

# Comparison of different sources of patent granted on economic effects

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***Abstract.** Nowadays, innovation and patents is a tool for enterprise to generate competency. Besides, most countries protect their patents with “Territorialism” and the annual-fee system. This study emphasis on the relationship between the patent from difference applied area and the generated benefits, which forms patent portfolio the best set of coherent strategy and combines with high value-creating , and attempts to find out a rule to assist enterprise in applying patent to the proper area where create the highest benefits and match their cost-benefit. Enterprises view patent portfolio as an integration of patent strategy to construct overall business strategy. From the results, benefits created by patents are very difference not only because of the theology, but also the applied area. Through this study, enterprises could realize that they must consider where could create the highest benefits under the restriction while applying patent.*

***Key words:** patent, patent portfolio, Tobin’s Q, USPTO EPO, JPO.*

***JEL classification:** O32, O34*

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## **1. Introduction**

Today the economy is on the basis of knowledge and has already replaced such traditional assets as the land, capital, such as patent right [1]. Ernst (1998) thought that this study could use patents to analyze the economy performance of enterprise. Patent analysis could explain the technology status among competitors and evaluate

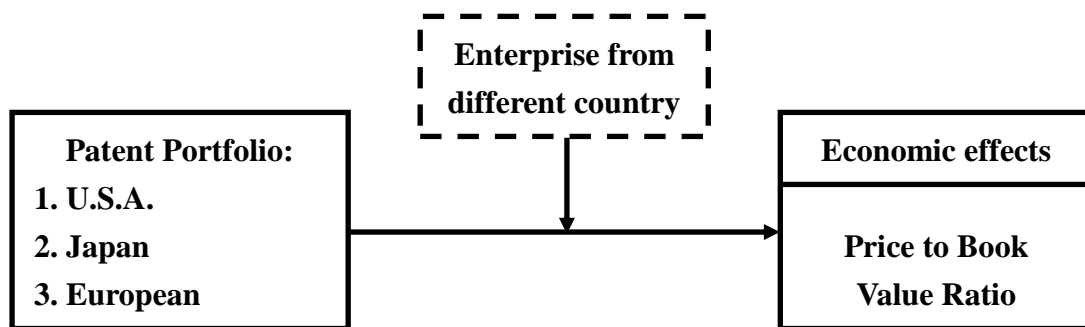
the relative position with the main competitor. Deng, Lev and Narin (1999) also commented would be a kind of knowledge stock and results of research and development. International Institute for Management Development (IMD) also views innovation and technology ability as an index of national competition, such as patent application and patent granted. Nowadays, “Territorialism” is a kind of patents protection, and a country only protects the patents applied from it, and applicators need pay premium per year. Enterprises or applicators only adopt priority applications beyond the concept of cost-effective, and the countries own larger market and higher technology are the priority, such as USA, Japan, and European.

Each patent could be applied in different area and generated different level and type of benefits for the enterprise, and this could be viewed as a designed strategy which is designed with limited budget and the concept of creating maximizing benefits. Innovation portfolio is on the basis of particular innovation, unique technology or classified patents and connects existing ideation events matured concepts are developed into products and services [2]. While enterprises apply a patent right for its new technology or innovation, they should consider performing patent portfolios as an integration of their patent strategy [3] and where is the most proper applied area to create the greatest value. The motivation of technology progress is from continuous and cumulative improvements, and innovative enterprises not only rely on a few patents, but on the portfolios include numerous patents [4].

The main objective of this study is to investigate the economic effects of patents on operation performance. Following the concept of innovation portfolio which includes the best set of concepts supporting by a coherent strategy and combines with the awareness of gathering aggregative high value-creating potential [2]. A strong patent portfolio could gain the strength of important technological know-how for

enterprise, because it assists enterprises to achieve important operational and strategic benefits [5] [6]. Patent portfolio proves a useful tool to evaluate both R&D landscape and business opportunities, and assist managers to make better R&D decisions [7]. From patent portfolio it is easier to realize innovation and the quality of enterprises, especially for assessing innovative potential of enterprises [8].

According to the total value of a patent deeply depends on where patent rights takes effect, such as patent rights in U.S., Europe or Asia has different economic effects [9]. This study separately investigates approved patents from USA, European, and Japan, which this study called patent portfolio, and compares the differences. Also, this study investigates enterprises from different countries have different results, if their patents are granted from other area. The paten count granted form U.S.A., Japan, and European is really positive related to the enterprise economic effects? Whether the economic effects of patent granted form different area would be different with enterprise located on different countries? According to above, this study could construct the research model of this study (figure 1):



**Figure 1:** Research Model

## **1.1 Patent Portfolio**

While enterprises set up an innovation strategy with consideration of serious innovation, technologies or even relevant patents, it would form the concept of innovation portfolio to generate the maximized economic effects. With particular strategic thought, an innovation portfolio serves as an important evaluation and alignment system between ideation events and project portfolios [2], and it might be a type of problem solving to figure out the dilemma since the innovation investment is so uncertain and risky. Not only under the uncertainty circumstance, but innovation portfolio also faces the evolutionary pressures to create great value and solves the risk. An innovation portfolio is aligned with a handful of promising concepts that make the strategy feasible [10].

Sometimes, within the portfolio it finds that clustering or grouping us is the one construction of innovation portfolio that comprised of concepts of differing phase maturity, which managing a complete overview or a particular concept of generating the great benefit. Under the concept of innovation portfolio, it could be focused on a set of clearly differentiated strategic choices and the near-term tactical decision on the aggregate incremental investment [2]. Thanks for the contribution from innovation portfolio, enterprises would reduce some kind level of costing and bring better economic effects at once or even the great benefit in the long term.

A granted patent not only patent protects the inventor, but also encourages the internal technology utilization. Moreover, an effective patent protection might be an important source of competitive advantage [11]. Accounting to the contribution of achieving important operational and strategic benefits [6], forming a strong patent portfolio becomes a requirement for gaining access to important technological know-how for enterprise [5]. Patent portfolio proves a useful tool to evaluate both the

R&D landscape and business opportunities, and from patent portfolio it is easier to realize patent activities and the quality of an enterprise, especially for assessing innovative potential of an enterprise [8]. In addition, patent portfolios could assist managers to make a better R&D decision of enterprises [7] and generate mutual hold-up positions to protect enterprises from the threat of blocking patents [4]. However, the total value of a patent deeply depends on where patent rights takes effect, such as patent rights in U.S., Europe or Asia has different economic effects [9]. This study follows the previous that presents insights into the influence of strategic patenting on the characteristics of enterprises' patent portfolios, indicated by the number of citations per patent and the likelihood of opposition [12].

## **1.2 Patent**

Patent presents a kind of intangible assets, this study so called “Intellectual Property Right”. Patents could also be a protection method of knowledge and point out the availability of enterprises [8]. In 1993, General Agreement on Tariffs and Trade classified intellectual property, in order to protect the innovation activities developed by intelligence. World Intellectual Property Organization (WIPO) explain the patent as a paper issued by the government and records a particular invention, and this is a kind of law to appoint only the patentee on the paper could employ the patent. Patent count has been utilized to evaluate the quality of innovation for 50 years [13]. Early studies used the patent count to value the innovation quality, but more studies focused on patent citing analysis [13] [14] [15] [16]. Most empirical results approved patent citations are significant positive relative to critical technology [17]. Patent indicators the most studies employed are CHI patent indicator come from CHI Research, and the common patent indicator as follows:

(1) *Patent Count*: Patent count means the granted patent count enterprises owed during particular period. It is a simple total counting of patents [13]. Patents are the output of innovation, and the patent count presents the output of this and it is used to evaluate the degree of technology ability in this study.

(2) *Cite Per Patent*: It means the count a patent is cited by other patents. The greater the count, the higher the patent is cited, and so called highly cited patents. Generally, this indicator is important and critical and utilized to identify the leading-edge.

(3) *Current Impact Index (CII)*: It presents the citing frequency of a patent and was employed as qualitative indicators [13] [18] [19]. CII is determined by how often an enterprise's patents from the previous five years are cited as prior patent in the current year's batch. CII measures the importance of an enterprise's patents, based on how often they have been cited by other patents, which shows how frequently they were used as the foundation for other inventions.

(4) *Technology cycle Time (TCT)*: The median age of patents cited in a specific patent. This indicator uses patent citations to indicate the age of the inventions on which a new invention is based. It is assumed that the more recent the faster one generation of inventions is being replaced with another. It could estimate the gap between present technology and previous technology and is one kind of qualitative indicators [13] [18] [19].

(5) *Science Linkage*: The total number of per patent references journal papers and other scientific publications. It refers the average number of quoting un-patent reference, and it also means the linkage between patent technology and science. It is assumed that the higher the number, the more the enterprise's patents are building on basic science and technology. Generally, highly linkage technology is focus on the newly technology field, and the enterprise with highly science linkage is usually the

leader of this technology field. Science is one kind of qualitative indicators.

### **1.3 Relationship between Patent and Economical Effect**

There were lots of empirical studies proved the influence between patent and economical effect. Hirschey and Richardson (2001) employed many patent indicators to examine enterprises from U.S.A. and Japan. It found Current Impact Index (CII), Science Linkage (SL), and Technology cycle Time (TCT) of U.S.A. and Japan enterprises were significant relative to market value. But for Japan, the information patent count (PAT) provided did not reflect the market value well enough. Some studies used patent and Tobin's Q Value to investigate the relationship between patents of Taiwan electronic industry and its asset [20], and found patent could evaluate the performance of innovation and also revealed the market value was significant positive related to patent. Tseng (2004) investigated electronic information enterprise with at least one U.S. patent found put the influence of patent count on market value would be different with patent granted from different area, in which, patent granted from U.S. has greater influence on economic value than patent granted from Taiwan and China. Moreover, U.S. patent count and patent citation were positive influence the operation performance. Hall et al.(2005) found all indicators influence the market value, especially per patent citation could increase market value up to 3%.

While enterprises create new technology, processes, or products, they will apply patent right to protect their new inventions from being copied or imitated. However, the protecting method is exclusiveness and territorialism. The total value of a patent deeply depends on where patent rights takes effect, such as patent rights in U.S., Europe or Asia has different economic effects [9]. Besides, due to the business strategy or the term of trade, enterprises might hand in patent right application where

the headquarters is or where the subsidiary is, different patent portfolios should be advisable in order to assess strategic recommendations derived from patent portfolios depending on the selection of different portfolio [7]. Innovation portfolio management faces many-dimensional utility, for example, balancing a portfolio between strategic business units or prioritizing projects in different geographical locations [21]. Therefore, innovation portfolio should be applied on the basis of different phenomena or area to generate the greatest economic effects. This study presents insights into the influence of strategic patenting on enterprises' patent portfolios, indicated by the number of citations per patent and the likelihood of opposition [12]. According to above, the study constructs the hypotheses:

H1: patents granted from U.S.A., Japan, and European are positive related to each other.

H1<sub>A</sub>: patents granted from U.S.A. are positive related to patents granted from Japan.

H1<sub>B</sub>: patents granted from U.S.A. are positive related to patents granted from European.

H1<sub>C</sub>: patents granted from Japan are positive related to patents granted from European.

Beyond the market value model, stock price would reflect the future profitability of intangible assets [22], so the effects of U.S.A. enterprises would be greater than that of Japan enterprises. U.S.A. business market is the greatest, and every enterprise in the world would apply patent to U.S. Patent Office [23], besides Euro has produced great economic effects since 1957 the year European Union was established. Also, the function of innovation portfolio could decide the priority of projects in different geographical locations to create the maximizing value [21]. Due to these, the



hypotheses as follow:

H2: Economic effects of the patent granted from different area are different.

H2<sub>A</sub>: Economic effects of the patent granted from U.S.A. are greater than that of patent granted from Japan.

H2<sub>B</sub>: Economic effects of the patent granted from U.S.A. are greater than that of patent granted from European.

H2<sub>C</sub>: Economic effects of the patent granted from European are greater than that of patent granted from Japan.

The early studies proved that patent granted and sale growth were positive relative and also had positive influence on the revenue [24]. Austin (1993; 1995) commented the market value of enterprises was significant positive related to the patent granted. According to this, this study developed hypotheses H3 and H3<sub>A</sub>. Owing to the territorialism, it anticipates Japan and European patent count in motherland would have higher economic effects of enterprises (H3<sub>B</sub> and H3<sub>C</sub>).

H3: Economic effects of enterprises located in motherland are positive related to that of patent granted form motherland.

H3<sub>A</sub>: Economic effects of U.S.A. enterprises are positive related to that of patent granted form U.S.A.

H3<sub>B</sub>: Economic effects of Japan enterprises are positive related to that of patent granted form Japan.

H3<sub>C</sub>: Economic effects of European enterprises are positive related to that of patent granted form European.

Generally, the market and competitors of parent enterprise are most from its motherland country due to geopolitics relations. This study expected that Economic effects enterprise acquires from the patent granted in its motherland country are much

greater than in other country. This study constructs the hypotheses as follow:

H4: For the same enterprise, it could acquire different Economic effects with different patent granted.

H4<sub>A</sub>: Economic effects of U.S.A. enterprise acquire in U.S.A. are greater than that acquires in Japan.

H4<sub>B</sub>: Economic effects of U.S.A. enterprise acquire in U.S.A. are greater than that acquires in European.

H4<sub>C</sub>: Economic effects of U.S.A. enterprise acquire in European are greater than that acquires in Japan.

H4<sub>D</sub>: Economic effects of Japan enterprise acquire in Japan are greater than that acquires in U.S.A.

H4<sub>E</sub>: Economic effects of Japan enterprise acquire in Japan are greater than that acquires in European.

H4<sub>F</sub>: Economic effects of Japan enterprise acquire in U.S.A. are greater than that acquires in European.

H4<sub>G</sub>: Economic effects of European enterprise acquire in European are greater than that acquires in U.S.A.

H4<sub>H</sub>: Economic effects of European enterprise acquire in European are greater than that acquires in Japan.

H4<sub>I</sub>: Economic effects of European enterprise acquire in U.S.A. are greater than that acquires in Japan.

## **2. Methodology**

This study investigates Economic effects of enterprise derive from patent granted in different country and adopts samples on the basis of the top 1000 manufacturers of

Industry Week (IW) in 2005. In addition, patent data is collected from United States Patent and Trademark Office (USPTO), Japan Patent Office (JPO), and European Patent Office (EPO). The objects this study examined are collected from the top 1000 manufacturers of Industry Week (IW) in 2005, and the manufacturers selected are in U.S.A., Japan, and European. From the top 1000 manufacturers, this study acquired 334 U.S.A. enterprises, 211 Japan enterprises, and 257 European enterprises and the data information is cross a decade, from 1996 to 2005 year. Finally, this study utility 312 U.S.A. enterprises, 207 Japan enterprises, and 230 European enterprises, and employs Price-Book Ratio to evaluate enterprises value.

This study uses panel data to analyze variables in the empirical model; this method directs at certain specific groups and obtains data by continuously observing these groups for a period of time and collecting time series and cross section data simultaneously. Nevertheless, since firms are not established at the same, the data form of this study is unbalanced panel data. The model this study addressed is present as follow:

$$Y_{it} = X'_{it}\beta + e_{it} \quad i = 1, 2, \dots, 749 \quad t = 1, 2, \dots, 10 \dots\dots\dots(1)$$

where  $Y_{i,t}$ : i enterprise Economic effects in t year;  $X'_{it} = (X_{K,it}, X_{L,it}, X_{P,it})$ , three parameters of i enterprise in t year, including tangible capital (K), labor (L), and patent count (PA);  $\beta = (\beta_K, \beta_L, \beta_P)'$ , coefficient;  $e_{i,t}$ : residual.

### 3. Empirical results

This study selected 749 enterprises to be investigating sample, but owing to the public time is different, the total observing objects is 6762 during 1996-2005 year. From

Table 1, it could know that most companies apply their new innovation or technology to their motherland in three areas. The most enthusiastic about apply patent is companies from Japan, they almost have patents 10 times over than companies from other countries, and then are the companies from U.S.A. Sum up patent counts of three area, it could knows that Top 10 companies are all from Japan and the top one is Hitachi (147644). Patent count of EPO is lowest among three area of patent office.

**Table 1: Patent Counts in Three Areas during 1996-2005**

<b>Total Patent Count</b>				<b>USPTO</b>		
<b>Rank</b>	<b>Company</b>	<b>Motherland</b>	<b>Patent Count</b>	<b>Company</b>	<b>Motherland</b>	<b>Patent Count</b>
<b>1</b>	Hitachi	Japan	147644	Micron Technology	U.S.A.	11743
<b>2</b>	Matsushita Electric Industrial	Japan	134901	Hewlett-Packard	U.S.A.	11334
<b>3</b>	Canon	Japan	117013	Motorola	U.S.A.	9846
<b>4</b>	Toshiba	Japan	108417	Intel	U.S.A.	9728
<b>5</b>	NEC	Japan	100594	General Electric	U.S.A.	9338
<b>6</b>	Sony	Japan	93261	Eastman Kodak	U.S.A.	8135
<b>7</b>	Toshiba TEC	Japan	88834	Lucent Technologies	U.S.A.	8018
<b>8</b>	Fujitsu	Japan	61285	Xerox	U.S.A.	6418
<b>9</b>	Ricoh	Japan	60330	Sun Microsystems	U.S.A.	4603
<b>10</b>	Mitsubishi Electric	Japan	58006	Microsoft	U.S.A.	4279
<b>JPO</b>				<b>EPO</b>		
<b>Rank</b>	<b>Company</b>	<b>Motherland</b>	<b>Patent Count</b>	<b>Company</b>	<b>Motherland</b>	<b>Patent Count</b>
<b>1</b>	Hitachi	Japan	134778	Siemens	Germany	14871
<b>2</b>	Matsushita Electric Industrial	Japan	120990	BASF	Germany	5962
<b>3</b>	Canon	Japan	97981	Nokia	Finland	5434
<b>4</b>	Toshiba	Japan	95109	Bayer	Germany	4998
<b>5</b>	Toshiba TEC	Japan	88020	Thomson	France	4868

6	NEC	Japan	84510	Alcatel	Netherlands	4405
7	Sony	Japan	78034	L.M. Ericsson Telephone	Sweden	4135
8	Ricoh	Japan	59982	Infineon Technologies	Germany	3568
9	Mitsubishi Electric	Japan	57215	L'Oreal SA	France	2983
10	Fujitsu	Japan	48486	Daimler Chrysler	Germany	2539

Source: USPTO, JPO, EPO

### 3.1 Economic effects of Traditional Input

The results shows that input of tangible capital and labor are negative to the price-book ratio. From Table 2, performance of patent granted from U.S.A. and European are significant positive. Patent from EPO and USPTO are significant, but that from Japan are not significant. It could say that Economic effects of patent granted from EPO and USPTO are greater than that from JPO. Precious study also found patent portfolio is an integration of patent strategy to construct business strategy [3] and earn higher value. Besides, patent Economic effects from EPO (10%) are obviously higher than that from USPTO (1%), so the hypotheses H2<sub>A</sub> and H2<sub>C</sub> are supported.

**Table 2:** Results of Economic Effects of Traditional Input

	Variables	Coef.	SD.	t-value	R-Square
<b>Japan</b>	JPO	0.2066	0.2241	0.92	0.1431
	K	-0.1337	0.0097	-13.75***	
	L	-0.0093	0.0039	-2.41*	
<b>U.S.A.</b>	USPTO	1.4333	0.7743	1.85*	0.1434
	K	-0.1347	0.0097	-13.83***	
	L	-0.0098	0.0039	-2.53*	
<b>European</b>	EPO	1.2482	0.0017	719.91***	0.99
	K	-0.0051	0.0011	-4.79***	
	L	-0.00002	0.0004	-0.05	

Note: \*Denotes statistical significant at 0.1 level; \*\*Denotes statistical significant at 0.05 level; and\*\*\* Denotes statistical significant at 0.01 level. Total sample number is 732.

### 3.2 Economic effects of U.S.A. Enterprise with Different Area Patent Granted

U.S.A. enterprise economic effects are significant positive to the patent granted from U.S.A., and it supports to the hypothesis H3<sub>A</sub>. While U.S.A. enterprise acquires positive benefits from EPO patent, JPO patent does not produces significant positive benefits for U.S.A. enterprise (Table 3). It means patent granted from EPO and USPTO could bring more benefit than patent granted from JPO. Besides, patent Economic effects from EPO (10%) are obviously higher than that from USPTO (1%) fit the hypotheses (H4<sub>A</sub> and H4<sub>C</sub>). Total value of a patent depends on where patent rights takes effect, such as patent rights in U.S., Europe or Asia has different economic effects [9], and it proves innovation portfolio would choice the proper area with maximizing benefits [21].

**Table 3:** Results of Economic Effects of U.S.A. Enterprise with Different Area Patent Granted

	<b>Variables</b>	<b>Coef.</b>	<b>SD.</b>	<b>t-value</b>	<b>R-Square</b>
<b>Japan</b>	JPO	2.943	3.4538	0.85	0.186
	K	-0.3128	0.0218	-14.34***	
	L	-0.0088	0.0086	-1.03	
<b>U.S.A.</b>	USPTO	2.4854	1.4464	1.72*	0.186
	K	-0.3149	0.0218	-14.41***	
	L	-0.0096	0.0086	-1.12	
<b>European</b>	EPO	1.2522	0.0003	4633.44***	0.999
	K	-0.0008	0.0002	-3.08***	
	L	-0.0003	0.0001	-3.44***	

Note: \*Denotes statistical significant at 0.1 level; \*\*Denotes statistical significant at 0.05 level; and\*\*\* Denotes statistical significant at 0.01 level.

Total sample number is 309.

### 3.3 Economic Effects of Japan Enterprise with Different Area Patent Granted

Investigating 206 Japan enterprises granted patents from Japan, this study found out there is any significant relationship among them from the results. The study hypothesis H3<sub>B</sub> is not supported (Table 4). Also, the results reveal that Economic effects Japan enterprises acquire from EPO patent is positive, but not significant. This

study could not determine the relationship between Japan enterprises and patent of JPO, EPO, and USPTO (H4<sub>E</sub> and H4<sub>F</sub>) due to the insignificant results.

**Table 4:** Results of Economic Effects of Japan Enterprise with Different Area Patent Granted

	<b>Variables</b>	<b>Coef.</b>	<b>SD.</b>	<b>t-value</b>	<b>R-Square</b>
<b>Japan</b>	JPO	0.0003	0.045	0.01	0.113
	K	-0.0085	0.0095	-0.89	
	L	-0.0031	0.0025	-1.22	
<b>U.S.A.</b>	USPTO	0.1240	0.2893	0.43	0.113
	K	-0.0088	0.0094	-0.93	
	L	-0.0032	0.0026	-1.26	
<b>European</b>	EPO	0.5729	0.4505	1.27	0.114
	K	-0.0096	0.0094	-1.02	
	L	-0.0034	0.0025	-1.33	

Note: \*Denotes statistical significant at 0.1 level; \*\*Denotes statistical significant at 0.05 level; and\*\*\* Denotes statistical significant at 0.01 level.  
Total sample number is 205.

### 3.4 Economic Effects of European Enterprise with Different Area Patent Granted

The results show the hypothesis H3<sub>C</sub> is supported. From the empirical results, Economic effects European enterprises acquire is positive related to USPTO patent, but not significant. In Table 5, it shows European enterprises acquire benefit from EPO patent, but JPO and USPTO patent bring less profit for European enterprises, that could be said Economic effects from EPO patent are greater than that from JPO and USPTO patent (H4<sub>G</sub> and H4<sub>H</sub>). This supports the command that innovation portfolio would decide the priority of projects in different geographical locations to create the maximized economic effects [21].

**Table 5:** Results of Economic Effects of European Enterprise with Different Area Patent Granted

	<b>Variables</b>	<b>Coef.</b>	<b>SD.</b>	<b>t-value</b>	<b>R-Square</b>
<b>Japan</b>	JPO	0.2594	0.4148	0.63	0.1509
	K	0.0118	0.0012	9.46***	

	L	-0.0029	0.0005	-5.5***	
U.S.A.	USPTO	-0.1691	0.23	-0.74	0.151
	K	0.0119	0.0013	9.47***	
	L	-0.0029	0.0005	-5.39***	
European	EPO	0.8026	0.0041	194.2***	0.9621
	K	-0.0003	0.0003	-1	
	L	-0.0002	0.0001	-2.13**	

Note: \*Denotes statistical significant at 0.1 level; \*\*Denotes statistical significant at 0.05 level; and\*\*\* Denotes statistical significant at 0.01 level.  
Total sample number is 218.

#### 4. Conclusions and Discusses

According to the empirical results, it found that JPO patent count is greater than others and it might be the patent protection of Japan is better than U.S.A. and European, so as to, most enterprises would not hand in paten application to patent office of their own country, but apply to patent office of other country. U.S.A. enterprises and European enterprises could have positive Economic effects with patent granted from their motherland, and it is greater, it might be innovation portfolio combines existing ideas and the coherent strategy to create higher value [2]. Besides, this study found Economic effects that European enterprises acquire with EPO patent could have better market value which proves that the function of innovation portfolio management could decides the better choice with different geographical locations [21] to generate the greatest economic effects.

When enterprises applying for patents, they should consider the performing level of patent portfolios, such as which kind of technology or even where the performance of patent portfolio would be revealed remarkable, to shape their overall business strategy while [3].The results prove the command patent portfolio is an essential part of strategic planning activities [7] and should fit with the most proper area to maximize the economic effects, because the different area patent granted indeed bring different Economic effects. U.S.A. enterprises have greater Economic effects with



EPO patent than with USPTO patent. This study also found that Japan enterprises apply the most patent protect, but it seems have lower benefit, and the quality of patent is low. The results prove that an innovation portfolio includes the best set of supporting coherent strategy and the awareness of creating higher value [2].

Many studies investigated Economic effects of patent, but they all focused on one area or one country. This study explains the difference among Economic effects through by patent granted from three areas, and discusses whether the patents granted from different area have different operation performance. From the results, this study found that enterprises would utility patent tight to protect their new technology, process, products, and inventions, but the protection produces less benefit than this study expect. In addition, this study revealed patent from European has the highest Economic effects. Under the consideration of cost, this study suggests enterprises could apply patent for their invention in European in prior.

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