Commercialization of Intellectual Property; an Insight for Technocrats

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***Abstract*—Industry4.0 focuses on growing trend of innovation and interconnectedness. These factors entail to a dire need to protect innovative products and procedures from being easily imitated, weakening an enterprise's competitive advantage. Hence Intellectual Property Rights (IPR) can serve to protect the uniqueness of an invention, which can then be commercialized to foster to the knowledge and technology transfers for a common cause. The purpose of this paper is to provide inventors, researchers and enterprises a guideline on the importance of IPR and also discussed about commercialization procedures involved for the same. Using the U.S. Chamber International IP Index ranking, some countries have been highlighted in light of their legislations and ease to commercialize IP assets including the extent of local barriers and contingency on sharing IP with local entities or imposition of restrictions on licensing activities.**

Keywords— Intellectual Property Rights, Commercialization, Globalization, Innovation, Technology Transfer

I. INTRODUCTION

*"Because its purpose is to create a customer, business has two—and only two functions: Marketing and innovation. Marketing and innovation produce results, all the rest are costs." Peter Drucker*Innovation is a process of developing a unique idea starting from the idea generation stage until the successful launch through effective marketing to meet the explicit or implied needs of potential customers. These innovations are secured from being hampered and copied through Intellectual Property (IP). Commercialization of IP refers to doing business with these, enabling technology and knowledge sharing and allows commercial gains to the IP holder. One of the most common method used to commercialize IP is Joint Venture, like the famous food retail, Mc Donalds has adopted, licensing various partners around the worlds to sell their products under the registered trademark.

Realizing the potential of commercializing IP, several research and technology intensive businesses are increasingly focusing to make full potential of the same. Many SMEs have also shifted their attention toward technological inventions, leading to entrepreneurship and increasing trend in commercialization of new technologies. This can be well reflected through the latest report of the U.S. Chamber International IP index 2018. The Global Innovation Index annually ranks the innovation performance of approximately 130 economies around the world. As of 2018, Switzerland, Netherlands, Sweden, United Kingdom and Singapore were among the top Innovative Countries in that year.

The report reflects many growing economies through innovation and improvised legislations on IP rights, licensing and commercialization [3].

II. LITERATURE REVIEW

As per ,World intellectual property organization(WIPO), nearly 3.17 million patents have been filed in 2017 compared for the 3.13 million filed in 2016, with majority of the patent applications filed in China, U.S. and Japan [15]. According to the report of Patent Cooperation Treaty Yearly Review 2018, Computer was most frequently featured area in patent application, followed by digital communication electrical machinery, apparatus, energy and medical technology which is 30.3 % of all in 2017 [17].

WIPO Director-general Francis Gurry stated on the release of WIPO reports "Demand for IP (intellectual property) protection is rising faster than the rate of global economic growth, illustrating that IP-backed innovation is an increasingly critical component of competition and commercial activity." [16]

A. Intellectual Property

As per the World Intellectual Property Organization (WIPO), Intellectual Property (IP) entails to the creation of the mind which includes inventions, literary, artistic works, symbols, names and images used in commerce. At a commercial level, companies largely invest in research and development of an innovation to gain a competitive advantage. But should this innovation not be rightly protected, competitors may imitate and create a highly competitive market, leaving the company weak on its innovation. In order to protect this creation from wrongful use or duplication, Intellectual Property Rights (IPR) may be availed, which is a legal property right to exclude others from reproduction and selling without prior consent of the IPR holder.

There are several types of IPR, where more than one can be used for an innovative asset as the case may be. These include:

1. Patent: right for a product or process that is unique, non-obvious and useful
2. Copyright: right to artists and authors for their artistic and literary work, saved on a tangible material
3. Trademark: to protect any distinctive sign of an innovation (like word, symbol or device) used to identify the goods or service.
4. Trade Secrets: any valuable information, owned virtually by every company in some form, which is not generally known or easily obtained. It requires no legal filling but reasonable efforts of the company to keep the information secret.
5. Geographical Indications: a sign on goods directing to its specific geographical origin, hence demonstrating certain qualities and reputation due its provenance.

6. Industrial Designs: ornamental or aesthetic aspect of an article.

B. *Technology & Knowledge Transfer*

Technology and knowledge may be transferred among various organizations, creating a harmonized and innovative economy. As a matter of fact, innovation these days is a result of increased cooperation among organizations and also with the support of external knowledge sources like public research organizations (PRO) and universities that share their IPRs and foster knowledge and technology transfers. In 2013, the largest patenting applications came from universities in U.S and PROs in France, with about 3,920 and 829 PCT applications respectively. These technological and knowledge transfers helps businesses to exploit their own potential, motivate to create new and improvise existing technology and cater to a productive business environment.

C. *Academic Institution and PRO Commercializing IPR*

Transfer of academic research benefits the society and industry at larger. It serves the public interest by addressing key human needs in healthcare and environment preservation, whiles also providing ground for new business and job opportunities. It enables industry players to collaborate with top university researchers, subsequently enabling them to commercialize their new products through the various channels created. And ultimately, not only do the universities and PRO gain financial benefits, but interaction with the society and industry attracts talent, funding opportunities and creates prestige through enhanced quality of teaching and research programs [18].

The era of globalization and the internet has enabled open access to many of the research, but also given rise to greater conflicts over their ownership and use. Hence the need arises to protect their scholarly knowledge with IPR to realize full social benefits and transfer the same to companies capable of transforming the invention into new products. Granting academic institutes and PRO with IPR provides them legal ownership and incentives to protect, disclose, exploit and commercialize their inventions.

III. COMMERCIALIZATION OF IPR

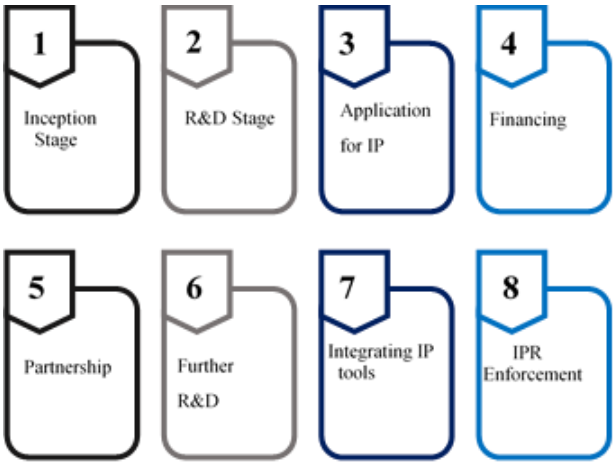

Fig. 1. Stages of Commercializing IPR. (Compiled by authors)

Commercializing is turning an innovation into a commercially viable product, service or process. It necessities effective planning to secure such idea right from the inception stage, because IP plays an important role in facilitating the process of communicating the innovative technology to the market place. Active participation of all stakeholders is an essential factor in innovation and their confidence only increases through IP since it implies reduced risk and high returns on their participation.

The journey of an Intellectual Property goes through several stages, and the crucial stages include (Fig 1).

D. *Inception Stage*

Firstly, any idea perceived must be screen for its demand and usefulness to the target market and audience. Any innovation thereafter by an enterprise must be treated as confidential, as a trade secret, especially at the inception stage. It noteworthy that though not all commercially viable ideas can be or will be patented, building and maintain trade secrecy is still vital to sustain the originality and uniqueness of the unique design.

Once a product has reached to a certain level of development and is regarded as a patentable invention (having feature of unique, non-obvious and useful) strategic business decision must be taken to decide whether to maintain the trade secrecy route or legally patent the part or whole of the product. The decision would depend on various factors such as nature of innovation, nature of competition, ability of competitors to reverse engineer and others.

Patent Documents are a useful source of information usually unknown to most enterprises and researchers, and can be used for screening idea conceived. It provides useful insights into whether an idea is new (state-of-the art), the strategies of potential competitors and about overall technology trends [7].

A. *R&D Stage*

Trade secrets should be continuously adopted during the entire R&D Stage to protect it from being copied by competitors. Patent documents here as well are a crucial source of information. The European Patent Office (EPO) estimates about 70% of the information in patent documents is not available elsewhere [7], and with more than 800,000 patents granted annually, there is no doubt what a rich source of information it would be.

At the R&D Stage, Patent Documents provide information on the state-of the art, enabling enterprises to enjoy economies of scale through minimized wastage of resources, including time and money.

B. *Application for IP*

Once strategic plans have been implemented to produce a competitive product ready to hit the markets, and after decision has been made to patent the product, the required patent application may be filed to claim exclusive rights over the intellectual property. It is only once the intellectual property has been secured that an enterprise may start with its journey of commercializing.

C. *Financing*

Inventors, entrepreneurs or enterprises may not have the skills or finance or both to produce or market the innovative product. This phenomena is labelled as the “valley of death” by the WIPO [7], a period wherein most inventions crumple mainly due to the absence of external support for marketing

and finance. But inventions protected by IP have a high chance of surviving this phase since it is a leading motivational factor influencing external partners to invest. These partners include business angels, seed capital, venture capitalists, financial institutions, and their likes that provide early-stage financing. Business plans and enterprise strategies indicates the potential use of IP rights in generating future revenue and competitive edge in the market.

D. Partnership

Enterprises may later engage in technical and knowledge transfers through primarily two methods: by selling or assignment of IP or by licensing IP. Sale of IP would result in transfer of right's ownership which previously belonged to the assignor. While licensing allow the IP holder, licensor, to share the invention to licensee in a controlled manner in consideration for fixed revenue (like royalties).

In theory, there are several strategies of adopting a license. There are several patent licensing strategies, some involving unfair or unethical practices such as [12]:

- Carrot Licensing: When an IP holder actively promotes in an attempt to license the patent to potential parties who are under no compulsion to do so.
- Stick Licensing: seizing a license involuntarily by a party (infringer) from the IP owner, under a threat of patent infringement.
- Iron Fist in a Velvet Glove: when a potential licensee feels pressurized to undertake a license, fearing the IP owner might take a legal action, resulting in more expense than licensing.

But the most appropriate means of commercializing IP using licensing is through joint venture and strategic alliances like merger and acquisition. These are mutual settings where two or more parties join an agreement to share finances and skills, hence having their own rights and obligations towards the venture. Companies may agree to share one or more patents to each other fostering freedom to operate. This is also known as Cross-licensing.

Commercialization of IPRs through joint ventures and strategic alliances also makes them available cross borders, creating a monopolistic market and competition on a global level. As we have the example of IBM, where it invaded the global market commercializing their IPs only through strategic partnerships with different SMESs globally.

E. Further Development (R&D)

Usually, innovative technological ideas may require further technical research and development to exploit their full potential for success in market so as to make them successful in the marketplace. These may be carried out internally or through external knowledge sources like research institutes, universities, innovation centers, technology parks and other large institutions.

F. Integrating IP tools

To give shape to the patented innovative property once its out in market, other IP tools may also be used to leave a mark of a robust brand image. Trademarks and industrial designs may be utilized to enable customers to identify the product and swiftly distinguish it from products alike. Above all, trademarks can also serve as a commercial advantage even after the life of a patent, where Aspirin® is a leading example for this.

G. IPR Enforcement

While entering into an IP transaction, one of the most important assessments should include the capacity to protect and enforce the IP. For it is possible that on the launch of a new product, competitors make an attempt to produce similar and cheaper products, hurting the economic standing of the original product in the market. Hence having a recourse to the effective enforcement of IPRs is a pre-condition for successful commercialization [13]. This may include court cases or injunction with infringer, persuading to negotiate on a licensing agreement on use of invention.

IV. GLOBAL COMMERCIALIZATION

A. Three Dimensional Business Strategy

IPR has now become a global Agenda for policy making which was initially was a national agenda. The International treaties are governing IPR institutions across the world. Such as 'Trade Related Aspects of Intellectual Property Rights' (TRIPS) Agreement, by Word Trade Organization (WTO) in 1994, aims at harmonization of Intellectual Property protection globally. For an enterprise heading to commercialize its innovation across borders, it is necessary to formulate business strategies that involve careful examining of the regional practices that relate to the utilization of data, intellectual property rights framework and global standardization, hence called the "three-dimensional strategy" [5] (Fig 2).

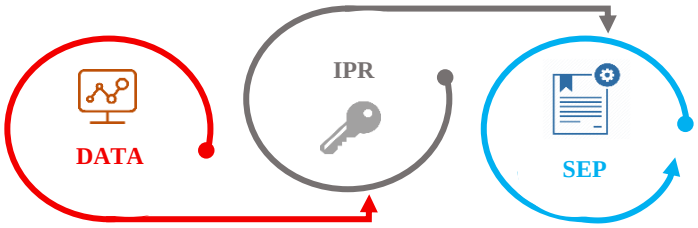

Fig. 2. The Three-Dimensional Business Strategy for IPR Commercialization. (Compiled by authors)

1) Data

In the Industry 4.0, data has become the newest source of competitiveness. Huge data calls for effective data management through data-analysis techniques and use of emerging technologies like, Internet of Things and Artificial Intelligence.

2) Intellectual Property Rights

Around the year 2000, there was a great increase in filling of business-related inventions, but in turned out that only about 10% of the applications filed were actually patented [5]. This was because of the common misconception that business methods and business-related inventions cannot be patented. On the contrary, any business using Internet of Things in its business operations, which is directly related to physical objects, can in fact be patented to protect an enterprise's business models.

3) Standard-Essential Patents

With emerging advancements in technology and increased demand for use of Internet of Things, businesses may use several standard specifications to assist integration of such

technologies in businesses. Hence the number of users of SEPs, important to adopt standard specifications, will increase. Using licensing strategies and prioritizing the FRAND terms on business strategies, SEP holders can create a great brand image in the international market [10].

B. Global Status of IP Commercialization

The U.S. Chamber International IP Index [4] ranks countries around the world according to the extent of reliability their IP system for healthy investment and commercialization. The latest edition (6th Edition 2018) benchmarks 40 discrete indicators under 8 categories for 50 countries. In this paper, we have analyzed eight of these countries on the category "Commercialization of IP Assets", considering countries high, medium and low under this category (Table 1). Through this, we analyze the extent of easiness in commercializing IP in countries worldwide and the initiative put in place for the same.

This category comprises of three indicators based on which countries have been rated (maximum score for each indicator is one):

1) Barriers to market access: it measures the extent to which existing laws and policies do not make market access dependable on the sharing or disclosure of intellectual property and technical know-how.

2) Regulatory and administrative barriers to the commercialization of IP assets: measures the extent to which regulatory allows IPR holders "freedom to operate" as part of their IP commercialization.

3) IP as an economic asset: measures the extent to which relevant institutions (including universities) are actively involved in capacity building and training commercializing IP.

TABLE I.

Countries	Intellectual Property Index				
	Overall IP Score	***Commercialization of IP Assets (category 5)***	***Barriers to market access***	***Freedom to operate***	***IP as an economic asset***
US	37.98	3.00	1.00	1.00	1.00
Japan	34.58	2.75	1.00	1.00	0.75
UK	37.97	2.50	1.00	0.75	0.75
Saudi Arabia	15.49	2.25	0.50	1.00	0.75
Malaysia	19.47	1.75	1.00	0.25	0.50
India	12.03	1.00	0.25	0.25	0.50
UAE	16.27	1.00	0.00	0.50	0.50
Indonesia	12.14	0.25	0.00	0.00	0.25

1. US:

Though the United States secures the first rank in the overall IP score and a complete 3 in commercialization of IP Assets category, it still faces challenges pertaining to the patent protection and licensing. This includes uncertainty with regards to the ability of patent holders to set licensing terms independently within the context of FRAND.

For instance, in 2017, the Federal Trade Commission (FTC) sued the chipmaker Qualcomm for refusal to license its SEP on FRAND terms, while the antitrust guidelines of FTC, issued earlier that year, did not include refusal to license SEPs as an antitrust violation under FRAND terms.

2. JAPAN:

In 2017, The Japanese Ministry of Economy, Trade, and Industry (METI) published "The Intellectual Property System for the Fourth Industrial Revolution 2016/17" report, portraying future plans of improvising Japan's IPR system in light of the emerging disruptive technologies like Internet of Things, Robotics, Artificial Intelligence and their likes. A key subject considered was the licensing terms and conditions for SEPs, including effective management of the growing number of potential legal disputes. Several strategies were recommended to ease legal disputes, should they arise from SEP licensing, and minimizing litigation costs involved.

As one of the world leaders among innovative and protection of IPR, the strategies proposed and actions implemented by Japan stand as a model for others economies to follow.

3. UK:

Has a distinctive and robust method of handling with rights infringements, like the injunctive-style model as a relief to IPR holders on online infringement. While some policies are threatening to the IPR for instance the SPC exemption for exports of biopharmaceuticals, posing a great risk to the UK's and EU's IP-based biopharmaceutical industry.

Uncertainty over Brexit may also have some negative repercussion on the level of IP protection granted under the current British IP system and the existing EU laws and standards at large.

4. SAUDI ARABIA:

A great effort has been put forward by the Saudi Arabia Government with regards to protecting and facilitating commercialization of IP. Like the well-known government institute, The King Abdulaziz City for Science and Technology (KACST), is set up to provide legal and financial support to public research and support domestic inventors to register patents both domestically and internationally. The institute has a number of national research centers including the National Center for Biotechnology

KACST and many other universities in Saudi Arabia have a tech transfer and explicit IPR policies to grant and protect IPR. Saudi Arabia is one of the few emerging markets having universities enlisted among the top 50 registrants of PCT patent applications globally.

5. MALAYSIA:

Malaysia has progressed towards a positive improvement of its IPR policies especially to leverage the commercial use of IP. As reflected in the 11th 5-year plan (2015–20), the establishment of a Research Management Agency and plans to encourage local and international collaborations for technology transfer is a great proof of Malaysia's IPR strategies. Training is also given attention, where for instance the MyIPO runs an IP Academy with various training programs and capacity-building activities.

6. INDIA:

A great focus has been put on the technology transfer in India, formulating strategies for more effective commercialization of IP. This can be well reflected in the objectives of the National Intellectual Property Rights (IPR) Policy which includes the generation and commercialization of IP assets. Also the National Biotechnology Development

Strategy 2015–2020 aims primarily at giving rise to technology transfer through regional and global partnerships.

These strategies were put in place to address the inactive technology transfer activities in India. While in 2013, a total of 55 Patent Cooperation Treaty (PCT) applicants were filed for universities, 2016 India had no university among the top 50 PCT university applicants.

7. UAE:

In 2018, UAE passed a law to remove the 49% foreign ownership cap, and allow full ownership in certain sectors of investment and technology. The Takamul program was initially introduced in Abu Dhabi to provide legal and financial support for international patent filings at the USPTO and the PCT. Now this program extends to other Emirates of UAE as well, including Dubai, to foster innovation in the country. Financial support extends to as much as 90% for individuals, 60-75% for academic institutions and about 50% for commercial organizations.

8. INDONESIA:

Indonesia scores the lowest among all other countries in regards to commercialization of IP due to the high local barriers and requirements for technology transfer and using compulsory licensing for commercial and other use. There is limited or no participation in international IP treaties. Though there has been high incidences of copyright infringement, administrative relief are available for copyright infringement online. Indonesia is also working toward a robust Cabinet-level coordination in formulating a strong framework for IP enforcement.

V. CONCLUSION

In this paper, we analyzed the importance to enterprises to secure innovative product, services and procedures through Intellectual Property (IP), should the business aim to gain a competitive advantage in the economy. These IP rights include patents, copyright, trademark, trade secret and industrial designs.

Commercializing IP is the best way of making a commercial use out of the innovative rights secured, enabling interconnectedness, technology and knowledge transfers, and growth of the business and the economy at large. It enables universities and PRO to protect their inventions and commercialize it for the benefit of society and industry at large.

Various stages of successfully commercializing IPR have been highlighted, with greater emphasis on securing innovative ideas from the very beginning of the inception stage through trade secrecy. Commercialization begins once a product has been completely formed and is officially protected through IP, after which it is ready to be sold in the market. External sources may be collaborated with, including PRO and universities, for knowledge and technology transfer to enhance the innovative product or procedure. Strategic use of a combination of IP tools, such as trademarks and industrial designs, a patented product can further improve its brand image and recognition. And lastly, IPR enforcement, a pre-requisite to a successful commercialization of IP, which entails assessing the capacity to protect and enforce an intellectual property.

Considering commercialization of IP at a global level, the three dimensional business strategy was suggested. These include utilizing data, intellectual property rights framework and standard-essential patents.

Finally, the global status of commercialization of IP in various economies worldwide was analyzed in light of the U.S. Chamber International IP Index, edition 6 2018, that ranks countries as per the reliability of their IP systems for sound investment and commercialization opportunities. In this paper, we examined eight countries on the category "Commercialization of IP Assets", ranging from high to low index under this category. We concluded with the assessment of the extent of easiness in commercializing IP in these countries, the various strategies in place and planned for future improvements in commercializing and licensing IP.

Overall, as per the report, economies tend to have achieved better performance on the indicator Commercialization of IP Assets compared to other indicators. Even economies with relatively challenging IP environments, like India, Nigeria, Pakistan, Ukraine, a positive amount of effort has been reflected. Though a national technology transfer framework is not always devised, universities and PRO are seen to have imposed great efforts in several economies with regards to technology transfer policies, actively engaged in capacity building and enabling the commercial use of IP.

REFERENCES

[1] *Commercialising Intellectual Property: Knowledge Transfer Tools*. (n.d.). [Online]. Available: European IPR Helpdesk: https://iprhelpdesk.eu/Fact-Sheet-Commercialising-IP-Knowledge-Transfer-Tools

[2] European IPR Helpdesk. (2015). Commercialising Intellectual Property: Internal product. EU.

[3] (2018). *Global Innovation Index 2018: Energizing the World with Innovation.* WIPO; INSEAD; Cornell SC Johnson College of Business.

[4] Global Innovation Policy Center. (2018). *Create, U.S. Chamber International IP Index.* Pugatch Consilium.

[5] The Intellectual Property System Study Group for the Fourth Industrial Revolution. (2017). *The Intellectual Property System for the Fourth Industrial Revolution.* Japan.

[6] Hong, S. (n.d.). *The Magic of Patent Information*. [Online]. Available: WIPO: https://www.wipo.int/sme/en/documents/patent_information_fulltext.html

[7] Kalanje, C. M. (n.d.). *Role of Intellectual Property in Innovation and New Product Development*. [Online]. Available: WIPO: https://www.wipo.int/sme/en/documents/ip_innovation_development_fulltext.html#P87_19299

[8] Mohammad, R., & Nazmi, M. (2016). Intellectual property rights commercialization: impact on strategic competition. *The Business and Management Review*, 21-27.

[9] (2017). *Patents and the Fourth Industrial Revolution.* Europen Patent Office; Handelsbatt Research Institute.

[10] Sakle, A. (2018). *Standard Essential Patents – The Irony of Standardization*. [Online]. Available: Competition Law: https://competition.cyrilamarchandblogs.com/2018/04/standard-essential-patents-irony-standardization/

[11] Singleton, A. R. (n.d.). Using Intellectual Property to gain a competitive advantage in the marketplace. [Online]. Available: http://www.researchpark.illinois.edu/sites/default/files/media/IP%20in%20the%20Marketplace%20article.pdf

[12] Tulsiani, M. (2018, May). *Patent Commercialisation Via Licensing*. [Online]. Available: IIPRD: http://www.iiprd.com/patent-

commercialisation-via-licensing/?utm_source=Mondaq&utm_medium=syndication&utm_campaign=View-Original

[13] United Nations Economic Commission for Europe. (2011). *Intellectual Property Commercialization.* United Nations Publications.

[14] (n.d.). *What is Intellectual Property?* . WIPO.

[15] (n.d.). *World Intellectual Property Indicators 2018.* WIPO. *WIPO. (n.d.). Patents.* [Online]. Available: *https://www.wipo.int/edocs/pubdocs/en/wipo_pub_941_2018-chapter2.pdf*

[16] *India doubled the number of patents it granted last year. (2018).* [Online]. Available: *Business Insider India: https://www.businessinsider.in/india-doubled-the-number-of-patents-it-granted-last-year-but-less-than-20-went-to-residents-and-entities-based-in-the-country/articleshow/66948862.cms*

[17] WIPO. (2018). *Patent Cooperation Treaty Yearly Review 2018.*

[18] (n.d.). *FAQ: IP Policies for Universities and Research Institutions* [Online]. Available: WIPO: https://www.wipo.int/about-ip/en/universities_research/ip_policies/faqs/index.html