

## Protecting R&D Inventions through Intellectual Property Rights

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Intellectual property rights play an important role in socio-economic development. Countries attempt to have stronger IPR laws over their R&D outputs and other forms of technological development. The role of IPR is also significant in the protection of the results of research. Existing IPR tools which are devised by IPR experts at some level are difficult to use and handle. R&D outputs at national level can robust. This study elaborates on the need for intellectual property rights for R&D investors and the issues to be addressed in developing an appropriate IPR framework. For this purpose it will analyze the IPR provisions of the Horizon 2020 European Union Framework Programme for Research and Innovation and the various issues involved.

**Keywords:** R&D invention, intellectual property rights, TRIPS Agreement, IPR Provision, Horizon 2020, European Union Framework Programme for Research and Innovation

Intellectual property rights seek to protect knowledge derived from R&D especially by firms involved in collaborations with others to ensure that the knowledge is not expropriated by their potential partners. The lack of intellectual property rights reduces the bargaining power of collaboration partners and increase costs of information for such partners.<sup>1</sup> Inventors who disclose their knowledge to the public may expose themselves to litigation from a rival patenting a competing idea.<sup>2</sup> It is usually difficult to protect the knowledge that inventors disclose in a patent for the first time. Vague intellectual property rights discourage firms to collaborate to the detriment of economic production especially in complex R&D projects that are based on a range of different resources and skills to achieve their outputs.<sup>3</sup> Without patent protection enforcement mechanisms, developers of new technology may not want to reveal their products as they would lose absolute control over their work. An appropriate local IPR deters people from imitating the products or technology.<sup>26</sup> As their IPR regime improves, developed countries and developing countries are already complied with TRIPS Agreement, and TRIPS has given an extended time limit to the least developed countries to comply with TRIPS Agreement, thereby inventors will be reluctant to collaborate in countries with loose IPR regimes.<sup>4</sup>

The existence of protective mechanisms over intellectual assets is essential to enhance the competitiveness of organisations especially those working on R&D-related issues as well as to attract potential investors. Therefore, it is essential to balance intellectual property systems to ensure that they provide proper motivation to invest in research and development, while ensuring that the spread and development of research results are not inhibited.<sup>5</sup> Weak IPR regimes lead to low returns for those seeking to innovate.

### Protection of R&D under TRIPS

The existence of IPR laws is important for protecting and managing research results. Countries must enhance awareness on intellectual property laws and their functions at national and international levels to protect patentable inventions in a legal manner.<sup>7</sup> R&D innovations can be protected under the TRIPS Agreement which covers seven forms of intellectual property, namely, patent, copyright, trademark, industrial design, geographical indication, lay out design of integrated circuit, and protection of undisclosed information or trade secrets. According to Article 27 of the TRIPS Agreement all inventions regardless of the field of technology would be eligible for protection.<sup>8</sup> Strong IPR protection checks imitations while simultaneously attempt to strengthening the ownership of the innovation. In other words, strong IPR protection by checking all possible imitation does

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not permit to offer ownership when the work does not entitle to receive it. It also has a positive effect on economic growth by increasing the average duration of monopoly on power of goods and an increase in the average price of goods in the economy. A strengthened IPR protection regime may lengthen the ownership duration of the owner over a product or invention.<sup>9</sup> It means by providing a strong protection according to their criteria, they ensure the IPR being offered. Weak or ambiguous intellectual property rights reduce the incentive to innovate and create, and countries with weak IPR protection and poor institutional environments for that purpose are not known for their R&D and technology strength. A functional intellectual property rights system is needed for successful utilization and implementation of R&D. Since, intellectual property is significant facet of global commerce; it is not possible to negotiate trade between states that does not utilize these key property rights. Therefore, countries recognize that designing a functional intellectual property system would help them to protect their rights. Although it has not been fully demonstrated that stronger IPR laws are essential for economic development, countries do attempt to comply with international IPR regime, namely the TRIPS Agreement, to promote their technological development and enhance economic competitiveness.<sup>27</sup> Most countries have amended their laws to make them compliant with the TRIPS Agreement so as to effectively protect and manage the results of their research.<sup>7</sup> A good example of this is India which emphasizes on enhancing awareness on intellectual property laws and their operations at national and international levels.

However, changes in technology require intellectual property laws to take into account the new technologies such as, in the field of biotechnology, domain names, animal genetic resources, and computer software.

### **The Enforcement of IP Rights for R&D Investors**

Data indicates that firms investing in R&D perform better in regions that have strong enforcement of IP rights that help to mitigate problems associated with R&D protection. When enforcement of IP rights is poor, foreign investors in joint ventures would hesitate to transfer or invest in technology. Good enforcement of IP rights enables greater technology transfer and development by deterring the local partners from illegally appropriating the technology. In addition, foreign partners of joint venture firms in regions with

strong enforcement of IP rights will be more forthcoming with resources for projects as well as in providing increased levels of R&D investments and enjoy greater productivity in terms of introducing new products.<sup>10</sup>

Countries must have proper legal structure as well as well-developed financial markets to have economic development. Knowledge resulting from R&D activities occur through contractual, namely, patent arrangements in countries which have strong intellectual property rights protection. The gains from firms' investments in R&D will be lost if courts are unwilling to restrain such action through leakage of proprietary information through imitation. This occurs due to the high cost of court action or trial in protecting R&D investments in countries with weak legal protection. Consequently, it curtails an individual firm's R&D activities and will reduce the benefits of firm-specific R&D. Therefore, arbitration should be considered seriously as an option to take control of a dispute. It has plenty of advantages over litigation. The main con of this creature is that parties can select decision maker with expertise in the type of intellectual property, which the dispute is involved. Basically, this is a major advantage of arbitration over litigation.<sup>21</sup> Further, ADR and Mediation consists of single proceeding under the law determined by the parties, while court litigation consist of multiple proceedings under different law with risk of conflicting result which make too many complexity in cross-border cases.<sup>24</sup> IP rights in various contracts throughout R&D project has a vital role. Thus, parties must be prudent in choosing dispute resolutions strategy when negotiating dispute resolution clauses. In fact, the legal protection of a firm's investment in R&D will have an effect on financial market development and economic growth. This is quite apparent in China where the economic development depends on financial markets and legal structure. Although, China's market was weak initially, transactions were protected *via* informal mechanisms. One of the deviations of informal mechanism is informal finance and informal financial systems. Informal financial institutions play a complementary role to the formal financial system. Informal financing typically consists of small, unsecured, short-term loans restricted to rural areas, agricultural contracts, households, individuals, or small entrepreneurial ventures. The vastness of the country results in wide variation in market and legal

structures across different regions. However, the government ensured that certain regions were sufficiently well-developed to support economic activities.<sup>11</sup> Statistics on more than 300,000 states and private industrial firms indicate that the leakage of proprietary information varies with the strength of property rights protection. Regions without such protection have larger R&D spillovers and firms have less incentive to invest in R&D activities. The strong economic position in China is an example of how R&D investment is closely associated with property rights protections and how they affect R&D investments. Despite the overall weak property rights protection within China, certain regions provide stronger protection which checks uncompensated spillovers of R&D. It is clear that weak property rights contribute to R&D spillovers and some developing countries “have not signed international treaties concerning protection of intellectual property rights and others that have laxly enforced domestic laws and regulations designed for this purpose.” As such, imitation and information leakage are common in those countries. This can be compared with the situation in developed countries with strong IPR regimes. The existence of strong IPR regimes is one reason why the R&D spillovers on investment differ in developing and developed countries.<sup>23</sup> According to the United States Trade Representative Report, about 90 countries have adequate and effective intellectual property rights protections. China is on its Priority Watch List as imitation is seen as a dominant element in R&D spillover there.<sup>10</sup>

#### **The Case Study of China**

Despite poor legislation (means the law which is not providing adequate scope of protection). Such law does not have the potential to enforce existing law against violators. Most developing countries do not have tradition to protect their intellectual property rights. Even though, they possess formal protection, they fail to have enforcement. While, the existence of both formal laws and effective enforcement are together, the law can work effectively in the protection of intellectual property rights. The intellectual property laws and the international treaties that China has acceded to places it at par with the more developed economies. It is important to note that the laws and treaties in China are domestic and local and that most of the intellectual property laws in China are quite recent with most being enacted or amended after 2001. Due to such growth, the amount of licensing

fees paid by Chinese companies to foreign countries has increased substantially from \$13.86 billion in 2004 to \$25.42 billion in 2007.<sup>25</sup> The statistics indicate that R&D plays a significant role in industries especially with regard to early stage technologies and new industries like biotech.<sup>12</sup>

The case of China emphasizes that countries with better IP rights enforcement have greater access to external borrowings and new equity and that they are more willing to invest in R&D due to better results and more partners. It also has an effect on agency costs in joint ventures by reducing the risk of appropriation with local partners. The case of China shows that economic growth from high-tech industries in regions which possess better IP enforcement mechanisms is positively impacted and that in turn enhances IP rights enforcement.<sup>13</sup>

#### **Yamaha Case Study**

The name *Yamaha* is synonymous with cutting-edge sound and music technologies that have been acquired over the years. This has enhanced the value of the *Yamaha* brand and creates new demand for its products through the provision of innovative, high-quality products and services. *Yamaha* is identified with world-class technologies that it has researched and developed and this is expected to further develop in the future. Its investments in human resources to support its research endeavours and business are high and the company constantly seeks advanced technologies and collaboration with universities and research institutions.<sup>13</sup> This acquired high-level knowledge and technology is then drilled down into its workforce. *Yamaha* is a strong believer in creating its own patent and other intellectual property rights while respecting that of other innovators. Lately, the company has taken steps to integrate its business, R&D and intellectual property strategies through measures aimed at maximizing the contribution of intellectual property to its business bottom-lines.<sup>13</sup>

The company's patent strategies are designed specifically to meet its operational requirements in particular business segments. They include acquiring patents in specific areas such as core and new technologies and new businesses and developing a strong patent portfolio on its core competencies.<sup>14</sup>

#### **Issues of European Commission Documents containing IPR Provision**

The global economy motivate competitiveness to create high value added goods and services. European

Union move towards innovation-based sustainable growth as a response to globalization.<sup>22</sup>

The FP7 is the main instrument for funding research in Europe which will run from 2007-2013. FP7 is the short name for the Seventh Framework Programme for Research and Technological Development. FP7 is also designed to respond to Europe's employment needs, competitiveness and quality of life. The programme has a total budget of over € 50 billion. This represents a substantial increase compared with the previous Framework Programme FP6, which reflected the high priority of research in Europe.

Horizon 2020 is the new EU Framework programme for funding research and innovation, which has run from 2014 to 2020 with a budget of €80 billion. It is the financial instrument implementing the Innovation Union, the Europe 2020 flagship initiative aimed at securing Europe's global competitiveness and driving to create new growth and jobs in the area.

The IPR provisions of Horizon 2020 are important because of the large budgets and their use as a reference in designing the IPR provisions of R&D national programmes. As a key objective of Horizon 2020 projects are to exploit and disseminate of project results, the implementation stage assumes particular importance which would not be possible without the assistance of Intellectual Property (IP).<sup>20</sup> The Horizon 2020 has four key interrelated aspects for IPR provision, namely, access rights, ownership, protection and use and dissemination. The issues which must be addressed by IPR for R&D include coverage of IPR, ownership of IPR, access to IPR and Use and Dissemination respectively.<sup>15</sup>

#### Access Rights

The sharing of knowledge is vital in collaborative research and participants must attempt to exchange information, software, etc. to perform projects and exploit its results. The provisions on access rights facilitate exchange of knowledge between participants of a project. Access rights are including from licences and user rights to results, background or sideground given by the owners to other parties. According to this provision, the access rights are granted 'on request' which must be in writing. According to Horizon 2020, participants are allowed to define the background information needed for the purposes of the project in a written agreement, particularly when it wishes to make the access rights limited to some conditions,<sup>20</sup> and

exclude specifics where appropriate or necessary. However, such exclusion must only be on the specific elements that may create problems. Such an exclusion provision is particularly useful for participants since previously it had to be concluded prior to signature of the grant agreement while currently there is no such limitation as the participants are not forced to define excluded background until they have sufficient knowledge of the project expectations. The right of access is requested for one year after the end of the project unless agreement is reached on a different time-limit. Generally, Horizon 2020 emphasize on open access on Article 31 to research publications, as its projects are based on collaboration between participants, matters related to access rights are of utmost importance.

It must be noted that access rights do not confer any entitlement to grant a sub-license unless agreed by the owner. If such prohibition does not exist, the number of participants entitled to a license increases even though they are not involved in the project. Further, the exclusive license for background information may be granted with the written confirmation of other participants that they have waived their access rights. Beneficiaries must inform all concerned of the limitation on accessing rights to background information. The Commission also has the authority to object to the granting access rights to a third party on competitiveness or ethical grounds.<sup>15</sup>

#### Ownership

The ownership of any IPR must be made clear to participants. Under Horizon 2020, the results of the project belong to the participants generating them. However, many ownership conflicts may arise as soon as the project is running and might become a potential problem for participants. According to the Horizon 2020, participants must be assured about the entitlement to claim rights for employees in a manner compatible with any obligation under the grant agreement. It must be noted that taking appropriate measures to manage ownership issues such as keeping laboratory books or completed invention disclosure form may avoid from ownership conflict and can be used to reflect who generated a given result. Under the European Union Framework Programme for research and Innovation Horizon 2020, "Participants must ensure that, where necessary, they reach an agreement with their employees and other personnel if the latter are entitled to claim rights to foreground (including personnel of third parties such as sub-participants,

students, etc.), in order for the participant to be able to meet its contractual obligations. Such agreements may for instance involve a formal transfer of ownership, or at least the granting of appropriate access rights (with a right to sublicense). For academic institutions, this is especially relevant regarding (a) non-employees such as students, both undergraduate and post-graduate, e.g. Ph.D. students), and (b) researchers in those countries having a specific type of "professors' privilege" regime (according to which the researchers concerned may have some personal rights to the results of university research)".<sup>16</sup>

#### **Joint Ownership**

Horizon 2020 allows joint ownership of foreground in cases where several participants have jointly carried out work that generates foreground and where it is difficult to determine their respective share of the work. Also, where participants cannot reach agreement on the allocation and terms of exercising the joint ownership, owners are authorized to grant non-exclusive licenses to third parties, without any right to sublicense, provided prior notification to the other joint owners is made and payments made to other joint owners are fair and reasonable.<sup>17</sup> Joint ownership is easier for participants where they have not agreed on the management of the joint ownership by the Horizon 2020 introduction and participants can still agree to different provisions of the agreement. Such a regime will ensure that the result can be fully applied and at the same time ensure fair and reasonable compensation to the other joint owners. Further, such an arrangement encourages participants to conclude a joint ownership agreement.

#### **Transfer of Ownership**

Owners are legally allowed to transfer foreground to any legal entity provided they also transfer all related obligations to the assignee. According to the Horizon 2020, on the Transfer of Foreground requires that participants give a minimum of 45 days notice and a fair and reasonable compensation to other participants of the invention to provide access rights and sufficient information to the new owner of the foreground to enable them to exercise their access rights.

By removing the requirement of notifying the Commission while still requiring it of the other persons, the bureaucracy has been removed from the system. Participants can waive their rights in advance for transferring their ownership to a specifically identified party. Such policies can protect the initial

right of the party in its own outcomes. Further, it reduces the restrictions of participants in transferring of ownerships as well as simplifying the transfer process. When such requirement did not exist the process of advance notification to the Commission of each and every transfer was burdensome and time-consuming. Giving up ownership in this manner allows for greater autonomy and makes participants more interested in securing the ownership.<sup>16</sup>

#### **Obligation on Owner to Protect its Own Foreground**

According to Article 27 of the Horizon 2020, in the event that an owner does not protect and transfer foreground that is capable of industrial or commercial application to any institute or another person, ownership with the consent of the participant will be assumed by the Commission which will then undertake measures for its effective protection.

#### **Use and Dissemination**

Participants must use their foreground or ensure that it is used and disseminated as swiftly as possible or it will be conducted by the Commission. However, the result must be protected before any public disclosure, as it can destroy the participants' chances of being granted intellectual property right. The public must be informed of the foreground by the participants for the results of their research work and this must be done within forty-five days in advance of dissemination activity. They also have the right to object to any loss they may suffer due to the removal of their legitimate interests on the foreground or background.

#### **Participant Issues in Negotiating IPRs**

It is apparent that participants encounter issues during negotiation over IPRs in their projects. As well known, it is crucial to arrive at an agreement on IPR issues in the early stage of the project. Nevertheless, most project partners are unable to elaborate fully on IPR issues on all aspects of their project. The "Seventh European Framework Programme for Research and Technological Development from a Swedish Perspective" in emphasizing on reaching agreement on IPR at an early stage states that "the various responsibilities within a consortium, e.g., regarding IPR, should be established in a consortium agreement to avoid future conflicts among the Participants".<sup>18</sup>

In negotiating and executing access rights, it is obvious that research organizations do not have the same advantages compared to their industrial partners

which can benefit from the commercialization of research results, nor do they have access to the same level of legal support to defend their interests. This clearly places the research partners at a disadvantage.

### Conclusion

The latest version of EC which is Horizon 2020 removes all necessary obligations which include the need for prior notice to the Commission for publication, transfers of ownership and provision of access rights to third parties. From the analysis, it appears that IPR provisions under Horizon 2020 of the EC are operating as intended and participants do receive proper protection. The provisions provide a balance between the needs of participants and in ensuring that the results of projects funded by the EU are put to use for either commercial or further research purposes. The effectiveness of the IPR provisions makes them suitable for adoption by other countries. The application of Horizon 2020 must be continued in order to understand the issues involved.

Property rights need to be well enforced and regulated to ensure that investments in socially desirable goods are not undermined. The level of property right protection at the national level can affect the leakage of firm proprietary information with countries having a strong regime in this area enjoying lower levels of leakages of proprietary information through imitation or theft. It has also been determined that there is a positive correlation between larger leakages of proprietary information and lower R&D investment, and this is aggravated in areas that have inadequate intellectual property rights protections. Legal protection of R&D activities and property rights protection affect R&D activities and simultaneously impact economic and industrial growth. A robust intellectual property rights regime enhances firms' incentives to invest in such activities.

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