Sergei Ikovenko, Ph.D., Dr.- Eng., LL.M, P.E., professor

Dr. Sergei Ikovenko is one of leading consultants and project facilitators in innovation technology of design. He has conducted more than 600 courses on innovation and TRIZ (Theory for Inventive Problem Solving) topics for Fortune 500 companies worldwide. Dr. Ikovenko was the primary instructor to deliver corporate TRIZ training programs at Procter & Gamble (about 1,500 engineers trained during 3 years), Mitsubishi Research Institute (200 engineers), and other companies. He received special awards for development creativity at Procter & Gamble and Unilever. Dr. Ikovenko is a Director of Innovation Leadership Programs at GEN3Partners – an innovation consulting firm in Boston, USA.

Dr. Ikovenko holds two doctorate degrees – a Ph.D in Industrial Engineering and an Dr.-Eng. in Environmental Engineering and Sciences as well as Master degree in Patent Law (LL.M) He is the author of more than 87 publications, and an active member of ASME, ACS, and ASEE. Dr. Ikovenko has studied and taught TRIZ since 1986 and holds a certificate of TRIZ instructor from G. Altshuller, the founder of TRIZ. Dr. Ikovenko has effectively utilized his TRIZ expertise to receive 77 patents in various engineering fields. He holds numerous silver and gold awards from international engineering shows and exhibitions for his inventions as well as Innovation Award from Oak Ridge National Lab of the Department of Energy, USA.

Dr. Ikovenko is a member of the Board and Vice-President of International TRIZ Association, a Six Sigma and QFD Black Belt, and Lean Master-Practitioner.

In addition, Dr. Ikovenko has taught seminars on innovation at MIT, Harvard University, Carnegie-Melon University, California Institute of Technology, Stanford University, Vanderbilt University, University of London, Oxford University, and other leading educational institutions worldwide.

Dr. Ikovenko holds a license of Professional Engineer from the Commonwealth of Massachusetts, and is a professor adjuncts of Massachusetts Institute of Technology (Cambridge, USA). Dr. Ikovenko is an Honorary Professor of the University of Edinburgh, Scotland, UK.

Опыт в применении и преподавании ТРИЗ

1. Провел более чем 400 семинаров на компаниях Fortune 500:
Ford, General Motors, Procter & Gmable, Colagate Plmolive, Gilette, General Electric, Motorola, Intel, Hewlett Packard, Dior, Chanel, Pegout, Alcatel, Nokia, SAAB, BMW, Siemens, Boeing, Diemler-Chrysler, L'Oreal, Raytheon, IBM, Samsung, LG, Dupont, Unilever, Ferrari, ENI, Shell Oil, Pliva, Solvey, Acer, Nestle, ABB, Dassault, Alcoa, 3M, Whirlpool и др.

2. Обучил:
- **Procter & Gamble** (1,400 engineers) contact Dr. W. Fisher, phone 1- 513-634-9631
- **Colgate Palmolive Company** (more than 200) ,
- **Hewlett Packard** (more than 150), contact Mr. John Morris, john.l.morris@hp.com
- **Christian Dior** (more than 100)
- **Whirlpool** (more than 100) contact Gigi Petrali, pierluigi_petrali@whirlpool.com
- **Ford**
- **Delphi Automotive**, contact Mansour Ashtiani, mansour.ashtiani@delphiauto.com

3. Специальная награда от Президента Procter & Gamble "За развитие технического творчества на P & G", 1998

4. Специальная награда от Президента Unilever "За развитие изобретательства на Unilever", 2000.

5. Награда от Samsung Electrinics за подготовку Мастеров Инновации, 2002.

6. "Золотой Знак" от Massachusetts Institute of Technology за отличные показатели в изобретательстве, 2001

7. Награда "За решение инженерных задач и изобретательцтво",Oak Ridge National Lab, DOE -Министерство Энергетики США, 1998.

8. Избрание в члены Нью-Йоркской Академии Наук, 1997

9. Звание "Лучший молодой изобретатель Украины", 1989

10. Звание "Заслуженный Изобретатель Украины", 1990

11. Звание "Отличник Изобретательства и Рационализации", ЦС ВОИР, 1990

12. 77 изобретений

13. Членство в организациях:

- New York Academy of Sciences

- Altshuller Institute for TRIZ Studies (a charter member)

- TRIZ Organization of New England

Список публикаций по ТРИЗ (Сергей Яковенко)

Книги и пособия.

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4. G3:ID Innovation Discipline, Basic Course
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Video

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2. TechOptimizer. Introductory Video.

Patents

77 patents – USA, Sweden, Germany, UK, USSR

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- курс по ТРИЗ (80 часов) Г. Альтшуллер, Челябинск ,1987

- курс по ТРИЗ (80 часов) Г. Альтшуллер, В. Цуриков, Минск, 1988

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научный руководитель Г. Альтшуллер
Комиссия: И. Верткин, Г. Иванов, Канер

- курс "Теория и практика решения узобретательских задач" (192 часов), Кишенев, 1990.
научный руководитель Г. Альтшуллер
Комиссия: Б.Злотин
А. Зусман
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Л. Каплан

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В. Герасимов

- Государственный Петентный Институт, 1988- 1991. Присвоена квалификация "патентовед"

- ВГКПИ, 1988. Методы технического творчества - ОТЛИЧНО.г. Москва

-семинар дла преподавателей ТРИЗ,40 часов, 1992, г. Зеленогорск
Преподаватели: С. Литвин
В. Герасимов
А. Зусман
А. Любомирский
В. Цуриков и др.

Sergei Ikovenko

TRIZ Application for IP Strategies Development

Boston, 2006

Academic Advisor: Simon Litvin, TRIZ Master

Opponents: Vladimir Petrov, TRIZ Master
Alla Zusman, TRIZ Master

Successful high technology companies recognize that a comprehensive intellectual property portfolio can be of substantial value. One key component of the intellectual property portfolio is patents. A patent is a right granted by the government that allows a patent holder to exclude others from making, using, selling, offering to sell, or importing that which is claimed in the patent, for a limited period of time.

In view of this right many companies recognize that a well-crafted patent portfolio may be used for a variety of objectives, such as bolstering market position, protecting research and development efforts, generating revenue, and encouraging favorable cross-licensing or settlement agreements. For companies that have developed original technology, a patent provides a barrier against a competitor's entry into valued technologies or markets. Thus, many companies that have developed pioneering technology or major improvement solutions are eager to obtain patent protection. However, to develop an effective patent portfolio, a company should first devise a patent portfolio strategy that is aligned with the company's business objectives.

A patent portfolio strategy may vary from company to company. Large companies that have significant financial resources often pursue a strategy of procuring and maintaining a large quantity of patents. These companies often use their patent portfolios for offensive purposes, e.g., generating large licensing revenues for the company. For example, IBM generates close to $1 billion dollars a year from licensing its patent portfolio. In contrast, for most start-up companies, developing and building a comprehensive patent portfolio can be prohibitively expensive. However, with an understanding of some basic principles of patent strategies and early planning, a start-up company can devise and execute a patent strategy to develop a cost-effective patent portfolio. For example, a start-up company can develop an effective patent portfolio by focusing on obtaining a few quality patents that cover key products and technologies, in
alignment with their business objectives.

For technology-based companies the major steps of designing and executing patent strategies are:

1. Identifying your business goals and areas of technology to be protected
2. Evaluating company assets
3. Developing a patent strategy for protecting the technology in view of the your goals.
4. Implementing the patent strategy and seeking meaningfully broad patent coverage when patent filings are made.
5. Managing your patent portfolio.

Any patent strategy involves a development phase and a deployment phase. The development phase includes evaluation of patentable technologies and procurement of patents. A deployment phase includes the competitive analysis, licensing, and litigation of patents.

Identifying your business goals and areas of technology to be protected

Starting the development phase, the patent strategy identifies the key business goals of the company. Clear business goals provide a long-term blueprint to guide the development of a valuable patent portfolio. In particular, the company should:

- List the business, technology, and product goals for the company.
- Identify key industry players (competitors, partners, customers).
- Identify technology directions (within company and within industry).
- Determine whether a patent portfolio be used offensively (i.e., asserted against others; revenue generation, etc.), defensively (i.e., used as a shield or counterclaim against others who file suit first), for marketing purposes (i.e., to show the outside world a portfolio to demonstrate company innovation), or a combination of these.
- Align goals, industry information, technology information, and core portfolio use strategy.

At this point TRIZ Benchmarking and Function-Oriented Search (FOS) provide a valuable input that regular marketing and information researchers usually ignore. Bridging from a list of specific core functions to a number of generalized functions and performing the search there allows to reveal new businesses, technologies and industries that might be an active arena for your patent strategies in regards to protecting IP, potential infringement cases and licensing. Identification of business MPV during the analysis will provide an input for working with functional MPV

Evaluating company assets

With the goals identified, the evaluation process begins by mining and analyzing intellectual assets within the company. In this process, a company organizes and evaluates all of its intellectual assets, such as its products, services, technologies, processes, and business practices.

- Identify the intellectual assets. To help determine this, gather and organize documented materials. Examples of documented materials include business plans, company procedures and policies, investor presentations, marketing presentations and publications, product specifications, technical schematics, and software programs. It may also include contractual agreements such as employment

agreements, assignment and license agreements, non-disclosure and confidentiality agreements, investor agreements, and consulting agreements.
- Identify the anticipated life span for each intellectual asset.
- Identify the market for each intellectual asset.
- Identify products/product lines incorporating each intellectual asset.
- Identify those intellectual assets best suited for patent protection.

When it comes to the analysis of the anticipated life span and physical limits of the corporate intellectual assets different parts of the pragmatic S-curve analysis can provide a substantial input into the integrated index of IP assets evaluation. It is effective to apply S-curve analysis for several Main Parameters of Value.

The evaluation phase also provides an opportunity to determine whether a patentability or patent clearance study is necessary. Such studies are used to determine the scope of potentially available protection or whether products or processes that include or use an intellectual asset potentially infringe third-party rights. This evaluation may also involve identifying company strengths with regard to its patent portfolio as well as potential vulnerable areas where competitors and other industry players have already established patent protection.

While the evaluation phase is in progress, the company can move into the procurement phase. In the procurement phase of the patent strategy, a company builds its patent portfolio to protect core technologies, processes, and business practices uncovered during the audit phase. Typically, a patent portfolio is built with a combination of crown-jewel patents, fence patents, and design-around patents.

Crown-jewel patents are often blocking patents. One or more of these patents is used to block competitors from entering a technology or product market covered by the patent. Fence patents are used to fence in, or surround core patents, especially those of a competitor, with all conceivable improvements so the competitor has an incentive to cross-license its patents. Design-around patents are based on innovations created to avoid infringement of a third party patent and may themselves be patentable.

Different companies may choose different directions depending on their objectives and capabilities. For most start-ups, costs for pursuing patent protection are a concern because financial resources are limited. Hence, most start-up companies begin the procurement phase by focusing on procuring one or more crown-jewel patents, while large corporation may choose to entertain a strategy that involves fence patents, etc.

Typically crown-jewel patents belong to Stage 1 or the Transitional stage of the S-curve for a specific MPV while fence patents are usually associated with Stages 2 and 3.

<u>Developing a patent strategy for protecting the technology in view of the your goals.</u>

Once the areas of technology have been identified, it is necessary to tailor a strategy for protecting the technology. This often-ignored step is of critical importance.

Although the strategy usually involves appropriate partitioning of the areas of innovation into specific inventions to be made the subject of patent applications, sometimes it is desirable to refrain from filing to protect an invention, unless the invention has been

further developed or is about to be commercialized. Additionally, foreign-filing considerations often affect the timing of filing of patent applications in the United States. For example, when a client has an ongoing development program in one area of technology, it may make sense to file an early United States provisional application to seek the first possible toehold for protecting such innovations. However, before the first anniversary of this initial filing (when foreign filings must be made in order to obtain the benefit of the United States filing date), the client may be able to file an expanded United States application covering additional innovations since the initial filing, and then base its foreign filings on the expanded application rather than on the initial application.

Such a strategy may enhance the opportunity for broad foreign coverage while maximizing the chances for significant and early domestic coverage.

When formulating a patent strategy, the business and technological objectives of the company are as important as the legal considerations. For instance, looking to license the technology will require a patent prosecution strategy different from that of seeking to prevent competitors from copying its technology. An elaborate foreign-filing strategy is worthless to a company whose budgetary constraints prohibit such expenditures. On the other hand, a client with only domestic product sales and no foreign sales ambitions might still benefit from foreign patent coverage if licensing of the technology or sale of the client's business are reasonable prospects. Similarly, once the question is squarely posed, a company may decide that the commercial exploitation of a particular area of technology lies beyond its business mission and that it should concentrate its resources in protecting areas of technology closer to its core business. For some market-oriented clients, it is important to focus on developing a trademark portfolio in tandem with a patent portfolio. The patent strategies should be developed taking into considerations all these nuances.

Often, differing business requirements lead to differing patent strategies even where the legal and technological circumstances may appear to be similar. For example, one company having an invention in a technologically crowded field may decide that the dim prospect for broad patent coverage cannot justify the expense of preparation and prosecution of a patent application, whereas another company - perhaps with a desire to bring a new product into the marketplace - may decide that even relatively narrow patent coverage may give it a business edge over the competition.

There is a number of strategies that are widely used in patent practice. Many of them can be enhanced with TRIZplus approaches:

N	Type of Patent Strategy	TRIZ*plus* Tools
1.	The Antidote Strategy	Function Analysis, Cause-Effect Chain Analysis, Trimming, FOS
2.	The Picket Fence Strategy	S-Curve Analysis, Trends of Evolution, FOS, Reverse Contradiction Analysis
3.	The Tall Gate Strategy	S-Curve Analysis, Trends of Evolution, MPV Analysis
4.	The Submarine Strategy (old and new)	Trends of Evolution, FOS

5.	The Counter-Attack Strategy	FOS, Reverse Contradiction Analysis, Semantic Tools
6.	The Stealth Counter-Attack Strategy	FOS, Reverse Contradiction Analysis, Semantic Tools
7.	The Patent Busting (through Trimming)	Function Analysis, Cause-Effect Chain Analysis, Trimming
8.	The Patent Busting (about the Doctrine of Equivalents and Prosecution History Estoppel)	Function Analysis, FOS
9.	The Blanketing Strategy	FOS, Trends of Evolution
10.	The Bargaining Chip Strategy	Trends of Evolution
11.	The Cut-Your-Exposure Strategy	FOS

Table 1.

Foreign filing strategies are mainly based on the legal aspects and are not discussed in this article, It is worth mentioning however that the expense of pursuing foreign patents often makes it difficult to decide the countries in which to pursue protection. Some of this cost can be postponed by using the Patent Cooperation Treaty. A foreign filing strategy should consider the location and nature of potential licensees and potential defendants, and may focus on where an infringing product is likely to be made or where it is likely to be used. Any company considering filing patent applications abroad should pay strict attention to the applicable foreign filing deadlines, which are quite different from those in the United States. An aggressive foreign filing strategy for trademarks can sometimes be an effective complement to a foreign patent strategy. In carrying out a foreign filing strategy, a company should make extensive use, where appropriate, of the Patent Cooperation Treaty and the European Patent Convention, to delay and sometimes reduce the substantial expenses of filings overseas.

Implementing the patent strategy and seeking meaningfully broad patent coverage when patent filings are made.

Once a patent strategy has been formulated, its implementation will depend in large part on the skill with which patent applications are prepared and prosecuted. Although it is often not difficult to obtain some patent coverage, there is nevertheless considerable challenge in obtaining meaningfully broad patent coverage. The scope of a patent is measured by the breadth of its claims, and consequently, it is necessary to devote early and continuing attention to the scope of the claims in the application drafting process. While some individuals view a patent application as a technical disclosure to which claims have been added, the shape and wording of the claims affect the shape and wording of the technical description that forms a part of the application.

Also in the deployment phase, the company may incorporate the licensing process. Here, the company
determines whether to license or acquire patents from others, particularly where the patent portfolio is lacking protection and is vulnerable to a third-party patent portfolio. Alternatively, in the licensing process the company determines whether to license or cross-license its patent portfolio to third parties.

Managing your patent portfolio

As patent applications are filed and begin to mature into issued patents, it is important for a company to be able to track the status of its growing portfolio. One of the reasons patents are important is that a patent portfolio shows potential investors, customers, competitors and licensees that a business has taken steps to protect its investment in research and development. Indeed, without implementing some sort of intellectual property protection, a full return on a business's investment in research and development will probably not be realized, as competitors can skip their own research and development costs and cut into the business's profit margins.

Thus, a patent portfolio can be a prized property for a company and, like any valuable asset, should be carefully maintained.

The development and maintenance of a patent portfolio usually call for attention to potential licensing transactions. Aside from the contractual and business issues in these types of transactions, important validity and infringement questions can arise. A company that is well prepared can often dramatically reduce the risks of patent infringement claims and lawsuits. Designing around a patent and obtaining a formal clearance opinion are two ways of reducing the risk of a patent infringement claim.

TRIZ together with problem analysis and semantic tools are powerful instruments for patent strategies development. It is necessary to further sharpen algorithms and recommendations on using specific TRIZ tools for specific strategic IP objectives.

A special attention in IP strategies development should be paid to the Doctrine of Equivalents and its substitutes.

While patents are actually legal documents that describe the exclusive rights granted by the government to the named inventors or entities, for strategic planning purposes patents can be viewed as a basis used in a variety of modern business scenarios. In virtually every situation a patentee’s interests are best served if the effort results in securing commercially valuable patents. The commercial impact of a patent largely depends on its scope. The patent scope outlines the boundaries of the patent’s claims and primarily determines its strength and market grasp. That is why drafting a comprehensive patent application with a broad and omni-covering scope is very desirable, but at the same time, very difficult and expensive.

First of all, it is impossible for a patent applicant to anticipate every unsubstantial variation that a competitor might try, let alone to articulate in general and abstract terms every detail of a genuinely new invention. Copyists would need only identify a single weakness in a claim and then would be free to adopt the relevant variation and infringe with impunity. And inadvertent infringers too, would from time to time stumble into variations that, due to a failure in the original claim language, would also happen to fall outside the patent’s scope. We should remember here that unlike trade secret law, patent law does not tolerate independent inventions. An infringer who innocently stumbles into a patent’s scope is subject to legal liability, just like an infringer who knowingly enters that same domain. Of course, damages in the latter case are typically higher, at least if the copyist has been shown to have acted willfully.

Secondly, even if an applicant tried to compose a perfect patent description with a broad scope including all the possible variants that are within reach, it would require

substantial time and money and still would not guarantee a bulletproof patent even with more inclusive claims. Sophisticated firms with real money on the line nevertheless routinely fail to craft literal claims that properly articulate their inventive accomplishments and, simultaneously lose time and momentum for introducing those accomplishments to the market.

To address these issues patent holders have at their disposal a number of both law-based and judiciary-created mechanisms by which to expand patent scope beyond the original contours and to file a strong patent application faster and at a lower cost. These mechanisms are Doctrine of Equivalents, Reissue Proceedings and Continuations.

Under the Doctrine of Equivalents, a patent owner can, in the context of an infringement action, ask the court to reinterpret the claim language to cover not only that which the claim literally describes, but also similar solutions that perform substantially the same function, in substantially the same way to obtain substantially the same results.

Under Reissue Proceedings a patent holder can turn to the Patent Office and, albeit subject to some serious restrictions, ask that new language be considered. As the result of the action, the scope of the patent can broaden. Yet another mechanism of Continuations allows the applicant to submit new claims that will under certain circumstances be treated as if they were submitted at the time of the original application.

One way in which the Doctrine of Equivalents, Reissue Proceedings and Continuations applications reduce application costs is by reducing the pressure to write perfect literal claims. These mechanisms are safety nets, and they to varying degrees stop a wasteful arms race in which copyists spend excessively on meaningless attempts to skirt literal claim language and applicants respond by upping the ante with respect to their attempts to craft the ideal phrase. The Doctrine of Equivalents is likely the most effective of the above-mentioned mechanisms because it obviates the need to ever actually write the necessary claim language. Under the other mechanisms, an inventor must spend some money updating his claim terms every time a new literal loophole is discovered, although perhaps not too often if copyists anticipate this pattern and decide that short windows of permissible infringement are not sufficiently worthwhile.

Another way in which these mechanisms reduce costs is by allowing applicants to postpone some of the work of scope articulation. This has value for two reasons. First, a system that allows for gradual investments in refinement also allows for resources to be conserved in instances where the patented technology turns out to be a commercial dud. Failures like this are surprisingly common – many patents are revealed to be worthless within a few years after issuance- and so the savings here can be significant. Second, because it is typically easier to articulate the essence of an invention after experience has made clear the technology's core attributes, delay is valuable simply because it gives inventors more time to gain experience with their inventions. Consider, for example, how difficult it would have been 20 years ago to describe the Internet in clear but abstract terms, and then compare that with the difficulty of undertaking this task today, when e-commerce, blogging and other online activities have rendered clear the technology's central features.

Though the Doctrine of Equivalents, Reissue Proceedings and Continuations may overlap and substitute each other sometimes there are specific nuances for each of those mechanisms. For example, like original claim drafting itself, the Reissue

Proceedings and Continuations applications require that an inventor write appropriate literal language early in the inventive process. This is in sharp contrast to the Doctrine of Equivalents which typically applies years later, when there is an actual controversy at hand. Reissue is the most limiting on this score: it can only be used to expand claim scope during the first two years after patent issuance.

The Continuations are not very flexible either. The first Continuation application must be filed before the associated before results in an issued patent, and that first continuation will typically run within a few years. An applicant can file additional continuations after the first one, and in theory the chain can proceed without end, but in practice an applicant must have some plausible reason to keep a continuation alive or the Patent Office will reject it.

The Reissue Proceedings and Continuation Applications cannot possibly offer protection as broad as that available under the Doctrine of Equivalents, simply because a finding of equivalents is retroactive whereas these other mechanisms are largely forward-looking. When a court announces that some accused product is equivalent to the patent invention, the remedies available are exactly the ones that would have been available had the accused product literary infringed. In both cases, the infringer is liable for damages for past infringement. In both cases, the infringer is subject to injunction relief with respect to any on-going activities. By contrast, when claim scope is expanded during the reissue proceedings, damages cannot be collected for past transgressions that infringe the new claim but not the old ones. And even more important, the court has the authority to permit continuing acts of infringement "under such terms as the court deems equitable for the protection of investments made or business commenced before the grant of the reissue".

Continuation Applications similarly let slip a class of infringers. Claims included in a Continuation Application are effective on a forward-looking basis and – except in specific circumstances – cannot be used to recover for activities that occur before the continuation patent issues. The specific circumstances under which the Patent Act does allow a patent holder to recover for infringements that take place after a Continuation Application is published but before the application matures into an issued patent. However, infringements are actionable under this rule only if (a) the infringer had actual notice of the published Continuation Application and (b) the invention claimed in the ultimate patent is "substantially identical" to the invention claimed in the published Continuation Application.

And lastly, to complete the picture. Many patent doctrines work to define the balance of power between the Patent Office on the one hand, and the courts on the other. The Doctrine of Prosecution History Estoppel, for example, empowers the Patent Office to extract from a patent applicant certain concessions that will bind that applicant even if a court later determines the concessions were unnecessary. The Doctrine of Equivalents meanwhile empowers the courts to broaden patent scope beyond the contours originally deemed appropriate by the Patent Office.

We will discuss the application of several the most important tools: Function Analysis, Trimming, Cause-Effect Chain Analysis, Function-Oriented Search and Trends of Engineering System Evolution.

Function Analysis and Trimming

Function Analysis is an analytical tool that identifies functions, their characteristics, and the cost of system and supersystem components. Function Analysis is significantly more powerful than a component focused approach. It opens many new innovation possibilities by developing a function model of the system. This leads to multiple design options that significantly increase our ability to improve the system.

Trimming is an analytical tool for removing (Trimming) certain components and redistributing their useful functions among the remaining system or supersystem components. Trimming is based on improving a system by reducing the number of components and simplifying the system. System value is increased by eliminating components, thereby reducing costs and preserving or improving overall functionality. Trimming offers multiple options for eliminating the same component. These options represent a spectrum of possible innovations — from incremental to more radical & fundamental.

Function Analysis is a cornerstone of many patent strategies enhancement with TRIZ and plays a really special role for the Doctrine of Equivalents, Reissue Proceedings and Continuations. One of the major FOE criterion is performing "substantially the same function" that is why to clearly understand the function model of a competitive invention is critical for both the substitution approach and the trimming techniques for circumventing purposes.

Cause – Effect Chain Analysis (CECA)

CECA is an analytical tool that was designed to identify key disadvantages of the engineering system. The key disadvantages that are responsible for surface (target) problems. The Key Disadvantages are formulated at a fundamental level — in terms of their physical, chemical, geometric, and biological essence. Identifying and solving the problems at this level eliminates all surface problems.

CECA finds a broad application in:

- patent umbrella development
- competitive patent circumvention when the DOE is an issue

Solving key problems as well as problems in the middle of the chain helps to generate a plethora of solutions from very different areas that together will make a diverse and strong patent umbrella blocking any other way to resolve the target problem.

Another application of CECA that is worth mentioning is competitive patent circumvention for professes, especially when it is done by mere substitution (no trimming) and the Doctrine of Equivalents may be a threat. It should be kept in mind that DOE is applicable when an allegedly infringing solution performs "substantially the same function in substantially the same way to obtain substantially the same result" Having a function model as a starting point, CECA allows to arrive to performing a totally different function and to achieve the same or better results. This approach is especially strong in combination with Function-Oriented Search (FOS).

Function-Oriented Search

Function-Oriented Search (FOS) is a problem solving tool based upon identifying existing technologies worldwide, using function criteria. Industries face similar engineering challenges, but the similarities are not obvious because the industries where the challenges appear are often completely different. In industries where similar challenges are critical, more resources (manpower, capital, and time) are allocated to address them. Solutions therefore exist — but are not readily apparent or applicable to other industries. FOS removes the industry-specific limitations of a potential solution, and uncovers possibilities, regardless of the source industry. It allows capitalizing on investments made in other industries. It also breaks psychological barriers for acceptance of new technologies, because there is already proof that the recommended solution will work.

Combing CECA and FOS results in either performing a different function or performing an old function in a totally different way (a different principle of operation) or both that makes DOE analysis helpless and non-applicable.

Trends of Engineering System Evolution

Trends of Engineering System Evolution (TESE) are statistically proven directions of engineering system development. They describe the natural transitions of engineering systems from one state to another. These directions are statistically true for all categories of engineering systems. Analysis of historical patterns of engineering systems evolution and the world's patent collection has revealed statistically proven trends in the development of engineering systems. Applying these trends enables innovation to be more productive, more predictable, and therefore, less risky.

Trends of Engineering System Evolution can be a powerful instrument if properly used in combination with Reissue Proceedings and Continuations. There were a number of cases when an initial patent application contained a part of the general description of several trends applied to the main function of the system protected by the patent and/or its major parts. If some recommendations and rules of descriptions were observed it gave a legitimate reason for initiating both Reissue applications as well as Continuations.

Trends of Engineering System Evolution can be effectively used for development of patent firewall strategies and are second to none for composing dependent claims for a patent application. There is a special technique that includes:

- breaking an independent claim into parts
- applying trends to those parts and developing a forecast of their development
- drafting a number of dependent claims based on the forecast

Intellectual property (IP) assets, like any other asset, must be properly managed to

maximize a company's return on investment. The returns are more easily maximized when an IP portfolio has been strategically structured to match the company's business model and objectives. The identified strategies should be equipped with a powerful implementation and deployment arsenal of approaches.

The major concepts of this work were published in the proceedings of:

1. TRIZCON 2004, Seattle, USA
2. ETRIA, TRIZ Future 2005, Graz, Austria
3. ETRIA, TRIZ Future 2006, Kortrijk, Belgium

Recommendations and Conclusions on the qualification work of Sergei Ikovenko "TRIZ Application for IP Strategies Development"

Thesis Advisor Simon Litvin, PhD, TRIZ Master

Objectives

The objectives of the submitted work are to develop a system of algorithms and recommendations on using TRIZ for development of various Intellectual Property (IP) strategies for both competitive patent circumvention as well as enhancing the existing IP portfolio.

Scientific Approaches

The scientific approaches used in this research work were analysis of TRIZ and TRIZplus tools and methods (Function Analysis, Cause-Effect Chains Analysis, S-curves and Trends of Engineering System Evolution, Function-Oriented Search and others) in conjunction with patentability infringement criteria of the Patent Law. The applicant conducted a research of Doctrine of Equivalents (DOE) patent practices and the applicability of TRIZ tools to instrumentally design a set of algorithms and recommendations.

Major Results

The submitted work offers step-by-step guidelines and recommendations for crafting IP strategies depending on the business objectives. The Doctrine of Equivalents is the most sensitive issue of the infringement practices. S. Ikovenko developed a multi-prong approach of handling DOE effectively using TRIZ. There are algorithms for TRIZ usage developed for "submarine" strategy, "fence", "tall gate" and other standard patent approaches.
The developed piece of the methodology allows to connect TRIZ tools with specific recommendations on IP strategies that makes it much easier and much more straightforward to enhance the business impact with TRIZ solutions.

Novelty

The novelty of the approach is multi-facet:

- for the first time ever it allows to apply S-Curve Analysis for development of IP strategies both addressing the competition and strengthening your own IP portfolio;
- absolutely new method of competitive patent circumvention is a combined use of the Prosecution History Estoppel (PHE) and Function-Oriented Search. PHE analysis allows to navigate around the Doctrine of Equivalents and shorten time-

to-market of new engineering solutions by freely substituting components of the independent claims instead of trimming them;

- development of the dependent claims using Trends of Engineering System Evolution as well as patent "umbrellas" and "firewalls". Using Cause-Effect Chains Analysis for this purpose is another interesting aspect of using TRIZ for IP development and protection.

Practical Applicability

The developed method can be and has been very successfully used in various projects for different leading corporations worldwide – Dior, Nippon Steel, Whirlpool, Siemens, Chiquita, and others.
Many parts of the method were presented at a number of international conferences and taught at TRIZ seminars at INA, Intel, General Mills, etc. The Whirlpool TRIZ specialists successfully used it to circumvente a competitive Siemens-Bosch patent, got the freedom to operate and avoided an infringement lawsuit.
The commercial department of Swiss Patent Office uses the method after S. Ikovenko conducted training seminars there in 2003.
GEN3Partners effectively uses the method in current consulting practices.

Conclusions

I think that the presented work of S. Ikovenko is a considerable contribution to development of TRIZ applications. It is of interest to many practicing TRIZ consultants, problem solvers, as well as patent engineers and engineering strategists, and it fully corresponds to the requirements of the "TRIZ Master" qualification.

Simon Litvin, PhD, TRIZ Master
Vice President and Chief Scientific Offices
GEN3Partners

Отзыв
официального оппонента
на квалификационную работу Сергея Яковенко
"Применение ТРИЗ для построения защиты интеллектуальной собственности"

В качестве работы на соискание квалификации «Мастер ТРИЗ» С.Яковенко представлена монография "Применение ТРИЗ для построения защиты интеллектуальной собственности" и сборник проектов (задач и решений), иллюстрирующих применение разработанной методики.

При рецензировании данная научная работа оценивалась по следующим основным критериям:

- актуальность тематики;
- научный уровень;
- практическая применимость и достигнутые практические результаты

Актуальность.

Выполненная работа посвящена разработке методики по использованию ТРИЗ для построения защиты интеллектуальной собственности.

Основная задача любой компании в условиях рыночной экономики - использовать инновацию для создания конкурентоспособной позиции на рынке. Однако во многих отраслях промышленности эти с трудом завоеванные позиции уязвимы для имитации, дублирования, у простого пиратского копирования. Защита интеллектуальной собственности приобретает все более важное значение для утверждения надежной конкурентоспособной позиции на рынке.

Одновременно с этим, действующий патент конкурентов может надолго заблокировать использование передовой технологии на фирме, что будет

серьезно тормозить вывод на рынок фирмой новых продуктов или снизить производственные затраты.

Разработка методики для построения защиты интеллектуальной собственности на базе ТРИЗ представляется чрезвычайно актуальной.

Что конкретно позволяет предложенная методика. Особенность представленного подхода состоит в использовании функционального анализа, причинно-следственных цепочек, законов развития технических систем, свертывания и других инструментов ТРИЗ для:

- обхода конкурирующих патентов;
- усиления собственных патентов;
- разработки «патентных зонтиков» («патентных заборов»);
- усиления патентных стратегий в зависимости от положения технической системы на S – кривой и т.д.

Научный уровень.

Оценивая научный уровень, можно отметить, что работа основана на отличном владении автором как инструментарием ТРИЗ, так и нюансов патентного законодательства. Если использование свертывания для обхода патентов достаточно интуитивно, то Prosecution History Estoppel представляет собой абсолютно новый эффективный подход для нейтрализации доктрины эквивалентов.

Другие очень интересные интересный аспекты методики - использование сочетания Continuations и Reissue Proceeding с законами развития технических систем, а также алгоритмов для патентных стратегий для разных этапов S-кривой.

Continuations, Reissue Proceedings, рассматриваемые совместно с ЗРТС, позволяет чрезвычайно эффективно использовать “submarine” стратегии - эффективнее, чем любые другие известные методы.

Хотелось бы отметить, что методика разработана при успешном выполнении конкретных проектов на базе ведущих мировых фирм-

производителей – Mannesmann (Germany), Kao (Japan), Siemens (Germany), Chiquita (USA), Dior (France) и др.

Новизна разработанной методики:

- использование Prosecution History Estoppel в комбинации с Функционально-Ориентированным Поиском;
- причинно-следственные цепочки как инструмент для разработки «патентных зонтиков» («патентных заборов»);
- Continuations и Reissue Proceedings и Законов Развития Технических Систем как основа «submarine» стратегии;
- категоризация патентных стратегий для разных этапов S-кривых;
- Инверсный Функционально-Ориентированный Поиск для разработки патентных платформ.

Практическая ценность.

Практическая ценность разработки определяется тем, что она уже, как было отмечено выше, опробована при очень успешном выполнении конкретных консультационных проектов: В результате проектов был обойден ряд конкурирующих патентов, а также укреплены патентные позиции/стратегии фирм-заказчиков: поданы 18 заявок, получены 14 патентов, многие из которых уже воплощены в товарах, выпущенных на рынок.

Автором был разработан и проведен ряд практических и учебных семинаров по теме диссертации: на Boeing, Whirlpool , в Патентном Ведомстве Швейцарии и т.д. Слушатели семинаров успешно применяю разработанную методику - ТРИЗ группа Whirlpool (Италия) успешно обошла конкурирующий патент Bosch-Siemens, чем сэкономила 7 млн. Евро.

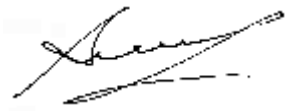
Оценивая по приведенным критериям выполненную диссертационную работу в целом, считаю представленную работу значимым вкладом в развитие ТРИЗ.

Автору рекомендуется:

- доработать алгоритм по разработке дополнительных пунктов формулы (более четкие рекомендации)
- уточнить методику в части применения причинно-следственных цепочек для разработки "патентных зонтиков".

В целом диссертационная работа является серьезным шагом в развитии методики и ее автор - Сергей Яковенко - заслуживает присвоения ему квалификации «Мастер ТРИЗ».

Владимир Петров



Президент Ассоциации ТРИЗ Израиля,

Мастер ТРИЗ

09.10.2006