

Leonid Kaplan

UTILIZATION OF TRIZ FOR DEVELOPMENT OF
BUSINESS STRATEGIES FOR INNOVATIVE
COMPANIES

Author's Abstract of Dissertation to TRIZ Master's certification

Scientific Consultant: TRIZ Master N. Feygenson

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Table of Contents

Actuality of Researched Topic	1
Goal and Objectives of Research.....	2
Methods of Research	2
Scientific Novelty of Research	3
Practical Significance of Research	4
Defense of the Thesis: Main Issues	4
Author's Personal Contribution	5
Experimental Research	5
Publications	5
Structure and Scope of Dissertation.....	6
Content of Dissertation	6
Publications on Dissertation Topic	8

Actuality of Researched Topic

Contemporary crisis is a transition from industrial to postindustrial, informational epoch of global economy. Currently, people invest in development of industrial capacities. In future, money, resources and efforts will be invested in long-term innovations. New products and services will be developed ahead of time. As a result, they will hit the market just in time, when consumers start feeling a need in new, better capabilities and begin searching for appropriate products. These changes in investing and product development look at least risky from standpoint of “widely accepted” approaches and principles. However, new paradigm is always counterintuitive from point of view of current, habitual paradigm. The companies, industries and countries that already follow the new principles can take the opportunity to be first in postindustrial world. Their competitive advantage is an ability to forecast improvements of their products for several generations ahead and implement these forecasts.

It is clear that competitive resistance is the toughest obstacle to implementation of innovative products and services. Companies already entrenched in industries and markets, with their obsolete products and services, are the most aggressive competitors to innovative businesses. They are fiercely fighting to preserve their position in the marketplace, to keep their customers.

The fiercer the competition is, the more obvious it becomes that innovation cannot succeed if company follows the reactive strategy, deals with internal and external obstacles after they become evident. Such strategy “reliably” leads to the failure. Multiple researches conducted by Clayton Christensen, Geoffrey Moore, Anthony Ulwick and other scientists and consultants demonstrated that proactive strategy that prepares company to dealing with obstacles ahead of time or even prevents occurrence of some obstacles is the key factor of success. Consequently, revealing of typical obstacles that prevent delivery of innovation to the customers, and development of strategic approaches to foreseeing, overcoming and preventing these obstacles becomes the most important direction of research and development in science of innovation.

Clayton Christensen, Geoffrey Moore and other well-known authors describe in their books and articles various aspects of competitive warfare and suggest efficient proactive strategies for successful implementation of innovative products and services. However, all these authors carefully avoid one of the most dangerous stages in the process of introducing an innovation to the market: the first substantial commercial success.

Author’s research showed that such “avoidance” is not an accident. The innovative company in this competitive warfare faces a conglomeration of aggravated, interlaced contradictions. The scientists who aren’t familiar with TRIZ and cannot address the contradictions such a situation is methodologically hopeless. On the other hand, they don’t risk scaring entrepreneurs away from implementation of innovations by describing such phenomenon without any recommendations on overcoming the obstacles.

However, entrepreneurs cannot avoid the troubles simply because they don’t know about these obstacles. Moreover, the entrepreneurs are unprepared to face these obstacles, thus

adding to the statistics of failures of innovative companies. The innovations, though, reach the consumers anyway, although they are produced by competitors rather than by original innovators.

Hence, importance and urgency of this issue is determined, on the one hand, by frequent failures of innovative companies after first substantial commercial success, and on the other hand, by lack of methodological tools providing development and implementation of successful business strategies capable of overcoming the competition at this stage, maximum involvement of intellectual resources of innovation company, and sustainable introduction of efficient innovations to the market.

The dissertation project has been conducted in traditions of Kishinev TRIZ School. These traditions include aiming the research to the practical purposes, broad and deep use of TRIZ tools, and delivery of methodological and practical recommendations in compact, usable format.

Although the recommendations produced in the course of this project target the small companies with limited resources, they also can be successfully employed by innovative companies of any size. These recommendations are also useful to business incubators, because innovative companies should prepare themselves to the consequences of first commercial success from the very beginning of their activities.

Goal and Objectives of Research

The goal of this research is to improve efficiency of methodological tools necessary to form the strategies increasing competitiveness of innovative companies at the stage of development of their first marketing success. This goal is achieved through development of TRIZ-based tools for diversification of innovation and for resolving the non-technological contradictions, and formation of the system of interrelated efficient strategies. The following objectives should be accomplished to achieve this goal:

- Reveal the typical interrelated contradictions the innovation companies face at this stage of business evolution;
- Develop the methodical tools for analysis and addressing of this system of interrelated contradictions, and for diversification of innovations;
- Develop the practical recommendations on implementation and utilization of strategies;
- Reveal and explain the reasons why such strategies are rejected or incompletely implemented by companies;
- Develop the practical recommendations on overcoming the obstacles that hinder implementation of suggested strategies.

Methods of Research

Major research methods used in this project are traditional in TRIZ research, especially in discovery and development of Patterns of Evolution. Research in history of subject is used to accumulate the factual knowledge on frequently occurring similar phenomena in typical process of system evolution, as well on cases when such phenomena don't occur in evolutionary process. In this particular case, we are talking about frequently repeating failures at the specific stage of evolution of innovative business (system), as well as about

cases when innovative business successfully passes this stage of evolution. Then, the repeating phenomena, as well as cases of their absence, are analyzed and compared in order to reveal the differences. This comparison results in step-by-step development of “portrait” of recommendation; then, this sketchy recommendation is tested in other cases, updated and corrected. The next step is testing of recommendations in new business situations.

Author used also the deductive logical method. Hypothesis on contradictions that cause business failures are suggested based on discovered differences between “desirable” course of events, i.e. more and more consumers purchase innovative products and services, and reality, i.e. competitors take any legal measures to protect and grow their customer base. These contradictions are analyzed to reveal the psychological stereotypes (assumptions) that lead to occurrence and aggravation of contradictions. Then, these assumptions are compared to the typical beliefs shared by majority of entrepreneurs. Inversion of these assumptions provides for new opportunities to resolve the problems caused by competition. Comparison of these solutions with actual cases of business successes at this stage provides for concluding on role of this assumption and contradiction, as well as on importance of successful resolution of this contradiction.

Experience of real innovative businesses serves as an empirical basis of this research. Information about real experiences of entrepreneurs is collected from both literature and networking with local entrepreneurs. Author also analyzed his personal experience of implementing the suggested strategies at early stages of several innovative start-ups.

Scientific Novelty of Research

1. Author discovered important, but not researched before, stage of evolution of innovative business.
 - a. Risk to the innovative company’s existence in the market at this stage is elevated.
 - b. The stage begins right after the first substantial commercial success of innovative product, and ends either when company disappears from market or when the market boom begins and nature of competition changes.
 - c. As a result of first substantial commercial success, the company stands out of the homogeneous crowd of “novices” and threatens the competitors; hence, the company experiences maximum competitive pressure. On the other hand, if company responds to the competitive blows in the conventional ways, its scarce resources quickly run low, and company crashes.
2. Author found out that this stage can be passed successfully, and developed appropriate strategies. These strategies provide innovative company with understanding how to efficiently utilize scarce resources, expand the business, avoid competitive blows and deceive competitors on its intentions, plans and responses to competitive attacks.
 - a. Strategies are developed via standard innovative procedure, i.e. reveal, analyze and resolve the contradictions the innovative company faces at this stage.
 - b. Typical contradictions arising in course of competitive fight during this stage, and patterns of their occurrence are revealed and researched. The mechanism of occurrence of contradictions is as follows: entrepreneurs follow the assumptions and beliefs shared by majority of businesspeople; if entrepreneur takes these contradictions as “unsolvable,” the company’s crash is inevitable.

- c. Strategies are integrated into the strategic system. This system suggests the following approaches: prepare ahead of time; quickly, at minimum cost shift to new generations of product and new markets; act covertly, and exploit the customers' support and know-how designed into the innovative process.
3. Author provided the methodological support to implementation of suggested strategic system. For this purpose, he developed efficient, easy-to-use method for revealing the new markets and generations of innovative product.
 - a. The method consists of fast generation of practically exhaustive set of alternative realizations of innovative idea and subsequent selection of appropriate product concepts based on specific criteria.
 - b. Generation of alternatives is aimed at development of product platform consisting of all feasible realizations. Generation of alternatives involves double morphological synthesis along the predetermined axes, thus multiplying the basic idea of innovative product.
 - c. Alternatives for implementation are selected by the following criteria: the subsequent generations of product satisfy the needs of customers better; new categories of customers pay attention to the "word of mouth" of existing customers. These criteria provide for uninterrupted process of shifting to new generations of products and new markets.
4. Author tested the strategies in real consulting project. He found out that development and implementation of these strategies calls for making the unobvious decisions in contradictive situations. For this purpose, the author developed and tested the new approach to addressing the contradictions that arise in non-technological areas of human activities. This approach suggests revealing the wrong beliefs and assumptions, analyzing them, and purposefully modifying the understanding of new situation rather than modifying the conflicting elements.

Practical Significance of Research

The results of this research are aimed at practical use in development of business plans and business strategies of implementation of breakthrough innovations and especially disruptive innovations. Efficiency of these strategies is demonstrated by both analysis of history of innovative businesses and experience from use of suggested strategies in business plans of innovative start-ups. It is important to notice that this experience is not limited by personal author's experience: the strategies suggested in this research had succeeded with many companies.

Suggested in this dissertation tools supporting the innovative activities had been used in multiple consulting projects.

Method of "idea multiplication" had been used for many times as a systematic approach to the issue of diversification of innovations. It usually took only few hours of consultant-methodologist's work with client to significantly expand entrepreneur's vision of marketing potential, efficient realizations and technological capabilities of their innovations. This easy-to-use method substantially accelerates analysis of marketing potential of any product, including the innovative ones, and increases this marketing potential, usually in order of magnitude.

Suggested approach to resolution of aggravated contradictions had been used in solving the wide variety of problems, both technological and non-technological.

The very nature of these problems made widely accepted TRIZ approach to resolving of physical contradictions unusable, because it was difficult to find a relevant analogy to notions of “space,” “time,” “condition” or “systemic level” in such situations. In many cases, separation of some “non-technological” entities was not an applicable option. On the other hand, due to suggested by new approach changing the understanding of and attitude to the situation at hand before trying to modify the involved entities provided the problem-solver with faster and more efficient solutions with minimum intellectual effort.

Author also used these results while developing the business plans for two innovative companies, Virtual Products LLC (Ann Arbor, MI, USA) and SkinTreet LLC (Ann Arbor, MI, USA). In 2008-2009, these business plans for several times were the finalists of business plan competitions conducted by GLEQ (Great Lakes Entrepreneur's Quest), division of Automation Alley, association of engineering businesses in Oakland, Macomb and Washtenaw Counties, MI, USA.

Defense of the Thesis: Main Issues

1. Discovery of specific stage in lifecycle of innovative companies
2. Results of revealed typical contradictions that render the innovative companies incapable of counteracting to the competitive attacks
3. Systematic approach to diversification of innovations, search for new generations of product and new markets
4. New approach to addressing the aggravated contradictions aimed at modification of problem-solver's perception of situation-at-hand rather than on modification of entities involved in this situation

Author's Personal Contribution

Experimental testing of new strategies in business plans of innovative start-up companies was conducted by author together with Valeriy Prushinskiy and Geoffrey Henny. All other findings described in this dissertation, including revealing and description of indications of inevitable dangerous stage in evolution of innovative businesses, discovery of typical to this stage system of aggravated contradictions, development of method for resolving the aggravated interrelated contradictions, development of strategies and determination of main obstacles to their implementation by innovative businesses, are the author's personal contribution.

Experimental Research

Author successfully used the major results of this research in consulting projects while working with innovative companies of different sizes. In parts, these results were presented at multiple conferences: TRIZCON2000 (The Altshuller Institute for TRIZ Studies, Inc., 2000), NCPDR 2001 (George Mason University, 2001), Future Trend Conference (Miami,

FL, 2006), Global TRIZ Conference 2010 in Korea (Seoul, Republic of Korea, 2010), 16th Conference on Industrial Engineering and Management (Tel-Aviv, Israel, 2010); they were also used in preparation of presentation at Japan TRIZ Symposium (Tokyo, Japan, 2010).

Publications

Major portions of dissertation are described in six publications listed in the end of this Author's Abstract.

Structure and Scope of Dissertation

Dissertation consists of Introduction, three Chapters and Summary, described in 91 pages of main text, contains 19 Appendixes in 76 pages, 14 figures and 10 tables, and list of literature including 73 sources.

Content of Dissertation

Introduction describes the problem statement, substantiates the actuality of the topic of this dissertation project, formulates the goals and objectives of research, lists the main ideas of defended thesis, explains the scientific novelty and practical value of results of this research.

First chapter contains the overview of literature and substantiates the goal and objectives of research. The publications used in this research could be categorized as follows:

1. TRIZ: researches on revealing, formulation and resolving of contradictions (G. Altshuller, G. Ivanov, V. Petrov et al.);
2. TRIZ + business: TRIZ research on evolution of organizations (B. Zlotin), on revealing and addressing the contradictions that occur in business;
3. Business: different stages in evolution of innovative businesses (G. Moore et al.), problems in implementation of innovations (G. Moore, C. Christensen, A. Ulwick et al.).

Second chapter of dissertation describes the system of interrelated aggravated contradictions, development of tools for addressing these contradictions and systematic search for new markets and market niches for innovation.

This chapter for the first time describes in detail an important stage in evolution of any innovative business: inevitable competitive attacks taken by stronger companies that immediately follow the first substantial commercial success of innovation. Author shows that competitive blows are directly caused by commercial success, but strength of competitive blows is disproportional to the size of this success. Author also reveals the mechanisms of occurrence and aggravation of contradictions that hinder the innovative businesses' ability to successfully counteract to the competitive attacks that aim at extermination of innovative business. These contradictions are brought to life by widely accepted among the entrepreneurs' beliefs and assumptions related to the "unwritten rules" of "fair competition." These unwritten rules inevitably create the conditions under which the stronger competitor always wins and weaker competitor always loses. But any business introducing the breakthrough innovation to the market is initially in the weak position regardless to the size of company – and must win in competition. This is the root cause of contradictions typical for this stage of evolution of innovative business.

According to the nature of contradictions under consideration, the author developed the new method of analyzing and addressing the aggravated contradictions; this method is based on revealing and inverting the assumptions that cause occurrence and aggravation of these contradictions.

Author also revealed and systematized the relationships between typical contradictions that characterize this stage of business evolution. Since simultaneous analysis and addressing of these interrelated contradictions is impossible, author uses conditional separation of these relationships. Later, this approach provides for opportunity to resolve each contradiction individually, and then, by reestablishing of separated relationships, combine the solutions (strategies into the integral strategic approach.

One of the most important strategies is conquering of new markets. However, there is no systematic approach to the issue of diversification of innovation. To fill this gap, author used patterns of evolution of innovations to develop the method of systematic search for new markets and market niches for company's innovations. This method has been successfully tested in multiple real-world projects. This method combines functional analysis of innovation and method of revealing all possible alternative realizations of function. Separate components of this method were suggested before by G.Yezersky, G. Frenklah and V. Prushinskiy; however, only integration of these components produced the usable and efficient method.

Third chapter describes the results of applying the new tools for resolution of system of contradictions; these results are presented in the form of system of business strategies aimed at competitive victory.

First of all, author formulated the strategic goal: business should survive and continue developing and growing despite the competitive blows. All actions that aren't targeted to achievement of this strategic goal are inexcusable waste of limited resources, efforts and time.

The unique method of resolving the aggravated contradictions that inverts the assumptions and beliefs provided for discovery of conditions under which any competitive blow doesn't cause any harm to the company, or causes the minimum harm.

Clear understanding of these conditions provided for development of 12 business strategies targeting at achievement of the strategic goal. These strategies should be implemented immediately as soon as an innovation is created. Only preparation ahead of time provides the company with opportunity to avoid any competitive blow with minimum efforts and losses, and continue developing the business. Author step-by-step demonstrates how consistent, persistent and timely implementation of these strategies provides for sustainable movement toward the strategic goal.

Discovery and systematization of relationships between contradictions allows integrating the strategies into the unified strategic approach.

The method of systematic search for new markets and market niches for innovation produces clear recommendations on introduction of innovation to the market and steady expansion of customer base.

Since widely accepted assumptions and beliefs are pretty firm in any community, including the community of entrepreneurs and managers, they would inevitably produce objections and obstacles to implementation of suggested strategies. These internal obstacles are as dangerous to the company as external competitive blows are. Taking this into account, author has developed methodological recommendations on timely revealing and overcoming these typical objections and obstacles.

Use of suggested strategies and recommendations increases chances to innovative company survival and provides for successful introduction of innovation to multiple markets and market niches.

The updated tools for analysis of complicated situations and synthesis of solutions used in this dissertation have been successfully tested in real-world innovative projects. Their applicability goes far beyond the scope of the topic of this dissertation; these tools can be used in various areas where TRIZ is applicable. Their use proven in multiple projects can substantially increase level of ideality of intellectual (creative) efforts of project team members and consultants. This effect is achieved through the following features of updated tools:

- Updated method of resolving the contradictions focuses attention on fundamental psychological root causes of occurrence and aggravation of contradictions: beliefs and assumptions that became wrong under new conditions;
- Suggested method of revealing the alternative realizations of innovative idea provides for “quick and easy” development of multiple variations of one idea, i.e. generate many ideas from one without substantial intellectual efforts.

Summary

1. Author discovered important, but not researched before, stage of evolution of innovative business. Risk to the innovative company’s existence in the market at this stage is elevated. The stage begins right after the first substantial commercial success of innovative product, and ends either when company disappears from market or when the market boom begins and nature of competition changes. As a result of first substantial commercial success, the company stands out of the homogeneous crowd of “novices” and threatens the competitors; hence, the company experiences maximum competitive pressure. On the other hand, if company responds to the competitive blows in the conventional ways, its scarce resources quickly run low, and company crashes.
2. Author developed strategies aimed at successful passing of this stage. With these strategies innovative company efficiently utilizes scarce resources, expands its business, avoids competitive blows and deceives competitors on its intentions, plans and responses to competitive attacks.
 - a. Since the company’s situation at this stage is similar to the situation when the contradiction arises in technology, author developed the strategies via standard innovative procedure, i.e. revealed, analyzed and resolved the contradictions.
 - b. Author revealed the typical contradictions arising in course of competitive fight during this stage, and patterns of their occurrence. In research of these patterns, author found out that contradictions occur when entrepreneurs follow the assumptions and beliefs shared by majority of businesspeople. When entrepreneur takes these contradictions as “unsolvable,” the company’s crash is inevitable.

- c. Author integrated the strategies into the strategic system. This system suggests the following approaches: prepare ahead of time; quickly, at minimum cost shift to new generations of product and new markets; act covertly, and exploit the customers' support and know-how designed into the innovative process.
3. Author provided the methodological support to implementation of suggested strategic system. Although the systematic approach to diversification of innovations is essential to success of innovative business, there is no known method specifically targeting this need. To meet this expectation, author developed efficient, easy-to-use method for revealing the new markets and generations of innovative product.
 - a. The method consists of fast generation of practically exhaustive set of alternative realizations of innovative idea and subsequent selection of appropriate product concepts based on specific criteria.
 - b. Generation of alternatives is aimed at development of product platform consisting of all feasible realizations. Generation of alternatives involves double morphological synthesis along the predetermined axes, thus multiplying the basic idea of innovative product.
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Publications on Dissertation Topic

1. System Approach to Win-Win Resolution of Conflicts. TRIZCON2000, The Altshuller Institute for TRIZ Studies, Inc., 2000
2. System Approach to Win-Win Resolution of Conflicts. Tutorial, NCPCR 2001, George Mason University, 2001
3. FutureMapping Experiential Workshop: Emerging Trends in 21st Century Transportation, Future Trend Conference, Miami, FL, 2006
4. Kaplan L. The Mind of the OutCompete Strategist: Dozen Business Strategies to Win Against All Odds, OutCompete Innovation Series, vol. I. ISBN 978-0-557-04498-6, Lulu, 2009, 207 pages.
5. Kaplan L. Strategic Innovation: How to Address Unsolvable Challenges, OutCompete Innovation Series, vol. II. ISBN 978-0-557-04544-0, Lulu, 2009, 435 pages.
6. Kaplan L. Strategic Innovation: Train Yourself to OutCompete with Confidence. OutCompete Ensign. OutCompete Innovation Series, Vol. III, ISBN 978-0-557-07217-0, Lulu, 2009, 423 pages.
7. Kaplan L. Contemporary Crisis: Attempt of Strategic Approach. // Strategic Management - 2009 - № 4(08). In Russian.

8. Resource analysis reveals new applications for innovative technologies, with Naum Feigenson, Global TRIZ conference 2010 in Korea, March 11-12, 2010, Conference proceedings, p.56.
9. TRIZ-IL – Theory & Practice. Development of inventive, systemic thinking for technological problem solving, with Alex Chernobelsky, 16-th Industrial Engineering & Management Conference, March 23-24, 2010, Tel-Aviv, Israel
10. SeHo Cheong, Len Kaplan, Valeriy Prushinskiy, TRIZ at SMD: Unique Situation, Unique Goals, Unique Approaches, Japan TRIZ Symposium 2010 (in process), Tokyo, Japan, 2010