12 Patent Regulations as an Obstacle to Innovation Rather than an Incentive

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12.1 Abstract

Patents have been used for centuries as an incentive to spend time and money on innovations. However, patents also hinder potential innovations as they limit access to existing inventions for non-patent holders. This paper argues that recent technological and economic developments have made the negative impacts of patents even more pronounced and looks at alternatives to the current patent system, which have the potential to increase the benefits they could bring to society.

Keywords: patents, innovation, regulations

12.2 Effects of Patents

Patents are meant to encourage people and corporations to spend time and money on innovations. This is achieved by granting monopolies to use an invention. Millions of patents are granted every year world-wide [1]. Thus, it could be argued that patent regulations are indeed effective in promoting innovations. The number of patents a country or an organization holds, is actually frequently used as an indicator for the innovative capacity of that entity.

However, that view is incomplete and misleading, as it omits two key aspects. First, in order to assess the impact of patents, we need to compare the stimulus for innovation created by patents to alternative regulations that do not use patents. We will discuss alternatives to patents further below.

Second, we need to take the effects of monopolies into account. Monopolies are generally considered to have a negative impact on societies [2]. Modern societies have various forms of competition laws, with the goal to prevent the formation of monopolies, as they would hurt consumers while only few would benefit. It is a bit of a paradox, that at the same time regulators freely grant monopolies in the form of patents. Even if patents succeed in encouraging innovation, that positive effect may be outweighed by the drawbacks of monopolies. In the context of patents, the problematic effects of monopolies are economic and scientific.

12.2.1 Economic View of Monopolies

Monopolies can bring enormous economic benefits for the monopoly holders, as they can ask prices for products and services that are independent from the costs of delivering them. These high prices, which are often a multiple of market prices, are the costs society must bear. One of many examples is Imatinib, an essential medication used to treat cancer. Novartis has a patent on that drug in USA, where they sell a 1-year supply per patient for $146,000. At the same time, Novartis lost the patent case in India, where the drug has subsequently been sold for a price of $400 [3].

The argument for patents is, of course, that inventions might not be made without incentives. If this is the case, the society would have the disadvantage that the invented product or service would not be available. This disadvantage, however, would be small, because the monopoly price is generally set near the achievable maximum. If people value a product at $x, then the monopoly price will be set just below x, so that the gain from purchasing the product is positive for the consumer, but very low. Without monopoly, the market price might be substantially below x, so that there is a significant gain when the product is available for purchase. If, in the

absence of patents, the invention would be made anyway, the benefit of the new product for society is much higher.

We will show below that the assumption that invention would be made anyway is indeed realistic and that alternatives to funding research exist. Even if one assumes that patents encourage investments in research, the opposite effect also exists. The pure existence of patents does in many cases prevent investments in innovations. It can be quite a challenging task to ensure that the expected result of investments for innovation does not violate existing patents. The risks of potentially violating patents and the costs of evaluating and mitigating these risks is often high enough to decide against investing in research in the first place.

12.2.2 Scientific View of Monopolies

From a scientific point of view, patents restrict the flow of scientific progress. Any invention is based on many inventions made before. Any software patent in the world, for example, is based on thousands of inventions that make computers and software possible. Access to a patented invention is restricted, as the patent holder normally asks for a license fee to allow the invention to be used. While some uses of an invention may justify paying the license fee, many others may not, or at least it may be difficult to find someone bearing the increased economic risk to finance further inventions. Thus, scientific progress, whose promotion ironically is the very reason why patents exist, will be hampered.

12.3 Problems with Patents

In addition to the problematic monopolies introduced by patents, there are many additional problems coming from the practical implementation of patent laws.

12.3.1 Questionable Patents

There are a huge number of patents, whose level of invention is so low, that it is quite unthinkable that the invention, if we even want to call it that, would not have been made in the absence of incentives. Many examples are in the field of software patents. The most famous questionable software patent is probably the Amazon 1-click-order patent [4], that streamlines the checkout procedure for customers of an e-commerce website by saving them one or two mouse clicks. It is a typical software patent that any working programmer could “invent” three times before breakfast, as the software entrepreneur Joel Spolsky phrases the problem [5]. Nevertheless, companies had to pay license fees to apply this method, which potentially makes online shopping more expensive for consumers in certain cases.

Another example of a very questionable patent is a patent for a method of swinging on a child’s swing [6]. It is a kind of sideways swing that certainly millions of people had done in the past before someone was granted a monopoly. Besides the questionable patents based on low levels of invention, there are other areas where patents are debatable for ethical reasons due to their nature, for example patents on living creatures.

12.3.2 Patent Applications

Some of the reasons why questionable patents are granted lie in the patent application procedures. It is often a challenging task to examine a patent application, to judge on the patentability of an invention. Some of the criteria used by patent laws cannot be verified objectively, for example the requirement that an invention must be non-obvious and sufficiently inventive. That results in decisions that many experts in the respective fields would deem as unjustified.

The underlying reasons for such debatable decisions are often low funding of patent offices. Studies suggest that the time allocated to review patents is in many cases insufficient, resulting in too many patents being granted [7]. This is based on the fact that granting a patent is less labour-intensive than to justify its rejection. In those cases where patents are rejected, the

patents are often re-applied for with minor modifications in the rejected parts, until, it seems, the patent finds a less diligent officer who choses the path of the least resistance by granting the patent. From the patent office point of view, there can also be an economic benefit in granting questionable patents, as the fees for rejected patents are significantly lower [8].

An important example of a bad patent and the consequences it can have is the case of Theranos, where Elizabeth Holmes applied for a patent to make certain blood tests with a minimal amount of blood. The patent application has been rejected several times, but was granted after 4 years and several re-applications. The patent gave Theranos enough credibility to convince investors, which eventually gave the company a $9 billion valuation. It turned out that the device described in the patent application did not exist and the operation ended as a fraud court case.

12.3.3 Patent Trolls

Patent trolls are generally described a non-practising entities, which monetize their patent portfolios by asking companies active in that area for license fees. Non-practising means that they own patents, but have no intention to actually use the invention other than as a means to collect fees. This can be seen as a misuse of the patent system, because the original idea of patents, namely to stimulate innovation, is not the business model of patent trolls. Unfortunately, this business model is quite successful, because the easiest, quickest and often the cheapest way out of a patent infringement law case often is to pay the fee, even if the justification is questionable. Many companies cannot afford to have an ongoing court case for years. Studies show, for example, that 41% of software startups see significant operational impacts from patent troll lawsuits, which cause them to exit business lines or change strategy [9]. That is an example of patents actually slowing down innovation rather than stimulating it. A remarkable outcome of the Theranos case mentioned above was that the only marketable asset the company had after the fraud became known was its patent portfolio. Obviously, even the most questionable patents can still be used by patent trolls to make money.

12.4 Alternatives to Patents

Do we have any alternatives to the current patent system that avoid or at least mitigate its disadvantages?

12.4.1 No Patents

The most straightforward alternative is to abandon patents completely. There would certainly still be innovation taking place, but it is impossible to prove that the speed of innovation would not slow down. There are a few examples of countries without a patent system in relatively modern times. The Netherlands abandoned their patent laws in 1869. There was no noticeable lack of innovation after that decision. Nevertheless, the Netherlands reintroduced patent laws due to international pressure in the context of trademark protection in 1912 [10]. Switzerland did not have a patent law as we know it before 1907, again without being visibly disadvantaged in terms of innovation power [10].

Abandoning patents would additionally have the effect of saving the substantial cost of obtaining and enforcing the patent. That money could be used directly for innovation instead. When deciding whether abandoning patents would be a risk, it is helpful to notice that many innovations cannot be patented anyway, yet they are still invented. Examples for this is finding new use for existing drugs, which is actually quite common. The original patent holder for the drug does benefit in such cases, not the one making the innovation. Another example is finding negative properties of drugs or other products, which can be an extremely important discovery, but cannot be patented.

12.4.2 Improved Patent System

While abandoning the patent system may seems a bit extreme and risky, improving the existing system would certainly be helpful without much need for radical change. One obvious change would be much-increased requirements for the level of invention. Trivial patents like many of the software patents should never be granted. Another aspect that can easily be improved is the period of validity of patents. In most countries, patent monopolies are granted for 20 years. For much of the fast-changing industries that time frame might easily cover the whole life-span of an invention. Innovations introduced in mobile phones 20 years ago are hardly relevant today. A shortening of the patent time period depending on the industry would be more aligned with the initial intention of patents than the fixed time span.

12.4.3 Other Incentives for Innovation

Improving the patent system by being much more restrictive when granting patents would ideally be combined with reinforcing other incentives for innovation. All the alternative incentives described here exist already and are tried and tested methods, but they could and should be used much more intensively, although they come with their own drawbacks. One idea that most countries already implement in one way or the other is to grant some form of tax reduction for research expenses. That stimulates innovation while avoiding the disadvantages of monopolies. The challenging task here is to set up criteria to determine which type of research is worth supporting and which is not. A more direct approach is to use public funding to finance research. In the US, basic research is already 80% funded by government and non-profit organizations [11]. Only more product-focused research is primarily funded by private entities. Advanced purchase commitments are occasionally used, for example in the medical field, to reduce the risk involved in research spending, and thus encourage innovation. If there is a guaranteed market, research expenses can also be more easily justified in the absence of guaranteed monopolies.

Innovation inducement prizes are contests, which grant a certain amount of money to whoever delivers some innovation result, for example to find a new cure for a certain disease. This method has been used in history in various fields, and interest in it has again increased in recent years. It can be an efficient way to promote research in a certain area and to achieve a fast dissemination of the research results at the sane time. Its main drawback is that as a centralized decision process it cannot compete with the ingenuity triggered by decentralized processes. Therefore, innovation inducement prizes cannot be a general means to curb innovation, but wherever they are applicable they would reduce the dependency on patents.

Cost sharing regimes are a way share research expenses among market participants who benefit from the results. It avoids the often frivolous price setting practices by monopolists as it limits the prices to be paid with the actual expenses, and at the same time it avoids the free-riders effect of a regime without any restrictions on the use of research results. Cost sharing regimes are already mandated in some areas, for example to prevent repeating the execution of the same animal testing multiple times by different organizations. A more wide-spread use of cost sharing regimes could lead to a more efficient utilization of research results.

12.5 Obstacles

Considering the problems with patents described above, and the available alternatives, why don’t we change our patent regulations? There are primarily two obstacles. First, most of the proposed alternatives would require international coordination. For example, one country funding research with their taxpayer’s money and making the results available for the whole world would not be fair unless other countries do the same. Ideally, already existing international organizations would be used to implement such schemes, but this is currently outside their focus most of the time, and that would need to be changed.

The biggest obstacle, however, is probably the influence big international corporations have on law makers. Big companies hold many patents (IBM, for instance, holds more than one hundred thousand patents [12]) and these patents are an essential part of their assets. Abandoning the patent system would have a severe impact on their value and on their way of securing their market position. They would use their influence to prevent any changes, just like they use their influence to shape tax regulations in a way favorable to them.

12.6 Conclusions

This paper shows the main weaknesses of the current international patent system. It is a troubling fact that these problems will only get more serious over time because of two developments. First, some of the areas where these problems have the most severe impact have become more important in the last decades and will be even more important in the future. These areas include IT technology, medicine and biology. Second, globalization has the positive effect of spreading innovations faster and faster, with substantial benefits to mankind, but at the same time, the problems affecting innovation caused by the patent system now have an immediate negative global impact. This paper also shows, that improving the situation is feasible, but requires substantial and coordinated effort. For the time being, as the World Intellectual Property Organization puts it, ironically, the system of patent monopolies benefits from not being innovative [11].

12.7 References

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