

PAPER

THE COMPARISON OF IMPACT FACTOR AND SELF CITATION TREND BETWEEN FRENCH AND GERMAN JOURNALS

By

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Abstract

All French and German journals indexed in the Journal Citation Reports through 2000-2005 were analysed. The study showed that the portion of French journals entering material to the JCR data bank in 2005 counted 1% whereas the portion of German journals at the same time is 4 times higher. From a total number of 6,088 journals in the JCR in 2005, 427 (7%) were published in Germany, 146 (2%) were published in France, The 6,088 journals in the JCR produced 847,114 articles, 50,276 (6%) appeared in the German journals and 13,913 (2%) in French journals. Of the 22,353,992 citations in 2005, 861,190 (4%) came from German journals and 179,585 (1%) came from French journals. Analysis of data showed that there is a correlation between total-citation and Impact Factors of German journals as well as French journals indexed in the JCR. 32.9% of all citation by German journals in the JCR in 2005 belong to the 7% of German journals with $IF > 3$, and 67.1% of total-citation belong to 93% of journals with $IF < 3$. This correlation is even stronger among French journals, 57% of total citation made by French journals belong to 10% of French journals with $IFs > 2$. 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 in 2005, 96% of all population has self-citation rate from 1% to 72%. From a total number of 161 French journals indexed in the JCR in 2000, 82% has self-citation rate from 1% to 100%, and from all 146 French journals in 2005, 86% of all population has self-citation rate from 1% to 79%. The study further showed that the self-citation rates of all German journals in 2000 as well as in 2005 stayed at 12%. The self-citation rate of French journals in 2000 and 2005 are respectively 13% and 12%. The mean value of French journals IFs in 2005 stays 0.25 more than 2000 whereas the mean value of German journals IFs in 2005 shows 0.31 increase with compare to the year 2000.

Keywords: bibliometrics, Impact Factor, self-citation, JCR, journal citation, German journals, French journals.

Introduction

Journals Impact factors and the citation behaviours such as self-citation among authors and journals are parameters for evaluation of journals. In fact they are controversy topics among bibliometricians. Even Garfield, the creator of IF didn't expect that it would be one day so controversial. "I first mentioned the idea of an impact factor in *Science* magazine in 1955. That paper is considered the primordial reference for the concept of the *Science Citation Index*. Five years later, we began the experimental *Genetics Citation Index* project which led to the publication of the 1961 *Science Citation Index*. In 1955, it did not occur to me that "impact" would one day become so controversial. Like nuclear energy, the impact factor is a mixed blessing. I expected it to be used constructively while recognizing that in the wrong hands it might be abused. Since *Current Contents*, no less *SCI*, did not exist, it would have been precocious indeed to contemplate the influence of the nascent impact factor."(1)

Journals IF depends 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 it should be used cautious but on the whole, it is a relatively suitable parameter 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.

"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."(5)

How to calculate the Impact Factor of a journal?

For example the German journal of "BIOCHIMIE" in 2005 has an IF equalled to 2.461.

It is calculated as the following formula:

Number of article published in 2003= 129 (A)

Number of article published in 2004= 116 (B)

Number of cites in 2005 to articles published in 2003= 445 (C)

Number of cites in 2005 to article published in 2004= 158 (D)

$$IF = \frac{(C + D)}{(A + B)} = \frac{(445 + 158)}{(129 + 116)} = 2.461$$

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. For example the journal of "BIOCHIMIE" in 2005 was cited 4210 times. Of this 4210 times, 45 times cited by itself.

As a result the self-citation rate is:
$$\frac{\text{self-citation}}{\text{Total-citation}} = \frac{45}{4210} = 0.01$$

This study endeavours to illustrate and compare the Impact Factor (IF) and self-citation rate of all French and German journals indexed in the JCR in 2000-2005.

All journals indicators extracted from the Journal Citation Reports (JCR) science edition.

In order to compare the French and German journals characters with all journals indexed in the JCR, the whole journals indexed in the JCR was divided based on IF into three 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 French and German journals, the Impact Factor of all French and German journals indexed in the JCR throughout 2000-2005 were extracted, and the mean value of IFs was calculated.

Analysis of data showed that there is a correlation between total-citation and IFs of French and German journals. 32.9% of all citations by German journals in the JCR in 2005 belong to the 7% of journals with IF > 3, and 67.1% of citations belong to 93% of journals with IF < 3 this correlation is even stronger among French journals, 57% of total citation made by French journals belong to 10% of French journals with IFs > 2 (10% of French journals had IF higher than 2, and 90% levelled under 2).

The study showed that 82% of all French journals indexed in the JCR has self-citation rate from 1% to 100% in 2000, and 86% of all French journals in 2005 has self-citation rate from 1% to 79%.

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 number 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. From 146 French journals in 2005 were 23% published in French-language and the rest (77%) were published in English or multi-language.

Findings

Table1: The portion of German and French journals entering material in the JCR data bank in 2005

Origin of journals	No. of journal	percent	Articles	percent	Citations	percent
German journals in the JCR	427	7%	50,276	6%	861,190	4%
French journals in the JCR	146	2%	13,913	2%	179,585	1%
All journals in the JCR	6,088	100%	847,114	100%	22,353,992	100%

As the table 1 indicates, the portion of German journals entering material to the JCR data bank in 2005 counted 4% whereas this portion by French journals is 1%. From a total number of 6088 journals in the JCR, 427 (7%) were published in Germany and 146 (2%) were published in France. The 6088 journals in the JCR produced 847,114 articles, 50,276 (6%) appeared in the German journals, and 13,913 (2%) appeared in French journals. Of the 22,353,992 citations in 2005, 861,190 (4%) came from German journals, whereas 179,585 (1%) came from French journals. as a whole the portion of German journals entering material to the JCR data bank is four times higher than the portion of French journals.

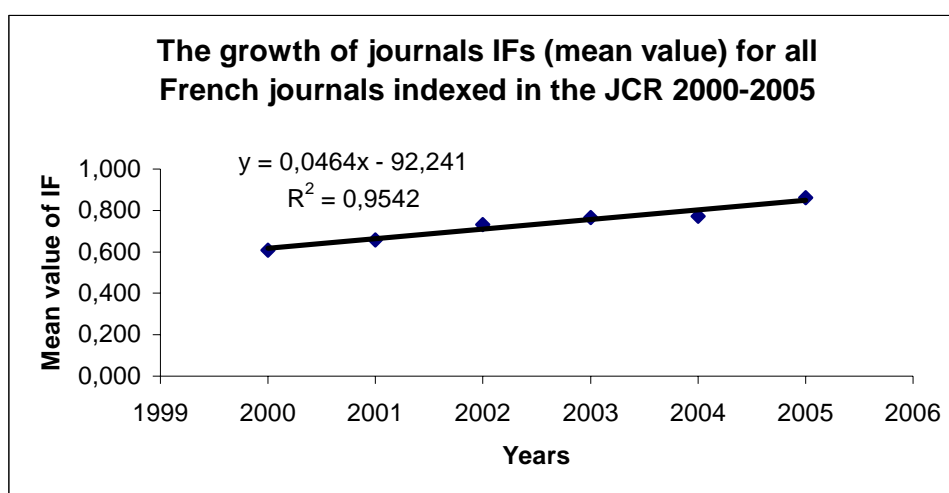


Fig.1 The growth of journals IFs (mean value) for all French journals indexed in the JCR 2000-2005

The graph (Fig.1) shows a linear correlation between the mean values of German journals IFs and the year of publication with a correlation coefficient of $R=0,976$.

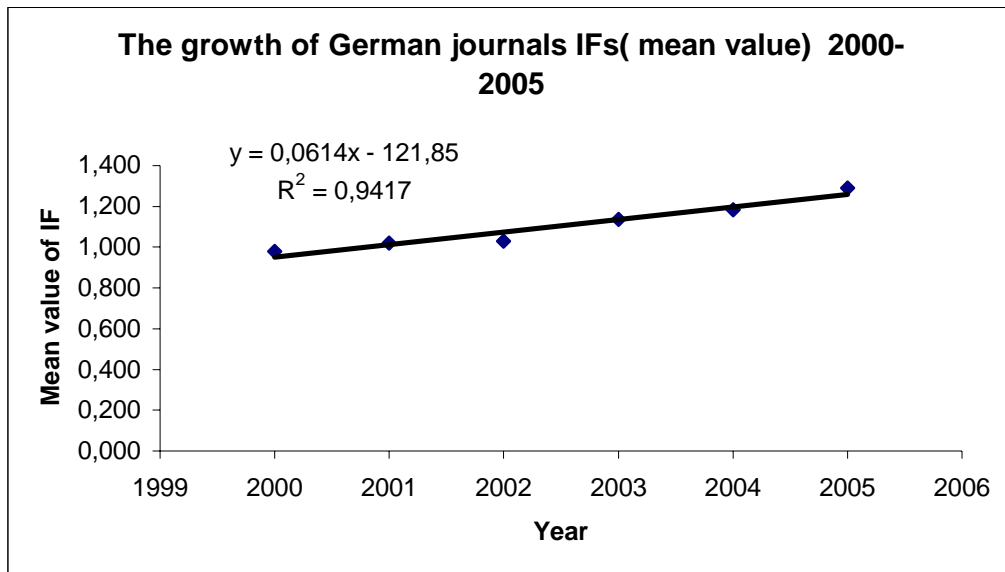


Fig.2: The growth of journals IFs (mean value) for all German journals indexed in the JCR 2000-2005

The graph (Fig.2) shows a linear correlation between the mean values of German journals IFs and the year of publication.

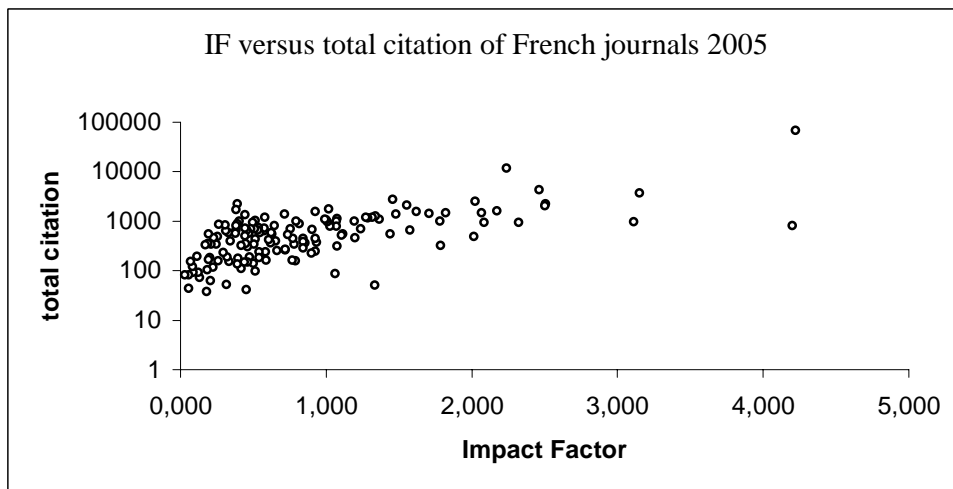


Fig.3 Impact Factor versus total citation of French journals in 2005.

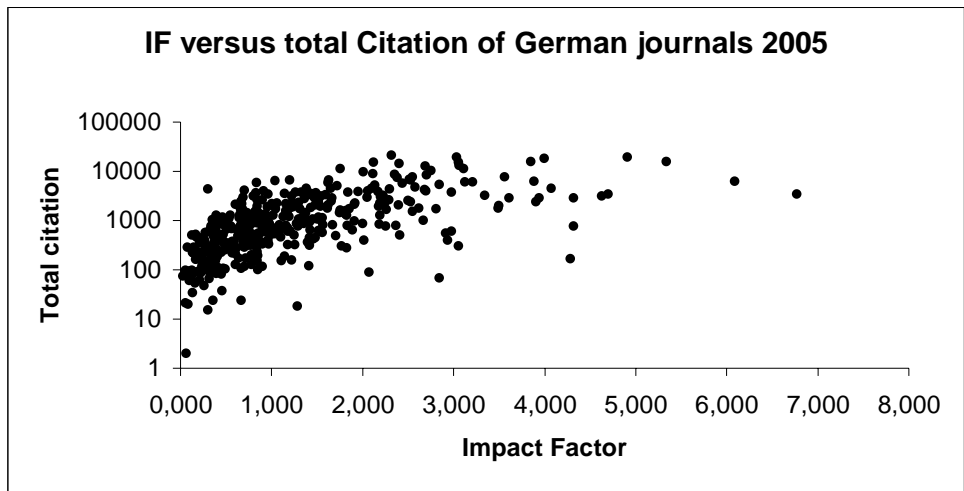


Fig.4 Impact Factor versus total-citation of German journals in 2005.

Table 2: self-citation rate of French journals in 2005

Self-citation rate	No. of journals	Percent
0- 5%	45	30.8
5-10%	36	24.7
10-15%	20	13.7
15-20%	14	9.6
20-25%	15	10.3
25-30%	7	4.8
30-35%	1	0.7
35-40%	2	1.4
40-45%	3	2.1
45-50%	0	0
>50%	3	2.1
Total	146	100

As table 2 indicates 69.18% of all French journals in 2005 have self-citation rate at or more than 5%, and 21.23% of all population has self-citation rate more than 20%. In all 86% of all French journals indexed in the JCR in 2005 has self-citation rate from 1% to 79%.

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 table 3 shows from a total number of 427 German journals indexed in the JCR in 2005, 76.58% has at or more than 5% citation to their own previous literature, 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 self-citation rate and IF of all French journals indexed in the JCR (2000 and 2005)

Year	No. of journals	Mean value of self-citation rate	Mean value of IF
2000	162	13%	0.609
2005	146	12%	0.860

As table 5 illustrates the mean value of IF for French journals in 2005 with compare to 2000 has 0.25 increased. The mean value of self-citation rate for French journals in 2005 shows 1% decrease with compare to the year 2000.

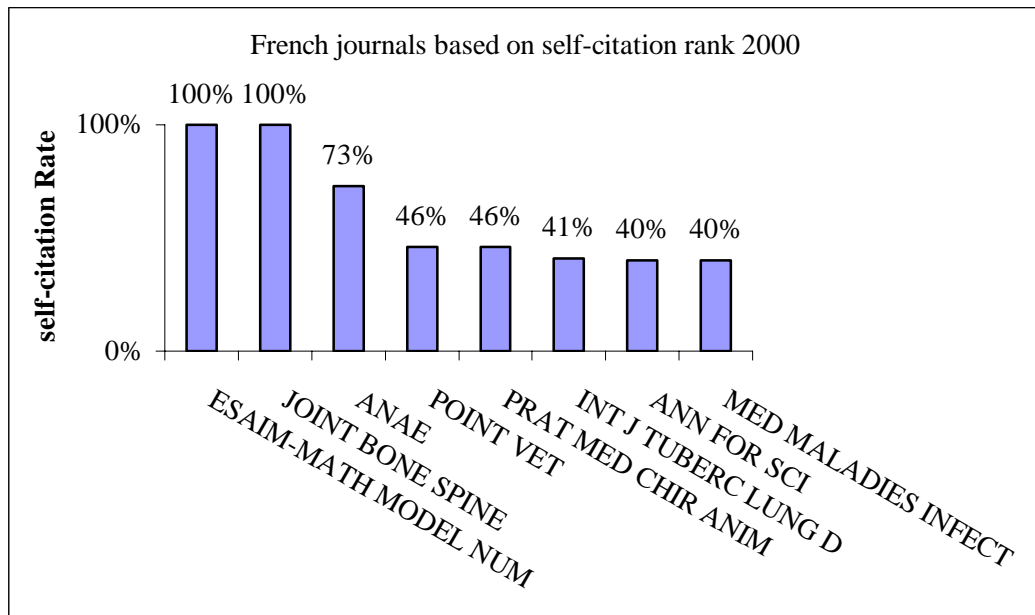


Fig.5 French journals based on self-citation rank 2000

As graph 5 shows the journals “*Esaim-mathematical modelling and numerical analysis-modelisation mathematique*” and “*Joint bone spine*” both of them with 100% self-citation rate followed by the journals of “*Anae-approche neuropsychologique des apprentissages chez l’enfant*” with 73% self-citation rate get the highest self-citation rank among French journals in 2000.

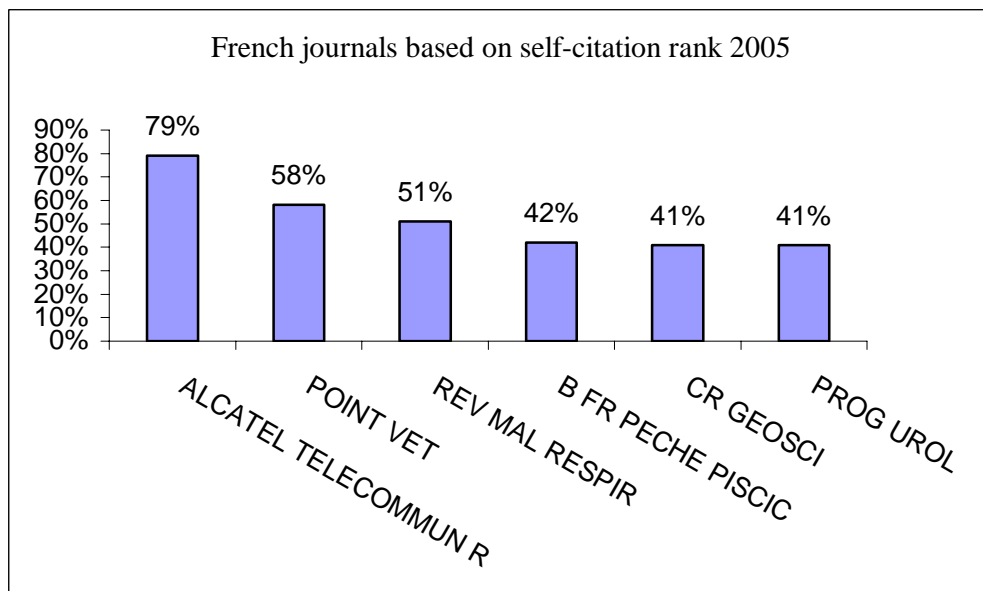


Fig. 6 : French journals based on self-citation rank 2005

As graph 6 shows the journal of “*Alcatel telecommunications review*” With 79% of self-citation rate get the first rank, followed by “*point veterinaire and revue des maladies respiratoires*” with 58% and 51% of self-citation rate respectively.

The graph (Fig.6) restricted to the six high self-citation rank journals (self-citation rate > 40%).

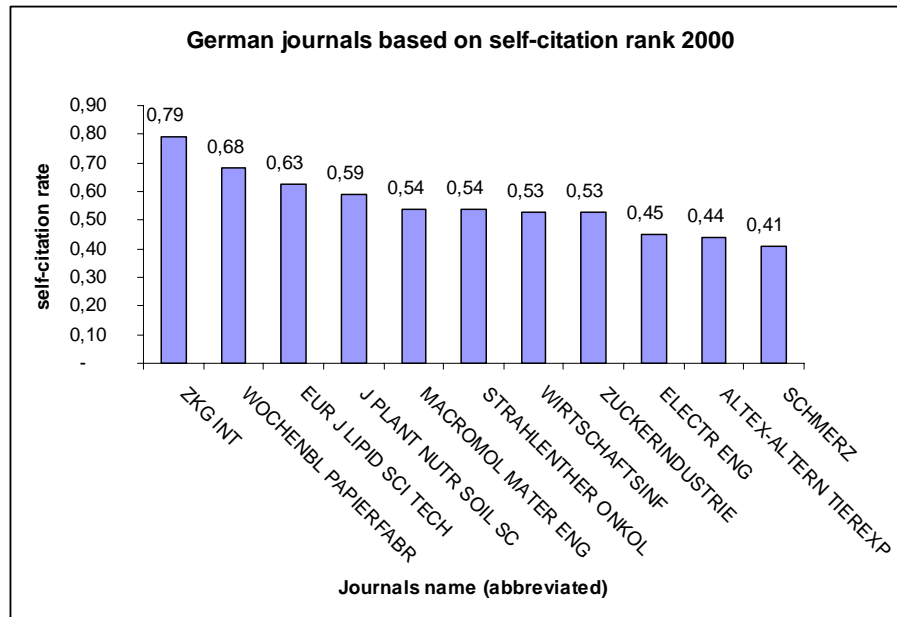


Fig. 7: German journals based on self-citation rank 2000

As graph (Fig.7) shows the journal of “ZKG international” with 79% of self-citation rate get the first rank, followed by “Wochenblatt für papierfabrikation” and “European journal of lipid science and technology” with 68% and 63% of self-citation rate respectively.

The graph restricted to the eleven high self-citation rank journals (self-citation rate > 40%).

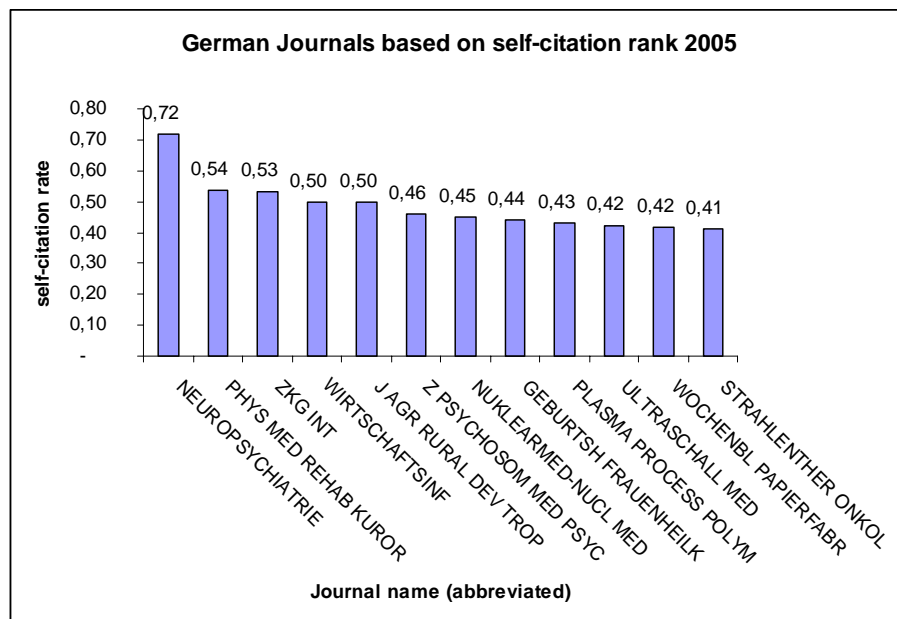


Fig. 8: German journals based on the self-citation rank in 2005

As graph (Fig.8) 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%.

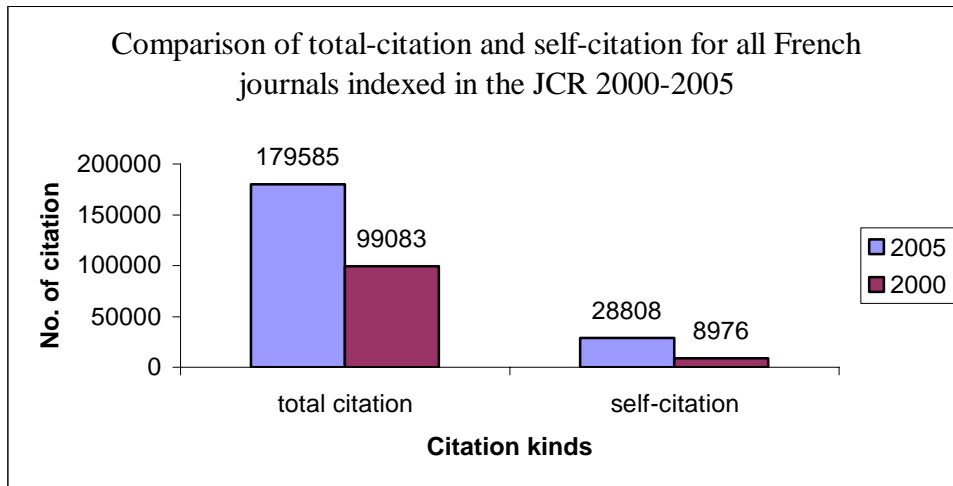


Fig. 10: Comparison of total-citation and self-citation for all French journals indexed in the JCR 2000-2005

As graph (Fig.10) illustrates , the number of total citation in 2005 shows 25% increase with compare to the total citation made by French journals in 2000, and the number of self-citation made by French journals in 2005 shows 16% increase with compare to the self-citation of French journals in 2000.

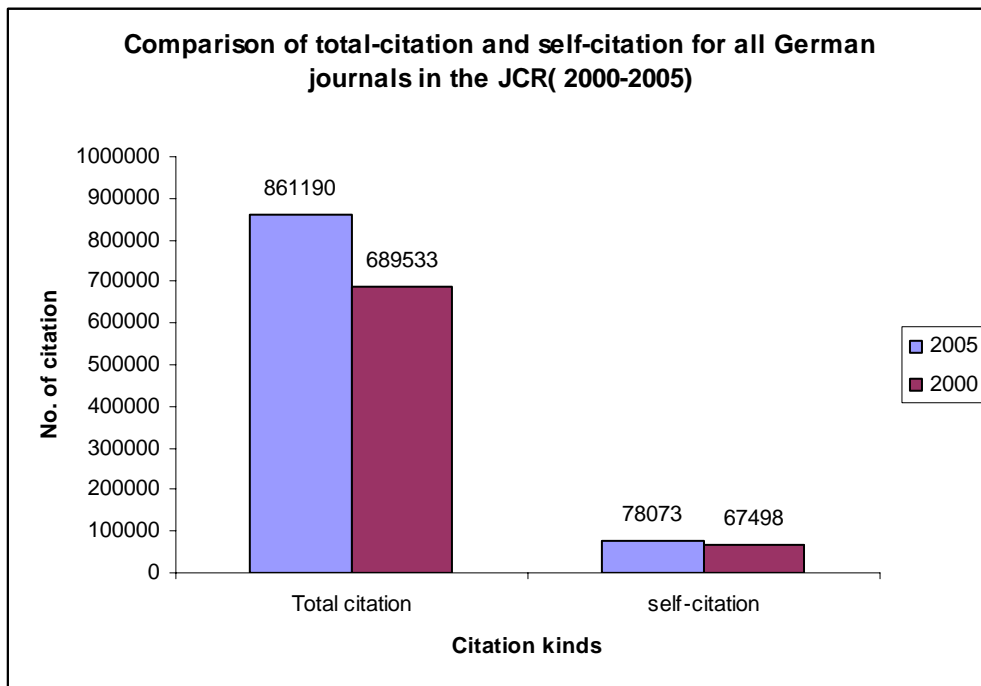


Fig.11: Comparison of total citation and self-citation for all German journals indexed in the JCR 2000-2005.

As graph (Fig.11) 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.

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 table 6 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 times 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 French journals in the JCR 2005

Impact Factor	No. of French journals In the JCR	Percent 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
0.000 – 4.223	146	2%	11%	179,585	28,808	1230.03	197.32

As table 7 indicates the French journals IFs levelled between zero and 4.223, the self-citation rate among them is 11% with a mean value of 1230.03 total-citation and 197.32 self-citation per journals in 2005

Table 8 the mean value of citations rate for all German journals in the JCR 2005

Impact Factor	No. of German journals In the JCR	Percent 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
0.000 -17.053	427	7%	12%	861,190	78,073	2016.84	182.84

As table 8 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 and French journals stay between middle rank and low rank of journals in the JCR.

Table 9: The growth of citations and Mean value of IF by French journals 2000-2005

Year	No. of journal	Total citation	Self-citation	Mean value of IF
2000	161	99,083	8,976	0.609
2005	146	179,585	28,808	0.860
Difference	-15	80,502	19,832	0,251

The self-citation made by French journals in 2005 shows more than 2 times increase with compare to the year 2000.

Table 10: 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 10 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 11: The kind of German journals languages indexed in the JCE in 2005

Language	No. of Journal	Percent
English	237	%56
German-language	48	%11
Multi language	142	%33
Total	427	%100

As table 11 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.

Table 12 : The kind of French journals languages indexed in the JCE in 2005

language	No. of Journals	Percent
English	38	%26
French-language	34	%23
Multi-language	74	%51
Total	146	%100

As table 12 shows from a total number of 146 French journals indexed in the JCR 34 (23%) of all population were published in French-language and the rest 112 (77%) were published in English or multi-language.

Conclusion

The study showed that the portion of German journals entering material to the JCR data bank in 2005 counted 4%, whereas this portion by French journals counted 1%. From a total number of 6,088 journals in the JCR in 2005, 427 (7%) were published in Germany, 146 (2%) were published in France, The 6,088 journals in the JCR produced 847,114 articles, 50,276 (6%) appeared in the German journals and 13,913 (2%) in French journals. Of the 22,353,992 citations in 2005, 861,190 (4%) came from German journals and 179,585 (1%) came from French journals.

Analysis of data showed that there is a correlation between total-citation and Impact Factors of German journals as well as French journals indexed in the JCR. 32.9% of all 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 $IF < 3$. This correlation is even stronger among French journals, 57% of total citation made by French journals belong to 10% of French journals with $IFs > 2$. 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 in 2005, 96% of all population has self-citation rate from 1% to 72%.

From a total number of 161 French journals indexed in the JCR in 2000, 82% has self-citation rate from 1% to 100%, and from all 146 French journals in 2005, 86% of all population has self-citation rate from 1% to 79%.

The study further showed that the self-citation rates of all German journals in 2000 as well as in 2005 stayed at 12%. The self-citation rate of French journals in 2000 and 2005 are respectively 13% and 12%.

The mean value of all German journals IFs in 2005 showed 31% increase with compare to the year 2000. The mean value of French journals showed 25% increase.

The self-citation rate for all German journals in 2000 and 2005 stay at 12%, whereas the self-citation rate for French journals in 2000 is 13% and in 2005 is 12%.

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

From 146 French journals indexed in the JCR in 2005, 34 (23%) were published in French-language and 112 (77%) were published in English or multi-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).

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