

## Introduction to Patent Drafting to Both Protect and Promote Scientific Research

Vinokur, Gennadiy V.

TR2019-114 October 18, 2019

### Abstract

A patent's value depends on its ability to help patent holders achieve their business objectives. Different companies may have different objectives for their patents, such as providing market advantage for selling products or gaining revenue through patent infringement and licensing programs. Hence, the same patent may have different value for different companies based on the alignment of the patent with a particular company's objectives. Various research organizations, such as scientific labs of universities and corporate research and development (CR&D) divisions, have another, distinct business objective – scientific labs strive when businesses are adopting the results of their research in their products and services. Hence, one business objective of a research laboratory is to promote their inventions to its parent organization, and patents, which are typically viewed as means for achieving the legal objective of protecting scientific research, also have another marketing objective to the research laboratory of promoting the scientific research. In this document, we introduce some principles of drafting a patent application to achieve synergy in both protecting and promoting scientific research.

*Innovate Magazine: American Intellectual Property Law Association (AIPLA)*

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# INTRODUCTION TO PATENT DRAFTING TO BOTH PROTECT AND PROMOTE SCIENTIFIC RESEARCH

## Abstract

A patent's value depends on its ability to help patent holders achieve their business objectives. Different companies may have different objectives for their patents, such as providing market advantage for selling products or gaining revenue through patent infringement and licensing programs. Hence, the same patent may have different value for different companies based on the alignment of the patent with a particular company's objectives. Various research organizations, such as scientific labs of universities and corporate research and development (CR&D) divisions, have another, distinct business objective – scientific labs strive when businesses are adopting the results of their research in their products and services. Hence, one business objective of a research laboratory is to promote their inventions to its parent organization, and patents, which are typically viewed as means for achieving the legal objective of protecting scientific research, also have another marketing objective to the research laboratory of promoting the scientific research. In this document, we introduce some principles of drafting a patent application to achieve synergy in both protecting and promoting scientific research.

## Marketing

The American Marketing Association defines marketing as "the activity ... for creating, communicating, delivering, and exchanging offerings that have value for customers, clients, partners, and society at large." The term developed from the original meaning, which referred literally to going to market with goods for sale. In the context of scientific research, marketing is a set of activities design to encourage utilization and adaptation of results of scientific research. These activities do not have to start after research is completed and results of the research are received. These activities can start way before the beginning of a research project, for example by learning about the business of a parent organization and/or pitching a research project to a parent organization.

The marketing activity or just the marketing of a general business organization can be roughly divided into three categories, figuratively labeled here as *past*, *present* and *future* categories.

The activities of the *past* category serve to establish *trust* between the organization and its customers. The *past* activities typically include promoting a brand of the company. Winning the trust of the customers is needed to sell them products and services of the organization. Because the trust precedes the sale, these activities are labeled as *past* activities. A prominent example is the Apple brand. It is a symbol of quality and has such a trust among millions of its customers, so whenever Apple is offering new services and products, they are all ears.

The activities of the *present* category aim to address customers' needs and wants. For example, the *present* activities can be aimed to demonstrate *advantages of products and services* to the customers. These activities typically focus on actual products and services and can include the demonstration of technical specifications of the products and services of the organization, such as highlighting performance of the products and explaining advantages of the services over the competitors' offerings. For example, these activities can explain the functionality of a newly designed Apple watch. These activities have a down-to-earth nature and, therefore, labeled herein as *present* activities.

*Future* activities aim to demonstrate to customers the benefits of satisfaction of their needs with the products and services of the organization. These activities are designed to trigger the emotions of the customers to make them want the product with or even without consideration of its specification. These activities can be associated with a word "imagine." For example, imagine you have the Apple watch, what can you do with that, how will it change your life, how cool that would be, and what the future of a person having the Apple watch will look like.

The benefits of satisfaction of customers' needs targeted by the *future* category of marketing activities should not be confused with advantages of products explained by the *present* category. The *present* category describes benefits of the product, while the *future* category visualizes advantages for customers enjoying these benefits. For example, the *present* category of activities describes that the Apple watch can measure ECG, while the *future* category of activities explains advantages of having ECG constantly measured to make customers believe that they need these advantages, and thus the Apple watch.

The marketing activities of a research organization can also be divided into *past*, *present* and *future* categories. The customer of a research organization is typically its parent organization and, thus, the marketing activities of a research organization are typically directed toward the parent organization. For example, if a research organization is part of the CR&D Division of Business Corporation, the customer of the research organization is Business Corporation; if a research organization is a lab in a University, the customer of the research organization is the University, etc. If the research is performed in collaboration between different types of research organizations, the customer profile becomes more complicated, but the principles of marketing activities remain the same.

For a research organization, the activities of the *past* category serve to establish a trust between researcher or research organization and their parent organization. The past activities aim to convince the parent organization to trust that researchers will deliver whatever they promise to deliver. The *present* activities aim to address needs and wants of the parent organization. For example, a *present* activity can be aimed at demonstrating results of scientific research in solving

a technical problem that a business unit of a parent organization has or may have. The *future* activities aim to demonstrate business benefits of the research to the parent organization. These activities typically aim to benefit customers of the parent organization in order to increase profit of the business organization or benefit the society at large. These activities aim to make the parent organization “imagine” what can be done with the results of the research to benefits customers of the parent organization, and perhaps develop a vision for the future that will drive research in a particular area.

The questions we are trying to address here are: (1) can a patent originally designed for protecting the research also help to promote the research itself in all three categories; and (2) whether the patent drafted in consideration of these three categories can achieve stronger patent protection of the research. In other words, the central question addressed here is: can we achieve synergy in both *patent protection and patent promotion of scientific research*. Indeed, one of the main objectives of a patent is to protect benefits of the invention. “Benefits” is a marketing term, so the legal and business aspects of a patent are intertwined and can be jointly use for both protecting and promoting scientific research.

### **Patent Promotion**

A patent written with a promotion objective in mind should describe the inventor’s contribution to the art on three levels. The first level is a fundamental level that describes a discovery or new knowledge gained during the research. Examples of such discoveries include understanding the relationships among different physical quantities, nature of different physical phenomena, cause of a problem in the art, scope of different laws of nature, etc. The second level is an applied level that takes advantage from that discovery to solve a technical problem. If the analogy of the first level is “fundamental” research, then the second level is “applied” research. The third level is a business level. This level uses the technical solution(s) of the applied level to address the business needs of a parent organization.

For example, a researcher has realized how to decompose and, thus, simplify, a model of a complex industrial air conditioning system by taking advantage of symmetry in the dynamics of some of its parts. This is the first fundamental level of researcher’s contribution to the art. Next, the researcher has realized that such decomposition can simplify the estimation of a controller for controlling such a complex air conditioning system. To that end, the researcher proposed a new method for generating a controller based on the discovered model decomposition that can reduce time of controller generation from days to just minutes. Efficient controller estimation is a technical problem that takes advantage of the researcher’s discovery, and thus the proposed solution corresponds to the second level of description. The third level aims to highlight business advantages of such fast control generation. It goes without question that greater efficiency is always better. However, oftentimes, and particularly in this case, the new technical solution to a

technical problem allows new business applications that were impractical before that proposed new solution. For example, such a significant time reduction for control generation enables new business workflows for configuration of complex industrial air conditioning systems that have been impractical before. The description of these workflows is the third level of a patent written with a promotion objective in mind.

***Trust the Past.*** The technical solution and the business solution are based on the discovery made by the researcher. If the discovery is incorrect, neither technical nor business solutions may work. Thus, the parent organization will be less inclined to invest resources in commercialization of the research results. Conversely, the correctness of the discovery supports plausibility of successful delivery of research expectations. In addition, business people may experience difficulties in understanding complex technical solutions. However, it is easier for people to understand complex technical notions not in isolation, but in relation with something else. It would be easier for the business community to understand and appreciate technical and business contributions of the research in relation to the discovery made during the research.

Clarity of explanation creates trust needed for promotion of the research. In the abovementioned example, a researcher asserts that his method can generate a controller within minutes, while current controller generators take days to compute these controllers. The researcher also asserts that his controller generated within minutes is at least as good as a controller generated over a span of several days. These assertions sound good, as long as business people would believe in them and would believe that the promised results would benefit their business. Explaining why the research can deliver what is promised to deliver facilitate establishing of these beliefs.

Hence, the description and explanation of the discovery aims to make a reader of a patent *trust* that the research can deliver what is promised to deliver. Trust is an area of the *past* category of marketing activities, and the description and explanation of the discovery is analogous to the *past* category of the first level of marketing activities.

***Be Present.*** The technical solution to a technical problem is the core of applied research. This is where the rubber hits the road. Knowledge without practice is philosophy. Practice without knowledge is ignorance. Practice, however, is a derivative of knowledge, not the knowledge itself. Unfortunately, it is not uncommon that knowledge that led to a technical solution is absent from the technical description of that solution. It is also typical to see papers describing fundamental research without providing practical applications of the research findings. However, the knowledge gained through fundamental research acquires value when used.

When I am presented with results of applied research, I ask researchers to take themselves back in time to recall what they have realized that allowed them to arrive at the presented technical solutions. When I am presented with results of fundamental research, I ask researchers to look

into the future to answer on this “simple” question: now that we know what others don’t; what can we do with this knowledge? The answers sometimes are very fascinating and lead to interesting patents.

*See the Future.* We want to make a reader of a patent to think along these lines: yes, I see what this researcher has realized - what a clever discovery; yes, I see how the discovery can be used to solve a technical problem; and, yes, that solution is useful for my business. It is quite too often, a patent falls short in explaining the business effects of the solution. Such a deficiency should not come as a surprise. A discovery can lead to a number of different technical solutions; a technical solution can lead to multiple business applications, so it is fruitless to list them all. It is true that a discovery can be used by different business applications, but it’s not the reason to list none.

For example, a researcher made a discovery that a negative capacitor can act as an inductor. Next, the researcher has realized that these inductive properties of the negative capacitor can be used in a filter, by replacing an inductor in an RLC circuit to reduce the size of a filter. There is a relationship between a size of conventional inductor and its inductive properties leading to bulky filters. Such a relationship is not valid for negative capacitors allowing to reduce the size of a filter. This is all good, but there is also a need to demonstrate business applications for using small filters. In this example, it is not difficult to do so, and researchers should not rely on somebody else to make such a connection between their discoveries and practical business application of the discoveries. Indeed, if researchers will not do it, who will?

### **Patent Protection**

A patent is a legal instrument designed to protect an invention. An invention, however, is also a legal concept created to draft and examine patent applications. In real life, researchers do not use the term “invention,” but rather call their findings as a solution, a method, or just results of research. The term “invention” or “inventive concept” is often used to understand a scope of patent protection defined by claims in a patent. Some commentators say that an invention is a claim: a patent claim defines the invention, and without having an issued patent, it is not clear what has been invented. In other words, to understand and define an invention, we need to draft a patent claim; to draft a patent claim we need to understand the invention. If this is confusing and sounds like circular reasoning, it is.

It is useful to think about a *patent claim not in terms of what the invention is, but as a strategy for protecting research. That’s it: **patent claiming is a strategy for protecting researcher’s contribution to the art.** Because it is a strategy, not the contribution itself, we can direct the claim to any level of research based on the type of research, business needs, and current state of patent law. Typically, a claim is directed to a second level of applied research to protect a technical solution to a technical problem. However, sometimes it is possible to direct a claim to*

the discovery itself or it is necessary to direct the claim to address customer needs. In any case, to make a strategy, a patent drafter needs to understand the discovery made during the research, the technical solution made possible by the discovery, and application of that solution in addressing customers' needs and wants. Even when a claim is directed to the second level of applied research, the understanding of discovery and/or applications of the applied research help define the scope of the technical solution. It is important to underscore here again that a technical solution is not the first contribution to the art, but is a derivative of a discovery made during the research. Understanding the discovery, which is sometimes hidden or buried in the technical details of scientific papers or patent disclosures, is paramount to understanding the full scope of the invention.

Further, to get a patent, a patent application needs to go through an examination by a national patent office. This examination process is called patent prosecution. Essentially, patent prosecution is a sales process – the Patent Examiner must *believe* that the patentee deserves a patent. It is much easier to secure patents when the Patent Examiners believe in the innovativeness of technology presented for patent examination than to force Examiners with various legal arguments to issue patents against their will. Clarity and depth of explanation of research on all three fundamental, applied, and business levels help tremendously in that regard. It is easier to demonstrate the innovativeness when the description starts with the discovery absent from the prior art.

In addition, the three levels of explanation can support legal arguments for innovativeness of the claimed invention. For example, when a patent is rejected based on a combination of prior art references, the description of discovery can support an argument that it is legally impermissible to combine the cited reference, because to combine them someone needs to understand what the inventor has understood, and such an understanding is absent from the prior art. Also, the three level of description can demonstrate practicability of the claimed invention to argue patent eligibility of claimed subject matter and its advantage over the state of the art.

### **What's Next?**

A patent written with protection and promotion objectives in mind is a story showcasing a researcher's contribution to the art on three levels: fundamental level, applied level, and business level. These three levels of description correspond to three categories of marketing activities: *past*, *present*, and *future* categories. The three levels of description help to analyze the invention, describe the invention, and promote the invention. However, to better understand what a patent story is, we need to take a look at another marketing term: *target audience*. We also need to compare patents with scientific publications to appreciate their differences and to see how patents can contribute to growth of the innovations. We would also like to argue that patents are a necessary, however, insufficient condition for commercializing products of scientific research.