

**Characteristics of Self-citations in *Journal of Natural Rubber Research* 1988-1997 : A Ten-year Bibliometric Study**

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***Abstract***

*Analyses the extent of journal self-citation and author self-citation in the research articles and short communications published in *Journal of Natural Rubber Research* during 1988 to 1997. Results show that 53% of articles contained journal self-citations; the rate of journal self-citations per article ranges between 1 to 12; a high percentage of authors (61.4%) contributing articles to the journal cited themselves; a tendency is noticed for authors affiliated to the institution publishing the journal to cite the journal; the highest self-citing author is A. D. Roberts.*

**Keywords:** Rubber Research, Journal Self-citation, Author Self-citation, Self-citation, Natural Rubber, Citation Analysis, Bibliometrics, Malaysia.

**INTRODUCTION**

The publication of the *Science Citation Index (SCI)* in 1961, twenty-eight years ago, increased the activity of citation analysis as a technique within the field of bibliometrics. In citation analysis, another related field of current interest to bibliometricians is the study of the relationship between the citation network, that is the link between cited and citing articles. Self-citation study is a sub-field of citation analysis, which has only been studied sporadically (MacRoberts and MacRoberts, 1989). Diodato (1994) defines self-citation as citation for which an individual is an author of both the cited document and citing document. Closely related to this term is hidden self-citation, which refers to self-citation of an author who cites himself and is not the first listed author of the citing document. On the other hand, Tagliacozzo (1977) uses the term self-citation to indicate the citation to a paper, which has been authored or co-authored by the author, or he is one of the authors of the citing paper. For the present paper, self-citation takes into consideration a journal where both the cited and citing documents are published in the same journal and the organisation publishing the journal is associated with the authors of the cited and citing documents.

**STUDIES ON SELF-CITATIONS**

As early as 1977, Tagliacozzo carried out an investigation to determine the extent of authors of scientific articles citing their previous publications and the principal

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distinguishing features of this particular type of citation. For this purpose, she analysed six journals, representing the core journals in plant physiology and neurobiology. The results indicated that self-citations was more recent and cited more frequently in the text of the citing articles than citations of other authors. There was no indication of any relationship between self-citation and the number of co-authors and to the size of the bibliography of the citing articles or to their authors' productivity.

Kundu (1981) carried out a study on self-citation using citation data obtained from *Annals of Library Science* (afterwards *Annals of Library Science and Documentation*) during 1954-1975. He found that out of the 1545 citations, only 231 citations (14.9%) were self-citations. He also noted that the top self-citing author is none other than the outstanding *mahaguru* of Indian library and information science, S. R. Ranganathan with a count of 174 self-citations.

Muskhelishvili, Oganyan and Shreider (1987) undertook to explore self-citation analysis as a method of research into the shaping of an author's scientific and philosophical concepts. They argued that self-citation analysis could reveal the real order of the author's thoughts and concepts backed by factual text leading to a particular scientific discovery. They added that the author's research findings play a part in the popularisation process together with the author's participation in the appraisal of his own work.

In 1989, Snyder and Bonzi, examined the motivation of authors in citing themselves and others in their research papers. A total of 13 researchers were supplied with copies of their research papers where they cited themselves and others. At the same time, a list of reasons for citing was also given and the researchers were asked to indicate the appropriate reasons for their citing behaviour. They found that there were relatively few differences in motivating factors for citing themselves and others. Any difference noted was due to intellectual grounds and not self-aggrandisement. Zmaic, Maricic and Simeon (1989) on the other hand, carried out a study to distinguish between hidden self-citations and self-citations by primary authors of citing document.

Bonzi and Snyder (1990) investigated patterns of self-citation in relation to the use of citations by others. The referencing patterns of authors of four disciplines, two each from the physical science and social science were collected and analysed to determine the number, age of references and pattern of self-citation. They also studied the proportion of self-citations to all references and the exposure to self-citation within text compared to other authors.

Bonzi and Snyder (1991) again investigated the motivating factors in self-citation of 51 self-citing authors in several natural science disciplines. The results of the survey on reasons for both self-citation and citation of others indicated that there

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were very few differences in motivation and that there were plausible intellectual grounds for these differences. The study also showed that there was no difference between self-citation and citation of others in text.

Maczelka and Zsindely (1992) on the other hand, investigated the impact and the journal self-citation rate of 22 newly launched chemistry journals. Their analysis indicated that the dependence of these indicators on the journal's age was found to be characteristics of the initial period of a journal's life cycle.

In 1995, Dimitroff and Arlitsch examined 1058 articles to determine the rate of self-citation in library and information science literature. They found that 50% of the articles contained at least one self-citation. The self-citation rate of 50% is higher than previous studies of self-citation rates in the sciences and social sciences. The percentage of self-citation as related to total citation count is only 6.6% which falls between the percentage reported in the sciences and other social sciences. Baldi and Hargens (1995) re-examined the work of Price entitled 'Networks of scientific papers' to distinguish negative citation and self-citations from other citations in N rays literature. Their study found that both negative citation and self-citation are prominent in the N rays literature. Pichappan (1995) tried to advocate the use of journal self-citation as crucial bibliometric indicators to measure contribution of a journal towards a specialty. He argues that journal self-citation rate can be normalised by adopting a two stage refinement. The normalised self-citing rates are also compared with external self-citing rate to know the self and external influence of journals.

As seen from the literature review, self-citation is significant to the world of citation analysis. The purpose of this study is to investigate the practice of self-citations as observed in the field of natural rubber research as reflected in the *Journal of Natural Rubber Research*, published by the Rubber Research Institute of Malaysia, a well-known institution promoting worldwide rubber research.

### **OBJECTIVES**

The aims of the study are to find out:

- (a) the number of articles with journal self-citations by year;
- (b) the frequency distribution of journal self-citations by year;
- (c) the frequency distribution of journal self-citations per article;
- (d) the frequency distribution of journal self-citations by titles;
- (e) the number of self-citing authors in journal articles;
- (f) the frequency distribution of self-citing authors in journal articles;
- (g) the relationship between author affiliation and journal self-citation; and
- (h) the rank list of self-citing authors.

## SCOPE

The study is based on 258 research articles and short communications and 4177 references appended to these articles published in the *Journal of Natural Rubber Research* 1988-1997. Title pages containing names of authors and their institutional affiliations together with references appended at the end of all the articles are studied and analysed. Out of 258 articles, 137 articles contain journal self-citations while 196 authors out of 319, self-cited themselves in these articles.

## METHODOLOGY

The title page and references appended to each article published between 1988-1997 were collected, compiled and scanned to study various aspects pertaining to journal self-citation and author self-citation. The references were then examined, checked and tabulated for necessary data into separate data sheets to facilitate analysis of the study in terms of number and frequency of journal self-citations per article, year, and title. At the same time, the extent of author self-citation was also examined and tabulated to find out the number and frequency of self-citing authors, relationship between author affiliation and journal self-citations, and finally to prepare a rank list of highest self-citing authors.

## RESULTS AND DISCUSSION

### 1. Frequency Distribution of Articles with Journal Self-citations by Year

Table 1 shows the frequency distribution of journal self-citations figured in references appended to articles published in the journal between the years 1988-1997. The years 1989 and 1996 scored the highest with 16 articles each having journal self-citations. On the whole, over a ten-year period, journal self-citations occurred in as many as 137 articles out of a total of 258 articles, meaning that 53% of the contributions to the journal contained journal self-citations.

Table 1: Frequency Distribution of Articles with Journal Self-citations

Year	Number of Articles with self-citations	Number of Articles without self-citations	Total Number of Articles
1988	14	13	27
1989	16	11	27
1990	13	14	27
1991	12	14	26
1992	13	11	24
1993	14	15	29
1994	14	14	28
1995	13	10	23
1996	16	7	23
1997	12	12	24
<b>Total</b>	<b>137</b>	<b>121</b>	<b>258</b>

## 2. Frequency Distribution of Journal Self-citations Per Article

Table 2 indicates the frequency distribution of journal self-citations per article. Most of the articles (40.2%) had at least one journal self-citation. Articles with two journal self-citations (24.8%) occupy second place and articles with three journal self-citations (16.8%) occupy the third place. The rest of the articles received between four and twelve journal self-citations each.

Table 2: Frequency Distribution of Journal Self-citations Per Article

Frequency of Journal Self-citations	Number of Articles with Journal Self-citations	Percentage
1	55	40.2
2	34	24.8
3	23	16.8
4	10	7.3
5	2	1.5
6	4	2.9
7	0	0.0
8	3	2.2
9	1	0.7
10	3	2.2
11	1	0.7
12	1	0.7
<b>Total</b>	<b>137</b>	<b>100</b>

## 3. Frequency Distribution of Journal Self-citations by Year

Table 3 shows the frequency distribution of journal self-citations by year. The data reveals that 1989 scored the highest number of journal self-citations with a total of 51 (14.2%). Over a ten-year period, a total of 352 journal self-citations occurred in a total of 4177 references. The mean score of journal self-citation is 8.4.

Table 3: Frequency Distribution of Journal Self-citations by Year

Year	Total Number of Journal Self-citations	Total Number of References	Percentage of Journal Self-citations
1988	31	466	6.6
1989	51	359	14.2
1990	33	401	8.2
1991	24	448	5.3
1992	28	481	5.8
1993	30	396	7.6
1994	22	429	5.1
1995	56	475	11.8
1996	51	426	12.0
1997	26	296	8.8
<b>Total</b>	<b>352</b>	<b>4177</b>	<b>8.4</b>

#### 4. Frequency Distribution of Journal Self-citations by Titles

Table 4 reveals the frequency distribution of journal self-citations by titles published in the Rubber Research Institute of Malaysia between 1929 to 1997. The *Journal of Natural Rubber Research* is actually the continuation of *Quarterly Journal of Rubber Research Institute of Malaya* which first appeared in 1929. Later, in 1931 the journal was renamed as *Journal of the Rubber Research Institute of Malaya* and in 1974 the journal assumed the title *Journal of the Rubber Research Institute of Malaysia*. Finally, in 1986, the journal was published under the title *Journal of Natural Rubber Research*. Out of a total of 352 journal self-citations, 173 (49.1%) were to *Journal of Natural Rubber Research*, 97 (27.6%) to *Journal of the Rubber Research Institute of Malaya*, 80 (22.7%) to *Journal of the Rubber Research Institute of Malaysia* and 2 (0.6%) to *Quarterly Journal of Rubber Research Institute of Malaya*. Most of the articles contained self-citations of more recent issues compared to earlier publications. In other words, the world of rubber research is keeping itself abreast.

Table 4: Frequency Distribution of Journal Self-citations by Title

Year	<i>Quarterly Journal of Rubber Research Institute of Malaya</i> 1929-1930	<i>Journal of the Rubber Research Institute of Malaya</i> 1931-1973	<i>Journal of the Rubber Research Institute of Malaysia</i> 1974-1985	<i>Journal of Natural Rubber Research</i> 1986-1997	Total Number of Journal Self-citations
1988	-	12	7	12	31
1989	-	21	16	14	51
1990	2	11	8	12	33
1991	-	6	2	16	24
1992	-	10	8	10	28
1993	-	2	8	20	30
1994	-	-	1	21	22
1995	-	18	16	22	56
1996	-	16	11	24	51
1997	-	1	3	22	26
<b>Total</b>	<b>2</b>	<b>97</b>	<b>80</b>	<b>173</b>	<b>352</b>
<b>%</b>	<b>0.6</b>	<b>27.6</b>	<b>22.7</b>	<b>49.1</b>	<b>100</b>

#### 5. Self-citing Authors in Journal

The results indicate the presence of self-citing authors in the references published in articles of the journal. A total of 196 (61.4%) authors cited themselves in their articles compared to 123 (38.6%) authors who did not cite themselves. Hence, the high percentage of self-citing authors clearly indicates that the authors of this journal have the tendency to cite themselves.

## **VI. Frequency Distribution of Self-citing Authors**

Table 5 reveals the frequency distribution of self-citing authors in the references appended to the journal's articles. Out of a total of 196 self-citing authors, 65 (33.2%) authors cite themselves only once in their articles while 45 (23%) authors cite twice followed by 28 (14.3%) authors who cite themselves three times. The rest cite themselves between four and 39 times. The highest number of self-citations by an author who cited himself is 61 times.

Table 5: Frequency Distribution of Self-citing Authors

<b>Frequency of Self-citing Authors</b>	<b>Number of Author</b>	<b>Percentage</b>
1	65	33.2
2	45	23.0
3	28	14.3
4	7	3.6
5	7	3.6
6	7	3.6
7	7	3.6
8	5	2.5
9	8	4.1
10	2	1.0
11	4	2.0
13	3	1.5
18	3	1.5
22	1	0.5
26	1	0.5
27	1	0.5
39	1	0.5
61	1	0.5
<b>Total</b>	<b>196</b>	<b>100</b>

## **7. Author Affiliation and Journal Self-citations**

Table 6 reveals the relationship between author affiliation and journal self-citations. Out of a total of 352 journal self-citations, 171(48.6%) are cited by the staff of the Rubber Research Institute of Malaysia which published the journal under study. A total of 63 journal self-citation are cited by staff of Rubber Research Institute of Malaysia collaborating with others in their research. On the other hand, 118 (33.5%) are cited by researchers not related to Rubber Research Institute of Malaysia. The staff of the organisation publishing the journal has the tendency to self-cite their own journal (66.5%).

Table 6: Author Affiliation and Journal Self-citations

Year	Staff	Staff & Others	Non-staff	Total
1988	14	2	15	31
1989	35	8	8	51
1990	25	1	7	33
1991	8	1	15	24
1992	15	1	12	28
1993	15	3	12	30
1994	6	9	7	22
1995	27	9	20	56
1996	19	22	10	51
1997	7	7	12	26
<b>Total</b>	<b>171</b>	<b>63</b>	<b>118</b>	<b>352</b>
<b>%</b>	<b>48.6</b>	<b>17.9</b>	<b>33.5</b>	<b>100</b>

### 8. Rank List of Self-citing Authors

Table 7 shows the list of self-citing authors in decreasing order of self-citations. A. D. Roberts of the Malaysia Rubber Producers' Research Association based in London scored the highest (61) followed by Yeang Hoong Yeet of Rubber Research Institute of Malaysia with 39. In third place is Gerald Scott (27) from Aston University, United Kingdom. Here, it should be noted that Gerald Scott also held the record of self-citing himself as many as 27 times in a single article. On the whole, it can be deduced that most researchers affiliated with Malaysian Rubber Producers' Research Association (5) and Rubber Research Institute of Malaysia (5) self-cited themselves in their research articles.

Table 8: Rank List of Self-citing Authors

Rank	Name of Author	Institutional Affiliation	Fre. of Self-citations	Cum. Total
1	Roberts, A. D.	Malaysian Rubber Producers' Research Association	61	61
2	Yeang, H. Y.	Rubber Research Institute of Malaysia	39	100
3	Scott, Gerald	Department of Chemical Engineering and Applied Chemistry, Aston University, United Kingdom	27	127
4	Tinker, A. J.	Malaysian Rubber Producers' Research Association	26	153
5	Gomez, J. B.	Rubber Research Institute of Malaysia	22	175
6	Gelling, I. R.	Malaysian Rubber Producers' Research Association	18	193
7	Ikram, A.	Rubber Research Institute of Malaysia	18	211
8	Yip, Esah	Rubber Research Institute of Malaysia	18	229
9	Bristow, G. M.	Malaysian Rubber Producers' Research Association	13	242
10	Campbell, D. S.	Malaysian Rubber Producers' Research Association	13	255
11	Lau, Chee Heng	Rubber Research Institute of Malaysia	13	268



## **SUMMARY AND CONCLUSIONS**

The findings of the study can be summarised as below:

The number of articles containing journal self-citation is slightly over 50%. This could indicate that the journal studied is scholarly and well-known in the field of rubber research and, hence, frequently referred to in this field of study.

The range of journal self-citations per article is between one and twelve. Of the 4177 references only 352 (8.4%) are journal self-citations. This is slightly above the self-citation rate of 5% found by Tagliacozzo (1977) in areas of social science and 10%-20% in the sciences.

As the journal under study was published with different titles at different times, it is found that more journal self-citations are to the present title.

A high percentage of authors (61.4%) who had contributed articles to the journal cited themselves indicating a high probability that future contributing authors would likely cite themselves too. On the other hand, the high percentage of authors who cited themselves could indicate the existence of a series of continuous research being conducted by the respective researchers in their field of study and the results are published in the source journal studied. The frequency distribution of author self-citation is between one and 61 times.

It is found that more than 50% of the authors contributing articles to the journal are affiliated to the institution publishing the journal. The close link between the author affiliation and the institution publishing the journal probably influenced the extent of journal self-citation in the articles.

The highest self-citing author is A. D. Roberts, affiliated to the Malaysian Rubber Producers' Research Association.

There were inconsistencies in the citing of certain Chinese and Malay authors' names and may create problems when analysing data, as more time and care are needed to examine these names. For example, the Malay names Mohd. Zin Ab. Karim, Mohd. Zin Karim and Karim, M. Z. refers to the same author but cited differently by the author himself in articles. Another example is Lau, C. H. and Lau, Chee Heng, which refer to the same person who is being cited. This inconsistency could be avoided by a more stringent instruction to authors in the editorial policy

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