Comparison of Patents Studies between China and Abroad

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Abstract

With classic statistic method, co-citation method, and the newest visualization tools, present paper shows and makes comparison between China and International patents analysis in the view of academic distribution, co-citation network and research front. According to this, we find that, in China, scholars pay less attention to quantitative analysis of patent. However, quantitative analysis of patent exploring its economic and strategic value is the biggest hot point in recent years in the world, especially in developed countries. Then, we point out the direction of patent analysis for Chinese study.

Keywords: Patents analysis; Comparison; Visualization; Research front

1 Introduction

"WIPO Patent Report (2006)" indicates: patent filings have grown at an average annual rate of 4.75% over the past ten years, to a total of nearly 1.6 million in 2004, and the use of patent system highly concentrated with five patent offices, including traditional great power patent offices(United States of America, Japan, European Patent Office) and two rising patent offices(Republic of China and Korea),accounting for 75% of all patent applications and 74% of all patents granted. Korea filings of patent applications have grown at the rate of 268%, and at the 488%for China filings. Meanwhile, patents filings worldwide have increased at an average rate of 42%. During the past ten years, pulled by many Asian countries, the amount of patent filings has increased by nearly two times.

With the great developing of the filing patents in China, study of patents have made great progress and many Chinese characteristic results both in patent law and academic study. In fact, in the developed countries, the developing of patent law always linked with the developing of its academic study closely. Constitution of patent laws in United States of America and Japan are all based on its academic and strategic reports. Against this background, present paper aims to find differences between China and distinuished international researches in the fields of research field, content, and method.

2 Data resources

The international data of present research are from Social Science Citation Index (SSCI) of Thomson Scientific Company. Comparatively, Chinese data are from China Social Science Citation Index (SSCI) of Nan-Jing University of China. There are 5894 items in the SSCI database and 983 items in CSSCI, which title or abstract or keywords contain "patent". For the international date, we employ the software of Bibexcel(Persson 2002) to do the basic data processing. While for the Chinese date there are not software in existence, so we had to make program with Perl language to deal with data processing. Both SCI and SSCI contain "author", "title", "institution", "references" et al. Normalization of the date is necessary, especially in SSCI, noise of the data need to be treated very carefully.

We made comparison in many fields as follows.

3 Distribution of subject category

Patent data contain valuable pieces of information on legal and bibliographic aspects of the invention. No doubt, study patent in the view of law is the most important part of patent analysis

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in that patent performs an exclusive right given to patent holders. Meanwhile, bibliographic aspects can give much information valuable to business decision, national development strategy, and so on, which make patent analysis be of great interest of scientists from fields of economy, management, information et al.

Distribution of subject category can reflect which subfield the patent analysis stress on, and the situation of realization or utilization of patent information. There are total 23 subjects have made research linked to patent in China. However, the subject of papers highly concentrated with only four subjects ("law"," management", "library, information, and bibliometrics", and "Economic") accounting for 94.6% of all the papers (Fig. 1). While the distribution of subject of international paper are rather sparse compared with that of China. There are total 160 subjects and 71% of all papers belongs to 9 subjects ("law", "information science and library science", "business", "economics", "management", "computer and information science", "planning and development", "multiscience", "computer science and multidisicipline application"). Although the partition system of subject category may be different for SSCI and SCI, China patent analysis is limited in a rather narrow field. Study, exploration, utilization of patent analysis haven't be realized broadly.
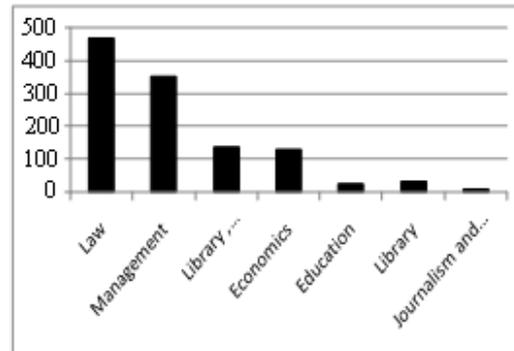

Fig. 1 Distribution of subject category in China

The dark and light parts in *Fig. 2* represent the number of papers published before and after 2001 respectively. The column is lined according to the amount of papers in each fields published after 2001, and the ordinal up to each column is the sequence of papers all over the time. "law", "Information Science & Library Science", "Management", "Economics", "Business" are the main field of patent analysis. It is clearly, the paper increased fast in "Economics" and "Management" field during the past few years. That means patent's value of management and economy has been realized deeply and broadly during this periof. Especially, economic value of patent get scholar's broad attention. China scholars should pay more attention on this trend.
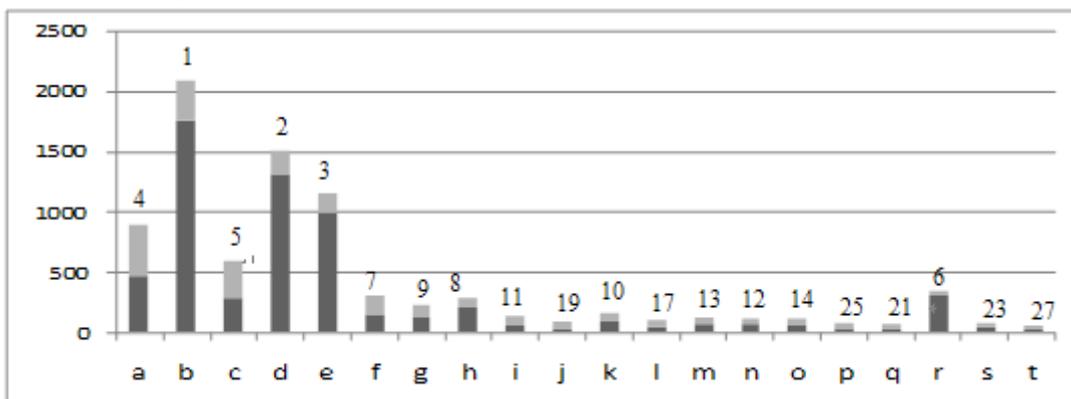

Fig. 2 Distribution of international subject category

a:Economics; b: Law; c: Management; d: Information Science & Library Science; e: Business; f: Planning & Development; g: Computer Science, Interdisciplinary; h: Multidisciplinary Sciences; i: Operations Research & Management Science; j: Ethics; k: Engineering, Industrial; l: Health Care Sciences & Services; m: History & Philosophy Of Science; n: Business, Finance; o:Engineering, Multidisciplinary; p: Health Policy & Services; q: Environmental Studies; r: Computer Science, Information Systems; s:Pharmacology & Pharmacy; t: Public, Environmental & Occupational Health

4 Structure of co-citation network

Small(Small 1973) produce the conception of co-citation, then, develop into the co-citation analysis. When two papers are cited together by the third paper, the relationship between these two paper is co-citation. The strength of co-citation can be used as the similarity of the two papers. Co-citation analysis is a effective measure to explore the structure of disciplines and analysis the link and exchange among the disciplines dynamically.

Present paper visualize the co-citation network with the Netdraw(Borgatti 2002) which use the spring embedding algorism to decide the location of each nodes. The more strength the link between two nodes, the short distance between them in the network. The width of the link is in direct proportion with the strength of the link.

The most distinguished characteristic of China co-citation network is its dispersion. Fig 3 shows the co-citation network of China patent analysis papers which are cited more than 3 times, the lines strength in the figure are also more than 3. There are many parts in the China co-citation network. The biggest sub-network belongs to the patent law study(the right part in Fig 3). It contains many patent law textbook, review of classical cases, and some studies related to the biotechnology. Another important sub-network is related to the "management" and "library,information and bibliometrics"(the left part), but the connection in this network is rather weak. It is clearly, China lack champion in patent analysis, more research papers are needed urgently. Especially in patent application fields, most papers just discuss the application of patent analysis, but without practical study. It is a big challenge for China scholars.
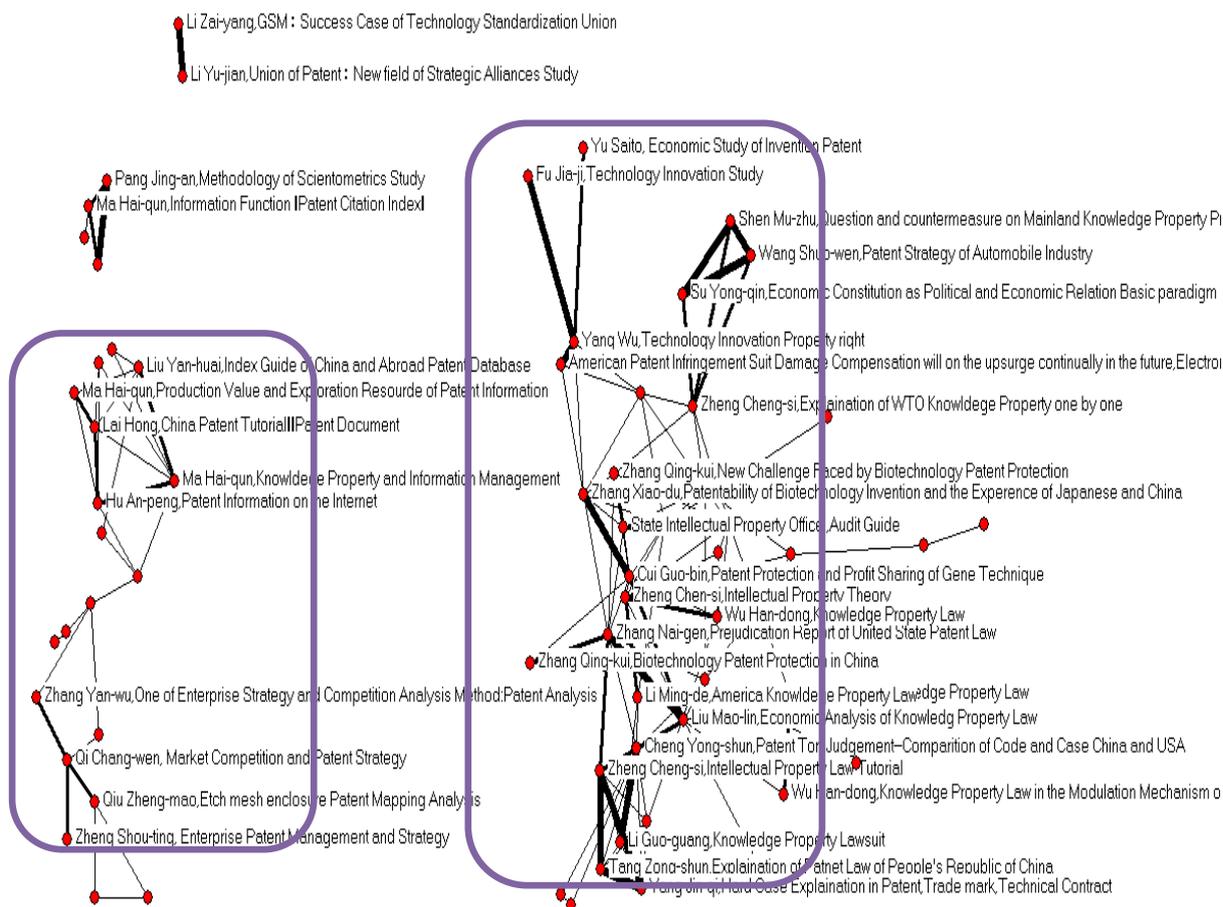
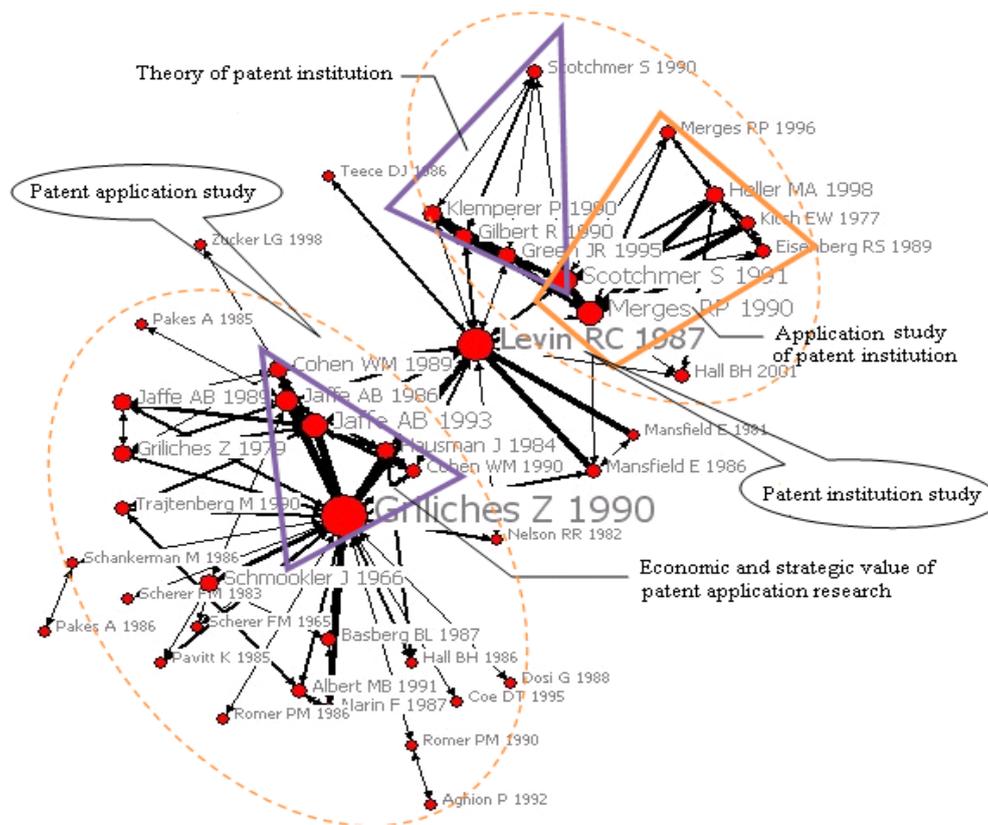Fig. 3 Co-citation network of high cited papers in China

Fig. 4 Co-citation network of international high cited papers

5 Patent research front

Research front is a set of papers which are the most active papers in an academic field(Price 1965).Many scientists applied quantified methods to study the front research(White and McCain 1998; Arunachalam and Doss 2000; Chen, McCain et al. 2002; Boyack 2004). However, dynamic and ephemeral essence of research front make it difficult to be grasped.

Based on the co-citation method, combine with academic front and the intellectual base conception, Chen(Chen 2006) developed a distinctive visualization tools(Citespace) to explore the research front. Now we employ Citespace software to make some analysis on the research front of patent analysis.

In the Fig 5, the ribbon from cold to warm colours represents the each two-years interval from 1990-2007 respectively. The words in the map are the burst words in the data. According to map,

again, we find exploring its economic and strategic value of patent application research is the biggest hot point in recent years which is in line with the statistical analysis in the first part of the present paper.

6 Discussion

Patent study is a rather new field to the China scholars. The scope of subject which concerned with patent is very centralized. There should have more scholars from different views to study patent and get more meaningful results.

There are more and more studies focus on the application of patent research in the high level academic group. However, in China, there are only very few scholars pay their attention to the application of patent research. In worse, the influential application of patent research in the economic and strategic is more exiguous. Patent researches can provide a lot of important information to the strategic making for corporation

and nations. So in order to accelerate the economic development of our nation, we need to do

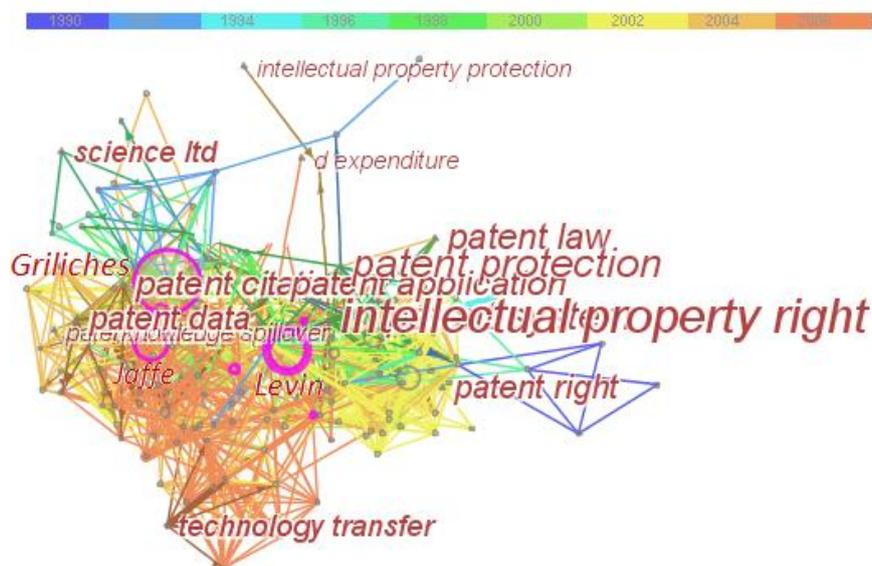some hard work on the digging of patent information and application of them.

Fig. 5 Research front of international patent analysis

Acknowledgement

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