

# Analysis of Patent Information Needs of Small and Medium Sized Enterprises in China

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**Abstract**—This paper introduces the current situation and problems of small and medium-sized enterprises in the development, and then get the relevant data of patent information demand of small and medium-sized enterprises of our country through the investigation of literature and websites, collecting relevant statistics about patent information personnel information demand of enterprises. Secondly showing the demand of enterprises on patent application, patent type, patent management system, the implementation of the patent, patent information training in a pie chart and the proportion of the bar graph and form and analyzing it combined with the specific cases. Finally, according to the above contents, the paper analyzes the patent information requirements and the problems of SMEs in great detail.

**Index Terms**—Patent information, needs, enterprises, small and medium sized.

## I. GENERAL SITUATION OF SMALL AND MEDIUM SIZED ENTERPRISES IN CHINA

Small and medium-sized enterprises is the largest enterprise group in China, accounting for 99.7% of the total number of enterprises, and it is an important part of China's economy. However, the current capital and land costs continue to remain high price, the tight constraints of resources and these problems are deteriorating about inadequate staffing, rising wages, financing difficulties and expensive financing, so the small and medium-sized enterprises are still facing with high production and management pressure. Coupled with the long-term accumulation of more prominent structural contradictions, innovation ability is not strong, most of small and medium-sized enterprises are still in the low-end of the value chain, so the situation of low prices, poor efficiency, high production capacity and high stock is difficult to reverse in the short term.

## II. PROBLEMS IN THE DEVELOPMENT OF SMALL AND MEDIUM SIZED ENTERPRISES' PATENTS

(1) The lack of understanding of the patent applications. Many researchers who have inventions would rather publish articles, appraise achievement, apply for awards, resulting in a large loss of patent technology.

(2) Weak patent consciousness. leaders' consciousness of

patent of some small and medium-sized enterprises is seriously insufficient and do not know how to use patent laws to safeguard their own interests, leading to enterprises has less patents, and even some enterprises are unwilling to apply for patents for their inventions and technological innovations.

(3) The technical content of the patents is low, and the amount of the patent applications and authorizations of the small and medium-sized enterprises is short, which also reflects the small and medium-sized enterprises' technological innovation ability is not strong, the enterprises' product technology content is low and the market competitiveness is weak.

(4) Poor utilization of patent information. Most of the small and medium-sized enterprises, in the early development, as well as the maintenance of the latter do not collect and analyze the relevant patent information. Patent information is not fully utilized.

(5) The level of patent development of SMEs is not balanced. Mainly divided into three levels, firstly, the development of enterprises is extremely uneven: some large enterprises would rather to apply for many patents, and have more own patents, but there are a considerable number of small and medium enterprises' patent number is zero. Secondly, the patent applications of the different states are not balanced that the number of foreign patent applications is low. Finally, in the different regions which the level of patents development and the economy is low, the intellectual property management of enterprises is relatively weak.

(6) It is difficult to safeguard patent rights. When their patents infringed, the enterprises cannot get timely protection. Some enterprises' patent litigation cases often should continue for several years, so the costs of patent litigation become higher, which results in the phenomenon that the enterprises win the lawsuits but lost money. Therefore, some small and medium enterprises give up the requirements of safeguarding legal rights.

(7) The lack of specialized personnel. Most enterprises lack of the compound talents who understand professional knowledge and patent related laws and regulations. Some enterprises' workers responsible for patent affairs are technical personnel.

(8) Lack of patent management systems. Most small and medium-sized enterprises do not have their own patent management departments and systems, and the incentive mechanism for personnel engaged in R & D is not in place, which is easy to dampen the enthusiasm of scientific and technological personnel, and even cause the lack of the talents [1], [2].

Manuscript received February 13, 2017; revised April 24, 2017.

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### III. INVESTIGATION AND ANALYSIS OF PATENT INFORMATION NEEDS OF SMALL AND MEDIUM SIZED ENTERPRISES

#### A. Data Sources and Methods

This section obtains the relevant data of the patent development of small and medium-sized enterprises in China through literature survey, displaying the present situation of the patent development of small and medium-sized enterprises in China in the pie chart and the bar graph, from which to explore the potential patent information service demands of enterprise, combined with the specific cases analysis. January 10th, 2017 in the 51job network home page (<http://www.51job.com>) we choose "job" on the "search for jobs", and input keywords to retrieve patent information, the retrieval results show 239 messages. The author selected the first 2 pages of a total of 100 job information, inputting the recruitment information in each request as a parameter to the excel table, and using the Excel's screening function and operation function to analyze data, at last we put forward the related conclusions [3], [4].

#### B. Demand for Patent Applications

Through the investigation, we found that nearly half of the enterprises applied for patents, and of which about only a half of the enterprises applied for a patent. The small and medium-sized enterprises which applied for some patents (more than 5) accounted for about 20% of the total number of enterprises surveyed, and the enterprises applied for foreign patents accounted for about 15% of the total number of enterprises.

In January 14th, 2016, the State Intellectual Property Office announced that in 2015, the annual Chinese invention patent applications for the first time exceeded 1 million, reaching 1 million 102 thousand, and for five consecutive years to become the world's most populous country to apply for a patent. There is a particularly important role for patent application that using patents to attract the attention of capital holders, and enhance investors' confidence. For investors, if a good technology not only has a better market, but also has a better protection of intellectual properties, it will undoubtedly enhance the confidence of them, thereby obtaining better returns.

#### C. Demand for Patent Types

The patent types can explain the technological innovation ability of enterprises, this is because Chinese patent examination system is stricter, and time of the utility model and appearance design patent review is very short. About 30% of the total number of patents is patents of invention in the sample enterprises.

#### D. Demand for Patent Implementation

In different scale enterprises, the implementation rate of micro enterprises to implement efficient patent of invention, utility model and design are lower than the implementation rate of corresponding patent types of enterprises, the implementation rate of three patent types of micro enterprises was 50% in 2% within the range of fluctuation. Relatively speaking, the implementation rate of three kinds of patents of medium sized enterprises is the highest.

#### E. Demand for the Protection of Enterprises' Innovation

In the protection of innovation, "the patent protection scope is too limited, and is easy bypassed" is the mainly risk in the cognition of enterprise patentees, accounting for 58%; they think the latter limitations of enterprise patent protection are "patent application development cycle is too long to catch up with the speed of technology" and "patent protection effect is not good to overt the technical information, so as to be learned by competitors", respectively accounting for 50.1% and 47.5%.

#### F. Demand for Patent Information All around the World

When Chinese enterprises and individual users are using patent information, in addition to the Chinese patent information, they have a considerable number of needs of patent information of the developed countries. According to the results of the literature research, most of the enterprises have a strong voice of needs of patent information of the United States, Europe, Japan and the World Intellectual Property Organization, besides they also concern the patent documents of Germany and South Korea. More than half of the business users need to use the patent information of United States, Japan and Europe. Besides they also have needs of patent documents of the World Intellectual Property Organization, Germany and the United Kingdom. Enterprise users want to acquire foreign patent information mainly through the State Intellectual Property Office website or special databases.

The frequency of patent retrieval platform is not high. In the patent application, technology development, product export, enterprises prefer retrieval and analysis of early warning technology by themselves, when they face the choice that searching by the State Intellectual Property Office, Hunan Provincial Intellectual Property Office, the patent intermediary service institutions, enterprises themselves. One is the description of the improving of patent information utilization ability of enterprises, they have the ability to use the retrieval systems; and one is that on the condition not involving the interests of infringement, enterprises can try to search by themselves, if the result is not ideal, it is not late that employ service organizations, but there are unbalanced and incomplete problems between enterprises.

#### G. Demand for Patent Talents

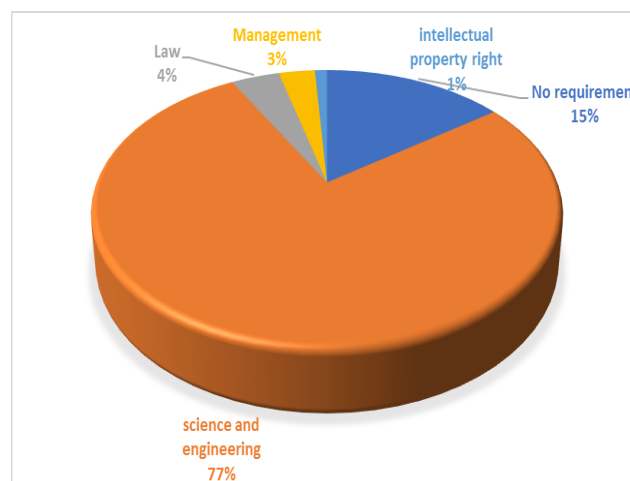


Fig. 1. Professional requirements.

Within the 100 of the information released by the enterprise, there are 85 information have clear professional requirements on the candidates, which require the science and engineering accounting for 77, the legal profession accounting for 4, the intellectual property rights accounting for 1, the management accounting for 3. The recruitment information released by enterprises which have clear professional requirements mainly require science and engineering. Most of the description of requirements of the jobs description of the company include a certain degree of master of the legal knowledge, which mastering such basic skills you need to have a professional law training. It also reflects the complexity of patent information and the diversity of subjects involved. In fact, the enterprises need complex talents.

#### *H. Demand for Patent Information Training*

Owing to the specialty of patent information, the quality of the use of patent information for enterprise users depends on the master degree of patent information related, therefore, enterprise users also need many systematic relevant trainings. For the training content, most users hope organizations provide information technology and knowledge training. Technology and knowledge mainly involve in retrieval and analysis of patent information, in patent information retrieval, users have a greater demand for retrieval time, retrieval application in specific issues; in patent information analysis, users are interested in patent information analysis process to solve specific problems.

In the training of enterprises patent information, it is necessary to highlight the practicality. Needs of training for enterprise staffs are different and there is a big difference, and there is a trend that requires more detailed demand. This is due to the different positions, not only expressing in the urgent needs but also in more specific contents of training needs, for example, for the needs of personnel of science and technology, how to use patent information to innovate is in the first position, they have stronger demands for the training of retrieval skills.

#### **IV. DETAILED ANALYSIS OF PATENT INFORMATION SERVICE NEEDS OF SMALL AND MEDIUM-SIZED ENTERPRISES**

In our country, the small and medium-sized enterprises occupy an absolute majority in number, but most SMEs do not have independent intellectual properties. They can only rely on outsourcing for other enterprises to survive that it is to say they can only do some simple processing and auxiliary works, which lack of competitiveness to develop in the market economy conditions. There are a variety of reasons that small and medium-sized enterprises are in this situation: firstly, the small and medium-sized enterprises' economic strength is weak, they have not enough funds for product development and technological innovation; secondly, enterprises also do not have the necessary technical personnel to engage in product development and technological innovation; the most important reason is that the leaders of small and medium-sized enterprises lack the awareness of intellectual property, especially the patent consciousness. These reasons have caused a lot of small and medium-sized enterprises in our country can only rely on others to survive, which

ultimately weaken the overall technological innovation capability of Chinese enterprises due to the lack of market competitiveness [5].

In terms of the current situation of SMEs in China, they lack enough strength and funds, and the investments of development are too little, which make it difficult to form absolute advantages in technological innovation. For most small and medium-sized enterprises, it is very difficult to develop a new product with strongly competitive power and long-time life. And even if the enterprises develop finally new products, it is nearly impossible to compete with foreign high-end products on the market advantages due to lack of time to take foreign competitors into account.

Domestic enterprises, especially small and medium enterprises, due to the relatively short existence time and very limited accumulation of technology, must learn from others' existing knowledge and experience that patents are one of the very effective experience, when they do not know how to develop new products. However, it is another bottleneck of SMEs, they must pay more expensive royalties or transfer costs if they want to purchase the rights to use the patents or ownerships. Therefore, most small and medium-sized enterprises reduce the costs of development to form their own price advantages in the market by imitating the existing excellent products. But there is also a great risk that if imitation accidentally caused the patent conflicts and litigation, it brings tremendous loss to the reputation, economy and operations of the enterprises. Therefore, it is no doubt the problem that all enterprises eager to solve how to avoid the relevant patents and effective innovation in the independent development of new products.

For large enterprises, as long as they invest enough money and manpower, they can construct patent strategies adapted to themselves, and establish the enterprise patent systems in a series process of using patents, for example, retrieval, analysis, utilization and protection of patents. Not only can they guarantee the enterprises reasonably and lawfully use patents, and protect the patent rights owned by the enterprises, but can also keep track of competitors in the enterprises' technological development and strategical development to take the initiative position in the market competition [6].

But for small and medium-sized enterprises, its characteristic is the flexibility of operation, so the financial and human resources that they can invest is limited. This is the ideal goal to develop effectively new products completely relied on independent innovations. But most of the time, we must rely on imitation or reference to reduce development costs and shorten the development cycle. With the improvement of the patent systems and the expansion of the scope of the legal systems, the space for imitation is getting smaller and smaller. At the same time, it is an urgent problem to solve that how to avoid the patent of the existing products by using the regular methods when enterprises are imitating others' products. In addition, in avoiding patents of the existing excellent product at the same time, if the enterprises can form their own characteristics and innovation of products, they can consider declaring patents of the new products to protect the labors enterprises paid in the development process, which is undoubtedly the result that many small and medium-sized enterprises want to get. But it is tantamount to

Arabian Nights that only relying on their own strength to achieve these goals. Therefore, SMEs need special service agencies to provide professional services, which aims to achieve their goals that cannot be achieved by themselves relying on social forces that maintaining their own business activities and flexibility, at the same time in the fierce market competition making up their own technology and money defects.

A survey on the using situation of patents of SMEs [7] shows that, almost half of the companies do not take advantage of patent information, and 80% of the companies which inquired patents conducted just one or less every year. Its possible obstacles lie in:

- Source barriers, no resources to proceed with the query or patent utilization;
- Barriers caused by costs, language or time, etc.;
- Access obstacles, access to ways, means, methods and technologies due to their own personnel, funds, materials and other restrictions;
- Conscious barriers, some SMEs do not really realize the benefits of patents.

In the society, more than 95% of the enterprises are small and medium-sized enterprises. Only if small and medium-sized enterprises could make use of the patents to improve the ability of independent innovation, can the whole industry advance. In order to solve these obstacles, in addition to improving the small and medium-sized enterprises' patent strategy consciousness and helping them to establish internal patent management mechanism and system, we should also strive to establish and improve the patent knowledge service system of small and medium-sized enterprises, which can solve the source, acquisition, capital, technology and time barriers in the process of using patent knowledge and ultimately form the socialized service system which is conducive to the development of small and medium-sized enterprises.

Patent knowledge services whose research object is small and medium-sized enterprises must study and analyze the characteristics of SMEs. Less capital, poor technical strength and lack of human resources are the main difficulties faced by SMEs. If they can reasonably use patent technological knowledge, they can effectively make up the gap of technology and talents, which can enhance enterprises' survival ability. Of course, technologies and talents gap also determines that the SMEs cannot like large enterprises fully enjoy the benefits of patent resources, which asks agencies as the representatives of the social service system to provide high-quality and fast services for them.

The profound patent services for enterprises in China are still relatively less, and it is precisely the most urgent needs of SMEs. It can provide many information services according to

the needs of SMEs for example: the development trend of patent technologies, technology development roadmap of competitive rivals, related reports of specific technologies (the resolved and unresolved problems, solutions and the technical effects, etc.) and the reports about the feasibility of avoiding patent torts. This kind of services requires service agencies have considerable patent analysis technologies, which analyze overall and individual patents from the macro and micro levels according to the requirements of customers. They provide the data and conclusions of patents analysis rather than patents search and list in order to help SMEs make up the weakness of technologies and talents.

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