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INTELLECTUAL PROPERTY PROTECTION IN OPEN INNOVATION PROCESS



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ABSTRACT

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Abstract

This master thesis considers Intellectual Property Protection in an Open Innovation. Open Innovations and IPR are looking like totally contradicting approaches. This work tries to provide that they could be used in the same Innovation process.

Keywords: Innovation, Innovation process, Open Innovation OI, Closed Innovation, Intellectual Property Protection IPR, Trademark, Trade Secret, Patent, Database Right, Design Right, Copyright

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1 INTRODUCTION

This chapter provides an introduction to the thesis. Here would be explained the background of the study and research questions. Introduction chapter also includes definitions of key concepts, limitations and theoretical framework of study. Also here would be described the research methodology and structure of this Master thesis.

1.1 Study background

Every year the pace of human life and technological progress becomes higher and higher. Every day, every hour, humankind generates new ideas. Some of them we are implementing, some stay on the conceptual level and are waiting for their time. Development of innovations is one of the key necessary processes for modern companies to survive. If company loses possibility to surprise the customers by new technologies or do not improve production facilities, it loses its competitive ability. That why innovation are so important for successful businesses.

The etymology of the word "innovation" goes back to the noun on the classical Latin "innovationem" from the verb "innovare" (innovatus), which means "update" or "modify". So, "innovation" is connected with the updating or changing of something.

The term Innovation was firstly submitted in 1912 in the book Theory of Economic Development by American economist from Austria Josef Schumpeter, There innovation was considered like invention, which could be used in production or a certain economic department management. Exactly Josef Schumpeter determined that innovation is the key engine of business development. [Schumpeter Josef A., 1934].

Business dictionary determines *Innovation* as the transformation process from any invention into a some product or service which is sold to customers and brings profit. Invention is the formalized result of meticulous research, an improvement of any product or way to create goods or services.

In another words, innovation is an idea which have economical reason and perform some specific task to cover customers' demand. Innovation process includes generation of idea and its transformation into the useful product.

There are two categories of innovation:

- (1) Evolutionary innovations (continuous or dynamic evolutionary innovation) – innovations achieved by the list of incremental steps in processes or technology
- (2) Revolutionary innovations (also called discontinuous innovations) – totally new and disruptive innovations. [Thomond etc., 2002]

An American scientist Peter Ferdinand Drucker, one of the most influential theoreticians of the 20th century, determined innovation like "the means which allow to an entrepreneur to produce a new products that bring him prosperity, or improve existing products to achieve greater profit" [Drucker, 2008].

Innovation is a complex process which is depicted in Figure 1. [Morris, 2011]

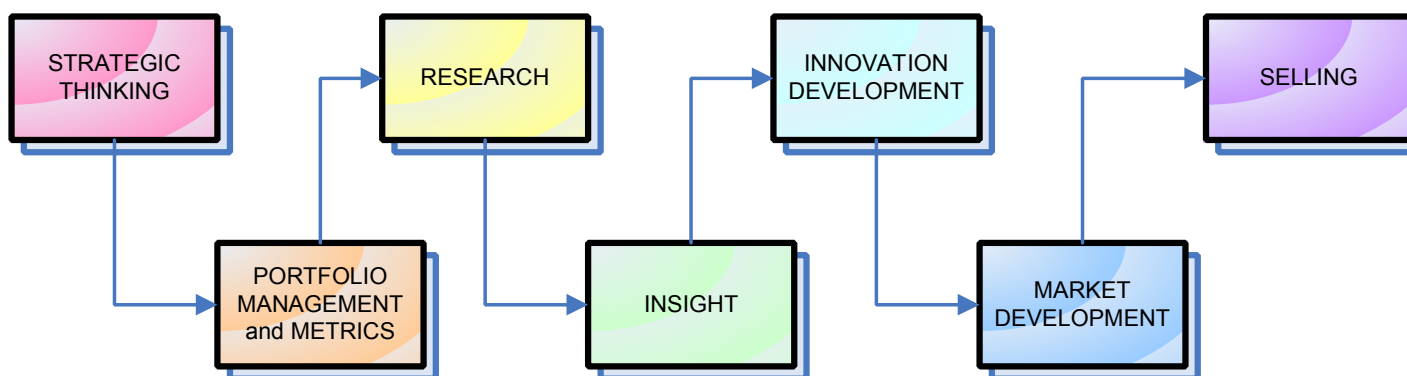


FIGURE 1 Innovation process

From the organizational point of view all the innovations could be divided into

Closed and Open.

Closed innovation is the way to innovate by using of only internal sources of the organization. According to this approach, company creates a special department, Research and Development department, which exclusively produces innovations. The company keeps all new ideas inside own R & D departments, transforms these ideas into new products and, this way it brings profit to it. All the ideas should be generated inside the company, and they should left there. This approach assumes that all the innovative works should be done by the company itself and its own resources. In the twentieth century this paradigm was the main used by the companies. Nevertheless in twenty first century this concept became less and less useful. To produce the innovation in our era of new technologies and be in time, companies are needed to collaborate and cooperate with each other.

Open innovation is another way to innovate, according to which could be used external sources as well, as internal. This approach assumes that smartest people could work in different companies, not only in one. So companies invite other people and companies to produce an innovation. Companies share ideas and technologies to obtain the final product. Open innovation considers the research and development process as an open system.

Open innovation is relatively new paradigm, the main idea of which is that companies are able to share their intellectual potential in order to collaborate while developing innovation.

According to this approach, external and internal knowledge of company as well as external partners could be used to innovate and obtain the final product. From other hand, the innovative technologies created by one organization could be sold to other companies if they could not by used in its business model or

organization do not have capacity or experience to develop these inventions. This way the main advantages of open innovation are:

- Reduction of cost and time of producing of innovation
- Possibility to commercialize and place to market innovations which company could not use by itself
- More ideas, technologies, patents, products could be collected by the company in shorter time by using external technical resources and knowledge

Open innovation process is incremental process which consists from the main 4 stages. (Figure 2)

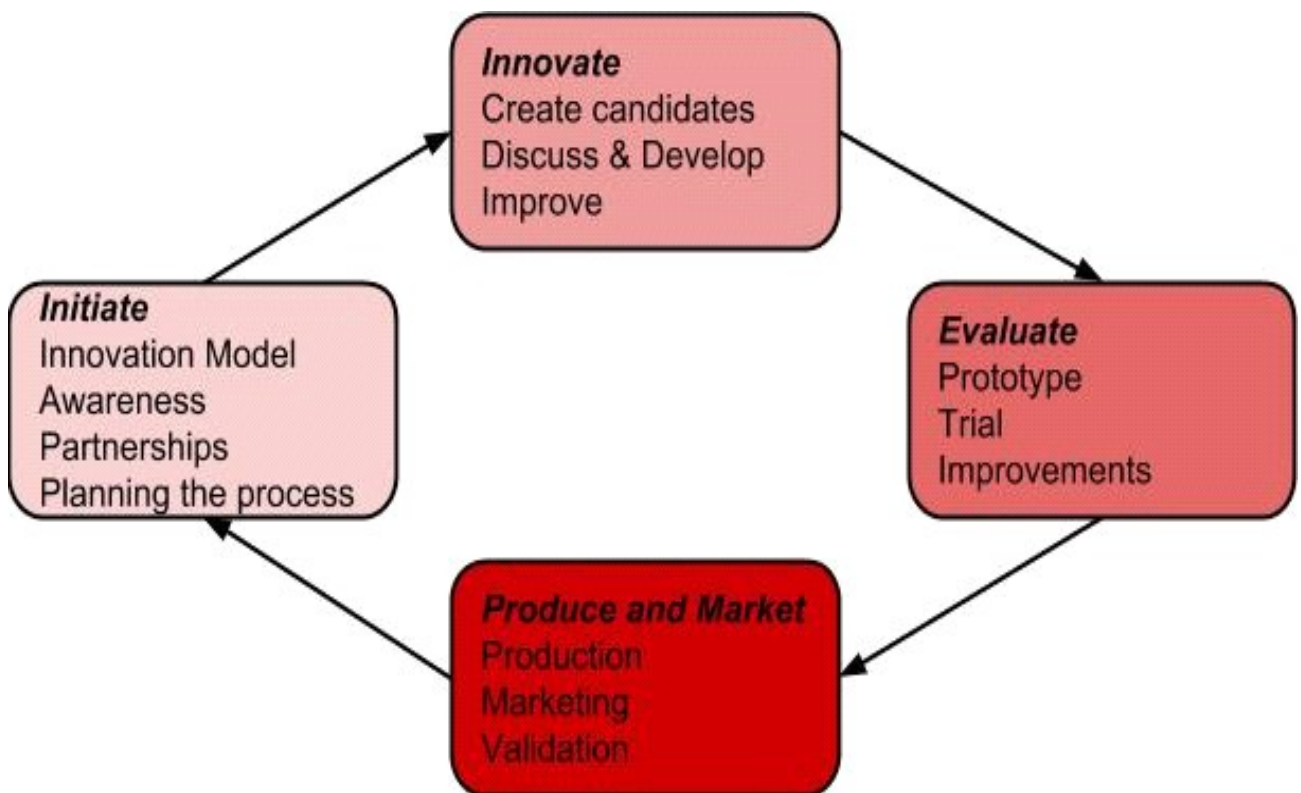


FIGURE 2 Open innovation process (simplified) (Pawlowski, 2013(AGLIS))

There are several prerequisites for the shift of companies' activities towards the

model of open innovation:

- Active distribution of knowledge between innovation subjects;
- Protected developments can not be used because of lack of knowledge, equipment, human resources, etc.
- A rapid grow of new developments amount in some field.

From all these factors, it can be concluded that, at the start of the transition to the knowledge economy, the most profitable strategy is to pursue an open innovation model and the right business. Firms closed by the internal environment loose their competition ability in the market. Often, this will result in them using their resources, duplicating innovative development that has already been created, or doing research for others. In addition, companies that conceal their research data lose an important part of the profits that have been made by using other companies in research and development. Developers and innovative ideas are at risk.

Although many companies consider it inappropriate to adhere to the open innovation model, because they realize that using this model, the degree of protection of intellectual property is significantly reduced. Some companies believe that the model of open innovation excludes patenting. The main idea of the using open innovation, as mentioned above, is to increase the company's profit through the exchange of developments with other companies and the satisfaction of customers' needs. At the same time, the company gets a larger profit, when they sell their patents or rights o use their patents. If innovation is not patented, mutually beneficial exchanges are impossible, all due to infringement. To obtain the maximum profit from innovations they should be used by wild public, patented, and use of patents is sold to some other companies. This way, the idea of open innovation does contradicting with

intellectual property protection but even contribute to it.

1.2 Research goals

Like the closed innovation model, open innovation also faces a few problems.

There are:

Not enough concentration. A lot of platforms for open innovations accept any ideas. This allows collecting different ideas for the gradual improvement of your products / services. You could also compare ideas to determine which ones are attractive, but hardly produce many radical ideas. To increase the likelihood that radical ideas will emerge, you will all have to concentrate on main problems of your customers and devote a most of time to possible solutions. We are talking about the depth of thought, not the breadth of ideas.

Misunderstanding of final customer. Producing a really innovative idea always requires a full understanding of the demands of customer. Mostly employees, and even mostly customers, do not sufficiently understand the most urgent, unsatisfied demands of their customers, especially since they could be mostly unclear. The main customer demands could be considered in an open innovation platform, but there is a limit how much detail it can share (due to technology and IP issues).

Limited space for conversations. Usually ideas are not separate eureka moments that we tend to count. In fact, they are usually a combination of ideas and numerous changes and developments. To create and refine different ideas we have to collaborate and discuss more than the comments sections of open innovation platforms can provide.

Status Quo Captivity. In order to come up with radical ideas, you need to understand the situation and imagine future opportunities that are difficult to do

on your own. As a result, most ideas presented on open innovation platforms are related to minor changes to current solutions to existing needs and problems. Innovative teams better anticipate the future (and thus produce radical ideas) through creative mind and knowledge of new technologies and technics.

As could be seen from this list of problems, that meets open innovation model, the most important question of it is 'how to protect the intellectual property in open innovation?' How to determine each innovator's input and share the final profit?

In this master thesis researching relations of two from some point of view contradicting prospectives like *open innovation* and *intellectual property protection*.

1.3 Thesis structure

1. *Introduction*. At this chapter of thesis is briefly described area and main goals of research.

2. *Literature review*. Main concepts like Open Innovations and Intellectual Property Right and their connection are considered here

3. *Intellectual property protection in open innovations*. This is the main part of thesis. Here is made an attempt to determine how effectively protect intellectual property doing open innovations.

4. *Conclusions*. This chapter describes main summary of research and possible future goals.

2 LITERATURE REVIEW

2.1 Concept of open innovation

The first time *Open Innovation* term was introduced by Henry Chesbrough, professor from California university in his book, which was published in 2003: “Open Innovation: The New Imperative for Creating and Profiting from Technology.”

Nevertheless, the first considers of this innovation approach were made much earlier. In Hayek’s (1945) *Joy’s Law* was described how that knowledge and innovations are distributed in society. *Joy’s Law* says that smartest people usually work for somebody else. And exactly this problem *Open Innovation Model* try's to solve.

Nowadays, the closed innovation model is experiencing a kind of transformation, which is caused by the emergence and progression of factors that destroy the logic of the closed innovation model. These factors are described on the Figure 3.

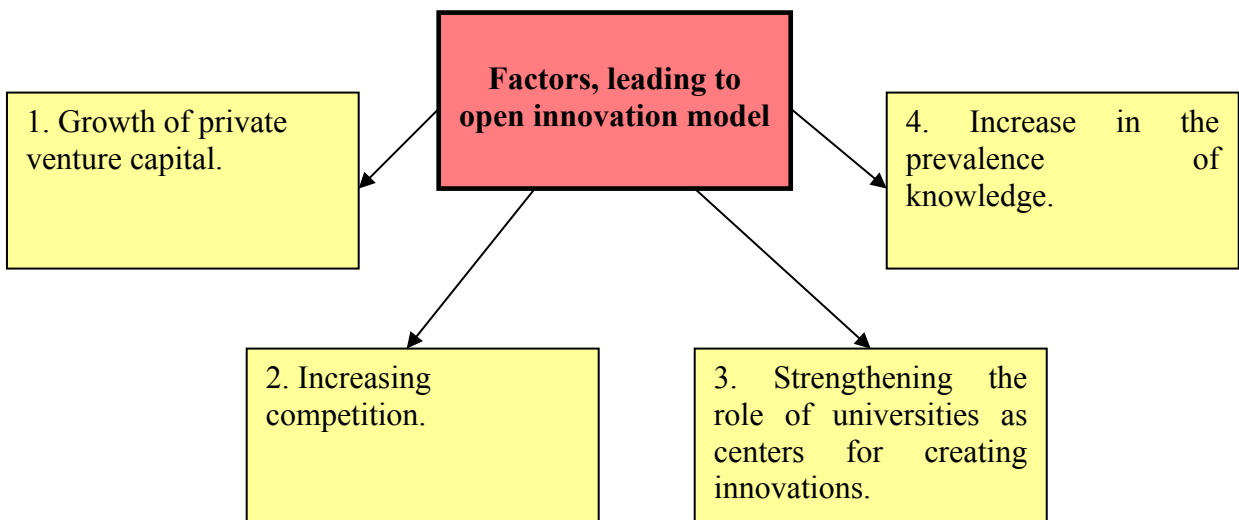


FIGURE 3 Factors, leading to open innovation model appearance

Growth of private venture capital.

During the last 30 years, it was a significant growth of capital, which was aimed at the creation of firms engaged in the commercialization of knowledge coming from external sources. Such start-ups (a start-up company, which was created quite recently and which builds its commercial activity on the basis of innovative ideas and technologies) become serious competitors of large companies-leaders in this industry. In addition, it was these leading companies that invested in those R & D, the results of which were later used by start-ups to create their products and services.

Increased competition.

The share of a competing market in the United States grew to 52.4% in 1939, 56.3% in 1959 and 76.7% in 1980. Increased competition will accelerate the process of creating innovation, which will lead to an increase in an amount of new technologies in the market, since an increase amount of firms involved in R&D will lead to the need to increase R&D funding for the success of competitors. To achieve the main part of market and leadership in the area, firms begin to concentrate only on the most profitable segments and processes. Finally they invest in a less extensive research pool, resulting to a one-way growth of investments. Every research company needs more and more innovations keep a leader status of some producing field.. This way, small companies have much more chances for success and faster results than companies with big R&D departments and different laboratories which try to make different researches there. Sometimes large companies have to buy different technologies from own competitors to remain at the market and in order to receive more or less influencable profit. This way those aspects lead to the fast production of new technologies and open innovation model becomes the most productive way to make it.

Strengthening the role of universities as centers of innovation. The decline in public funding of basic scientific research in most scientific areas created incentives for universities to search for sources of funding for their research among corporations. What led to the fact that higher education institutions began to understand much better what issues are facing certain sectors, and their research began to be aimed at solving specific problems facing business today. "In the 1980s and 1990s, it is generally accepted that the US patent system and universities are one of the most important factors in the country's economic growth that determine its competitiveness in the world, which is due to the growing importance of scientific research and intellectual property for the technological development of the United States. Universities are often described as "an engine for economic growth", and the legal protection and commercialization of the results of their research is the only way to attract, preserve and reward gifted scientists who want to see that the results of their work are used for the benefit of society". The knowledge that is now being created in universities has become more focused on concrete results that can be commercialized, on innovation.

Increase in the prevalence of knowledge. The closed innovation model was successful and effective in a monopoly on the ownership of the knowledge of individual large research centers operating within vertically integrated companies. However, as knowledge spread, the monopoly right of these laboratories to knowledge began to weaken, thereby reducing the effectiveness of the closed innovation model and giving rise to new opportunities for generating knowledge, the emergence of open innovations. Thus, the main factor determining the possibility of a model of open innovation is the degree of prevalence of knowledge. Therefore, if we single out the criteria by which we can judge the prevalence of knowledge, then we will have a tool with which we can

assess the possibility of moving from the closed innovation model to the open innovation model.

2.2 Main problems of open innovation

Like Closed Innovation Model Open Innovations also have their advantages and disadvantages. The main disadvantages of open innovation model are described on the Figure 4.

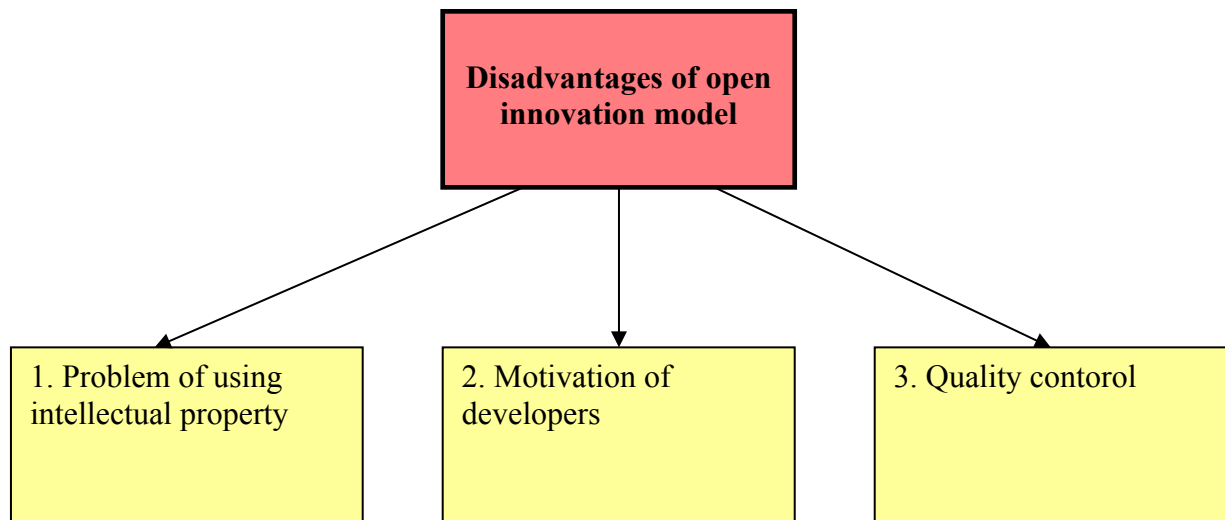


FIGURE 4 Disadvantages of Open Innovation model

The problem of using intellectual property.

The author's law question is a problem for companies that want to use this process to develop open innovation. Quite often, companies demonstrate differences before embracing open innovation. The issue of intellectual property rights is often cited as a major drawback of open innovation. However, many researchers and advocates of open innovation are united by the fact that

intellectual property rights should not be seen as a problem.

It is believed that innovation stimulates competition and requires the emergence of new, more advanced technologies. He argues that a more sophisticated model and smarter advertising methods allow companies to sell their technology and make their products more successful than other companies. Some companies may be better at producing certain goods and services. The importance of more complex business models is that other companies can use these products or technologies for their own purposes. As a result, for example, relatively sophisticated American marketing, distribution, sales, and service systems can provide US companies with a significant competitive advantage. From this point of view, intellectual property rights can be considered as part of the defense policy in companies with relatively outdated business models and as a barrier to scientific and technological progress.

The founder of the corporation Intel E. Grove believes that the modern world system patenting is full of obvious shortcomings and flaws. According to his opinion, such an organization will lead to a systemic crisis similar to that is observed in the financial system. The evolution of patenting has stopped a few decades ago, and many current patents never develop into products, at the same time the development of products, often described in patents, goes on continuously. "In the end," he says, "patents are increasingly being presented not as an instrument for the protection of intellectual labor, but as an instrument speculation, the main goal of which is the extraction of maximum profit by any ways. Exactly the same situation was in the financial sector, when the exchange tools were cut off from reality. "

Motivation of developers.

Another obvious difficulty in the implementation of open innovation companies

is to attract users and motivate them to participate in the process of innovative development. Users are an integral part of the open innovation process as they jointly create new ideas and products. Many companies offer customers rewards for the idea of solving certain problems. Innocentive and Netflix have used such practices. Financial incentives will increase user participation in the innovation process.

Threadless.com is a company offering users financial incentives in a different form. This website invites everyone to design their own version sketches of t-shirts and half-sleeves and send it by e-mail, the company will promote it's on the market, and the authors will get their share of revenue. In addition, the company will provide clothing manufacturers with valuable information on trends in their industry.

Thus, financial incentives turn out to be an excellent way motivation and attracting users to participate in open innovation.

Quality control.

One of the problems in implementing the mechanism of cooperation in the development and application of open innovation and collective action is quality control. The preparation and implementation of an open innovation project requires a complete mechanism for managing the process of joint creativity.

Collaborative agreements are effective if there are clear rules, clear leadership, open goal-setting processes and conflict resolution between partners. Each of these elements enhances the quality of our services or products.

Practice shows that the partners of the company can achieve much more success in the market, giving way to some control over making decisions about quality goods interacting with each other participants (suppliers, consumers or both). Thus, the mentioned difficulties for open innovation can be overcome if the

companies go to transfer part of the control to partners on cooperation, offering financial incentives and creating advanced models business to solve emerging problems, in particular problems with the rights to intellectual property.

2.3 Intellectual property right

Intellectual property rights (patents, designs, copyrights), as defined in the WTO, are rights granted to people to create their opinions. Usually they give the creator the exclusive right to use his creation for a certain period of time. "

Intellectual property (IPR) is the protection of mental creations of moral and commercial value.

IP law usually provides exclusive rights to use the creation and creator of intellectual creativity. However, these rights, also called exclusive ownership rights, are limited in scope, duration and geographical scope.

In the broadest sense, the term IP means a temporary exclusive right established by law, as well as individual non-property rights of authors to intellectual property or identification. The Law on Intellectual Property establishes a monopoly of creators on certain forms of using the results of intellectual, creative work, which others can use only with the permission of the former. The scope of the concept of "intellectual property" is not limited to exclusive rights, but applies to the whole set of property rights, to the results of intellectual activity and to means of identification. A narrower term describing the results of intellectual activity is the term "intellectual property", which combines the protected results of intellectual activity with means of identification.

The purpose of protecting IP is to promote the creative potential of the human mind for the benefit of all, ensuring that the benefits of using creation will benefit creation. This encourages creativity and gives R&D investors a fair return on

their investment.

There are four main intellectual property rights (Figure 5):

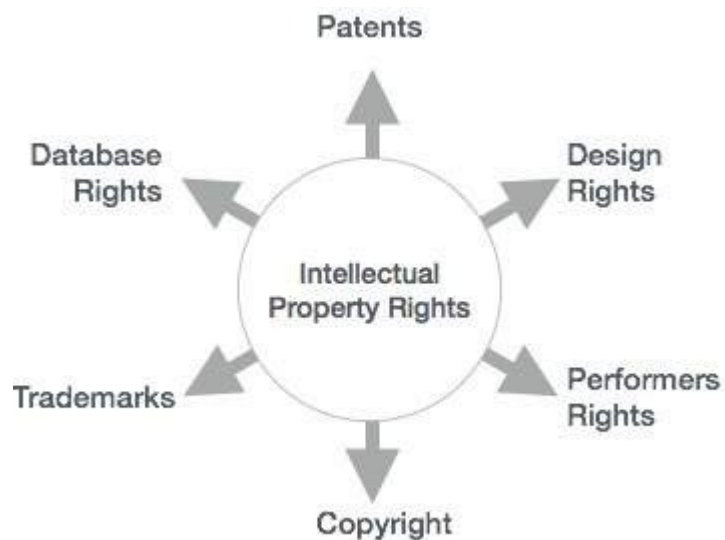


FIGURE 5 IPR types

- Relations governing the creation and use of scientific, literary and artistic works are governed by *copyright*. Copyright is based on the concept of “work”, which is the initial result of creative activity that exists in any objective form. It is this objective form of expression that is in the field of copyright protection. Ideas, methods, processes, systems, methods, concepts, principles, discoveries, facts are not subject to copyright.
- *Patent law* is a system of legal rules that defines the procedure for the protection of inventions, utility models, industrial designs (often these three objects are combined under one name - “industrial property”) and the patent that must be obtained in the selection process.
- A *trademark* is an identifiable mark, design, or expression that distinguishes goods or services from one seller from goods from other sellers.
- *Trade secret* is a formula, practice, process, design, tool, model or set of information that is not generally known or reasonably identifiable, with which the company can gain an economic advantage over its competitors and

customers. The government was not provided with formal protection; Each company must take measures to protect its trade secrets.

- *Design right* is an intellectual property right that protects the visual design of objects that are not purely utilitarian. Industrial design consists in creating a form, composition or composition of a picture or color, or a combination of a picture and color in a three-dimensional form that contains aesthetic value. An industrial design can be a two- or three-dimensional design used to make a product, industrial product, or craft.

- *Database rights* are considered copyrighted, but different from them, which exists to identify investments in compiling the database, even if it does not include the “creative” aspect reflected in the copyright.

2.4 IPR in Open Innovation in modern world

Open innovations have some challenges, because it involves collaborators sharing resources and research. This is particularly a challenge when it comes to Intellectual Property.

IP refers to creations both technical and intellectual. IPRs exist in most territories or regions to protect different types of IP and include patents, trademarks, design rights, and copyright — relevant not just to artistic works, but also software. IPRs also include certain types of database rights, plant variety rights and, to some extent, trade secrets.

Almost all types of research will lead to the creation of some kind of new IP. Very often this IP will be susceptible to protection by one or more types of IPR. For this reason, it is standard that traditional collaborative research and development relationships will include terms that deal with the generation, use, and disposition of the IP brought into the agreement, and resulting from it.

Since OI assumes that the parties bringing different types of insight and ability to

the collaboration, it is prudent that any agreement governing the OI project acknowledges the “background” IP which the parties can bring. It should also deal with later access to that background. This way parties could concentrate on innovation itself and avoid disputes.

When it comes to commercialization of innovations created by the OI model it will generally require further investment, which may involve parties not even involved in the original OI. This way it is necessary to demonstrate a coherent IP position.

Therefore, a proper consideration, at the outset of the OI project, of all the issues likely to arise about the ownership and rights in the “foreground” IP — which the collaboration hopes or expects to generate — can maximize the chances that the public will eventually benefit from the OI process. Furthermore, as a by-product of this analysis, the effort required to define or predict the IP associated with the collaboration at the outset, and the IP hopefully resulting from the arrangement, may, in fact, help to crystallize ideas about what might be achieved. The confidence that comes from knowing that IP considerations have been properly aired right from the start should enhance the trust in the collaboration, and facilitate the exchange of ideas. (Kremer, 2017)

There is a problem in working with OI and patents, especially when using external ideas and the subsequent attempt to use them with patent protection, finding that an idea or innovation does not necessarily meet the requirement of secrecy. Each IPR leader should consider when deciding how open a process should or should be. Perhaps there is a greater need to solve the problem as such than having a monopoly on the use of the invention. In many cases, an alternative to patentability may be required to make money on innovation and cover the costs of investing in R&D. If the need to solve the problem is higher than the solution to the problem of exercising a monopoly on it, the IPR master should

consider the possibility of sharing costs by creating joint R&D departments or funding university research on a specific area of research in this area. This makes it possible to make it more economical. (Andersson, 2017)

3 INTELLECTUAL PROPERTY PROTECTION IN OPEN INNOVATIONS

3.1 Signaling role of IPR in open innovations

The previous section described the problems that OIs face due to IPRs. However, IP is not an OI problem. On the contrary, there are many situations where IP facilitates collaborative research and development. Let's take a look at the OI process, where a company is actively looking for the IP addresses of other parties for inclusion in its own product line. If intellectual property rights such as patents exist, they become the currency of innovation; When a company finds an idea that it wants to turn into a product, it is much easier to transfer it to the company if the technology is patented. Thus, the company will be able to better understand what kind of idea it is and how it works, since this information is indicated in the patent. In addition, inventors should not be afraid that this company will abuse this idea, since the patent proves that it belongs to them. Finally, a patent makes it easy to transfer ownership; a company can simply license or buy a patent.

IBM, for its part, is actively using its large patent portfolio to promote OI in the ecosystem. For example, in 2005, IBM made 500 valuable patents available to the open source software community, which can now use them for free. IBM hoped it could drive innovation flows in its ecosystems, thereby increasing value. As a result of this change, IBM allowed IBM to significantly reduce customer concerns about patent infringement on the Linux operating system. Linux is an important part of the delivery of many IBM products - if customers fear IP problems, sales may suffer. (Alexy, Criscuolo, 2009)

As we can see, IPR plays a useful role for OI when used more as a signaling device than as a control. The company's patent portfolio takes the company higher by negotiating with venture capitalists, potential partners, or large companies interested in buying an idea. The patent demonstrates to third parties that the company has taken an inventive step in a certain field, possibly indicating experience in this area. This recognition can help attract partners working in similar areas.

In connection with the transition to open innovations, companies are changing their approaches to managing intellectual property. It is also important that the phenomenon of intellectual property itself tends to present unique knowledge as something static, as frozen, to some extent external to the company, an object that can be treated almost like a “thing”. However, in today's competitive environment, some “turbulence”, dynamic functioning, mixing a wide variety of knowledge, which may or may not be unique, is important. That is why the emphasis in management today is largely shifted from the “frozen”, “objectified” knowledge behind this or that intellectual property object to the entire dynamically proceeding knowledge process in the organization. In this regard, intellectual property is another source of increasing the company's profits.

In a world full of knowledge, companies must be active buyers and active sellers of intellectual property. However, so far only a few companies fully receive a commercial advantage from their intellectual property when they decide to use it not only in their business. In addition, each company can benefit from the use of foreign intellectual property in its business, rather than independently from the very beginning to engage in all the inventions it needs. Of course, this option requires a completely different approach to managing intellectual property: instead of managing in such a way as to prevent competitors from accessing its intellectual property, it should be managed in such a way as to profit from the

fact that others use it. The experience of Millennium Pharmaceuticals, IBM and Intel clearly shows what excellent opportunities arise when properly managing intellectual property.

3.2 The balance between IPR and Open Innovation

When analyzing the management of intellectual property, many managers think of this line of business solely as an opportunity to gain value at the expense of technology or a combination of technologies. Although intellectual property, of course, can be viewed from this point of view, this is only part of its role and importance. Firms developing new technologies and new products are engaged in intellectual property primarily to achieve protective goals in order to ensure that new technologies can be put into practice in their business without the fear that someone will interfere with this. The availability of patents becomes a kind of insurance policy against undesirable litigation and acts as a powerful advantage in situations if such litigation does arise.

However, in the world of open innovation, even this approach is insufficient. When applied, intellectual property cannot be used to extract value from it, until value is created with the help of technology or technologies. Intellectual property can be managed to create value, and not just to get some of that value. This is especially possible when its management is aligned with the company's business model and its internal innovation process. For example, companies could choose to publish information about some of their intellectual property or distribute it altogether free of charge to create standards, or to allocate part of their property for general use, that is, to obtain a kind of safe haven where you can safely work out developments. This way, how they are implemented on the basis of common knowledge, and thanks to these developments, it is quicker and more dynamic to

achieve useful improvements that, in turn, can increase the scale of their business.

A new approach to managing intellectual property is best seen when examining the experience of companies that have confirmed the power of their patents in the course of litigation. Since the era of open innovation began in the United States, we proceed from the experience of this country as the most developed in the direction of open innovation. The situation with Texas Instruments (TI), Polaroid and IBM companies is particularly interesting in this regard.

A semiconductor development company TI, uses new techniques to obtain intellectual property from intellectual property licensing. This company back in 1959 filed an application for a patent to the US Patent Office, and then to the Japan Patent Office. But only 1989 was able to get a patent when the semiconductor business became a global industry. The patent just granted gave TI the right to exclude other participants from engaging in many aspects of semiconductor design, if they did not pay TI and received a license from it. Although TI led cross-licensing with many companies, exchanging intellectual property with them, there were many other companies in the industry, especially in Japan and Korea, that did not sign cross-licensing agreements with TI. Thus, TI began to sue many companies and over the next few years received several hundred million dollars from these patents. In some years, about 50% of TI's total corporate net income accounted for license fees, mainly related to patents. From this it followed that TI was not only the manufacturer, but also the owner of valuable intellectual property, ensuring the receipt of a significant share of the company's profits. Other companies such as Polaroid, IBM, ARM, Qualcomm, Rambus, etc., followed the example of such business. Most of the profits of these companies began to fall on intellectual property transactions, not on products. The experience of US companies once again confirms the economic feasibility

and profitability of such intellectual property management in the context of the development of open innovation. This example is undoubtedly very important for other countries in relation to the wide use of the open innovation model in the country's companies.

The impact of intellectual property protection on innovation often is contentious. Also it looks very difficult to find a way to maintain a balance between innovators and the public interest when choosing an approach to protecting innovation. However, the impact of intellectual property rights on open innovation varies. The monopoly nature of intellectual property rights is an incentive to create and exploit innovation internally. In order for IP to have unique rights for innovators, a company may be tempted to dedicate most of its internal resources developing innovations, which are protected by intellectual property rights, thus enabling companies to exclude other companies that compete to some extent on the same innovation. Also it should be mentioned that different levels of intellectual property rights provide levels of exclusion. That is why they differ to attract companies with closed innovative designs. In particular, patented innovations can influence a company's decision to use models of closed innovation. The strongest of all IP classes is patenting. Patents protect an idea as well as its industrial use.

Typically, patent protects innovation for approximately 20 years from the date of its application. Thus, the company leaves for itself the right to produce, use, sell, import and export a patented invention. Of course, innovation using closed models will allow companies to exclude their competitors, giving them a high degree of control over patented innovations. And also when some company produces some innovation that could be similar to the patented innovation of another, this company first violates this innovation of the company that has patent for this innovation.

However, patent protection is shorter than other IP classes, like copyrights and industrial designs. And it becomes quite clear why, when we look at the level of control that the patent holder provides the patent holder with other IP rights.

For example, computer programs can not be protected by patents in most of countries. They are protected by copyright. Copyright gives long-term protection which protects contribution from the moment of its application to 50 years after authors death. Such term is the minimum time that could be used for copyright according to international law. Nevertheless in most of countries the term for copyright plus 70 years from authors death. As a result, two companies can independently develop similar software products without violating their copyrights. So we could say that copyright is narrower than patent. Another way to protect innovation is an industrial design. It protects some original product and its model and design. Well-known examples of industrial design include the Apple iPod and iPhone. For example, an industrial model of a company may register it, and as a result, other companies cannot produce similar products of the same model during the validity period. For example, phone manufacturers may not produce phones with the exact Apple iPhone model for the duration of the protection. Industrial designs usually have a shorter period than a patent, trademark or copyright protection. Industrial designs protect innovation usually from 5 to 25 years, depending on jurisdiction. It should be noted that the protection of an industrial design covers only the aesthetic features of a useful product but they are not covering to its functions. Trade secret is the only form of intellectual property law that demands a strictly closed innovation environment to provide legal protection.

Trademarks are another category of intellectual property rights that provide copyright owners with a high level of control over their innovations. Such form of intellectual property rights allows copyright holders to prohibit others from

using their trademarks in combination with their goods or services. The main functions of trademarks are: firstly, they protect the economic interests of trademark owners by preventing others from using the commercial interests of trademark owners in relation to their trademark. Secondly, it protects the public by informing them of the source of the goods and services that they receive, which is a key factor in choosing the quality of these goods and services. One of the strengths of brands is their ability to extend indefinitely; Consequently, obtaining a trademark from a particular form of innovation can guarantee long-term market benefits. It should be noted that trademarks are not limited to words, logos or decals, but sometimes include unusual characters such as smell, acoustic or sensory signs. For example, trademarks have been found and obtained for certain smells and sounds. With regard to copyright, it provides copyright holders with control over their literary, artistic and dramatic works. This form of protection is very important for information technology innovation. The protection of trade secrets will continue as long as the innovation remains a secret. A notable example of such an innovation is Coca Cola's secret formula. Business secrets can lose their protection when they are known. They also do not provide protection against self-creation or reverse engineering. In short, IP protection gives companies the incentive to follow the pattern of closed innovation. However, the level of involvement varies depending on the class of intellectual property that protects company innovation. While trade secrets and patents have the greatest impact on a company's decision to pursue a closed innovation model, copyright, trademarks and industrial designs offer less incentive. Although some studies have already identified the negative impact that strong IP protection can have on open innovation, IP monopolies, despite their monopoly nature, are able to fulfill their traditional role of rewarding and promoting innovation, even in an open innovation environment.

Open innovation is a new brand, but an old way of thinking, and IP has always worked in an innovative environment where external knowledge was used to maintain internal R&D and where internal knowledge was in demand from the outside. In other words, IP is not a competitor to open innovation, albeit in different masks. The starting point for illustrating the value of IP protection in open innovation is the presentation of a situation where IP protection is not provided for innovation. In this situation, it is likely that companies will rely, in particular, on complete confidentiality in order to avoid free discrimination. On the other hand, a company that has patent rights for its innovations, such as cars, is more open to licensing these innovations to other companies, because this company is confident that any use of the innovation outside the scope of the license violates patent law. In other words, IP licensing eliminates the contradiction between data protection and data exchange. (Kremer 2017)

From the perspective of innovation users, not creators, IP protection can be seen as an incentive for open innovation. A company that can copy the innovations of other companies has no incentive to acquire or license intellectual property rights. It is true that closed innovation is still the predominant model for creating and using intellectual property rights and that managing intellectual property using open innovation methods is not an easy task (Luoma, Paasi & Valkokari, 2010), but it's equally true that companies are gradually moving the paradigm (Lee, NysténHaarala & Huhtilainen, 2010). For example, IBM, one of the largest intellectual property rights holders in the world, has become an active participant in open innovation. In 2006, she launched the Open Collaborative Research (OCR) program, designed to foster collaboration between IBM and universities in the field of open source software (IBM, 2006). In addition, Horacio Gutierrez, Microsoft's Executive Vice President and Vice President of Intellectual Property and Licensing, describes IP as the "bridge" that allowed Microsoft to

work with other companies (Gutierrez, 2008). For Philips Research, open innovation is the key to success; they say that “through“ external ”innovation, we use the potential of individuals, organizations, and even small startups around the world. Providing a wider window to the world of health and well-being, these strategic partners will help us gain new knowledge and access to new technologies ”(Philips Research, n.d.). Managing IP in open innovation is key to its success (Alexy, Criscuolo, & Salter, 2009; Bogers, Bekkers, & Granstrand, 2011; Chesbrough, 2003b) and typically uses specific tools, namely, getting / configuring IP and IP Licensing. The easier it is to use these tools, the more successful open innovation will be (Gallini & Scotchmer, 2002). The following sections explain these tools and illustrate issues related to IPRs.

Using IP in an open innovation environment can take the form of mainly IP assignment / acquisition and IP licensing. Both forms are legitimate activities that could adversely affect the protection of intellectual property rights of firms engaged in open innovation, if not followed with caution. IP assignment and acquisition companies may not be able to produce IP, since the creation of IP usually requires significant investment in research and development. And even when possible, the results of this study may not involve the protection of intellectual property rights. For example, a pharmaceutical company may invest in developing a specific medicine for years, but a research paper published by a research laboratory for that drug makes the results of a pharmaceutical company’s research obvious and therefore not patentable. In addition, a company may already have some form of innovation that lacks some technical components in order to be ready to enter the market; in this case, waiting for the R&D team to develop this technology may take some time, during which the company may lose the advantage of the first actor.

As a result, some companies use obtaining IP addresses through IP addressing instead of generating IP addresses. Transfer of ownership - transfer of a package or some exclusive rights of the owner of the IP (assignee) to another person (assignee). Owners of intellectual property rights, whether legal or natural persons, can transfer in whole or in part their intellectual property rights through inventions, works protected by copyright, trademarks or other categories of innovation based on IP. For example, a publisher may assign all copyrights that it owns in one of its publications, or it may grant translation rights only to that publication. In addition, the transfer of intellectual property rights may be limited to one or more geographical areas. An American pharmaceutical company may assign its patent rights to one of its patented medicines in Japan and continue to exercise its patent rights to the same medicines in other jurisdictions where it is protected. It should be noted that in most jurisdictions the transfer of intellectual property rights must comply with certain formalities, such as the requirements for writing and registering relevant legislation.

One company may transfer its intellectual property rights to another company in order to generate revenue (Bogers, Bekkers, & Granstrand, 2011) in order to strengthen its subsequent ability to use its other intellectual property rights in the production and marketing of its products. When a host company considers an IPR assignment, this is considered an IP acquisition. In other words, the outgoing innovation of a company participating in open innovation may take the form of IPR, and the incoming innovation may take the form of acquiring intellectual property rights. Most of the time, an open innovation company is involved in both IP assignments and IP procurement. The acquisition of IP is important for innovative companies because it creates a wall around the firm's innovation field, which ultimately hinders other competitors (Bogers, Bekkers, &

Granstrand, 2011; Yoffie & Freier, 2005). This importance is illustrated in practice in many recent IP procurement contracts. For example, many giant companies were in fierce competition for intellectual property rights from Canadian telecommunications company Nortel, which filed for bankruptcy in 2009. Consortium of Apple, EMC, Ericsson, Microsoft, Research In Motion (RIM) and Sony manage to go beyond Google and buy nearly 6,000 Nortel patents for \$ 4.5 billion. On the other hand, just a month later, Google acquired Motorola Mobility for \$ 12.5 billion to strengthen its patented portfolio and thus protect its Android operating system from fierce competition between Apple and Microsoft. Google CEO Larry Page (2011) explained that this acquisition "will increase competition by strengthening Google's patent portfolio, which [Google] will be able to better protect Android from anti-competitive threats from Microsoft, Apple and other companies."

Getting IP is not limited to organizations specializing in ICT, but it is important for other industries. In 2008, many large pharmaceutical companies came together, including to strengthen their patent portfolio. The amount of transactions completed this year amounted to \$ 70 billion (Big Pharma, 2008). In addition to transactions in the field of IP and copyright, trademarks are also important IP assets that are reserved for several IP stores. Businesses acquire reputable trademarks in order to gain a reputation for products or services sold or offered with these trademarks. For example, Acella Pharmaceuticals recently announced the acquisition of the PRENATE® family of brands from Avion Pharmaceuticals to capitalize on the reputation of this family of brands associated with maternity vitamins (Acella Pharmaceuticals, 2012). The lack of the creation or acquisition of IP can open up opportunities for competitors to enter the field of innovation in which the company specializes. For example, Eastman Chemical has not received enough patents for "polyethylene

terephthalate,” a polyester material used, in particular, in the manufacture of plastic bottles. As a result, Dow Chemical managed to seize intellectual property rights, which facilitated access to the soft drink business sector (Yoffie & Freier, 2005; Rivette & Kline, 2000).

3.3 IP licensing

IP Licensing An IP license is a permission granted by the copyright holder (licensor) to another person (“the licensee”) through which the licensee may exercise some or all of the rights of the licensor in exchange for an agreed fee. For example, a company owning a patented machine may license another company to sell the machine, which is only one right, a right to sell, a group of exclusive rights granted to the patented machine. In addition, a company may license more or all of its patent rights, such as the right to manufacture, use and export, etc. An IP license may be limited to one or more geographical areas. In the above example, a company may license its right to sell a patented machine in only one geographic area, while retaining its sales and other rights in other geographic areas. IP licensing can be divided into three categories. The first category is the exclusive right under which the licensee exercises exclusive rights; The licensor or anyone else during the term of the exclusive right cannot exercise the licensed right. Proprietary drugs are generally licensed on an exclusive basis. The second category is non-exclusive licensing, in which the licensor can exercise the same licensed rights and grant other non-exclusive licenses to other licensees during the term of the non-exclusive license. And the third category is the only licensing that allows both the licensor and the licensee to use the same rights as the license obtained during its term; however, the licensor cannot license the same rights to other licensees.

Licensing is an important open innovation that contributes to the competitiveness of companies. A company that does not have the ability to turn its property into goods and then sell it can license this intellectual property to generate sufficient revenue (Lichtenthaler & Ernst, 2007; Lichtenthaler, 2005) to be able to develop its intellectual property rights into market products. Licensing is also an important source of revenue for companies specializing in research and development. In addition, licensing activities can help companies set effective standards for the industry. For example, Apple's reluctance to license its Mac operating system has enabled it to make this operating system the industry standard (Yoffie & Freier, 2005). On the other hand, Microsoft licensed its Windows operating system more flexibly, which allowed it to dominate the PC market. In addition, the company licensing IP has faster access to the market, especially when the company does not have the opportunity to develop its own IP. For example, Procter & Gamble's SpinBrush is an innovative product based on IP licensing from four other companies (Yoffie & Freier, 2005). It should be noted that companies may be reluctant to license their intellectual property rights when licensing incurs competitive costs that exceed licensing royalties (Yoffie & Freier, 2005). In addition, companies typically license intellectual property rights that may not directly benefit their core business (Yoffie & Freier, 2005).

Cross licensing is another form of licensing that occurs when companies agree to exceed each other's IPR rights. Dell and IBM enter into one of the well-known cross-licensing agreements. The deal amounted to \$ 16 billion. Cross licensing and licensing in general, especially with respect to patents, save companies from participating in patent litigation (Bogers, Bekkers, & Granstrand, 2011; Granstrand, 2004), which may ultimately lead to the annulment of certain patents by each company. Cross-licensing also helps companies use each other's knowledge to make collaborative innovation more efficient, simple, and cheap

(Bogers, Bekkers, & Granstrand, 2011). A very important cross-licensing concept is Patent Warehouses, where two or more companies commit to cross-license their patents with each other. It should be noted that patent administrations play an important role in the development of innovations, as the patent litigation largely stifles innovation. In addition, patent assets and IP integration, in particular, serve both consumers and producers of innovation, as they foster collaborative innovation (Bogers, Bekkers, & Granstrand, 2011). For example, in 2005, a consortium of 20 companies agreed to create a patent pool for their RFID patents (Michael Blakeney, 2009). Without such a consortium, most of the innovations in RFID would be blocked by the IP infringement lawsuit.

Issues associated with the assignment / acquisition of IP addresses and licensing in an open innovation environment. Obtaining IP addresses is a complex process and involves many of the challenges that an IP address acquisition company faces. First of all, the procuring company must ensure that the intellectual property it acquires has reliable legal protection with one of the categories of intellectual property recognized by law. This requires the company to carefully study the patent, copyright, or trademark that protects its intention to acquire legal force.

In patent law, some problems, such as business practices, are inherently weak to attract patent protection, and even after obtaining protection, this is usually the result of lengthy and costly litigation.

For example, while Amazon.com managed to obtain patent protection for its famous United States one-click acquisition system in the late 1990s, it has still not been protected in Canada and Europe. This type of object is patentable in the future when it is patented, especially when its patentability is called into question by new case law. For example, at the request of a stakeholder, the

United States Patent and Trademark Office (USPTO) ordered a one-click patent review in 2006 and invalidated some of the claims requiring Amazon.com to review their claims. An updated patent was later confirmed by the USPTO. In this regard, there is also a test rejected by the US Supreme Court (*Bilski v. Kappos*, 2010), originally developed by *State Street Bank & Trust Co. v. Signature Financial Group* (1998), which developed a patent for a commercial method patent, raised some doubts about its validity. Many patents issued by the old test. In the trademark law, some trademarks are also weak in nature, such as “common words” and not “fictitious words” (Fox, 1972).

3.4 Patents, Copyrights and Trademarks in Open Innovations

The importance of protecting the copyrights, patents and / or trademarks that a company buys is that when a company wants to protect its intellectual property rights with respect to the alleged infringer (defendant), the latter usually encroaches on the legality of protecting intellectual property rights. This is always the case when patents and trademarks are infringed. It is also used in cases of copyright infringement, but to a lesser extent, since the conditions for protecting copyright are generally less stringent than the conditions for patents and trademarks. Secondly, a company acquiring a portfolio of patents, copyrights and trademarks for another company should be aware of the strength of this portfolio, taking into account other important factors, such as the remaining patent term and copyright protection, as well as the volume of each application for patent. Since the volume of claims determines the volume of its monopoly position.

In the case of trademarks, the enterprise should carefully examine the scope of the categories of goods and / or services to which the trademark belongs and the

reputation of the trademark. By registering a trademark in a large number of goods and services, a company can enjoy the reputation of a trademark in several business areas and / or take advantage of companies interested in licensing a trademark. using this trademark in such areas. For example, the Jaguar trademark is registered for many different goods and services, such as clothes, watches, shoes, bags, of course, in addition to cars. As a result, the owner of the Jaguar trademark can license it for a company interested in making bags if the owner is not interested in making bags. Thirdly, a company that acquires the copyright of another company through computer software must ensure that the software does not contain open source software if the company wants to use it as a proprietary program. Otherwise, the company must be aware that any distribution of the software must comply with the open source software license.

An American court upheld the compulsory implementation of an open source license in *Robert Jacobsen v Matthew Katzer* (2008). In this case, the applicant, Robert Jacobsen, was the developer of the software for model railways and the administrator of the Java Model Railroad Interface open source system. Jacobsen claimed that Matthew Katzer, a proprietary software developer, included part of Jacobsen's code in his software without properly revealing the origin of the software, some of which were changed. Notice was required under the terms of an open source license. Therefore, Jacobsen claimed that Katzer violated his copyrights and therefore claimed both damage and an injunction preventing Katzer from distributing software. According to the district court, Katzer did not infringe Jacobsen's copyright; However, a U.S. federal court canceled Jacobsen's enforceable copyright, and since Katzer failed to comply with the terms of the open source license agreement, the latter violated copyright laws. If the case was returned to the district court by the federal federal court, but the case was finally

settled out of court in 2010. However, the case remains the leading case to enable open trial. source licenses.

In 2003, Cisco Systems acquired Linksys, a company that manufactures networking products. Some of the products manufactured by Linksys included open source software licensed under the Free Software Foundation (FSF). Later, Cisco Systems began distributing some Linksys products without disclosing the source code associated with the software included in these products under open source license terms. The Free Software Foundation sues Cisco Systems for copyright infringement and seeks an injunction that would prevent Cisco from distributing open source software products or returning profits already received from previous distributions. Courts have not ruled in Free Software Foundation v. Cisco, since Cisco systems have agreed to post the software source code on their website, donate an unknown amount of FSF and appoint a person responsible for marketing Linksys products. compatible with the FSF license .

Fourth, the company acquiring the mark must also ensure that the mark does not lose its distinctive character. For the purposes of trademark law, “distinctive character” means the ability of a trademark to distinguish the goods and services of one enterprise from the goods of another enterprise. The distinctive nature of a trademark is a condition that a trademark must meet in order to be registered, and this mark must remain a condition for extending trademark protection (Gervais and Judge, 2011). When a distinguishing mark is lost, the mark becomes “general” or “descriptive,” because the public perceives it as a word that refers to a particular product or service, and not as a word that distinguishes the goods and services of one enterprise from another. An example of a sign that has lost its distinctive character and has become general or descriptive is petroleum jelly (Shpetner, 1998). This word is usually regarded as petroleum jelly, used as a

lubricant and moisture, and not as a sign that distinguishes petroleum jelly from one manufacturer from another.

In addition to the problems in the field of IP law related to the assignment / acquisition of IP, licensing can create some problems with intellectual property for companies involved in this activity. Examples of companies that assign their trademark to another company should ensure that the licensee uses the trademark in combination with goods and services of the same quality as these trademarks. commonly associated with. Otherwise, the trademark loses its distinctive character and therefore may be dissolved (Gervais and Judge, 2011). As explained earlier, customers always develop a relationship between a given trademark and the quality of goods and services associated with it; Therefore, when a trademark is associated with lower quality goods or services, public interest requires the expiration of the trademark (Gervais and Judge, 2011). In *Heintzman v. 751056 Ontario Ltd* (1990), the trademark owner produced high-quality pianos, but decided to sell his business under his own brand. Outsourcing the production of a piano to another company producing a lower quality piano. The court ruled that the mark had lost its distinctive character, since the public was not informed of any changes in the source of goods with which the mark was associated with this mark. In this case, the fact that the quality of the piano after the transmission of the mark was worse was an important factor in the loss of the distinctive character of the mark. Trademark licensing can also threaten trademark protection if the licensor does not directly or indirectly control the quality or nature of the goods or services of the licensee to which the trademark belongs (Gervais and Judge, 2011). In most jurisdictions, the “use” of a trademark is one of the most important requirements for maintaining trademark registration. Thus, if a trademark is not used within the period established by law, the registration of a trademark may be terminated at the request of the

interested party. If the licensor no longer uses the trademark, the licensee will use it to fulfill the requirement to use in accordance with the law on trademarks, unless the licensor exercises direct or indirect control over the quality or nature of the trademark. trademark related goods and services (Gervais and Judge, 2011).

CONCLUSION

Intellectual property rights (IPRs) are generally considered the most problematic and complex issues faced by companies implementing open innovation programs. The possibility of disputes over intellectual property may hamper the development of innovations from third sources.

The problem of intellectual property is most acute in the patent industries, such as high technology, the aerospace industry, pharmaceuticals and medical devices. Individuals and organizations that offer ideas face the same problem: to help commercialize ideas, inventors must present the company's technology as part of an open innovation program. The inventor wants to provide enough information to help the company understand the technology - and, most importantly, its value - while protecting the key information necessary for a successful patent. Legal risks include possible future disputes regarding ownership of the claimed intellectual property right, especially if the resulting intellectual property is very similar to existing internal research. With this in mind, it is very important that the company's open innovation program is designed to provide the right information. The key to success is to control the amount and type of information provided in order to alleviate the problems of the small reformer and limit the legal risk to the host company.

Companies implementing open innovation programs can manage costs and potential liabilities through an automated system that guides applicants on what to disclose and what not to disclose and how to disclose information. It also documents the history of the relationship between the company and the inventor, which is necessary to prevent litigation.

As service companies innovate, they are increasingly participating or interacting in the same complementary areas of knowledge, creativity, development, and commercialization. This is because they have become interdependent in their

knowledge base. However, there are other strategic incentives for this, as evidenced by the various types of patented and generic innovative models that illustrate many of the goals of such collaboration.

This growing trend of many companies participating and interacting in the same areas of knowledge and creativity, which are usually collaborative, multidisciplinary and global, is also called open innovation. This should be seen in sharp contrast to closed innovation, when companies create their own ideas and then commercialize using only their own resources. Service innovations are driven by a number of types of information, one of which is science and technology. Other basic information includes aesthetic knowledge, cultural knowledge, social, organizational and managerial knowledge and knowledge-based knowledge. Therefore, IP-based service companies believe that a wide range of IP products (including patents, project patents, copyrights, trademarks and secrets) is “very important” for their organization, for both the IP manufacturer and the owner or user. However, evidence suggests that a particular type of IP service industry is specific.

In other words, patented protected inventions, including restrictions on the use, copying and modification of any invention using all legal restrictions of patent or copyright or using some technical means (for example, preserving the source of the invention), do not necessarily imply its value and, Economic and non-economic the value of patented patented inventions is realized through open innovation, through external interaction of ownership rights or control of intellectual property rights. Such assets range from simple acquisitions and sales, licensing or distribution of intellectual property rights, to more complex contracts, such as cross-licensing and consolidation of intellectual property. This is an agreement on open methods of open innovation.

in line with the previous closed innovation paradigm when companies retain

their intellectual property rights to protect markets. The financial value or non-economic value that can be achieved using open innovation methods using patented designs is universal. These include

- 1 access to ownership of production through various licensing agreements,
- 2 the creation of territories (i.e., market power) through strategic (often exclusive) licensing, cross-licensing, or patent pool agreements,
- 3 the creation of favorable joint ventures,
- 4 attracting venture capital from IP lists in the stock market,
- 5 revenue from licensing or buying and selling copyrights,
- 6 lower costs from cross-licensing or patent pool agreements,
- 7 other measures, such as ensuring the strategic development of common standards. Therefore, the strategic use of intellectual property rights in patented protected inventions considers intellectual property rights as intellectual capital, driven by values.

However, service companies are increasingly using intellectual property rights in common models of open innovation. Intellectual property is used here as a tool to easily identify scientific and creative work with the freedoms that inventors want to use. It is about changing the conditions for protecting intellectual property rights so that all rights to certain rights are protected.

In other words, despite the fact that the purpose of the intellectual property law is to automatically limit the right of the inventor or author to use, reproduce, modify and distribute works, as well as allow the concealment of the source of the invention; Changes to an intellectual property license (such as a standard public license (GPL) or copyright license) use the same intellectual property law to ensure that everyone who receives a copy of an invention or work has the same research rights, use, modification and distribution, as well as derivative versions. Therefore, such general licenses require that the same license terms

apply to all redistributable versions of the invention or work. Thus, we are talking about freedom of expression, access and / or participation in the public domain, and that maximizing such interaction in the areas of development creates better knowledge and inventions for business and society. The reason that an invention or work does not become public, is not protected by the use of intellectual property rights, is because non-cooperating agents do not convert the invention or work into closed material based on changes in non-patented material, and then distribute the final result.

Small and medium-sized enterprises (SMEs) and some large companies are increasingly using common models of open innovation. Many companies use a combination of proprietary and versatile models for open innovation.

It should be noted that high-tech business services, in particular, responded to the emergence of open innovations in their innovative fields, such as media, publishing, creative industries, healthcare, science and education. This is due to the fact that these service sectors are already actively introducing ICT and microelectronics to improve the quality and productivity of their services. These are the same technologies that make scientific information, knowledge, ideas, knowledge, creative expression, etc. accessible and distributed around the world. However, in order to benefit from the development of open innovation, it is necessary to adapt innovative policies and innovative practices in enterprises and industry.

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