Study on the Relationships between Citation and Collaboration

Qiu Junping[1] and Ma Feng[2]

[1]*jpqiu@whu.edu.cn*
Wuhan University, School of Information Management, Wuhan, 430072 (P. R. *China*)

[2] *mafeng.920@gmail.com*
Wuhan University, School of Information Management, Wuhan, 430072 (P. R. *China*)

Introduction

There have been a few studies investigating the relationship between the citer and citee. These studies are instructive for the research on relationship between citing and collaboration. Findings of Shadish et al. (1995) and Case & Higgins (2000) are very similar that 16% of the participated authors indicated they had worked with citees. Rong Tang & Martin A. (2008) investigated a total of 49 authors in biology and 50 authors in psychology. Results indicate that the 9.6% of respondents were cited because of self-citation or co-authorship with the citers, 9.8% of citees had worked together with citers, 15.3% of the respondents had personal or professional relationship with the citers, 27.7% of citees were cited because of their reputation, and 37.6% of cited authors were not known to the citers. Results of Rong Tang & Martin A. (2008)'s study indicate that relations between citee and citer have a great influence on importance assessment of citing. There are three usual different kinds of relationships between citer and citee: self-citation, having been worked together, knowing about citee. Besides, Wagner D.(2000), Tsay M. & Chou S.(2004), Levitt J. & Thelwall M. (2009) had done some research on relations between citing and collaboration from the quantity.

This paper studies on the relationships between citing and collaboration from a new perspective. Several kinds of methods have been adopted, i.e., citing analysis, citation identity, ordering method. Also combined with investigation results on citing and collaboration motivations, the relationship between citing and collaboration is explored.

Data/methods

In his pioneering paper published in 2001, White H. for the first time, proposed the conception of "citation identity" (White H., 2001). White (2001) defines citation identity as "the set of authors that an author cites". Citation identity is formed by list of authors cited by a certain citer and the times. The counting methods used for counting cited times in citation identity are different from those in citation analysis. Suppose author A cites author B, author C, etc. Even if A cite a work of B several times in an article, the count of cited times of B by A is once. When B has two different works or more cited by A, the cited time is counted as twice or more correspondingly. Adopting the method in citation identify formation, list of sample author's co-authors can be established.

There are several levels of citation identity: broad, strict and the strictest. Data of citing analysis, broad and strict citation identities come from CCD, which were collected on 2010-7-18. Data of strictest citation identities and collaboration come from CCD, Wanfang Data and China Scientific Journal Database by VIP Corporation, which were collected from 2010-7-18 to 2010-7-20.

Three core authors from Library and Information Sciencef (LIS) in China were selected as test cases in this study. They are Prof. Qiu Junping, Wu Weici and Wang Zhijin. All of them have different

research directions and a long history of publication in his/her own direction.

Results

The number of citing times shows a concentration-scatter tendency. With the increase of cited times, the number of authors with same cited times is also increasing. In the citing analysis, the orders of citing authors are not taken into account. Whether the citer himself/herself included in the cited literature is also not considered.

All the papers first-authored by sample author as source data. Whether the citer was co-authored with other authors in the cited literature, other cited authors are also considered as citees. The result of this process is broad citation identify, as shown in Table 1. By excluding other citees co-authored with citer from the broad citation identify, the strict will be formed. Only the single-authored citing articles are considered to form the strictest citation identity.

There are a few foreign authors in the strictest citation identity. It's because only publications produced by Chinese authors are included by CCD, and cited articles are not included by CCD before the mid 90's of 20th century. The strictest citation identity shows that authors cited by Qiu are not many. Only a few were cited by him many times. Most of the cited authors are Chinese.

The co-authored publications of a sampled author Qiu are collected for statistics, the result of which is shown in Table 2. The number of co-authors also showed a certain concentration – scatter distribution. Besides, the citer tends to cite their collaborated partners, the authors with proximity, the authors they know about, etc. For example, Qiu had co-authored with Wang Hongxin for 5 times, and cited his two articles (excluding the co-authored articles by them) for many times.

Similar conclusions could be concluded by analysis on the citation identify and collaboration conditions of Wang's.

However, the main differences are as follows. First, among all the articles published by Wang, about 25% of them are single authored. The broad citation identity is almost the same as the strict one for Wang. Second, compared with the Wang's self-citation proportions in citing frequency analysis and three kinds of citation identities, respectively, Qiu's are higher. Wang cited many well-known scholars in the field of LIS in China, but less outside the field. Qiu cited many authors from a number of areas, and many of whom are from other fields. Qiu have collaborated with more authors than Wang, also the number of collaboration times are more than Wang.

Citation identities and collaboration status of Wu are very similar to that of Wang's. Although Wu and Qiu have some differences on citation identify and collaboration status, there are some same or similar points between them. Some of his collaboration partners were cited more frequently, and these collaborators are located in the relative front of citation identity, i.e., Wang Zizhou, Fan Bingsi and Luo Zhiyong, with several cited articles for each. Similarities are in that of Qiu.

Citing and collaboration shows relations on quantitative characteristics at micro and individual level. On the basis of previous research findings on the citing and collaboration behaviour (Melin G., 2000; Ma F. & Wu Y., 2009a, 2009b), conclusions could be drawn as follows. First, citing and collaboration are common scientific research activities influenced by social and psychological factors, scientific and technology factors as well as cognition, knowledge, ideas, ability and other factors of researchers. Second, citing and collaboration are also influenced by conditions and social environmental factors. Third, Citing and cooperation are important means of scientific communication.

But there are also many differences on characteristics and laws between citing and collaboration behaviour. Collaboration has

stronger self-organizing and pragmatic than citing. Citing behaviour may be of more subjective with weaker pragmatic features. Relationship between citer and citee equals, but asymmetrical between collaborators. Cited literature always produced ahead of citing literature. An author should be acted as a citer and then be a citee. Citers are active, but citees are passive in citing behaviour. Collaborators appear in a same article contemporarily, etc.

Table 1. Partial broad citation identity of Qiu's

Order	Citee	Cited Times
1	Qiu Junping	105
2	Duan Yufeng	13
3	Ma Ruimin	9
4	Ma Feicheng	8
5	Zhao Rongying	8
…	…	…

Table 2. Partial collaborators of Qiu's

Order	Collaborator	Co-author Times
1	Zhao Rongying	36
2	Ma Ruimin	29
3	Duan Yufeng	22
4	Wen Tingxiao	20
5	Chen Jingquan	19
…	…	…

Acknowledgments

References

Case, D. & Higgins G. (2000). How can we investigate citation behavior? A study of reasons for citing literature in communication. *Journal of the American Society for Information Science*, 7, 635-645.

Levitt, J. & Thelwall, M. (2009) Citation Levels and Collaboration within Library and Information Science. *Journal of the American Society for Information Science and Technology*, 3, 434 - 442.

Ma, F. & Wu, Y. (2009a) A survey study on motivations for citation: A case study on periodicals research and library and information science community in China. *Chinese Journal of Library and Information Science*, 2, 28-43.

Ma, F. & Wu, Y. (2009b) Study of research collaboration motivations and related issues——exemplified by 《Chinese Journal of Scientific and Technical Periodicals》 authors. *Science and Technology Management Research*, 8, 572-575.Melin, G. (2000). Pragmatism and self-organization Research collaboration on the individual level. *Research Policy*, 29, 31-40.

Rong,Tang & Martin, A. (2008). Author-rated importance of cited references in biology and psychology publications.*Journal of Documentation*, 2, 246-272.

Shadish, W. ,Tolliver,D., Gray, M. & Sengupta, S.(1995). Author judgments about works they cite—three studies from psychology journals. *Social Studies of Science*, 3, 477-498.

Tsay, M. & Chou S. (2004). A Citation Study of Life Science Authors in Taiwan. *Journal of Education Media & Library Sciences*, 4, 503 - 529.

Wagner, D. (2001). Continuity and discontinuity of collaboration behavior since 1800 ——from a bibliometric point of view. *Scientometrics*, 3, 503 - 517.

White, H. *(2001). Authors* as citers *over time*. Journal of the American Society for Information Science and Technology, 2, 87-108.