



IPR ANALYSIS OF PHARMACEUTICAL AND SOFTWARE INDUSTRY

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ABSTRACT Pharmaceutical & software sectors are the most trending industries in current era. The rate at which these industries are growing, makes IPR more crucial for these industries. A strong & robust system of IP rights assures complete protection of the original ideas of the inventors. In addition, the owners can officially receive monetary payment for the official use of their original creations. Here, in this paper, we'll be analysing intellectual property rights (IPR) in pharmaceutical & software industry of developing countries (India & Thailand) vs developed country (USA). Based on the observations, significant hypotheses will be made.

KEYWORDS : Intellectual Property Rights, Pharmaceutical Industry, Software Industry, Patent, Development

INTRODUCTION

IP refers to the Intellectual property. IP is a vital sub-component of technology & invention management. Therefore, it needs to be secured properly & rightly. Effectively & efficiently managing firm's Intellectual property portfolio helps protect that organization's crucial data, reduces risks, and improves compliance with global worldwide legislation. The original IP owner has rights of exclusiveness and complete claim for royalty on use by rightful owners. Thus, it acts as a strong deterrent against infringements & trespassings.

Common types of Intellectual Property include copyright, patent, Design Right, Trademark, geographical indication.

METHODOLOGY:

Firstly, the IP regime and statistical data of developing countries (India & Thailand) & developed countries (USA) needs to be compared followed by thorough data analysis and application of statistical models. Then, graphs are plotted to predict the trend for any country worldwide.

Table-1: Statistical Data for Pharmaceutical Industry

Parameter	India	Thailand	USA
Revenue (2019)	\$20.03 bn	\$6.4 bn	\$490 bn
Industry growth rate (YOY)	9.8%	4.5%	0.2%
Patents granted (2018-19)	761	263	57,565
FDI	\$245.8 mn (2019) \$16.2 bn (2000-19)	\$60-70mn	\$2347.154 mn
Total R&D investment (% of sales)	8.4%	1.5%	22.8%
Contribution to GDP	1.72%	1.099%	3.2%
Employment	2.86 mn	0.1 mn	4 mn
Innovation (number of new drugs)	new product growth-rate: 2.7%	No data but according to several research papers it is very less as compared to India and USA	- 59 & 48 novel medicines were approved in 2019 & 2020 respectively. - Also USA reported 125 new chemical or biological entities in 2018 (highest in the world)
Average salary of employees (range)	\$1100 pm	\$1K-3K pm	\$5,646-8,000 pm
Export	\$18.1bn	\$474.5 mn	\$53.56 bn
Time taken to manufacture a drug (years)	14-15	14-15	12
Number of Pharma firms	> 3,000 companies	700-900	> 35,500

Profit in the industry	Less profit (more than Thailand & less than USA)	Least profit	Highest profits
Natural deaths in 1000s (2019)	6.8	7.7	6.1
Increment in patent granted (yearly basis)	17.156%	5-6%	21%
Patented drug revenue share	21%	30%	80%
% of global pharma industry	2.4%	0.7%	48 %
Assuming Profit & expenses to be in the same ratio as that of revenue	>thailand but <USA	Least Profit	Highest Profit

Table-2: Statistical Data for Software industry

Parameters	India	Thailand	USA
Revenue (2019)	\$8.1 bn (\$191 bn-IT)	\$3.38 bn	\$284.66 bn
Industry growth rate	7.7% (IT)	4.95%	11.3%
IPs Granted (2019)	1073 copyrights	113 copyrights	203455 patents
IP Valid on software	copyrights	copyrights	patent
FDI	\$6,415 mn (IT)	\$124.38 mn (software) \$0.5 bn (IT)	\$122,800 mn
R&D investment	Less than USA but more than Thailand	Least expenditure	Highest
Contribution to GDP	7.7% (IT)	In 2018, approx 17% Thailand's GDP was derived from the digital economy.	8.16%
Employment	4.3 mn (IT)	There were 386,306 employed ICT specialists in 2017, accounting for 1.03% of total employment.	12.3 mn+
Avg. salary of employees (pm)	\$745.87	\$925	\$8916.67
Number of firms	40,000+	5000+	525,000+
Startup Ecosystem	8,900-9,300 (2018)	Number of startups funded by venture capitalists increased from mere 3 in 2012, to over 90+ companies in 2017. Funding for startups over the same period also increased at a rapid rate from \$ 2.1mn to \$271.48 from 2012 to 2017.	40,500 startups established alone in 2018

Profit in the industry	Low profit	Very low profit	High profit
% of global market	1.58%	0.67%	48%
Losses due to software piracy	More than \$6.5 bn	Thailand's software piracy rate was 66% with losses of \$714 mn in 2017	\$2.8 bn
Losses per firm	\$0.1625 mn	\$0.1785 mn	\$0.0053 mn
Exports	\$2 bn	Data NA but it can be concluded from revue that export will not be more than that of India & USA	\$34.5 bn

RESULT

Based on the above statistics, clear distinction can be made between developing & developed countries. Following are some observations:

- Developed countries tend to invest more on R&D and thus have more innovation.
- Developed countries have more number of employees in IP intensive sectors as compared to developing countries. Additionally, the employees in developed countries get better salaries in IP intensive sectors.
- Developed countries have more patents granted on a yearly basis as a result they have more FDI & more contribution to GDP.

Therefore, it can be observed that protecting the IP can be directly or indirectly related to several statistics in both developing & developed countries. On the basis of this, following hypothesis could be delivered:

1) Number of patents in pharmaceutical industry is inversely proportional to the number of natural deaths per year.

This is clearly evident from table-1.

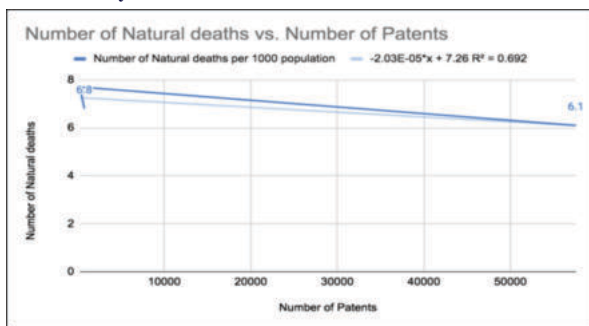


Figure-1

Following are some of the reasons for above trend:

- Patents are mainly for drugs related to major life threatening health issues. The lack of patents imply that there is a lack of life saving drugs in the nation and therefore need to be imported from foreign countries at higher prices which most of the citizens cannot afford.
- There is less trust & confidence in that country's health facilities.
- The availability of life-saving drugs is very limited in that country.

2) For a given industry, profit % is more in the country with larger number of patents

This is clearly evident from Table-1

Therefore, as the number of patents increases, firms tend to increase the price and also prevent its competitors from marketing & selling that particular product. As a result of this, they tend to earn greater profit. This is valid for any industry.

Reason for the profit in pharma industry:

Profits for patented pharmaceuticals represent a reward that pharmaceutical companies earn through years of research and development and only then will they be able to profit from their work. The patent system allows drug companies to profit from patents by prohibiting any other company from marketing and selling an identical prescription drug. This system seems to be the best way to provide drug companies with the reward of potential profit for the research and development spending that is necessary to develop new and innovative prescription drugs.

Inventor knows that his work will be rewarded with potential profits once patent is granted because a patent ensures no competitor will be able to copy his/her idea & prevent inventor from profiting

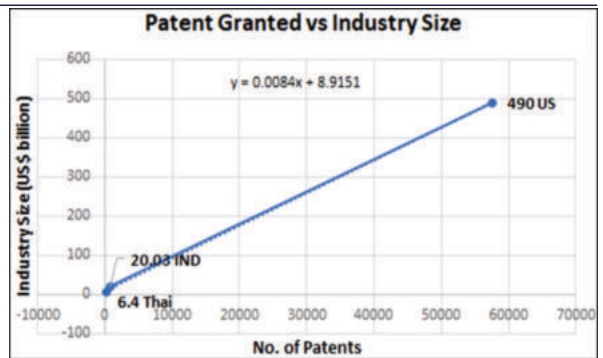


Figure-2

3) Countries having more patents in a particular industry will have more exports in that industry.

This is clearly evident from both Table-1 & Table-2

Reason: If a country has more patents it means that for the duration of that patent no other company will be allowed to manufacture and sell that product. As a result, entire world will be dependent on that particular firm for the needful product be it software, medicine, super fast engine etc..

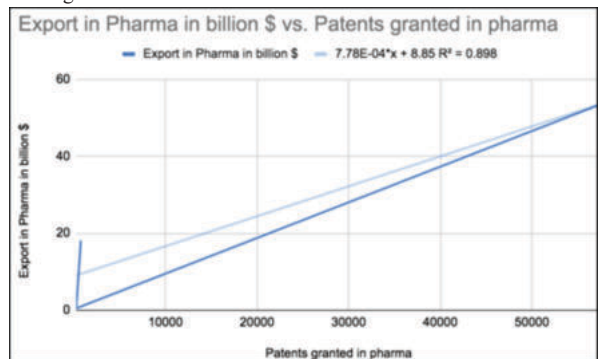


Figure-3

4) Number of IPR in an industry is directly proportional to the average salary of an employee.

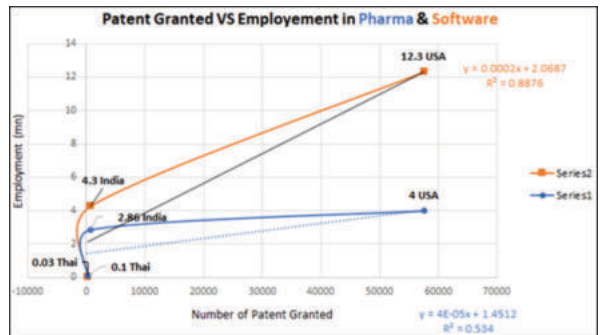


Figure-4

Reason: IP Creates & Supports High-Paying Jobs. Amount of R&D involved in IP intensive industries is extremely high. Therefore, in these industries a highly skilled & experienced workforce is required. Thus, they get higher salaries for the skills that they bring along and also for the amount of time & dedication invested in the job.

Comparatively **high wages in IP-intensive industries** correspond to the completion of more years of schooling by these workers. More than 42% of workers aged 25 and over in these **industries** in 2010 were college educated, compared with 34% on average in non-IP-intensive industries.

5) Industry having more patents will have lesser losses due to piracy.

Evident from Table-2:

It can be clearly concluded that loss per firm is maximum for Thailand followed by India & USA. USA has the least loss per firm & maximum

patents in the software industry. This is in accordance with our hypothesis.

Therefore, it can be concluded from the above data that in order to prevent losses due to piracy, IPR is very much necessary. However, international patenting is necessary, because product pirates can obtain patent licenses of the original products in unprotected countries, preventing the real author to export in the future or to manufacture in these countries.

6) Country having more patents in a particular industry will have greater number of firms in that industry i.e. IP drives economic growth & competitiveness

From Table-1 & Table-2, it can be concluded that:

- 1) In a particular industry, Country having more patents will have more contribution towards the economy of the country and also drives competitiveness.
- 2) Contribution to GDP and FDI is max for developed countries
- 3) Number of patents is directly proportional to the number of firms in the industry.
- 4) For a particular industry, country having more number of IPs will have more revenue & FDI. Whereas, country having lesser number of IPs will have lesser revenue & FDI in that industry.

CONCLUSION

In this Article, it was observed that IPR is directly proportional to the economy of the country. Developed countries also tend to have more robust IP evaluation systems as compared to developing countries.

Later, on comparing pharmaceutical & Software industry wrt IPR in developing vs developed countries, we were able to map certain trends. All the observations & hypotheses were explained above with proper analysis of the available data.

LIMITATION & FUTURISTIC VIEW

Here only 2 countries were considered as developing countries (India & Thailand) and only USA was considered as developed countries. Also the statistical data was restricted to the latest yearly data.

Thus, the observations & hypotheses are on the basis of the very limited data set that was considered. However, if we consider large data space by considering multiple countries & multiple yearly data. We would observe more accurate results.

In future this research can be continued on large sample data space to get a more clear idea. Thus, we'll be able to map more accurate trends between developing & developed countries on the basis of IPRs.

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