

Fifth TRIZ Symposium in Japan, 2009

Collection of Abstracts of All the Presentations from Overseas

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Program Committee

EI01- Zlotin (USA) (Keynote)

Use of TRIZ for Prediction of the Future of Technological Systems

Boris Zlotin and Alla Zusman
(Ideation International Inc., USA)

The first successful attempts to apply TRIZ for forecasting of technology were made by TRIZ originator Genrich Altshuller in the end of 1960s. Since 1975 when Altshuller introduced the first system of patterns of technological evolution, Boris Zlotin has been involved in TRIZ forecasting, including development and further improvement of methods for TRIZ forecasting and managing evolution. For over last three decades, TRIZ forecasting projects for various systems from the majority of the areas of human activities have been conducted. This work has resulted in development of Directed Evolution methodology for the purpose of studying the given system evolution, predicting possible positive and negative events and solving inventive problems ensuring realization of preferable outcome.

Directed Evolution methodology includes analytical (DE questionnaires, algorithms for cause-effect analysis and failure prediction, etc.) and knowledge base (over 600 patterns and lines of evolution, Bank of Prognostic Scenarios, Operators for solving inventive problems, etc.) instruments that could be applied manually for relatively simple systems or educational purposes. For full scale projects, Directed Evolution software is recommended.

The presentation will also include the brief history of TRIZ forecasting, several examples of completed projects in various areas and selected utilized instruments.

EI02- Mann (UK) (Keynote)

TRIZ: Necessary But Not Sufficient: Customers And Theories Of Everything

Darrell Mann
(Systematic Innovation Ltd, UK)

As suggested by the TRIZ trend, all systems pass through successive phases of increasing and decreasing complexity. Mankind's understanding of the world has likewise followed a similar pattern; sometimes, as through the 20th Century, the dominant paradigm was increasing specialisation and fragmentation of knowledge. At other times, during the Renaissance for example, synthesis and integration of knowledge fragments has occurred.

Thanks at least in part to the work of the TRIZ researchers, it looks again as though a period of consolidation has again begun. What TRIZ has done to map and integrate the world of technology, others have been doing in the worlds of biology (Margulis), physics (Einstein), social history (Strauss & Howe), psychology (Graves), literature (Brooker), religion (Wilbur) and economics (Mandelbrot, Gilmore & Pine).

The paper examines the various compatibilities and contradictions between the numerous different domain-specific 'Theories Of Everything' and explores the possibility that we may soon be entering a period where a synthesis of these domains into a higher-level Unifying Theory becomes feasible.

Given the apparent lack of successfully commercialised innovations with a clear TRIZ start point, the paper will pay particular attention to, what the author believes to be the biggest single missing-piece in the TRIZ toolkit, that being the anthropological study of populations in general and 'customers' in particular. We show that the majority of attempted innovations fail not because the chosen solution was necessarily 'wrong', but rather because it was either the 'right' solution to the 'wrong' problem, or that it was the 'right' solution at the wrong time.

In discussing this failure to properly understand the tangible and, particularly, intangible motivations and timing-drivers of 'customers', the paper summarises some of the key findings of an eight-year programme of research to uncover the DNA of what motivates people to spend their money on something new. A final section of the paper draws a few tentative conclusions and recommendations aimed at helping companies to increase their innovation success rate.

E01- Devaraj (Malaysia)

An Innovative Approach on Module Ionizer Efficiency Management

Paul Devaraj (Intel, Malaysia)

Delta designed - RFS test handlers are automatic device handling machines that have been in service all across Intel Test Factories worldwide for many years. They are reasonably reliable and relatively easy to maintain. However there are some key weaknesses in some of their systems that needed our attention. One such 'Achilles heel' was their ESD Ionizing system. Not only was it unstable, but it was also very expensive to maintain. Annually Intel Test factories world-wide spend hundreds of thousands of US Dollars to maintain them. This represents a key challenge. The control system of this feature often fails, the Ionizing probes often accumulate dust particles which reduce the Ionizing efficiency of the system. This paper discusses the key design weaknesses of the DELTA RFS test handler's ESD Ionizing System and how the team innovated and improved the system with TRIZ problem solving technique while maintaining output Quality. The simple and effective strategies from TRIZ have been a unique eye opener to us to 'see' the problem in a different perspective. This eventually solved the 5 years old problem saving Intel USD1.2Million in 4 years. TRIZ once again proved as a great problem solving tool which resulted in increased management focus on this 'art' recently.

E02- Moreira (Malaysia)

Simplifying Conversion and Enhancing Outgoing Product Quality on the ICOS Vision System with TRIZ

Darin Moreira, Sushiph Sum Bun, and CT Ong (Intel, Malaysia)

The ICOS module is the final screening gate for cosmetic defects at the factory prior to going out to the customers. Being a HMLV (High Mix Low Volume) factory, there is a big pool of different dimension

products that will be screened. Long conversion time and conversion related downtime has been a big problem that has been gating the factory output and on top of that a concerning number of customer complaints whose root cause originate from the conversion on the ICOS itself. TRIZ enabled the reduction of downtime by 50% and at the same time minimized the conversion time by 35% that eventually returned more than anticipated.

E03- Altholz (Germany)

Legitimacy of a Problem Solving Approach and its Success in Practice as a Decision Criterion

Vitali Altholz (International Graduate School Zittau, Germany)

Providing a critical-analytical review about issues such as a problem solving approach and its legitimacy, this paper comes to the conclusion that even if there are no universally valid concepts or models for problem solving, a certain framework of requirements for effective problem solving can be created. By developing a general problem solving process and a perspective of problem solving under uncertainty, the author argues that the success of a particular problem solving approach is an important, but still in some cases, insufficient criterion for choosing a successful approach. This paper recommends adding a base of legitimacy to the criterion “success in practice” when choosing problem solving approaches. Such a legitimacy base would consist of three points: (1) demonstration of similarities between a new and previously solved problem, (2) possibility to reconstruct the successful problem solving approach, and (3) a similar as possible application of the successful approach to the new problem.

E04- Selladurai (Malaysia)

Innovative Leakage Safety Detection System using TRIZ

Surendran Selladurai (Intel, Malaysia)

S9K (ITS9000) FX/GX ATE uses FC-77 coolant as a cooling agent circulating in a closed-loop refrigerated system to cool down the board components in the testers with hundreds of joins and connector to this board . FC-77 coolant can create a severe slip hazard if it spills or leaks as this liquid is colorless and odorless .The biggest challenge faced by the team was to design a system capable of differentiating between leakage and natural losses (FC-77 coolant has high evaporation rate). This physical contradiction was resolved with the help of TRIZ which lead to a major breakthrough through its ability to distinguish between leakage and natural evaporation

E05- Regazzoni (Italy)

How to Define the Right Problem in a Problem Solving Activity

**Davide Russo, Daniele Regazzoni , Valentino Birolini
(University of Bergamo, Italy)**

Contemporary challenging market and tough competition among enterprises highlight the importance of the ability of going straight from problem to right solution. The hardest issue preventing technicians to systematically fulfil this goal when a problematic situation arises often relies on the difficulty of identifying the real problem to solve. Known innovation methodologies are not able to help from missing the definition of right components of the system to work on, or the proper level of detail, and it happens frequently that smart solutions are found that result to be useless because they don't address the right problem. Even TRIZ theory,

whose method and tools efficacy is well known, is not as powerful in problem statement as it is in problem solving, as proven by the evolution of problem definition step in ARIZ.

The present paper describes a step by step working paradigm to be used before problem solving in order to provide a more systematic and repeatable process of identification and modelling of the real problem to be solved so that emerging contradictions will bring to successful solutions..

E06- Shanmugam (Malaysia)

Customize Picoclock Checkers (Software Program)

Ragubalan Shanmugam; Cheng, Chiew Shan (Intel Malaysia)

In Catalyst Tester RF Class Test Operation, pass checkers fail device-“PCFD” has been an intermittent issue. Success of TRIZ in software & electrical issues was proven with applying the Innovative principles to PCFD issue. The 39 parameters and contradiction matrix had helped us to solve the issue that we faced in a structured manner. Innovative principles applied in this project were *The Other Way Around & Multifunctional*. This team drove Teradyne Asia to implement customize checkers program as a new process flow at CEBU repair centre for detail debugging prior to shipment of picoclock boards to Intel. ROI Savings of ~184K USD thru VF factory implementation with zero spending.

E07- Russo (Italy)

How to Build a Network of Potential Scenarios to Find Innovation Opportunities

**Davide Russo, Caterina Rizzi, Tiziano Montecchi
(University of Bergamo, Italy)**

Nowadays an even more hard market competition pushes companies to continue innovation in the process and product development. Therefore, the role of emerging technologies forecasts can play as an information source in the decision-making of the private and public companies. Dozens of forecasting methods, dealing with social, economic, financial, environmental and technical aspects have been proposed so far in order to support decision makers, but limitations in accuracy on middle and long-term forecast, the poor repeatability and adaptability have limited their applications and diffusion. In this paper a methodology aimed to provide a visual synthesis of a system in all its evolution steps, design variants and future potential configurations, is presented. Such a method integrates new criteria for patent searching/clustering and knowledge organization. The Knowledge Mapping framework shows in a very concise way what has already been explored by competitors and highlights what can still be done. The outcome permits to identify key variants at the structure level both for a rapid and for a following deeper forecasting activity. A software implementation (called KOM- Knowledge Organizing Module) is under development to make the information extraction process more automatic.

A case study of the method, already widely tested in different engineering domains, is here proposed.

E08- Chen (Taiwan)

Eco-Innovation by Using Unified Structured Inventive Thinking

**Jahau Lewis Chen and J.-F. Wang
(National Cheng Kung University, Taiwan)**

This paper presents an eco-innovation method for new eco-product development by using USIT method. It is combined eco-design concept with the USIT method to create new ideas for product eco-innovation. This new method integrated eco-efficiency elements, eco-design principles with engineering parameters to guide the designer the focus point of eco-innovation in using USIT method. It is hoped that when design engineers start to develop a new product, they can consider every kind of the needs to increase products values and reduce environmental impacts. Examples are demonstrated to illustrate the capability of the proposed methodology.

E09- Hyun (Korea) -- Cancelled

E10- Arshad (Australia) -- Cancelled

E11- Mirakyan (Germany)

The Potential of OTSM-TRIZ as a Frameworking Method for Modern Regional, Integrated Energy Planning and Modeling

**Atom Mirakyan, Nikolai Khomenko, Dr. Laurent Lelait, Igor Kaikov
(European Institute for Energy Research, Karlsruhe, Germany)**

The reorganization of national energy markets in many countries, the increasing energy and environmental restrictions, the further energy market uncertainties and the diverse, regional conditions makes regional energy and environmental planning tasks very complex and region-specific. Numerous methods and tools have been used and are still useful for energy planning and modeling. However, there is a need for a systematic and well structured method to deal with these challenges.

This paper presents OTSM-TRIZ as a potential method, which is intended to deal with modern challenges creating innovative solutions and supporting the whole modeling and planning processes.

The initial use of OTSM-TRIZ in a case study provides useful guidelines for the planning and modeling processes, creating not only typical solutions but also combinations of typical solutions with various innovative solutions which fit the specific regional conditions.

E12- Cascini (Italy)

Network of Evolutionary Trends and Maturity Assessment through Contradictions Analysis

**Niccolò Becattini, Gaetano Cascini (Politecnico di Milano, Italy),
Federico Rotini (Università di Firenze, Italy)**

TRIZ literature presents several papers and even books claiming the efficiency of Altshuller's Laws of Engineering System Evolution as a means for producing technology forecasts. Nevertheless, all the instruments and the procedures proposed so far suffer from poor repeatability, while the increasing adoption of innovation as the key factor for being competitive requires reliable and repeatable methods and tools for the analysis of emerging technologies and their potential impact.

Moreover, a paradoxical dichotomy characterizes most of TRIZ publications: most of them focused on problem solving, take into account the concept of contradictions, but practically neglect any relationship with the LESE. Vice versa, evolutionary analyses and "technology forecasting" applications are just based on the directions inspired by the LESE and/or by a few trends (e.g. the Inventive Standards of Class 2 and 3), but the notion of contradiction is missing.

The present paper introduces a contribution in this context through a study about the correlations existing between the evolution of contradictions and the Law of Ideality increase. A maturity index based on such correlation is defined. The full paper details the proposed algorithm for contradiction classification and an extended case study in the field of production of tablets in the pharmaceutical manufacturing sector.

E13- Sallaberger (Austria)

The Evolution of Cooking with TRIZ

Wolfgang Sallaberger (Congelo, Austria)

Banquets with 500-1000 meals prepared in 11 minutes, are a normal task in banquet business for chefs in hotels, but hard to handle, with old “classical” structures and methods.

This old fashioned system with its hierarchy comes from the time of the Visionary Master Chef and Culinary Genius August Escoffier (France).

He had the vision that the “Evolution of cooking will go with the changes in society”.

In our time this old system can be a beautiful show but not a modern and save instrument for leadership in business, it was groundbreaking at the time of Escoffier where the classical European kitchen was developed and defined.

New kitchens and cooking have to be much more effective: in the used space, crew size, which leads to the contradiction “ less is more” especially more value.

Banquets, congresses, meetings, wedding ceremonies ... bring the main value in big kitchens, but they ruin the innovation and creative power of a kitchen brigade, let’s see what TRIZ can do.

E15- Lee (Korea)

TRIZ Activities in Korea and Its Success Factors until 2009

**Kyeongwon, Lee (Prof. at Dept. Mechanical Design, Korea Polytechnic Univ.
& CEO / Chief TRIZ Consultant at Korea Item Development Inc.)**

Many big companies and Universities in Korea are very interested in TRIZ applications until 2009 more and more. In this paper the TRIZ activities at Samsung, LG, Hyundai Automobile and LS Cable are briefly summarized. The Departments of Mechanical Engineering of Korea Polytechnic University and Ajou University etc. have opened the TRIZ course for “Creative Engineering Design Education” certificated by ABET. Specially main factors on why TRIZ applications in Korea are most active in the World, will be explained in the view of the author with some demos on Korean TRIZ books, TRIZ online/ offline education (& consulting) programs and the good results that may be possible to be opened to public domain in Japan.