

Bibliometrics Analysis of Science and Technology Policy in China*

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Abstract Using bibliometrics technology to study “Science and Technology Policy” can not only improve better understanding of “Science and Technology Policy” for researcher, but also have important value for policy maker. In this article, the author use bibliometrics method and select “Science and Technology Policy” as search word and 267 records of articles in 1998-2008 are retrieved from CSSCI. Then the author analysis on the key words, publishing authors and cited authors, source and cited journals. According to analysis, the author get the following conclusion:(1) these studies are not particularly focused on hot spots and links between studies are not particularly close;(2) Not only publishing authors but also cited author, their articles’ counts are very low and couldn’t form special core literatures and core authors;(3) Science and Technology policy research is absorbed contents of many fields, has not formed fixed areas.

Key words Science and technology policy; Bibliometrics; CSSCI

1 Introduction

Science and technology are the most active elements of modern society, science and technology policy is an important strategy for socio-economic development and scientific and technological development. To explore the content and the focus of Science and technology policy research is a scan for the development of science and technology policy research itself, it is also Element Study. Many scholars (Ye 1995, Wang 1998, Sheng & Cheng 2002, Lou 2002). have made outstanding contributions to these element studies. In addition to per study, Liu LI(Liu,2008), Song Jian (Song, 2008) Peng Fu-guo(Peng 2006) and other scholars have studied the stages, milestones, and evolution of Chinese science and technology policy development, which is equivalent to study the history of Chinese science and technology policy; Wu Tong, Sun Li(Wu&Sun,2004), Wang Tao, Wu Gui-Sheng (Wang&Wu,2001), who studied the relevant shortcomings and problems of China's science and technology policy; Peng Ji-Sheng, Sun Wen-Xiang, Zhong Weiguo(Peng, Sun&Zhong 2008), Li Xia, Su Jin-Ying (Li&Su,2008)and others have made quantitative research on the Chinese science and technology policy-making, evaluation, determination; Duan Jianping (Duan,2006) and other scholars pay their attention to the science and technology policy in other countries and comparative studies. There are many of the characteristics of Chinese science and technology policy research. Although scholars have made comprehensive discussion on Chinese science and technology policy research, but few authors study the field from the perspective of bibliometrics. In this paper, we try to study the science and technology policy from bibliometrics point of view and get some interesting results.

2 Data and Methodology

The data in this study are all from CSSCI. There are a lot of science and technology policy inconsistencies in research, so we had made concept analysis before retrieval. According to comparison, we find “Science and Technology Policy” can represent these conceptions better, so we decided use “LY98,LY00,LY01,LY02,LY03,LY04,LY05,LY06,LY07,LY08, BY=“Science and Technology Policy” ”as search expression and 267 records of articles and 1564 citation references in 1998–2008(exclude 1999) are retrieved from CSSCI. In order to nicety, the data have been cleaned up and standardization and 260 articles are efficiency. Taking these data as database, we analysis on the key words, publishing authors and cited authors, source and cited journals.

3 Results and Analysis

3.1 Keyword analysis

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There are total 542 keywords in 260 papers, according to frequency analysis, we found that " Science and Technology Policy (S&T policy)" appeared 208 times, Key words appeared 10 times is 2, 9 times(2), 8times(1), 7times(3), 6times(2), 5times(5), 3times(18), 2times(45), 1time(453).

Table 1 Keywords Appear Above 4 Times of Science and Technology Policy Research in CSSCI

Freq.	Key word	Freq.	Key word	Freq.	Key word
208	Science and Technology Policy(s&t policy)	7	WTO	5	Science and technology
11	national innovation system	7	Industrial Policy	4	scientific and technological thought
10	science and technology management	7	the Transformation of Scientific and Technological Achievement (TSTA)	4	S&T investment
10	science and technology innovation	6	Development of science and technology	4	Policies of Science and Technology of the U.S.
9	basic research	5	technology foresight	4	Scientific and Technological Indicators
9	Technique Innovation	5	Scientific Technological system and	4	reforms of sci-tech system
8	Science of science	5	national S&T Policy	4	indigenous innovation

From table 1, we can see that there are a lot of content are included in S&T policy study, these contents are related to science and technology policy, the keywords with more frequency can be seen as a research focus. However, table 1 shows that these studies are not particularly focused on hot spots and links between studies are not particularly close.

3.2 Author analysis

3.2.1 Publishing author analysis

There are total of 347 authors in 260 papers who had published one article are 305, two articles are 32, three articles are 5, four articles are 2, 5 and 8 articles are only one person. Table2 show the authors and work units who have published three or more.

Table 2 Publishing Authors of Science and Technology Policy Research in CSSCI(above 3 times)

counts	Publishing author	Organization
8	Li xia	The Institute for Research in Science Technology and Society in ShanXi University; Department of Philosophy,Central South University,
5	Xiao guangling	Center of Science , technology and Society ,Tsinghua University
4	Chinese Association for Science of Science and S&T Policy	Chinese Association for Science of Science and S&T Policy
4	Du Baogui	School of Literature and Law, Northeastern University
3	Liu Li	Center of Science, technology and Society ,Tsinghua University
3	Huang Junying	Institute of Science and Technology Information of China
3	Gong Xu	Policy Bureau,The National Natural Science Foundation of China
3	Hong kai	Management School,Jinan University; school of Architecture,South China University of Technology
3	Su Jun	School of Public Policy and Management, Tsinghua University

From table 3, we can see there are 40 people who studied on science and technology policy had published papers more than 2 in CSSCI. Among of them 22 units are included "Science and Technology", 8 units are related to economic management, the rest is the Policy Office, Party School, Business School, school of literature and Law, school of Humanities and social sciences and so on. The distribution of high published authors of s&t policy is in Beijing, Shanxi, Liaoning, Wuhan, Guangzhou,

etc. University is the main source for published papers, followed by a number of research institutes; there are also some government departments who published on the Academic Journal.

3.2.2 Cited author analysis

According citation analysis on 260 papers, we find that there are 1564 citations and average cited times are 6.02 per author.

From table 3, we can see important cited authors of science and technology policy research in china in CSSCI. Compared published authors with these cited authors show that there some different between them which not necessarily high on high. However, some of them appear Simultaneous, such as Li Xia, Zeng guoping, Liu Xielin, Zhou Jizhong, Xiao guangling, Ye Ming, Wang Tao etc.

Table 3 Show that there are several categories high cited author, for example, the cited authors in A are leaders of China, Mao Zedong, Deng Xiaoping, Jiang Zemin etc., Some of their discourse on science and technology or the classic statement widely cited by Science and Technology Policy researcher; B cluster is a number of authoritative international and national institutions or discussion group released a number of related data, special reports, or policy guidance, etc.; authors in C are all foreign researchers who focus on innovative theory; D is some foreign reports issued by Science Foundation. The rest are well-known scholars from the major university and institutions who had innovative or groundbreaking research or discussion for policy research which discourse or judge had made an important influence on science and technology policy research and policy development and formation.

Table 3 Cited Authors of Science and Technology Policy Research in CSSCI(above 5 times)

Time cited	Cited author	Cited contents
11	OECD	Science & Technology policy Outlook
7	Wang Chunfa	developing countries in Science and technology globalization
7	State Scientific and Technological Commission	China Science and Technology Policy Guide
6	Chinese S&T Research report Group	Chinese S&T Research Report
6	National Bureau Of Statistics Of China	China Statistical Yearbook on Science and Technology
6	Deng Xiaoping	Deng Xiao Ping Wen Xuan
5	Mao Zedong	Selected Works of Mao Zedong(Volume 5)
5	Li Xia	The Making Subject Change and Model Select in Process of Making Policy
5	Fu Jiayi	Technology innovation studies
5	Zeng Guoping	Science and national interests, national objectives
5	Li Zhengfeng	A Preliminary Exploration on the Changes of the Basic Research Function

It is can be seen that not only published authors but also cited author, their articles are very low and couldn't form special the core literatures and core authors.

Table 4 Source Journal of Science and Technology Policy Research in CSSCI(above 2 times)

Journal title	Counts	Journal title	Counts
Forum on Science and Technology in China	42	Science Technology and Dialectics	3
Studies in Science of Science	32	Latin American Studies	3
Science of Science and Management of S&T	25	Productivity Research	3
Science and Technology Management Research	19	Northeast Asia Forum	2
Science & Technology Progress and Policy	16	Management World	2
China Soft Science	12	International Economic Cooperation	2
Studies in Dialectics of Nature	11	Journal of South China Normal University (Natural Science Edition)	2
Science Research Management	10	Economic Management	2
Scientific Management Research	9	On Economic Problems	2
Journal of Dialectics of Nature	8	Economic Review	2
R&D Management	7	Studies in the History of Natural Sciences	2
Future and Development	5	Forum of World Economics & Politics	2

3.3 Journal Analysis

3.3.1 Source journal analysis

The 260 papers are distributed in the 60 magazines. The number of articles published in the top 12 journals is 196 and 75.4% of total published papers; there are 223 papers published in top 24 journal which occupied 85.8 % of total. Table 5 shows the top 12 journals are all core journals about scientific management, economics and management. We also see that there are many published in the international economic and political development core journals.

Table 5 Cited Journals of Science and Technology Policy Research in CSSCI(above 5 times)

Cited journal	Cited times	Cited journal	Cited times
Unknown title	452	Science & Technology Review	9
Studies in Science of Science	26	Beijing: Science and Technology Literature Press	8
Scientific Management Research	25	Beijing: China Renmin University Press	8
Science of Science and Management of S&T	23	People's Daily	8
Forum on Science and Technology in China	21	R&D Management	7
Global Technology Economic Outlook	19	<i>Technological Forecasting and Social Change</i>	7
<i>Research Policy</i>	19	Management World	6
China Soft Science	17	Journal of Dialectics of Nature	6
Chinese Science Bulletin	16	<i>Science</i>	6
Studies in Dialectics of Nature	13	Impact of Science on Society	6
Science and Technology Management Research	13	Science & Technology Progress and Policy	6
Beijing: People's Publishing House	12	Xinhua Digest	5
Science Research Management	11	Beijing: China Statistics Press	5
Economic Research Journal	11	Beijing: Peking University Press	5
Science and Technology Daily	10	Beijing: Huaxia Press	5

From cited journal analysis, we can see that Science and Technology Policy Research is absorbed contents of many fields such as science of science, philosophy of science, technology and society, economic management, and public administration etc. However, it is also reflects such issues that there is yet no specific core journals of science and technology policy, science and technology policy research is not yet a relatively mature field. At the same time, science and technology policy studies had absorbed more other types of literature contents, such as books, newspapers, etc., but for its core journals, citation is relatively low, shows a considerable spread of science and technology policy, has not formed a fixed several areas.

4 Conclusion and Forward

4.1 Conclusion

According to bibliometrics analysis on "Science and Technology Policy", we have a general understanding on contents and research fronts, publishing authors and cited authors, source and cited journals of Science and Technology Policy of china. We find that:(1) these studies are not particularly focused on hot spots and links between studies are not particularly close;(2) Not only publishing authors but also cited author, their articles' counts are very low and couldn't form special core literatures and core authors;(3) Science and Technology Policy Research is absorbed contents of many fields, has not formed fixed areas.

4.2 Inadequate and forward

This study has some deficiencies as following:(1)For use of CSSCI database includes only the 1998-2008 data, we can only show a rough part of China's Science and Technology Policy Research. Using "science &technology policy" as a search keyword maybe inevitably miss some aspects of research, such as science and technology talent policy research; (2) As the special nature of Science and

Technology Policy Research, some professional policy staffs' production maybe couldn't appear in academic journal, this would also have missed some studies. (3) Using bibliometrics methods and do not have much content analysis.

The next step will be launched in the following areas: (1) We will consult some well-known scholars in this field and ask for about 10 key words on science and technology policy, according to comparison and combination, we will retrieval again and made more deeply analysis; (2) We will use CNKI database and made content analysis so that we can study Chinese S&T Policy more nicety and more comprehensive understanding and can give good advice for S&T studies.

References

- [1] Ye Mengchen. The history, focus and direction of Chinese science and technology policy research[J]. Scientific Management Research,1995,13(6) :70-74 (In Chinese)
- [2] Wang Zhiqiang. China's science and technology policy thinking: a should not be neglected area of research[J]. Studies in Dialectics of Nature,1998,14(5) :50-53 (In Chinese)
- [3] Sheng Jianxin, Cheng Liangbin. Current status analysis of China Science and Technology Policy Research[J]. Forum On Science and Technology In China,2002,(2) :35-39 (In Chinese)
- [4] Lou Chengwu. The Problems of Current Science and Technology Policy Investigation in China[J]. Journal of Northeastern University Social Science,2002,4(3) :190-192 (In Chinese)
- [5] Liu Li. Four Milestones of Science and Technology Policy in China since reform and opening up[J]. Forum On Science and Technology In China,2008,(10) :3-5 (In Chinese)
- [6] Song Jian. Awakening-Evolution of China's Science & Technology Policies[J]. Bulletin of Chinese Academy of Sciences,2008,23(6) :505-512 (In Chinese)
- [7] Peng Fuguo. Stage of development of Chinese science and technology policy. Hunan Social Sciences[J],2006,(6) :25-28 (In Chinese)
- [8] Wu Tong, Sun Li. On Problems Concerning China's Policy for Science & Technology in the New Period Since 1978[J]. Journal of Inner Mongolia University,2004,36(6) :47-51 (In Chinese)
- [9] Wang Tao, Wu Guisheng. The Research on Chinese Entering WTO and the Adjustment of Chinese Policies of Science and Technology[J]. China Soft Science,2001,(10) :80-84 (In Chinese)
- [10] Peng Jisheng, Sun Wenxiang, Zhong Weiguo. The evolution of Chinese technological and innovational policies and the empirical research on the performance(1978-2006)[J]. Science Research Management,2008,29(4) :134-150 (In Chinese)
- [11] Li Xia, Su Jinying. Study on Measure System of the quality of Chinese Science and Technology Policy[J]. Forum On Science and Technology In China,2008,(5) :93-97 (In Chinese)
- [12] Duan Jianping. A Comparative Study of Science and Technology Policy: India Vs. China[J]. Market Weekly(Disquisition Edition),2006,(7) :84-85 (In Chinese)