Patent quality and the measuring indicator system: Comparison among China provinces and key countries

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Abstract:

This paper develops an indicator system to measure patent quality, which is defined as the degree of the patent application or patent granted meeting the statutory requirements of patentability and sufficient disclosure. The patent quality can be measured from four aspects: quality for invention, quality for application document, quality under examination, and quality for commercialization. To express each aspect, several secondary indicators and third-level indicators are developed. The indicators selected were considered from both theoretical integrity and data availability. This paper compares the four aspects of patent quality among eight countries, and discovered that many criticism towards China's patent quality based on surveys is not reliable, quality under examination is actually the best performed aspect of China's patent quality, while China lags far behind those developed countries in quality for invention, application document and commercialization.

Key Words: patent quality; indicator system; China

1. Introduction

Since joining WTO, China has achieved significant progress in economic growth. the foreign economic situation became more and more better than ever. In 2010, China became the second largest economy in the world. In 2008, Chinese government promulgated the "National Intellectual Property Strategy (2008-2020)" aiming at building up a high level nation of intellectual property creation, utilization, protection and administration. Since then, there has been an upsurge for patent application in the country. In 2011, China's domestic invention patent application number ranked the first in the world, and PCT patent application number ranked the fourth. But in fact,

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China isn’t a strong nation of intellectual property, the overall patent quality is still very low. The average effective life span of invention patent is only slightly over 5 years. The implementing rate of patents in universities and research institutes is less than 10%. The contribution of intellectual property to social-economic development is very deficient.

In recent years, debates around China’s patent quality from abroad have never vanished. The public seems to believe that China’s patent quality is lower than that of developed countries. Giacopello (2012) comments that Chinese government policies are more concerned about promoting patent quantity while seem to have ignored quality, and technological development of the country was asymmetrical to patent numbers. Thoma (2013) assesses the quality of Chinese patent applications at EPO, and finds that Chinese applications have shorter renewal life cycles, which indicates a lower quality. In a survey of IP professionals by Thomson Reuters and Intellectual Asset Management (IAM) magazine, patent quality of China’s State Intellectual Property office (SIPO) ranked the last among the world's five largest patent offices. Only 23% and 13% of the surveyed perceive SIPO’s examination quality to be good. A study by OECD, which uses a set of patent indicators as the measurement, shows that China’s patent quality is under the world average level (Squicciarini and Criscuolo, 2013). What is particularly deserved paying attention to is the report by Dan(2012). He points out that China’s IP policies will hamper the nation’s innovation. The goals set by the government tend to focus on number of patent applications instead of on patent quality. The patent subsidy programs only support patent applications, rather than granted patent and commercialized patents, and thus leading to a decrease of patent quality. On the other hand, the high cost of rules and procedures for patent application examination and enforcement of patent right may also undermine patent quality.

Now, there are twelve patent offices joined the Patent Prosecution Highway Pilot Program including SIPO and the patent examination results can be acknowledged by each other. It shows that China’s patent system is trusted upon by others (Zhu, 2013).

An empirical study on the grant ratio of applications shows that patent application quality didn't seem to be jeopardized for the enact of those government subsidy programs, unless the standards for granting a patent were significantly lowered (Li, 2012). Facing such many criticism and questions, what is the current status of China's patent quality? Are Chinese patent applications lagging behind in technology, in document drafting, or in examination? It is evident that a systematic study is needed to fully answer these questions. However, as argued by Hargreaves (2011), policy on IP issues should be built on the basis of evidence, the situation of China's patent quality in both domestic and abroad is also needed an investigation based on evidence, instead of feelings or intuitive.

This research is attempting to present an evidence-based assessment of China's patent quality by collecting the interior data from SIPO. The objective of this paper is to establish a measuring indicator system of patent quality and find out the relative position of each Chinese province and developed countries that have patents granted in SIPO. To fulfill this objective, a definition of patent quality is developed firstly. Following that, a quantitative model to measure patent quality is designed based on the available data. Lastly, the established indicator system and model is applied to both national and international level comparison.

2. The concept of patent quality

There are three kinds of patent in China which is invention patent, utility model patent or industrial design patent. Because the latter two kinds of patent are excluded from the scope of "patent" in most countries while invention patent can be generally defined identically and compared across countries, we choose invention patent as the main subject. In this paper, "patent" refers only to the invention patent, also defined as utility patent in U.S. According to the patent law in most countries, patent refers to the new product or method which has significant technological progress and outstanding virtue comparing with the prior art before the application date and shall have novelty, inventiveness or nonobviousness and utility.

Patent quality is defined in various ways. It's often defined as whether the legal requirements are properly met, in particular the appropriate subject matter, utility, disclosure, enablement, novelty and nonobviousness (Scotchmer, 2004), or the extent to which a granted patent meets or exceed the statutory standards of patentability, which is novelty, nonobviousness, and the document written clearly and sufficiently disclosed (Wagner, 2009, Graf, 2007). Furthermore, a high quality patent shall go through the Court test without being invalidated (Merges, 1988), and is prosperous to ultimately be commercialized and brings social, economic and/or environmental welfare (Dan, 2012). Different actors of patent activities may hold different opinions towards the contents of patent quality. From the perspective of patent users, patent quality is related to factors such as reasonable cost, and manageable patent claims. For patent offices, it is the optimal balance of various dimensions including performance, cost, and the service time (Scellato et al., 2011). Patents of high quality are not inventions that have been widely used but not yet patented; rather, it is truly new and is implementable by those "skilled in the art". The validity and breadth of claims should be clearly stated with the least uncertainty (Hall and Harhoff, 2004).

According to above research, this paper defined the patent quality as the degree of a patent application or patent granted meeting the statutory requirements of patentability, and the degree of its specification meeting requirements of sufficient disclosure (SONG Hefa, 2010). The definition can be understood in two related aspects: One is from patentability. It refers to novelty, inventiveness, and practical applicability, which are the universal standards for a patent. The degree of meeting these standards reflects whether the patent quality is high or low. The other is from legal stability and the purpose of patent system, which is a temporary monopoly in sacrificing disclosure of technological information to promote further innovation. It is usually the case that sufficiently disclosed patents face less judicial challenges and is less prone to be invalidated. Therefore, sufficient disclosure is a crucial factor in the defining of patent quality.

Based on the definition above, the content of patent quality is divided into three

different but related aspects: technological quality, legal quality and commercial quality. Technological quality is determined by the technical inventiveness of the invention or the degree of nonobviousness, the technical solution may either solve a difficult problem or generate unexpected technical effect. Technological quality is fundamental to patent quality, which lays the foundation of other aspects of patent quality and mainly decides the market value of the patent. Secondly, legal quality contains both how well the application document is written and the quality revealed under the examination process. It is usually an outcome of interaction between patent attorney and examiners, which reflects whether technical information has been sufficiently disclosed and the claims properly demanded, as well as being supported by the specification. Patents with higher legal quality are usually more difficult to be challenged in examination or invalidation procedures. Thirdly, commercial quality refers to the commercial value of patents. Though not always, commercial quality is usually proportionate to the overall quality of patents, which is the comprehensive embodiment of patent quality, even defensive patents are still economically valuable. Therefore, commercial quality is partly dependent on technological and legal quality, and it reflects the other two but relates more with market value.

3. Patent quality indicator system

In order to measure the patent quality, many measuring indicators system have been developed. Some scholars use simple indicators to measure the patent quality, such as maintenance rate (Schankerman and Pakes, 1987), number of citations (Henderson et al., 1998), grant ratio, citation to science articles, etc. Other scholars use multiple indicators such as an indicator system to measure patent quality. Ernst (2003) proposes the grant rate, citation frequency, size of patent family, technological and international scope of patent applications as patent quality indicators. Squicciarini and Criscuolo (2013) suggests that patent scope, family size, backward and forward citations, citations to non-patent literature, and claims to be the measurement indicators. Other indicators system include indicators like relative patent position, revealed technology advantage, Herfindahl–Hirschman Index of patents, and patent

citations (Chen and Chang, 2010), forward citations, technological scope, and family size (Hall et al., 2007), number of patents, citation from patents to scientific papers, technology cycle times, etc. (Hicks et al., 2001). Another stream of research also focuses on prosecution quality, where legal security, cost effectiveness, and timeliness are all selected as measuring indicators.

The existing research has provided us with many measuring indicator systems and methods. However, they have three aspects of problems. Firstly, theoretical studies are usually good at theoretical integrity, but some of the data is inaccessible and it is difficult to be put into practical measurement. Secondly, though practical studies can take data availability into account, they're often theoretically deficient and many of them are measuring examination quality based on prosecution data, which fail in including all aspects of patent quality. Thirdly, the studies based on survey are hardly comparable across countries and over time.

4. The measurement indicator system of patent quality

To build up a patent quality indicator system, three principles should be adhered to: (1) A proper patent quality indicator system demands rationality in theory and the feasibility in practice. The most relevant indicators concerning patentability, sufficient disclosure, and proper patent claims cannot be neglected, and the data for those selected indicators should be easily collected. (2) An indicator may bear different meanings from different perspectives and should therefore be used carefully. For example, a lower rejection rate of applications indicates higher quality of technology at the macro level, while possibly means a careless examination and hence bad examination quality. However, based on the current study, where all the examination data is from Chinese patent office, it is deemed that a lower rejection rate in the examination stage indicates higher quality of applications. (3) There is no unified measurement indicator system of patent quality. For enterprises and universities, the focus is mainly on technological quality, while patent office concentrates more on the quality under examination. For government, commercial quality may be more

important. Therefore, there is hardly an optimal indicator system and it varies by the measurement purposes and the kind of entities. This paper is intended to evaluate the patent quality of each Chinese province and make comparison among Chinese provinces and that of some key developed countries.

This paper divides indicator of patent quality into four dimensions for measurement, including quality of invention, quality of application document, quality of examination and quality of commercialization, which covers the technological, legal and commercial aspects.

4.1 Quality for invention

The quality of invention is the “objective” quality of a patent. It is primarily concerned with patentability, i.e. novelty, inventiveness, and practical utility for a technology or an invention. Novelty means the invention is not prior art. The degree of inventiveness or non-obviousness is the core of the patent quality, without which all other aspects of patent quality shall become ungrounded. An invention patent with high quality should solve a desired technical problem, overcome technical bias, achieve unexpected technical performance, or market success.

Quality for invention is divided into three secondary indicators: inventive base, extent of meeting statutory requirement, and the technical height of the invention. To express these concepts’ meaning, the paper proposes several third-level indicators as follows.

(1) R&D input per patent application, which stands for inventive base. R&D is always essential for the creation of a patent. For technologies of higher complexity, adequate financial support is a most basic foundation for creating a better invention. On the macro level, the more input per patent application, the larger potential for creating better inventions, the better the invention quality tends to be.

(2) Grant ratio, which stands for the extent to which statutory requirements are met. Grant ratio is probably the most commonly used indicator for patent quality. It is

based on the examination procedure, which judges comprehensively on the patentability of an invention. The higher the grant ratio is, the better the statutory requirements are met, and the better invention quality of a region or country is indicated. It is calculated by the proportion of number of the granted patent to the total number of granted patent, rejected application and withdrawal application.

(3) Ratio of the proportion of citation times for a region or country in all citation times to the proportion of the patent grant number for the region or country in whole patent granted number. Take a region or country R for example, the indicator for R is calculated as:

$$\frac{\text{cited number of R}/\sum\text{cited number of R}_i}{\text{grant number of R}/\sum\text{grant number of R}_i}$$

The indicator reflects the invention height. For patent with higher forward citations, they are usually critical for technology development or are the basic patent for industry development. However, the number of citations for a region or country is positively correlated with the time duration and the number of granted patents. The forward citation frequency always increases with time but was near zero in recent year. The above indicator can eliminate the influence of number and time. The higher the value for this indicator, the better the invention quality tends to be.

4.2 Quality for application document

Writing high quality application documents is the second important demand after an invention is created. Quality for application document is determined by two aspects: the quality of specification, and the quality of patent claims. To measure the quality for document, this research puts forward following two sub indicators.

(1) The average page number of granted patents of specification and attached drawing. To disclose technical information sufficiently, so that those ordinarily skilled can implement the patent without additional creative labor, patents with more number of pages are prone to be more sufficiently disclosed and more detailed in

implementing cases. According to the data from SIPO, the average page number of granted patents for specification and attached drawing of China domestic patent is only 7, and that of abroad patent is 22.

(2) The average number of claims for the granted patent. The essential purpose for filing patent application is to gain monopoly over some technical fields. Therefore, more claim number means more technology solutions are monopolized and more difficult for others to get re-invented and get patent right around the granted patent. According to the data from SIPO, the average claim number of China domestic patent is 6 and that of the abroad patent is 22.What is needed to be pointed out is that excessive claim number will exhaust much more time for the examiner and will lead to a decrease of patent examination quality.

4.3 Quality for examination

The patent examination is a crucial procedure for obtaining patent right, which comprehensively appraises whether a patent is patentable or not. In the current study, the quality for examination is to assess the patent quality of each province or country that has filed an application in SIPO. The quality for examination is the quality of a drafted application revealed under the examination procedure. It constitutes of two aspects of indicators: the quality of retrieval and the quality of substantive examination. The latter also includes three indicators. One refers to the substantive examination itself, and the other two reflects to the examination result in the following procedure of reexamination and invalidation.

(1) Average number of referenced X and Y literature per examined patent. Quality of the search report will influence the quality of the examination (de la Potterie, 2011). Since it is required that a granted patent fall out of prior art, the number of referenced literature will have a profound effect on patent quality. Because X and Y literature are used to appraise the creativity or nonobviousness with one or two most related prior arts for an application, if there are more literatures being referenced in the examination procedure. Although the quality under examination is

high, the quality of the patent application will be low.

(2) Ratio of number of first actions to the total number of patents settled in the substantive examination. First actions are the first substantive response from the patent office telling that the specification or claims have substantive deficiency. The more first actions issued from the patent office, the less direct granting of patents in the substantive examination and therefore the lower patent quality is reflected in the examination stage.

(3) Ratio of number of cases in the reexamination stage to cancel original rejection decisions to the total number of reexamination case settled. After the rejection of application in the examination procedure, the applicant is allowed to appeal to the Patent Reexamination Board. If there are more reexamination requests that are judged to be reasonable, and hence canceled the original decision to reject granting, a better patent quality is revealed under examination stage.

(4) Ratio of number of patent whose all or part claims are maintained valid to total number of invalidation requests of patent. If there are more invalidation requests that fail to invalidate the target patents, the patents are hence revealed to be more legally stable, which indicates that statutory requirements are better met. This is also a positive indicator to patent quality.

4.4 Quality of commercialization

The basic assumption of creating patent system is to promote innovation, which have two aspects of meanings. One is to get a monopoly of the advanced technology by disclosing the technical information and then promote innovation. The other is to get economic value which is the core of innovation and finally increase the social welfare from implementing the patent technology. Consequently, the commercialization shall not be neglected in the measurement of patent quality. The quality of commercialization is a comprehensive reflection of the above three dimensions of patent quality. The high quality in invention, document and examination doesn’t necessarily mean a high performance in commercialization. On

the macro level of regions or countries, the patent quality of commercialization is more important. People often pay attention to the practical outcome of patent quality rather than the quality itself. The quality of commercialization has the following three indicators.

(1) Ratio of the number of patent in force to the total number of granted patents in the past five years. The patent in force is the base for the quality of commercialization. To maintain a patent right, companies or other entities need to pay for the annual renewal fee, which is usually increasing according to the "living" length of time. Therefore, with more number of patents in force for a region or country, it shows that those patents are still contributing to the economic activities.

(2) Ratio of patents that lasts for more than 5 years to all patents in force. This is calculated by dividing number of patents that lasts for over 5 years by the total number of patents in force. If there are more patents that are maintained for over 5 years in a region or a country, it means that among all the living patents, long-life patents from this region or country occupy a higher percentage, and hence the patent quality for commercialization is higher.

(3) Ratio of royalty and license fee to the number of patents in force for a region or country. The indicator calculates by the average royalties and license fee per patent in force, which measures the overall quality for commercialization in practical revenue. If the average royalty and license fee is higher, the patent quality of the region or country is also considered to be better. The data can be obtained from the World Bank database.

4.5 Patent quality index method

According the above analysis, the patent quality indicator system the paper proposed is shown in table 1. To get a comprehensive patent quality index, this paper also puts forward the following calculating equation:

$$F=(\alpha X_1+\beta X_2+\gamma X_3)^m X_4^n \qquad \text{(Equation 1)}$$

Table 1

Indicator	Secondary indicator	Third-level indicator	Weight
Quality for invention	1. Inventive base	1. R&D input per patent application	0.3
	2. Extent of meeting statutory requirement	2. Grant ratio	0.4
	3. Invention height	3. Ratio of the proportion of citation times for a region in all citation times to the proportion of the patent grant number for the region in whole grant number	0.3
Quality for application document	4. Quality of specification	4. The average page number of granted patents for specification and attached drawing	0.5
	5. Quality of patent claims	5. The average number of claims for granted patent	0.5
Quality under examination	6. Retrieval quality	6. Average number of referenced X and Y literature per examined patent	0.3
	7. Quality of substantive examination	7. Ratio of number of first actions to total number of patents settled in the substantive examination	0.3
		8. Ratio of number of cases in the reexamination stage to cancel original rejection decisions to the total number of reexamination case settled	0.2
		9. Ratio of number of invalidation requests whose whole or part claims are maintained valid to total number of invalidation applications	0.2
Quality for commercialization	8. Economic base	10. Ratio of the number of patent in force to the total number of granted patents in the past five years	0.25
		11. The ratio of patents that lasts for more than 5 years to all the patents in force	0.25
	9. Economic value	12. Ratio of royalty and license fee to the number of patents in force for a region	0.5

F stands for the patent quality, X_1 stands for the quality for invention, and X_2 represents the quality for application document, X_3 for the quality for examination, X_4 for quality of commercialization. The underlying rationale for adding up X_1, X_2, and X_3, but multiplied by X_4 is based on the relationship between different dimensions of

patent quality. In Equation 1, indicator of X_1, X_2, and X_3 are parallel, but if X_4 is lower, the quality will be severely affected. Index of *m* and *n* is valued with 0.6 and 0.4 according to their elastic coefficient. Coefficients of α、β、γ are contribution rate which adds up to one ($\alpha+\beta+\gamma=1$). However, in terms of the value, this paper adopted unequal value for each impact factor. The rationale is that different aspects of quality are not equally important. According to the evaluation by experts, quality for invention is fundamental for better quality patent, and therefore α is assigned 0.35; considering that patent examination is the last stage for issuing a patent, quality under examination is also valued as 0.35, while the impact factor for document quality is 0.3. Therefore, patent quality is calculated as:

$$F= (0.35X_1+0.3X_2+0.35X_3)^{0.6}X_4^{0.4}$$

To calculate each X_i , several steps are taken: Firstly, for indicators that may have reverse impact on patent quality if exceeding a reasonable limit, for example, page number for specification and the number of claims, the paper sets a maximum benchmark value. This benchmark value is based on average growth speed of past three to five years. Then, each third-level indicator is standardized as:

$$x_i^* = \frac{x_{ij}}{B_{i\max}}\text{，（i=2011, 2012; j=1 ,…, 12）}$$

Each X_i is calculated based on these standardized third level indicators x_i^*, using $X_i =\sum x_i^*$. Different weights are assigned to third-level indicators based on its impacts (See table 1), which is averaged from surveys of several experts. For example, the quality of invention is calculated as:

$$X_1=0.3x_1^*+0.4x_2^*+0.3x_3^*$$

5. Results and comparison

Since the study is to assess patent quality among provinces of China and that among China and some key countries, most of the data is obtained from SIPO, especially the examination data. The paper also collects data of R&D, royalty and

license fee from the World Bank, and the OECD databases.

5.1 China's patent quality

The average patent quality score of China in 2011 is 0.257, and 0.254 in 2012, showing a slight decrease. Further investigation reveals that the increase is attributed to the decrease in quality for invention, quality under examination and quality for commercialization. Only the quality for application document shows a little increase, owing to the rise of document length and number of patent claims. It is shown in Figure 1.

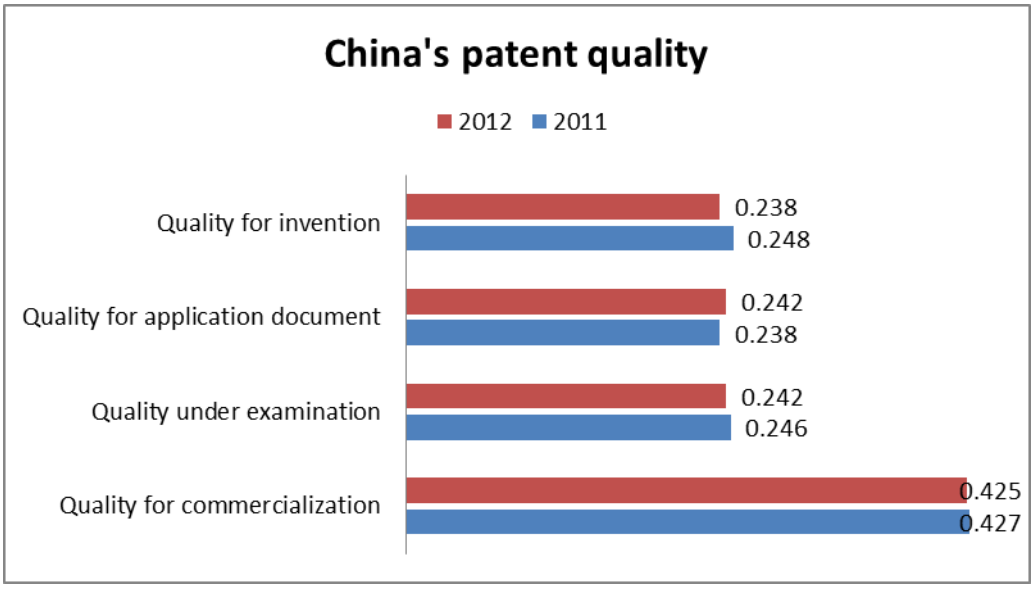

Figure 1 China's patent quality

A comparison of patent quality on the Chinese provincial level is listed as Figure 2. It could be seen that in 2012, Shanghai, Hebei, Beijing, Sichuan, and Shanxi are the top 5 in patent quality. Provinces with huge patent applications such as Jiangsu is not highly ranked from the perspective of patent quality, which is out of the conventional knowledge upon Chinese national conditions. Inner Mongolia ranks to be the ninth, which shows that patent quality from provinces with relatively smaller number of applications may be very high. The main reason is that those provinces are usually underdeveloped and with fewer reexamination appeals and fewer invalidation cases.

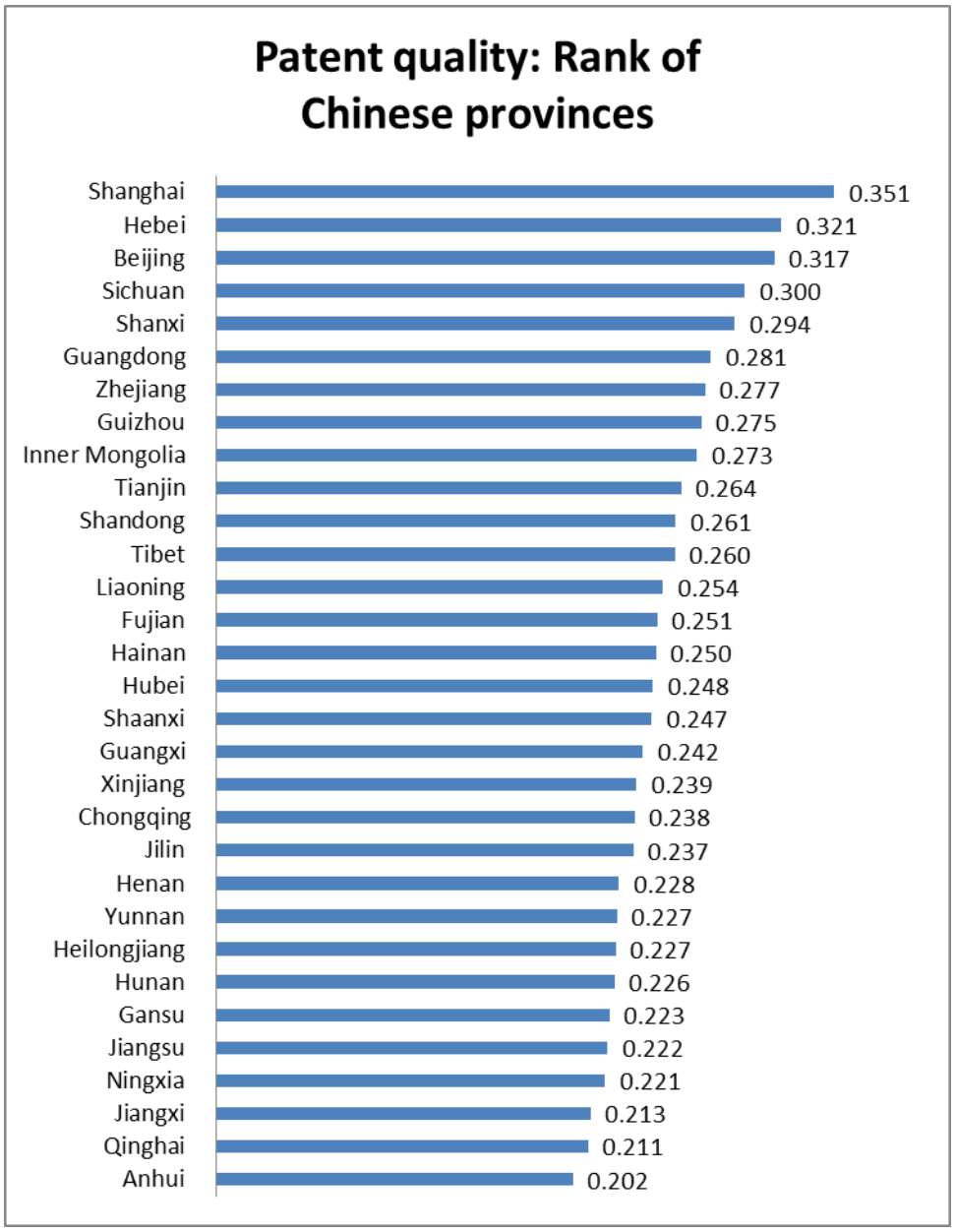

Figure 2 A rank of patent quality on Chinese provincial level(2012)

5.2 International comparison

It is one of the main focuses of this study to clarify on the relative position of China's patent quality. We selected Germany, France, South Korea USA, Japan and Italy, UK as the research countries, and most of them are developed countries which locate either in North America, Europe, or Asia.

(1) The measurement result shows that for overall patent quality, China ranks the last. UK has the best performance in patent quality, and is much higher than that of

United States. The reason is probably that UK is significantly better in quality for commercialization, which helps notably to improve the overall value for patent quality based on our way of calculation. It is shown in Figure 3.

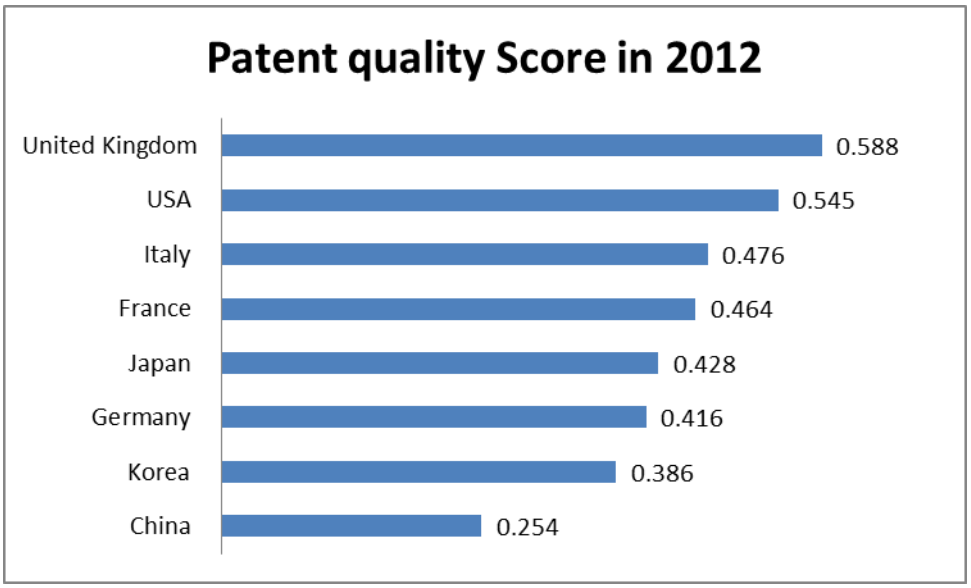

Figure 3 Patent Index in 2012

(2) A time series comparison shows that patent quality of most of the researched countries improved from 2011 to 2012. France is the fastest growing country, while UK is dropping very fast due to the decrease in quality for commercialization. China has a slight decrease. USA is at the bottom of all the countries with a positive growth rate. The improvement of US patent quality mainly comes from the quality for invention, quality for document, and a slight increase of quality for commercialization. However, the quality shown in the examination process decreased from 2011 to 2012.

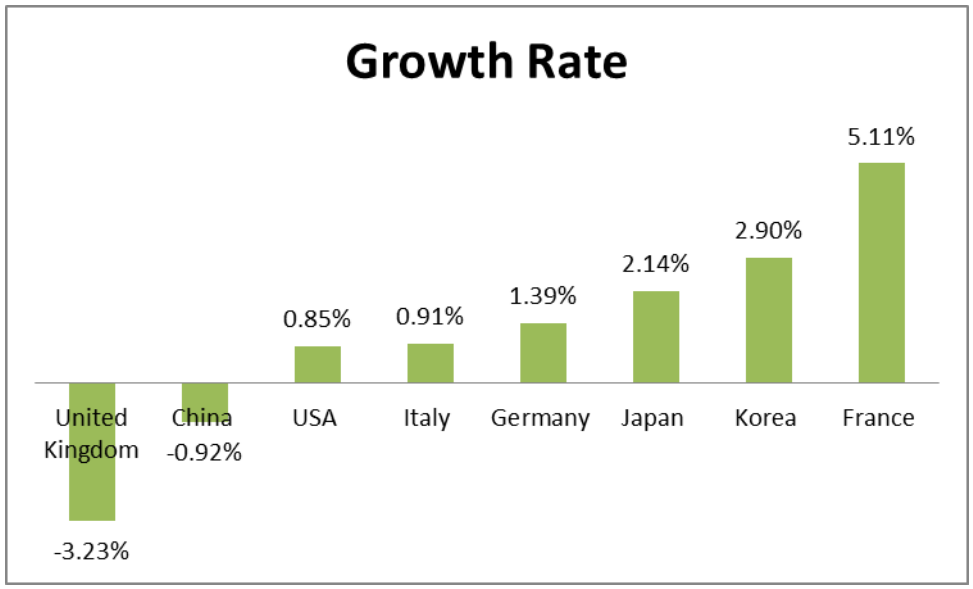

Figure 4 Growth rate of patent quality from 2011 to 2012

(3) The quality of examination of China is a little bit better. Based on the data for 2012, the current study shows that China's quality for invention is the worst of all the eight countries selected. UK and USA is most advanced in the technical quality of patents. All the Asian countries lag behind in this dimension.

For the document quality, China still lags behind. USA and UK occupies the top two positions. USA shows a significantly high performance in document quality, which indicates that application document is usually well written, while the reason is that patent application documents from USA tend to be longer and with more number of claims, and are thought to be more sufficiently disclosed. With less than 1/3 of the length of USA application document, China is the shortest one in terms of the page number. The average number of patent claims from Chinese patents is only 1/5 of that of USA.

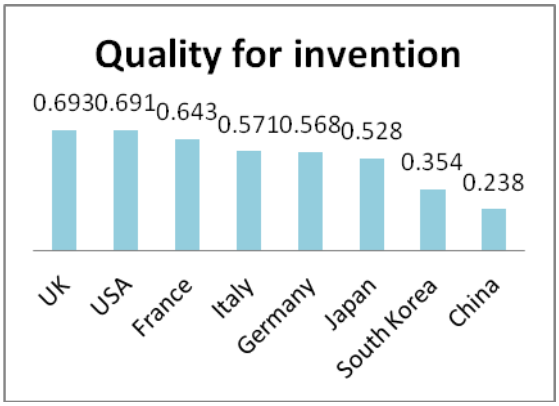

Figure 5 Quality for invention

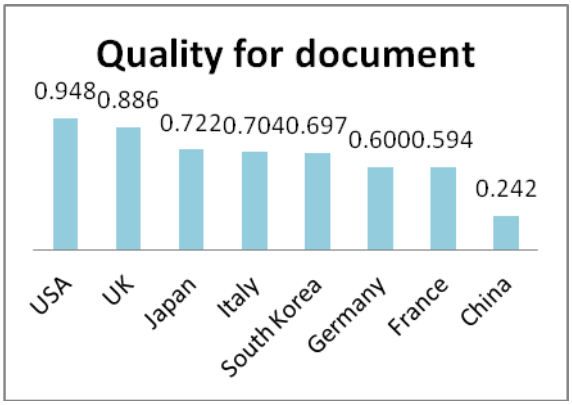

Figure 6 Document quality

For quality of examination, China ranked sixth of all the sampled countries, which is surprisingly slightly higher than Italy and Germany. France shows the best quality under examination, which is also mainly attributed to Indicator 9 (the value is 100% percent in 2012). Japan ranks the fourth which is the best in four aspects of patent quality. The primary reason for Japan surpassing USA in quality under examination is that less Japanese patents are invalidated compared with US patents.

Some scholars argue that there exists differential treatment of Chinese applicants by SIPO (Liegsalz and Wagner, 2013). But the result shows that the argument may be inaccurate. The main reasons for faster examination and grant of Chinese domestic patents are that they have shorter pages of specifications and less number of claims.

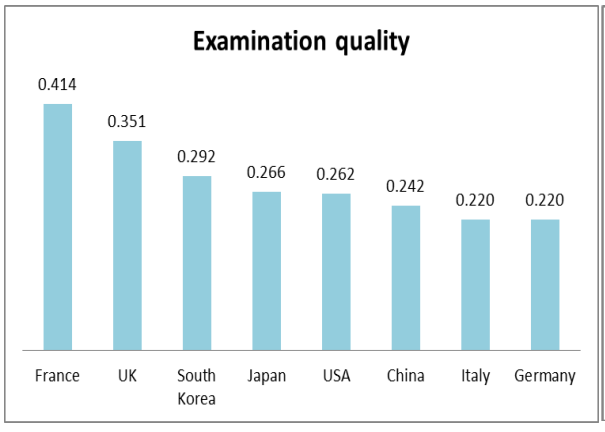

Figure 7 Quality under examination

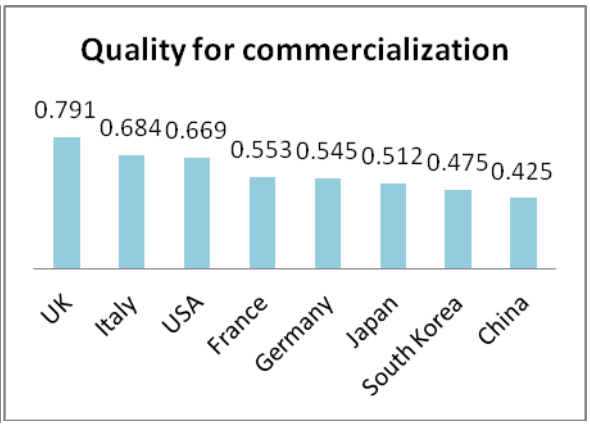

Figure 8 Quality for commercialization

For the average quality for commercialization, China once again ranks the last one. UK shows the best performance in Quality for commercialization, which is

mainly attributed to a significantly higher average royalty and license fee than other countries (Indicator 12). Asian countries are all not very well performed in this dimension.

6. Conclusion and Implications

Based on the analysis above, it is discovered that of all the four aspects of patent quality, China falls behind in quality for invention, document quality, and quality for commercialization, except for the quality under examination, which is out of the conventional understanding. The reason is closely connected with the perspective adopted in the current study, in which all the data for quality under examination comes from SIPO. Based on the statistical data within SIPO, it is discovered that the average number of claims for Chinese patents is less than six, while the average number of those developed countries is twenty-two. Therefore, there tends to be larger number of rejections of applications from other countries in both examination and reexamination stages compared with Chinese domestic applications. Consequently, it is revealed that China's high quality under the examination procedure shows a relatively higher performance.

The research has also generated many implications on improving China's patent quality. The quality for invention falls within common expectation to be lower, which implies the up-surge of domestic applications hasn't been creative and inventive enough. Therefore, the statutory requirements for patentability may need to be improved. Additionally, it also implies that government subsidy programs are needed to be adjusted.

The lower document quality also complies with professionals' qualitative analysis that the market for patent attorneys is under vicious competition, which severely imparts the patent document quality. Due to the pressure for applying for more patents, the patentee tends to lower their standard for document drafting and hence pay less to the attorney, which has created an adverse selection problem. Consequently, those skilled in writing application documents but with higher charges

could be eliminated out of the market, while those less skillful attorneys occupy a larger share of the market. It is necessary to play the role of market to create a healthy environment for patent service industry.

The lagging behind quality for commercialization shows the reality that Chinese patents are less commercially valuable. The average royalty and license fee is significantly lower compared with developed countries. Chinese patents are also abandoned more quickly after the grant. The reason is primarily concerned with lower quality for invention. Another reason is partly related with bundles of government subsidy programs for patent application, which distorts the market mechanism. A third reason is that current level of intellectual property protection weakened the value of patenting, where temporary monopoly is not very well guaranteed. Therefore, the value for patents becomes under estimated.

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