Granted patents have the same level of inventive step? A new approach to distinguish patent protection based on the level of inventive step

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Abstract: According to recent surveys, there exist numerous patent applications in countries, such as Japan and the USA. Out of the total granted patents, there are so many patents which are not utilised on the product and its market. In this research, we analysed the different levels of inventive step or non-obviousness especially focusing on the difference of the ratio of office actions made by EPO and JPO between European enterprises and Japanese enterprises whether the office actions include the prior arts related to the said invention filed as a patent application. Under the current patent law, all patents granted have the same level of protection. Considering the basicness or improvementness of patents, it is proposed based on this research to distinguish the level of inventive step or non-obviousness together with the level of protection, which gives big impact on legal structures together with how the patent law should be amended in the future.

Keywords: basic patent; improvement patent; different inventive step; non-obviousness; prior arts; IP management; different protection level; patent law amendment.

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Daphne Jue Wang graduated from the Graduate School of Innovation Management, Tokyo Institute of Technology in 2009. She was a student from Professor Yoshitoshi Tanaka’s laboratory, and her research was mainly focusing on the management of intellectual property rights, and she also did researches in other fields of innovation. Before going to graduate school, she obtained a double Bachelor’s degree in Japanese Language and Law. She currently works for Citigroup as a Financial Analyst.

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1 Introduction

In Japanese Prime Minister Koizumi’s policy statement in the 154th Diet in February, 2002 in Japan, intellectual property (IP) Creation Cycle, and the creation, protection and utilisation of IP were positioned as a pillar of the competitive edge of the nation aiming to build IP-based nation. An IP Fundamental Law was enacted, a National IP Strategy Office was established, and an IP Promotion Plan concerning the creation, protection and utilisation of IP has been developed every year, and its concrete measures have been implemented. The said IP Promotion Plan has involved all concerned ministries and initiated a big transition stages of IP policies in Japan, consisting of the measures such as the strengthening of IP management at universities, the revision of the employee’s invention, the staff increase of patent examiners, the establishment of the IP High Court, the revision of infringement penalty code, the strict control of counterfeit goods and pirates, the digital contents protection, strengthening the branding strategy, the substantial implementation of intellectual asset management, the guideline of the IP valuation, the introduction of the IP trust system, etc. It is considered that he strengthening of IP strategy has been developing and making the big role to recover the global competitiveness (IP Strategy Headquarters, 2010).

Japan takes pride in its position as a leader of patent applications in the world with over 350,000 applications filed every year. Figure 1 shows the number of patent applications, request for examination, patent granting in Japan (Japan Patent Office, 2011). What should be paid attention here is the number of patent granting. Although over 350,000 applications are filed every year, the number of patent granted is about 200,000 corresponding to 50% of the total. About 150,000 were once filed and published but not protected as exclusive rights and the technologies can be used freely together with generating technology outflow.

Figure 1 No. of patent applications, exam

![Graph showing patent applications, request for examination, and patent granted over years]

Source: JPO Annual Report (2011)
Figure 2  Trends of the no. of IP staff

![Bar chart showing the trend of the number of IP staff in Japanese enterprises. The number of IP staff increased from 2003 to about 50,000 by 2007.]

Source: Japan Patent Office; ‘IP activity investigation 2009’

Figure 2 shows the trend of the number of IP staff in the Japanese enterprises, and Figure 3 shows the amount of IP expenditure. Although the number of patent applications has been saturated as shown in Figure 1, the number of IP staff continues to increase from 2003, closely up to about 50,000. The IP expenditure keeps increasing as shown in Figure 3 with quite big volume of expenses. It is not clear whether the global competitiveness of Japanese industry increases steadily to according to the number of IP staff and the IP expenditure increasing (Japan Patent Office, 2009, 2010).

Figure 3  Amt. of IP expenditure

![Bar chart showing the amount of IP expenditure from 2003 to 2007. The expenditure is categorized into Staff, Staff Compensation, Applications, and Others.]

Source: Japan Patent Office; ‘IP activity investigation 2009’
Another issue is whether the granted patents have been utilised enough or not; in other words, whether they demonstrate the essential function or not, while a patent right is an exclusive right to monopoly the market within a certain period excluding participation by other third parties. Figure 4 shows the situation of utilisation/non-utilisation ratio of patents based on the JPO’s survey of IP activities (Japan Patent Office, 2009, 2010). In 2009, 50% out of granted patents is utilised including licensing; however, the rest (50%) is not utilised at all, which corresponds to half the level of 100,000 patents shown in Figure 1. It is supposed that 28% out of total applications of 350,000 is utilised and the rest of applications generates the waste of expenditures and outflow of technologies without being protected as a result of a large number of applications (Tanaka, 2001; Kimura and Tanaka, 2010; Tanaka, 2004; Nagatsuka and Tanaka, 2010; Chuang and Tanaka, 2010).

It is expected that there exists measurable tools to estimate the required number of patents to protect market in one country, of course, it is reflected by the market size, market needs, industrial level, and so on, and however, the comparative study of patent applications in several developed countries gives us one suggestion.

Table 1 shows the number of patent applications with the data of residential applicants in each country (World IP Organization, 2010; European Patent Office, 2010). In Japan, the market is occupied with the number of applications of about 330,000 by Japanese applicants; in the USA, with the number of applications of about 240,000 by the US applicants; in UK with about 17,000 applications; and in Germany with about 48,000 applications, etc. As long as it is unclear that the limited number of applications in Europe is insufficient to defend European market, it is doubtful that there is such a large amount of applications in Japan, i.e., there is insufficient evaluation and review performed, and as a result, a lot of needless applications have been filed in Japan by the Japanese enterprises. Additionally, seeing the back-log of unexamined applications of about 800,000, it is observed that it is the stage where there is a certain conceptual change of patent strategy on how to make the selection and focus of patent applications.
Table 1   Ratio of residential applicants in major countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Japan</th>
<th>USA</th>
<th>UK</th>
<th>Canada</th>
<th>Germany</th>
<th>France</th>
<th>Sweden</th>
<th>Norway</th>
<th>Russia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential applicants</td>
<td>333,498</td>
<td>241,347</td>
<td>17,375</td>
<td>4,998</td>
<td>47,853</td>
<td>14,722</td>
<td>2,527</td>
<td>1,223</td>
<td>27,505</td>
</tr>
<tr>
<td>Non-residential</td>
<td>62,783</td>
<td>214,807</td>
<td>7,624</td>
<td>35,133</td>
<td>13,139</td>
<td>2,387</td>
<td>398</td>
<td>5,431</td>
<td>11,934</td>
</tr>
<tr>
<td>Total</td>
<td>396,291</td>
<td>456,154</td>
<td>24,999</td>
<td>40,131</td>
<td>60,992</td>
<td>17,109</td>
<td>2,925</td>
<td>6,654</td>
<td>39,439</td>
</tr>
<tr>
<td>Non-residential ratio %</td>
<td>15.8</td>
<td>47.1</td>
<td>30.5</td>
<td>87.5</td>
<td>21.5</td>
<td>14.0</td>
<td>13.6</td>
<td>81.6</td>
<td>30.3</td>
</tr>
</tbody>
</table>

2   Hypothesis

2.1   Reasons why so many patent applications in Japan

It is important to understand why there are so many patent applications in Japan. There are some institutional factors behind the large number of patent applications.

First, we can make look at the historical background of the enterprises’ management which promoted the technological development during the economic reconstruction of Japan after the World War II. Toyo Rayon received a patent licensing on basic technology of Nylon from Du Pong in 1951. Tokyo Telecommunication Industry received a patent licensing on basic technology of transistor from Western Electric in 1952. Since the Japanese enterprises were behind this period of technological development, they tried to receive patent licensing on basic technologies from western countries; then based on these basic technologies, they exerted efforts to improve the technologies surrounding the basic patents to qualify their products (Japan Patent Office, 1982, 1984, 1985). It can be described that, the wide range of products’ application and the detailed improvements to increase quality, productivity and functional performance of products, have improved the competitive edge. Japanese enterprises filed numerous patent applications even if the scope of protection of each patent was narrow. Inevitably, it led to tremendous increase in patent applications which have been used to file a large number of improvement patent applications inside and outside of the scope of basic patent.

Secondarily, the utility model law accomplished the prominent role of the technological improvement of the Japanese industry. A Statute of patent monopolies was introduced in Japan in 1885; however the technological capability was not comparable to the western countries at that time, and it was expected to promote technological development competing with other countries. Therefore, as one of promoting actions, utility model law to protect small inventions was enacted in 1905, which had played a significant role in increasing the technological level of industries against technological monopoly from advanced western nations. There was a time when the number of applications for utility model registrations that exceeded 200,000 a year was performed in the 1980s (Japan Patent Office, 1982, 1984, 1985). At that time, the claim of utility model registration was defined as a single claim; therefore each scope of protection was small with the technology related with the shape, structure, or the combination of both. The number of applications had been decreasing rapidly at the end of 1980s because of the amendment of utility model law which shortened the period of protection. At the same time, the number of patent applications has increased rapidly up to about 400,000.
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The application for utility model registration decreased of the revised law and resulted in the increase of patent applications.

Thirdly, cultural difference in Japan is also a major cause. Hofstede and Hofstede (2005) conducted a perhaps the most comprehensive study of how values in the workplace are influenced by culture. According to his study, Japan has a high uncertainty avoidance index (UAI). UAI deals with a society’s tolerance for uncertainty and ambiguity; it ultimately refers to man’s search for truth. It indicates to what extent a culture programmes its members to feel either uncomfortable or comfortable in unstructured situations. Unstructured situations are novel, unknown, surprising and different from usual. Uncertainty avoiding cultures try to minimise the possibility of such situations by strict laws and rules, safety and security measures, and on the philosophical and religious level by a belief in absolute truth; ‘there can only be one Truth and we have it’. People in uncertainty avoiding countries are also more emotional, and motivated by inner nervous energy. Because of the desire to improve the predictability, all careful consideration is paid, and measures enough for the quality are given in the product manufacturing. It is thought that the improvement activities have brought the result of increasing by detailed and improvement applications to avoid uncertain situation.

Fourthly, it is thought that customer-first principle and the intense inter-enterprise competition generates a large number of applications. When launching a new product on the market, the company receives demands in the market. These demands provide the companies with incentives to increase the number of applications, proposing the technical solutions responding to customer’s needs.

Fifthly, it is a company strategy of positioning the IP department in the enterprise. The IP department contributed to enterprise management in recent years. The IP department used to be a professional department which is responsible only for the legal practises according to concerned law and regulations, such as patent law, utility model law, design law, trademark law, and copyright law. It does not collaborate well with other business function, such as purchasing, production, R&D, sales, marketing, etc. Because of the positioning of IP department, it is separated from business, market and customers, they have not have enough collaboration with other functional departments, and just making practical works speeding up the applications under the first-file system, which has resulted in the situation of large number of applications. The IP department has not made a through selection and focus on what is really necessary for the business of enterprise. The lack of collaboration with other functional departments has generated a large number of applications and also high ratio of unutilised patents (Tanaka, 2007, 2009).

2.2 Research subjects and hypothesis

As described in the above, we can explain some of the reasons for the large number of applications. In this research, as pointed out, we focused on the large number of improvement patents filed by Japanese enterprises, and tried to make comparative study on the characteristics of patents between European enterprises and Japanese enterprises.

We shall review the mutual relations between basic patent and improvement patent. Figure 5 shows the improvement patents which have mutual relations with a basic patent, also the patents surrounding the basic patent which is positioned outside of the scope of the basic patent. In case that an enterprise X has a patent No. 1 with the scope of protection comprising the technical elements A, B, C, D, E, and an enterprise Y has a patent No. 2 comprising the technical elements A, B, C, D, E, F, the patent No. 1 and the
patent No. 2 have mutual relations of utilisation each other. It is considered that the
patent No. 1 is a basic patent and the patent No. 2 is an improvement patent. Although a
patent No. 3 comprising the technical elements A, B, C, D, F is positioned outside the
scope of patent No. 1, the patent No. 3 has the same technical elements (A, B, C, D) of
the patent No. 1 and is considered as an improvement patent of No. 1.

**Figure 5** Patents and improvement patents

Generally speaking, a basic patent has the technology positioned in the upper side of
technical development deemed as a centre of all following improvements. However,
since all inventions are created as a combination of the past technology, they have a
certain prior arts and it is not easy to evaluate a specific invention as a basic invention.
When it comes to the technology evaluation owned by an enterprise, it is important to
evaluate patents as a patent portfolio whether these patents have basic value or just
improvement value, not necessary to specify the basic patent.

Currently in Japan, there exist roughly 1.35 million patents, and big enterprises have
so many patents over 10,000 patents, and it is not realistic to evaluate all patents strictly
from the value point of view. However, if they have a certain rough scale to evaluate its
basicness or improvementness, it would be very useful to position their competitiveness
against competitors. Therefore, in this research, we used the statistic of the existence of
prior arts which were cited by patent examiners during the examination processes which
shows the basicness or improvementness of the patent. In other words, if the prior arts do
not exist, then the patent is considered having basicness, and in case some prior arts exist,
the patent is considered having improvementness. Based on the above observations, we
defined the following hypothesis.

**Hypothesis**

Japanese enterprise’s patents have high improvementness, but less basicness, while
European enterprise’s patents have high basicness but less improvementness.

The balance between basic patents and improvement patents shall be considered as
an important factor of patent strategy.
3 Statistical results

3.1 Comparative study between European enterprises and Japanese enterprises on the basicness or improvementness of patents

In this study, we made a comparative study between European enterprises and Japanese enterprises, because of big gap of the number of patent application. Also, in the field of automobile industry and electronic industry, there is a big difference of patent behaviours between those two regions. We focused on the patent examination processes of the patent applications filed in 2004 to 2008 by automobile enterprises and electronic enterprises, and checked whether the patent examiner notified specific prior arts or not during the examination process. Table 2 shows the ratio of the existence of prior arts regarding the Japanese enterprises, referred from the reason for refusal notified by patent examiners. Here, we made an evaluation based on the idea that a patent having no prior arts has high basicness and less improvementness, and a patent having prior arts has high improvementness less and basicness. Table 3 shows the ratio of the existence of prior arts regarding the European enterprises. As we can see in Table 4, we found the facts that there is a big difference between European enterprises and Japanese enterprises regarding the ratio of existence of prior arts. The average of the ratio of existence of prior arts of Japanese enterprises is about 84%. The average of the ratio of existence of prior arts of European enterprises is about 41%. In terms of the ratio, there is not big difference between automobile industry and electronic industry. We can say that European enterprises have patents which have basicness and less improvementness, on the other hand, the Japanese enterprises have patents which have improvementness and less basicness.

Table 2 Ratio having prior arts of Japan patents

<table>
<thead>
<tr>
<th>Company</th>
<th>Office actions with prior arts</th>
<th>Office actions without prior arts</th>
<th>Ratio having prior arts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toyota</td>
<td>47</td>
<td>3</td>
<td>94%</td>
</tr>
<tr>
<td>Honda</td>
<td>46</td>
<td>4</td>
<td>92%</td>
</tr>
<tr>
<td>Nissan</td>
<td>40</td>
<td>10</td>
<td>80%</td>
</tr>
<tr>
<td>Suzuki</td>
<td>44</td>
<td>6</td>
<td>88%</td>
</tr>
<tr>
<td>Mitsubishi motor</td>
<td>43</td>
<td>7</td>
<td>86%</td>
</tr>
<tr>
<td>Mazda</td>
<td>41</td>
<td>9</td>
<td>82%</td>
</tr>
<tr>
<td>Isuzu</td>
<td>36</td>
<td>14</td>
<td>72%</td>
</tr>
<tr>
<td>Hitachi</td>
<td>47</td>
<td>3</td>
<td>94%</td>
</tr>
<tr>
<td>Panasonic</td>
<td>42</td>
<td>8</td>
<td>84%</td>
</tr>
<tr>
<td>Sony</td>
<td>38</td>
<td>12</td>
<td>76%</td>
</tr>
<tr>
<td>Toshiba</td>
<td>43</td>
<td>7</td>
<td>86%</td>
</tr>
<tr>
<td>Fujitsu</td>
<td>38</td>
<td>12</td>
<td>76%</td>
</tr>
<tr>
<td>NEC</td>
<td>39</td>
<td>11</td>
<td>78%</td>
</tr>
<tr>
<td>Canon</td>
<td>40</td>
<td>10</td>
<td>80%</td>
</tr>
<tr>
<td>Mitsubishi Electric</td>
<td>35</td>
<td>5</td>
<td>88%</td>
</tr>
<tr>
<td>Sharp</td>
<td>41</td>
<td>9</td>
<td>82%</td>
</tr>
<tr>
<td>Sanyo</td>
<td>42</td>
<td>8</td>
<td>84%</td>
</tr>
</tbody>
</table>
Table 3  Ratio having prior arts of European patent

<table>
<thead>
<tr>
<th></th>
<th>Office actions with prior arts</th>
<th>Office actions without prior arts</th>
<th>Ratio having prior arts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daimler</td>
<td>17</td>
<td>33</td>
<td>33%</td>
</tr>
<tr>
<td>Volkswagen</td>
<td>19</td>
<td>31</td>
<td>38%</td>
</tr>
<tr>
<td>Peugeot</td>
<td>20</td>
<td>30</td>
<td>39%</td>
</tr>
<tr>
<td>Fiat</td>
<td>22</td>
<td>28</td>
<td>45%</td>
</tr>
<tr>
<td>BMW</td>
<td>33</td>
<td>17</td>
<td>65%</td>
</tr>
<tr>
<td>Renault</td>
<td>17</td>
<td>33</td>
<td>33%</td>
</tr>
<tr>
<td>Volvo</td>
<td>15</td>
<td>35</td>
<td>30%</td>
</tr>
<tr>
<td>Siemens</td>
<td>15</td>
<td>35</td>
<td>30%</td>
</tr>
<tr>
<td>Nokia</td>
<td>32</td>
<td>18</td>
<td>64%</td>
</tr>
<tr>
<td>Philips</td>
<td>20</td>
<td>30</td>
<td>39%</td>
</tr>
<tr>
<td>Ericsson</td>
<td>19</td>
<td>31</td>
<td>37%</td>
</tr>
</tbody>
</table>

Table 4  EU and Japan comparison of ratio having prior arts

<table>
<thead>
<tr>
<th>Enterprise/Japanese-European/automobile/electric</th>
<th>Ratio having prior arts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average of Japanese automobile enterprises</td>
<td>85%</td>
</tr>
<tr>
<td>Average of Japanese electric enterprises</td>
<td>83%</td>
</tr>
<tr>
<td>Average of Japanese enterprises</td>
<td>84%</td>
</tr>
<tr>
<td>Average of European automobile enterprises</td>
<td>40%</td>
</tr>
<tr>
<td>Average of European electric enterprises</td>
<td>42%</td>
</tr>
<tr>
<td>Average of European enterprises</td>
<td>41%</td>
</tr>
</tbody>
</table>

Japanese enterprises have made a huge development in improving inventions licensed from western countries. This patent strategy has contributed to its success so far. However, since technical capability has grown on a global standard level, therefore the Japanese enterprises have to change their improvement strategy to the basic strategy. They have to be very careful and conscious on the balance between basic patents and improvement patents.

4  Interview

4.1  Results and discussions on the interviews to enterprises

In connection with the results obtained from the examination processes, we conducted interviews with the Japanese automobile enterprises and electronic enterprises, as follows.

4.1.1  Summary of the interview to automobile industry

In general, about 20,000 to 30,000 parts are involved in an automobile, and the R&D subjects for the assembling company are basically limited into the engine and body. In
order to increase the competitiveness of automobile enterprises, it is necessary to implement patent strategy involving all concerned parts manufactures.

Since there are so many parts are involved, cross licensing strategy is also important to keep product freedom. It is considered that the automobile enterprises have to construct a certain group of patents to be ready for this cross licensing.

On the other hand, when we see the utilisation ratio of granted patents, it is roughly 30%, and we cannot say all patents have value. Regarding the basicness or improvementness of patents, we cannot deny that most of patents are improvement patents. While the number of patents is important for cross licensing, however the quality of patents is important for licensing negotiations. It is getting important to change from the number to the quality, focusing on the basicness of patents.

Automobile product is different from electronic products in terms of product life cycle, and the product price is higher. Therefore, the basic patents having long life cycle is really important to keep competitiveness against competitors. Patent strategy focusing basic patents is very important.

4.1.2 Summary of the interview to electronic industry

Electronic enterprises file so many patent applications and maintain many unutilised patents. In the electronic industry, patent applications are made to compete against competitors under the first-file system, considering cross licensing. It is requested that the technical evaluation and commercial evaluation are necessary to make decisions of patent applications; however in reality, it is just the technical evaluation such as novelty and inventive step which is under consideration. The commercial evaluation is done at the time of request for examination or commercialisation process.

Regarding the basicness or improvementness, the basic patent cannot cover all product diversifications, and the number of patents is important for cross licensing. However, it is true that companies have to aim to obtain the patents which are really valuable and can be utilised on our products.

The background of many patent applications is enhanced by the norm principle for R&D staff, and how the inventor’s motivation will be raised, which is related with organisational development and HR development. Since the remuneration and rewards to inventors are shifted into actual utilisation of patents, it is necessary to consider the real utilisation on the products and basicness against competitors in the future.

It is requested to make patent inventory every year considering the status of its utilisation. However, it is not easy to make evaluation on patents. The method to make patent inventory together with patent valuation is strongly requested to be proposed in the future.

4.1.3 Discussions

Based on the above statistical survey and interviews to industry, we can observe that the Japanese enterprises have a tendency to put importance on improvement patents compared with European industry. Japanese industry has already recognised the necessity to change their strategy from improvementness to basicness. However, it is not so easy to implement such changes because of historical background and management point of views, as we described in Chapter 2. One suggestion based on this research is to consider the legal structures of patent law. Under our current concept of patent law, most of
countries have the basic requirement of patent; ‘industrial applicability’, ‘novelty’ and ‘inventive step’. In some countries, they have a requirement of ‘non-obviousness’, instead of ‘inventive step’. However, all inventions are treated with the same process whether or not the invention satisfies the ‘inventive step’ or ‘non-obviousness’. And, once the patent right is granted, it has the same legal power as an exclusive right, injunction and compensation for damages. The basic patents having no prior arts must have very high level of inventive step, and the improvement patents having related prior arts must have small level of inventive step. If there is regulation to distinguish the basic patents and improvement patents in terms of protection level in patent law in the future, the enterprises will have more strong and careful concerns on the basicness and improvementness. Figure 6 shows how the concept of inventive step differentiates basic patents with more strong protection compared with the improvement patents with normal level of protection.

Figure 6  Inventive step, non-obviousness

Under the current concept of patent law, there is no distinction in protecting patents once the patent has cleared the required inventive step. This is a big problem. As we discussed in the above, the Japanese patents have so many improvement patents, even if it is under the discussions and the Japanese enterprises are changing their strategy. Because of the current patent law, there are so many patent applications in Japan which is surprising compared with the situation in Europe.

Since there are many patent applications rapidly increasing in new developing countries such as in the economically growing countries, should the new concept of Japanese patent law adopt a new approach which should consider the protection level together with the different levels of inventive step? The patent law should provide the same level of legal power for all patents without considering the basicness of improvementness? The patent law should provide an injunction and compensation for damage to the basic patents, and give only compensation for damages to the improvement
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It can also regulate the period of protection depending on the basicness or improvementness.

5 Conclusions

In this research, we compared the patent strategy between European enterprises and Japanese enterprises from the viewpoint of basic patents and improvement patents. It is clear that the ratio of existence of prior arts that European enterprises put importance on basic patents, and Japanese enterprises have emphasised improvement patents so far. To achieve further development of the role of patents in the future, it is necessary to recognise the importance of competitiveness based on basic patents, considering that Japan has already has caught up with the global standard of technical capability. There must be a certain balance between basic patents and improvement patents which the enterprise should challenge and obtain their competitive edge. The improvement patents shall be maintained from the aspect of cross licensing, product life cycle, inventor’s motivation, etc. At the same time, the enterprises are expected to increase the competitiveness with basic patents which can be utilised on the market and give strong pressures to their competitors. Patent protection shall be integrated with business impact as the basic patents. Basic patents should have more strong protection, and the improvement patents can keep normal protection level. These aspects must be incorporated in the amendment of future patent systems.

The number of patent applications is rapidly increasing in the developing countries. However most of patents are deemed as improvement patents. There must be a new subject category which will differentiate between basic patents and improvement patents, which are critical factors in improving global competitiveness.

References


