Chapter 33
Patents and Scientific Research:
Five Paradoxical Scenarios

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ABSTRACT

It is argued that patents encourage scientific development, benefiting society by creating useful products and services that improve the quality of life. However, by granting exclusive rights of exploitation, patents create situations in which they interfere with the exercise of the freedom of scientific research. This work examines five scenarios where this problem can be seen and the utilitarian function of patents is questioned. Firstly, the effects of research funding in the definition of the lines and research objectives are observed. Secondly, the anticommons is studied, as it is a situation where excessive fragmentation of ownership in scientific knowledge may prevent its use. Thirdly, broad patents and their implications are examined. Fourthly, the deterrent power of patent litigation, which creates an unexpected business model, is analyzed. Fifthly, secrecy is looked upon, as it is encouraged by the logic in which the patent system works.

INTRODUCTION

Intellectual property rights, in general, and patents, in particular, give their holders exclusive rights over creations and discoveries. This legal right, or *ius prohibendi,* conferred with a patent, implies that no one can legally use an invention without prior permission from its holder. These exclusive rights are granted as an incentive for the return of investment made in research, in exchange for the disclosure of the invention so that others can use it.

However, if patents would promote innovation in the terms in which it is said, one must ask why there are groups who claim that the open and free access to knowledge is essential to the advancement of science. For them, patents have not been the main incentive for scientific and technological innovation. By contrast, patents create situations in science that challenge their utilitarian purpose, since the *ius prohibendi* granted to the patent holder enables the flow of ideas to be blocked, hindering the exercise of the freedom of scientific research.

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Indeed, in the scientific community there are initiatives to migrate to platforms that ensure the free exchange of scientific results, offering incentives different to those of the patent. A paradigmatic example is the free software movement, where creators collaborate on improving and expanding the available knowledge base by ensuring the so-called "four freedoms": use, study and modification, redistribution, and improvement and publication.

The romantic notion of science, in which the scientist is lost in thought searching for a "eureka" moment, provides an individualistic view of the intellectual creation that denies any possibility of defining knowledge as a collective and cumulative process. As such, science requires full and open communication of their findings. This requirement does not arise from selfish whims, but both from the requirements of the scientific method, and an inherent need for the production of scientific knowledge: knowledge requires knowledge to be created.

In practice, patentes generate a series of situations that reveal a conflict between intellectual property rights, freedom of scientific research and free exchange of knowledge in science. The situations encountered in which patents interfere with the free exercise of scientific research are presented in this chapter as follows. Firstly, the effects of public research funding in the definition of the lines and research objectives are observed. Secondly, the *anticommons* is studied, as it is a situation where excessive fragmentation of ownership in scientific knowledge may prevent its use. Thirdly, broad patents and their implications are examined. Fourthly, the deterrent power of patent litigation is analyzed, as it may discourage research, while creating an unexpected business model. Fifthly, secrecy is looked upon, as it is encouraged by the logic in which the patent system works. Finally, the last section is composed of some discussion and the conclusions reached in this work.

FUNDING

Independently of the domain, scientific research "economics" includes a series of expenditures to completely fulfill the objectives of a research project. Any project will require the acquisition of books, journals, equipment and supplies, the payment of wages, travel expenses and institutional overheads. For any researcher willing to carry on his line of research, the logical question would be "where do I find the required economic resources?" Thus, the long pilgrimage of researchers and research institutions begins.

Not all universities or research centers have the same infrastructure and budget to execute research projects proposed by their researchers, so lines of research are carefully selected. Nevertheless, belonging to one of the selected lines of research does not ensure financial support of a researcher's project. In some domains of science, competition for funding can be so frustrating that researchers feel their peers systematically shun them out. Even if funded, the amount assigned to a research project delimits a hard boundary to its scope. Furthermore, competition is also increased by research teams that belong to the industrial sector, more focused in "products" that could be profitable and, therefore, more attractive to investment[1].

Funding must come from an actor with a clear interest in the line of research followed by a researcher. The State tries to partially cover the lines of research that are more adapted to its strategic planning, leaving the rest behind. Private sector, through nonprofit foundations, philanthropic grants, crowdfunding[2] or NGO-backed initiatives, finances some other research lines. However, those with more profitability potential are usually funded by the industry, which offers support in exchange for a participation in the potential economic benefits derived from the commercialization of the intellectual products[3]; access