 groups of journals in the JCR 2005

IF	No. of selected journals	Percent of selected journals in the JCR	Mean value of self-citation rate	No. of total-citations	No. of self-citations	Mean value of total-citation per journal	Mean value of self-citation per journal
IF > 9.846	100	1.64%	2%	3,255,988	75,497	32,559.88	754.97
4.352 < IF > 5	100	1.64%	6%	1,085,570	101,486	10855.70	1014.86
IF < 0.052	100	1.64%	17%	10,613	1,999	106.13	19.99

From all 6,088 number of journals indexed in the JCR in 2005 ascent sorted based on the IF, a total number of 100 journals with highest IF (IF>9.847), 100 journals with middle IF (4.352< IF > 5), and 100 journals with lowest IF (IF<0.052) were chosen in order to compare the total-citation and self-citation behaviours in the JCR.

As the Table indicates, the mean value of self-citation rate among journals with highest IF is 2% and this rate among the journals with lowest IF is 17%, in other words the self-citation rate among the journals with lowest IFs in the JCR is more than 8 times higher than the self-citation rate of journals with highest IFs.

Although the self-citation rate among the journals with highest IFs is 8.5 times lower than the self-citation rate among the journals with lowest IFs, but it should be noticed that mean value of total citation per journal among journals with highest IFs is 307 time higher than the mean value of total-citation per journal among the journal with lowest IFs. And the mean value of self-citation per journals among the first group (the journals with highest IFs) is 38 times higher than the later group (the journals with lowest IFs). Therefore it is remarkable to be noticed when it is discussed about the self-citation rate among the journals with high IFs and as well as with low IFs.

Table 7 the mean value of citations rate for all German journals in the JCR 2005

Impact Factor	No. of German journals In the JCR	Percent	Mean value of self-citation rate	No. of total-citations	No. of self-citations	Mean value of total-citation per journal	Mean value of self-citation per journal
0.000 -17.053	427	100%	12%	861,190	78,073	2016.84	182.84

As table indicates the German journals IFs levelled between zero to 17.053, the self-citation rate among them is 12% with a mean value of 2016.84 total-citation and 182.84 self-citation per journals in 2005.

The comparison of table 4 with table 5 indicates that the German journals stay between middle rank and high rank groups, in other word the German journals behaviours are higher than middle rank and close to the high rank journals in the JCR.

Table 8: The growth of citations and Mean value of IF by German journals 2000-2005

Year	No. of journal	Total citation	Self-citation	Mean value of IF
2000	432	689,533	67,498	0.98
2005	427	861,190	78,073	1.29
Difference	5	171,657	10,575	0.31

As table illustrates, total citation in 2005 with compare to the year 2000 shows about 20% increase. The self-citation shows about 14% increase, and the mean value of IF has 0.31 increased.

Table 9: the kind of German journals languages indexed in the JCR in 2005

language	No. of Journal	Percent
English	237	56
German-language	48	11

Multi language	142	33
Total	427	100

As table illustrates from a total number of 427 German journals indexed in the JCR in 2005, 89% of them are in English or multi language, and only 11% is in German-language.

Conclusion:

The study showed that the porportion of German journals entering material to the JCR data bank in 2005 counted 4%. From a total number of 6,088 journals in the JCR, 427 (7%) were published in Germany. The 6,088 journals in the JCR produced 847,114 articles, 50,276 (6%) appeared in the German journals. Of the 22,353,992 citations in 2005, 861,190 (4%) came from German journals.

Analysis of data showed that there is a correlation between total-citation and Impact Factors of journals among German journals indexed in the JCR, 32.9% of all total-citation of German journals in the JCR in 2005 belong to the 7% of journals with IF > 3, and 67.1% of total-citation belong to 93% of journals with IF < 3.

From a total number of 433 German journals in 2000 indexed in the JCR, 91% of all population has self-citation rate from 1% to 79%, and from all 427 German journals indexed in the JCR 2005, 96% of all population has self-citation rate from 1% to 72%.

Analysis of data showed although the self-citation rates in 2000, and 2005 for all German journals indexed in the JCR stayed at 12% (Table 4), but the number of total citation and self-citation in 2005 with compare to the all German journals in 2000 has respectively about 20% and 14% increased. As a result the increase of self-citation by German journals caused the parallel increase of total-citation throughout the period of study, consequently the self-citation rates equal in 12% in 2000 as well as in 2005.

The mean value of all German journals IFs in 2005 showed 31% increase with compare to the year 2000.

The mean value of 360 German journals in 2005 showed 27% increase with compare to the same set of journals in 2000.

The self-citation rate for all German journals in 2000 and 2005 stayed at 12%, whereas the self-citation rate for 360 German journals in 2000 and the same set of journals in 2005 showed a self-citation rate of 13% and 11% respectively.

From a total number of 427 German journals indexed in the JCR in 2005, 89 % (379 journals) of all population is published in English or multi-language, and only 11 % (48 journals) is published in German-language.

The other finding of study is that the self-citation rate among the journals with lowest IFs in the JCR are more than 8 times higher than the self-citation rate of journals with highest IFs.

The self-citation rate among German journals showed close similarity to the finding of McVeigh, M.E. who found that the self-citation rate for all journals indexed in the JCR in 2002 is a portion of 12.41%³

³ McVeigh, M.E.(2004): Journal self-citation in the Journal Citation Reports – Science edition (2002): A citation study from the Thomson Corporation. The Thomson Corporation. Retrieved October 25, 2006: from <http://www.thomsonscientific.com/media/presentrep/essayspdf/selfcitationsinjcr.pdf>.

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4. Wikipedia, the free encyclopedia. http://en.wikipedia.org/wiki/Impact_factor.
5. ISI web of Knowledge, Journal Citation Reports. <http://portal.isiknowledge.com/portal.cgi?DestApp=JCR&Func=Frame>.