

The Impact of Patent Applications Filed on Sustainable Development of Selected Asian Countries

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Abstract - Innovative activity underpins economic productivity and growth. Countries that generate innovation, create new technologies, and encourage adoption of these new technologies grow faster than those that do not. In some industries patenting is identified as the most important means of protecting IP and is increasingly used as a strategic asset by companies to create sustainable competitive advantage – although, in others, secrecy is used to safeguard proprietary knowledge. The basic purpose of this paper is to see the impact of patent filing on economic growth of the country leading to sustainable development of the economy. For this, the paper analyzed and tested the data of 9 countries for the period of 10 years (2000-2009). The results concluded that it was a mixed result in case of Asian countries. Only, technology based countries' economies were affected by patent applications filed.

Index Terms - Intellectual Property Rights (IPR), economic growth, Gross Domestic Product (GDP), Asian countries, Patents, Sustainable development

1. INTRODUCTION

Intellectual Property rights (IPR) are legally enforceable rights relating to creations of the mind and include inventions, literary and artistic works, and symbols, names, images, and designs used in commerce. A number of individual rights are covered by IP like Patents, trademarks, copyrights, designs and trade secrets, [1] For sustainable development, economic growth of the country is very essential. Patent of new invention is one of the ways economic growths. The recent history seems to show that technology and knowledge are important factors for economic growth and development. Since the creation of the first mechanism to protect inventions in 15th century, the patent system has evolved with a view to promote innovation and encouraging economic development. By offering exclusive rights for a limited period, an inventor may recover R&D costs and investments [30]. A patent for an invention is granted by government to the inventor. When a patent is granted, the *right* becomes the property of the inventor, which – like any other form of property or business asset – can be bought, sold, rented

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or hired. The patent is not a monopoly, but gives the inventor the *right* – normally for 20 years from the date when the patent application was first filed – to stop others from making, using or selling the invention without the permission of the inventor. Patent provides a great strength to the technology driven companies across the world and also helps in creating wealth to the economies of all developed, developing and least-developed countries. Many researchers revealed that there is a direct and/or proportionate relationship between Patent registration and economic growth of a country. This article will reveal such relationship between the country's percentage GDP (Gross Domestic Product) growth and the percentage change in the patent application filed among selected Asian countries for the period of 10 years (2000-2009) resulting in its sustainable development.

2. REVIEW OF LITERATURE

Intellectual property helped make possible the conditions for innovation, entrepreneurship and market-oriented economic growth that shaped the 20th Century. A critical enabling tool increasingly is intellectual property protection [31]. The contribution of technological innovation to national economic growth has been well established in the economic literature, both theoretically as well as empirically [27]. Many studies had evidently proved that there is a relationship between number of Patent application filed and economic growth of that country. Patent is a better performance variable but does also suffer from serious limitations. Patents can be expected to reflect conditions (red tape, financial sector quality, etc) that affect the decision to innovate [32]. Porter and Ketels argue that true competitiveness is measured by economic productivity – determined by capital intensity, labour force skills and total factor productivity – and productivity growth is influenced by trade, investment and innovative activity. They suggest that countries' economies, in terms of their characteristic competitive advantage and modes of competing, evolve through various stages, namely, Factor-driven stage, Investment-driven stage and innovation-driven stage. All these stages are on the basis of their competitive advantage. [2]

Another study [3] revealed that there is an evident relationship between Intellectual Property Rights (IPR) and sustainable development of the country. The author analysed the recent developments and indicated that there are an increasing number of links between intellectual property protection and sustainable development which need to be addressed. A number of studies have empirically demonstrated the ability of weaker IPRs in stimulating domestic innovative activity in developing

countries. In fact stronger IPRs may actually adversely affect innovative activity by stifling the absorption of knowledge spillovers that are important determinants of innovative activity. More and more researchers have endogenously determined by technical change resulting from decisions of profit-maximising agents. Some authors provide surveys of such innovation and R & D based endogenous growth models [25] [26]. The OECD report on “Intellectual Property as an Economic Asset” [4], which draws on Kaplan and Norton [5], highlights the fundamental role IP plays in business performance and economic growth in knowledge-based economies. The report points out that, increasingly, a large proportion of the market value of a company is determined by its intellectual assets – which, as intangible assets, have monetary value and add to the company’s balance sheet to increase enterprise value. Indeed, substantial value placed on patents [6] and patenting innovations substantially increases (up to 47%) the value realized from them. [7]

The most recent of these studies have expanded the analysis to include economic growth as measured by per capita output (GDP). [28] An economic author developed an error correction model to determine the equilibrium rate of entrepreneurship as a function of the stage of development of an economy. The idea of the equilibrium rate has its roots in the choice between self employment and wage-employment that exists in the labour market. Also using data for 23 OECD countries, this study derived the equilibrium rates of entrepreneurship and showed that deviations from these rates significantly and negatively influence GDP growth. In a related area, [29] an author applied this formulation to study the impact of small business prevalence and reached a similar conclusion. Any country deviating from the equilibrium rate of entrepreneurship incurs a growth penalty in terms of foregone economic growth. In this way, depending on whether a country’s actual rate of entrepreneurship is above or below its equilibrium rate, there is technically both a negative and positive relationship between economic growth and the rate of entrepreneurship.

In an important contribution, [8] the authors compiled an index of patent rights for 60 countries between 1960-90. The GP (Ginarte and Park) Index focused only on patent rights, as published in law, with no attention to enforcement. Nevertheless, the index has been widely applied in subsequent studies as a measure of the strength of the national patent rights regime. The authors used the index to study the relation of economic growth, investment, and R&D expenditure to patent rights. They found no relationship between stronger patent rights and economic growth. However, among richer countries (with above median income), stronger patent rights were positively related to investment and R&D. There was no such relation among poorer countries.

3. OBJECTIVE

This article will discuss the relationship between two variables – Patent application filed growth rate and GDP growth rate among 9 selected Asian countries. The basic objectives are:

1. To find out the relationship between Patent applications filed growth rate and GDP growth rate.
2. To identify the salient features of all the Asian countries which make them patent friendly or restrict them to compete with other Asian countries in terms of patent applications filed and economic growth.

4. RESEARCH METHODOLOGY

This article selected 9 Asian countries as a sample namely, India, China, Japan, Indonesia, Brunei, Vietnam, Singapore, Malaysia, Thailand and Philippines. These countries were selected randomly out of all Asian countries. A correlation was set up for 10 years record of both patent application filed and GDP growth rate of all 9 Asian countries. The article’s hypothesis is that there is a direct relationship between the number of patent application filed and GDP growth rate. It means

H_0 = There is no relationship between Patent applications filed growth rate and GDP growth rate.

H_1 = There is/may have a direct relationship between Patent applications filed growth rate and GDP growth rate.

For testing this hypothesis, Student’s T-test was used as it is one of the most appropriate correlation testing techniques for small sample.

5. PATENT RIGHTS IN DIFFERENT ASIAN COUNTRIES

Regarding the present IP scenario in Asia, it has been quoted that almost every region in Asia Pacific has at some point or other been accused of not providing adequate protection to IP rights. It is also a fact that most countries in Asia Pacific that have developed strong technological capabilities, including Korea, Taiwan, China and India, have built their capabilities on the basis of poor IP rights enforcement. [9] After this study, things had been changed variedly. Many changes took place in the laws and by laws of the countries world wide. Our sample countries also went through few changes which helped them in fostering their position in terms of secured patents to the world and hence increased the number of patents filed in the present time. This change had variedly impacted the economic conditions of those countries.

5.1 India

There is a well-established statutory, administrative and judicial framework to safeguard intellectual property rights in India, whether they relate to patents, trademarks, copyright or industrial designs. As far as patents are concerned first recognition to patents was provided in 1856 by British government on the basis of United Kingdom Act of 1852. After many modifications in 1872, 1888, 1911 and 1949, in 1970, the first independent Act was passed by Joint Committee of Indian government. In 1999, another Patents (Amendment) Act, 1999 passed by the Indian Parliament on December 20, 1999 to amend the Patents Act of 1970 that provides for establishment

of a mail box system to file patents and accords exclusive marketing rights for 5 years. It was again amended in 1999 in the name of Patents (Second Amendment) Bill, 2002 to further amend the Patents Act, 1970 and make it TRIPS compliant. The third amendment was made in 2004 in the name of Patent amendment Ordinance, 2004 w.e.f. 1st January, 2005. All these amendments made a great impact on the number of applications for the filing of patent applications. This can be seen in Table 1A and Table 1B.

	Thailand	Japan	Vietnam	Phillipines	Malaysia
1999	6897	405655	1142	3361	5842
2000	7746	436865	1239	3636	6227
2001	7994	439175	1286	2605	5934
2002	7726	421044	1211	918	4937
2003	8574	413092	1150	1942	5062
2004	8942	423081	1431	2695	5442
2005	10885	427078	1947	2972	6286
2006	9821	408674	2166	3261	4800
2007	10339	396291	2860	3473	2372
2008	10561	391002	3199	3311	5403
2009	9730	348596	2890	2997	5737

Table 1A: Number of Patents Applications Filed Among the Asian Countries

	India	China	Indonesia	Singapore
1999	8954	16203	153	6679
2000	4824	26427	170	7720
2001	8503	31198	103	8133
2002	10592	41379	123	8070
2003	11466	58770	99	7908
2004	12613	68944	74	7951
2005	17466	97565	107	8606
2006	24505	128767	56	9164
2007	28940	160502	26	9955
2008	35218	203257	21	9692
2009	36812	229096	96	8736

Table 1B: Number of Patents Applications Filed Among the Asian Countries

The irony is that the increase in patent application numbers did not affect much the growth rate of GDP of India. It was because of the reason that India is an agriculture based economy rather than technology based economy. The difference can be seen in Fig. 1.

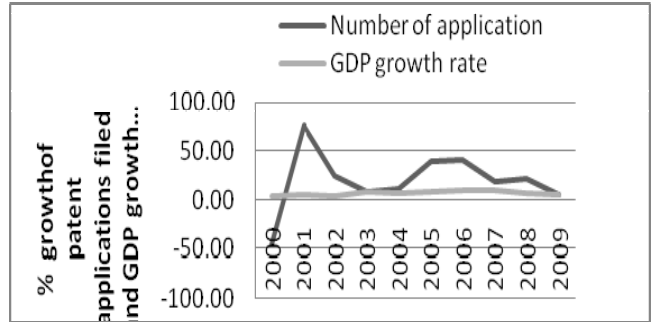


Figure 1: Comparison of Patent Application Filed and GDP Growth Rate of India

5.2 China

Chinese history of patenting starts from 1985, when Ist Chinese patent law was framed. In 1992, after signing the Sino-US MOU (Memorandum of Understanding) on the protection of IPR, the Patent Law was reframed in a more protective manner. It was further amended in 2000 creating a huge number of patents registered with China with a growth rate of 63%. Since then, year after year China had gone through many changes in IPR laws and the last amendment was made in 2009 including Utility Models and Design patents in it. Right now, China is in a very strong position of technical advancement along with highest growth rate of GDP in Asia. The relationship of number of patent application filed and GDP growth can be seen with the help of Fig. 2.

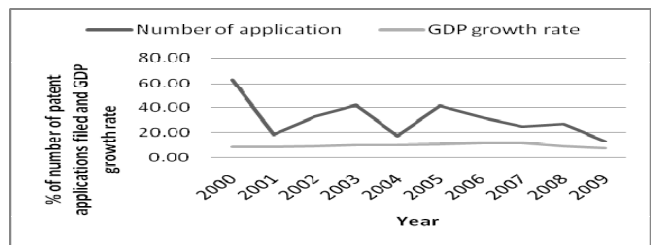


Figure 2: Comparison of Patent Application Filed and GDP Growth Rate of China

5.3 Japan

The first Japanese patent Law was established in 1871 although it was abandoned with in a year. So, the proper functioning of Patent Law was known to be from April 18, 1885, when Patent Monopoly Act was enacted. In 1978, Japan acceded to the Patent Cooperation Treaty (PCT). In 1980, the JPO adopted the International Patent Classification, discarding its own patent classification. [10] In 2002, Japan Patent Office declared computer programs patentable. It is based on first to file basis. Although Japan is tech savvy country but in last decade, there is a decline in terms of patent application filing. It is affecting the GDP growth also. It can be seen in Figure 3.

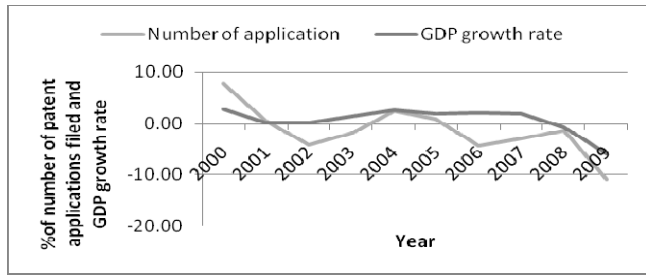


Figure 3: Comparison of Patent Application Filed and GDP Growth Rate of Japan

5.4 Indonesia

In Indonesia, patent law was first introduced in 1991. After the ratification of TRIPs (Trade Related Intellectual Property Rights), amended patent law was introduced in 2001. Despite of all amendments and membership of many conventions, application of patent law in Indonesia was not an easy job in Indonesia. Its IP protection is still one of the weakest in world. [11] as per Indonesian Patent Office, the number of patent registered is very much varying from year after year. In 2009, it was 96 as compared to 21 in 2008. [12] In this country, patent applications do not make much impact on GDP growth rate. This can be seen through Figure 4.

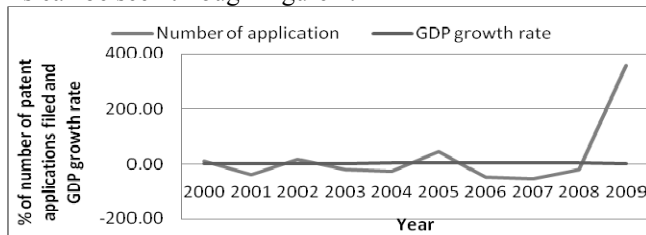


Figure 4: Comparison of Patent Application Filed and GDP Growth Rate of Indonesia

5.5 Singapore

The Patents Act came into force on 23 Feb 1995 and provided Singapore with its own patent system. The Patents Act (Cap. 221) and its subsidiary legislation, which consists of the Patents Rules, the Patents (Patent Agents) Rules, and the Patents (Composition of Offences) Regulations, form the legislation governing patent law in Singapore. [13] Whilst it is not mandatory to apply for patent protection in Singapore first before seeking patent protection overseas, any person resident in Singapore is required to obtain written authorization from the Registrar of Patents for an invention, before he files or causes to be filed outside Singapore an application for a patent for that invention. It is one of the developed countries in WIPO list. Singapore is technology based country so both patent registered are highly correlated with each other. This can be seen with the help of Figure 5.

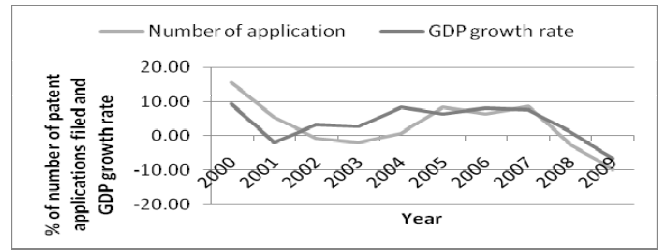


Figure 5: Comparison of Patent Application Filed and GDP Growth Rate of Singapore

5.6 Thailand

Thailand is a country where intellectual property has generated much controversy. In the late 1980s, the debate about controversial changes to the Copyright Act to strengthen the position of rights holders even led to dissolution of parliament and the calling of new elections. [14] The discussion subsequently shifted to patents and pharmaceuticals during the 1990s. In view of the AIDS crisis in Thailand, the government was much criticized for failing to use existing compulsory licensing mechanisms for pharmaceuticals because it feared a negative impact on foreign investment. [15] The first Patent Act was formed in 1979. It was then amended in 1992 and then in 1999. [16] Regarding patent applications, Thailand is getting quite a good number of patent applications year after year. It was 10,561 in 2008 and 9730 in 2009. The GDP growth rate is also moving in almost same direction except in 2005 and 2006. This fact can be seen through Figure 6.

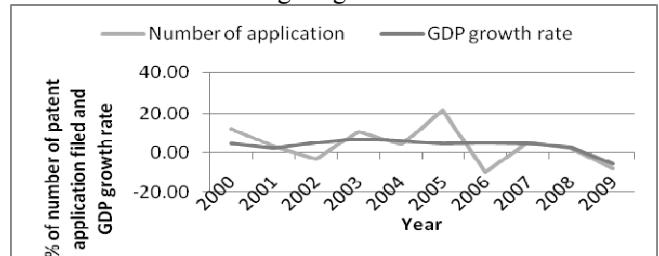


Figure 6: Comparison of Patent Application Filed and GDP Growth Rate of Thailand

5.7 Vietnam

The protection of intellectual property rights was first introduced in Vietnam in 1981 by the promulgation of the Ordinance on Innovation and Invention 1981 (“Ordinance 1981”) [17] The Ordinance on the Protection of Industrial Property Rights enacted in 1989 (“Ordinance 1989”) marked a turning point for the industrial property laws of Vietnam. [18] For the first time in the history of the country’s IP protection, the concept of “industrial property” was introduced in a legal instrument. Ordinance 1989 provided the fundamentals for the protection of inventions, utility solutions, industrial designs, trademarks, and appellation of origin in the country. Most importantly, Ordinance 1989 specifically recognized patent

rights as exclusive rights. It was then amended in the name of Civil code 1995. a proper Intellectual Property Rights Law was formed in 2005. [19] The number of patent applications and GDP growth rate are highly correlated in Vietnam and hence can be said that there is a impact of GDP growth rate on number of patent applications filed. This can be seen in the Figure 7.

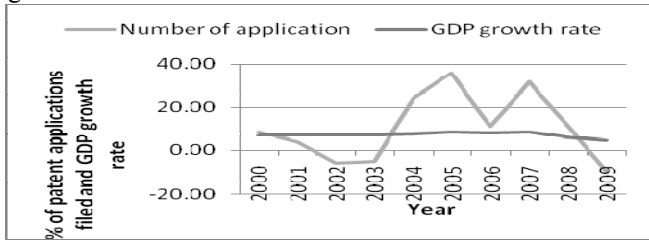


Figure 7: Comparison of Patent Application Filed and GDP Growth Rate of Vietnam

5.8 Philippines

The Philippines is the country with the longest tradition of intellectual property protection in the region, reaching back to decrees introduced by the Spanish colonial power in the early 19th century. [20] After a period of IP protection via Presidential decrees during the Marcos regime, the Philippines was the first country in Southeast Asia to adopt a comprehensive intellectual property code following WIPO models in 1995. The Code covers patents, utility models, trade marks and geographical indications, copyright, industrial designs, layout designs of integrated circuits and undisclosed information. It was then amended in 2006 and 2008. Regarding the number of patent application and GDP growth rate, Philippines is not a tech savvy country and hence there is no direct relationship between GDP growth rate and Number of patent applications filed. It can also be seen in Figure 8.

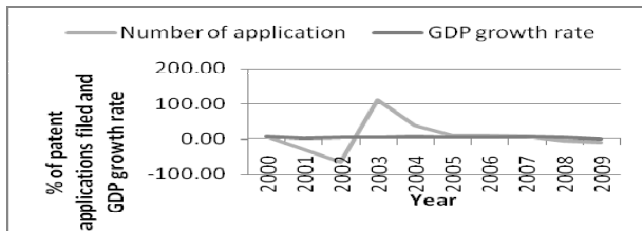


Figure 8: Comparison of Patent Application Filed and GDP Growth Rate of Philippines

5.9 Malaysia

The Malaysian Patent System generally originates from the United Kingdom Patent System. In 1983, the local system was introduced via the Patents Act 1983. Accordingly, a complete set of governmental mechanism was established and therefore allowing examination and subsequently registration of patents. [21] On May 16 2006, Malaysia became the 131st contracting state to the World Intellectual Property Organisation Patent Cooperation Treaty. The treaty was to enter into force in

Malaysia on August 16 2006. Regarding the patent applications filed in Malaysia, it is in a speculating position as compared to GDP growth rate which is more or less steady year after year. It is shown wit the help of Figure 9.

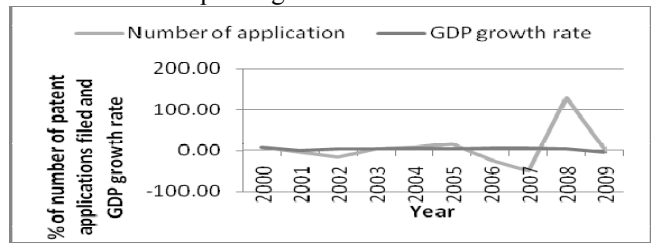


Figure 9: Comparison of Patent Application Filed and GDP Growth Rate of Malaysia

5.10 Data Analysis

The data collected from different sources was analyzed to see whether there exists a relation between country's GDP growth rate and Number of patent applications filed by domestic applicants and foreign applicants. It was then tested on hypothesis with 5 % level of significance. Student's T-test is used in it.

On the basis of data collected it was discovered that it was a mixed expression of Asian countries regarding the filing of patent applications and its relationship with GDP growth rate of the respective country. Out of the sample of 9 countries, 5 countries, namely, India, China, Indonesia, Philippines and Malaysia (having there t-value less than 1.86) were having no effect of number of patent applications filed over GDP growth rate and other 4 countries, namely, Singapore, Thailand, Japan, and Vietnam (having there t- value more than 1.86) have an impact of number of patent applications over GDP growth rate. This fact is clearer in Table 2.

S.No.	Country	r	r*r	t-value	Student's t-value at 5% sig.
1	India	0.29	0.08	0.86	1.86
2	China	-0.19	0.04	0.55	1.86
3	Indonesia	-0.45	0.20	1.43	1.86
4	Singapore	0.74	0.55	3.14	1.86
5	Thailand	0.93	0.86	6.99	1.86
6	Japan	0.75	0.56	3.19	1.86
7	Vietnam	0.86	0.75	4.87	1.86
8	Philippines	0.16	0.03	0.46	1.86
9	Malaysia	-0.04	0.00	0.13	1.86

Table 2: T-Test for GDP Growth Rate and Number Of Patent Applications Filed Relation for the Period 2000-2009.

Also, three countries, namely, China, Indonesia and Malaysia were having negative correlation. It shows that there is a negative relationship between number of patent applications filed and GDP growth rate. The main reason behind this negative relationship is non-dependency or lesser dependency

of GDP growth on number of patent filed. Also, in most of the years, when Number of patent applications was more, there was a fall in the GDP growth rate and vice-versa. It shows there are many other factors which are affecting the GDP growth rate than innovations and their registration as patents.

6 CONCLUSION AND RECOMMENDATIONS

Many studies have explored the relationship between economic growth, competitiveness, innovation, IP and their sustainable development. These studies have generally used R&D investment or the number of patents filed as proxies for innovation [22][23][24]. The article examined the correlation between patent applications filed and financial growth of 9 selected countries of Asia. This study has considered only one variable for studying the financial effect of patent applications filed on economy of the country i.e. GDP growth rate. Out of the data collected, it was discovered that half of the selected Asian countries were not having any concerns with number of patent applications filed. They have other GDP growth affecting factors like, agriculture, service industry, assembling of new technology from outside, etc.

With the help of literature review in this study, it can also be concluded that in few countries like Singapore, Philippines, the IPR regime is likely to affect growth indirectly by encouraging the innovative activity that in turn is the source of total factor productivity improvement leading to the overall development of the country.

The countries having positive correlation (namely, Singapore, Thailand, Japan, Vietnam) depicts, leaving all other factors of affecting GDP, innovations are the major factor affecting GDP growth rate.

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