TRIZ Forum: Conference Report (23-G)

TRIZ シンポジウム 2010
The Sixth TRIZ Symposium in Japan

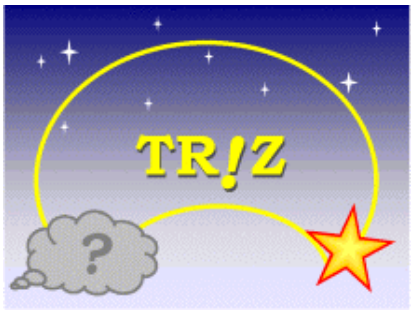
Personal Report of The Sixth TRIZ Symposium in Japan, 2010

**Held by the Japan TRIZ Society, NPO,
on Sept. 9-11, 2010, at Kanagawa Institute of Technology , Atsugi, Kanagawa, Japan**

Part G. Patent Studies and Tools

Toru Nakagawa (Osaka Gakuin Univ., Japan),
Dec. 22, 2010; Mar. 20, 2011

[Posted on Dec. 30, 2010; Added: Apr. 2, 2011]



For going to Japanese pages, press Jap. buttons. Japanese translation of this page is not scheduled.

Editor's Note (Toru Nakagawa, Dec. 22, 2010; Mar. 20, 2011)

This page is Part G of my Personal Report of Japan TRIZ Symposium 2010. Please see the Parent page Engl. for the overall description of the Symposium and the general introduction of the Personal Report. I am thankful to the Authors for their permitting me to cite their slides here for introduction. Click here for the PDF file of this page of Personal Report. (16 pages, 1.2 MB).

The following table shows the presentations to be included in this part. But currently only the first one is reviewed. (Since my reviewing work is much delayed, I have chosen to work on selected articles first independent of the topic categories. See the parent page.) (Dec. 22, 2010)

All other 3 presentations are now reviewed and posted here. (Mar. 20, 2011)

Code	Author(s)	Affiliation	Title of presentation	Agenda	Review	Posting of individual paper
JI06	**Toshimitsu Kataoka**	Patbrain, Co., Ltd.	Intellectual Property Strategy of TRIZ Usage and Practice	1st day PM L-1 RA	(Dec. 30, 2010)	JTS Official site (Dec. 1, 2010); (Dec. 30, 2010)
J09	**Kimihiko Hasegawa**, Nozomu Takeuchi, Teruyuki Kamimura, Toshimitsu Kataoka, Narumi Nagase, Shigeru Suzuki, Atsushi Nagayama, Hiroshi Ueda, Toshiaki Masaki,	[Intellectual Property Creation Study Group, Japan TRIZ Society]	Analysis of Inventions in Patent Journals -The 3rd version	2nd day PM P-A1	(Apr. 2, 2011)	
E06	Yuri Borgianni 1, Niccolò Becattini 2, **Gaetano Cascini** 2, Federico Rotini 1	1 Università degli Studi di Firenze, Italy; 2 Politecnico di Milano, Italy	Computer-Aided Problem Solving: A Dialogue-based System to Support the Analysis of Inventive Problems	1st day PM O-1 RB	(Apr. 2, 2011)	
E08	Darrell Mann, **Paul Filmore**, Mir Abubakr Shadad	Systematic Innovation Ltd, UK, University of	Computer-Aided (Systematic) Innovation: New Tools and New Ways of Thinking	2nd day AM O-8 RB	(Apr. 2, 2011)	

		Plymouth, UK				

Top of this page	Review of Kataoka's lecture	Kataoka's presentation => JTS	Rev. Hasegawa et al.	Rev. Cascini et al.	Rev. Filmore et al.	PDF of this page	Japanese page

Personal Report (Top)	Part A. Keynotes	Part B. Methods in TRIZ	Part C. Integration with other methods	Part D. Case Studies	Part E. Promotion	Part F. Education and Academia
Part G. Patent studies	Part H. Non-technical		TRIZ Symp. 2010 Official Page (Preparation)	TRIZ Symp. 2010 Official Page (Results)	Japan TRIZ Society Official Site	Japanese page of Personal Report (Top)

Part G. Patent Studies and Tools

Toshimitsu Kataoka (Patbrain, Co., Ltd.) [JI06, L-1] gave a 'Special Interest Lecture', i.e., an invited lecture (60 minutes) on a topic requested by the Symposium organizers, with the title of **"Intellectual Property Strategy of TRIZ Usage and Practice"**. The full presentation slides in PDF are posted on the Official Web site of Japan TRIZ Society both in Japanese and in English (translated into English by Kyoko Miyashita and Kazushi Tsuwako (Hitachi GST)). [We are grateful to Ms. Miyashita and Mr. Tsuwako for their voluntary hard work of English translation.]

Mr. Kataoka has been interested in creativity and invention methods for many years. As early as in 1972 he read G.S. Altshuller's book "Algorithm of Invention" in Japanese translation ("Hatsumei-Hasso-Nyumon", translated by Keiichi Endo and Takao Takada, published by Agune-sha (1972)), and he has been involved in TRIZ since 1997 when TRIZ was introduced to Japan through USA as a new movement. He worked for Anritsu Co. as an engineer in electrical communication and then as an IP specialist. Since 2007, after retiring from Anritsu, he started an IP consulting firm, Patbrain Co.

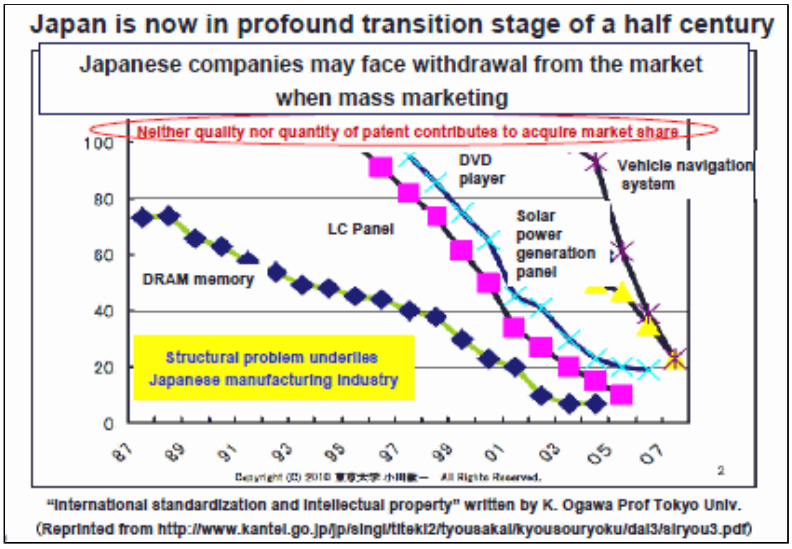
The Author's Abstract is quoted here first:

> Titled “Explosive Spread of Super Inventing Art – US Taking Off its Hat to This Russian-born Method,” TRIZ was introduced in the May 3rd, 1997 issue of Nikkei Mechanical. As this was a specialized mechanical magazine, many people accepted TRIZ as a potent tool for technical problem solving. Since then, though about 10 years have passed, this situation hasn’t changed. Many of the people from intellectual property also have nearly the same perspectives, and they don’t look upon TRIZ as an important weapon for intellectual property problem solving. When it comes to intellectual property right acquisition, intellectual property problem or intellectual property strategy, people in any sector try to solve problems turning to means other than TRIZ because they are related with legislation. What a waste! TRIZ will adjust the direction of vectors for management strategy, technology strategy and intellectual property strategy, and will supplement each other. Such being the case, it will be illustrated using cases how TRIZ can advantage intellectual property strategy.

The Author talked with a strong sense of crisis in the current situations in Japan of not only IP (Intellectual Property) strategies but also of industries and economy.

The slide (right) quotes the graph made by Professor Koichi Ogawa, Univ. of Tokyo. In the graph, historical change in global market shares by Japanese industries are plotted for the products, e.g., DRAM memory, LC panel, DVD player, Solar power generation panel, and Vehicle navigation system. Japanese industries developed these high-tech products and obtained initially a very high global share, but gradually, or even rapidly, lost its

share when the global market was expanding. This fact is known as a serious problem in Japan. Professor Ogawa has pointed out that some structural problem underlies Japanese manufacturing industry. In relation to IP, neither quality nor quantity of patents contribute to acquire (or keep) global market share, the slide says.

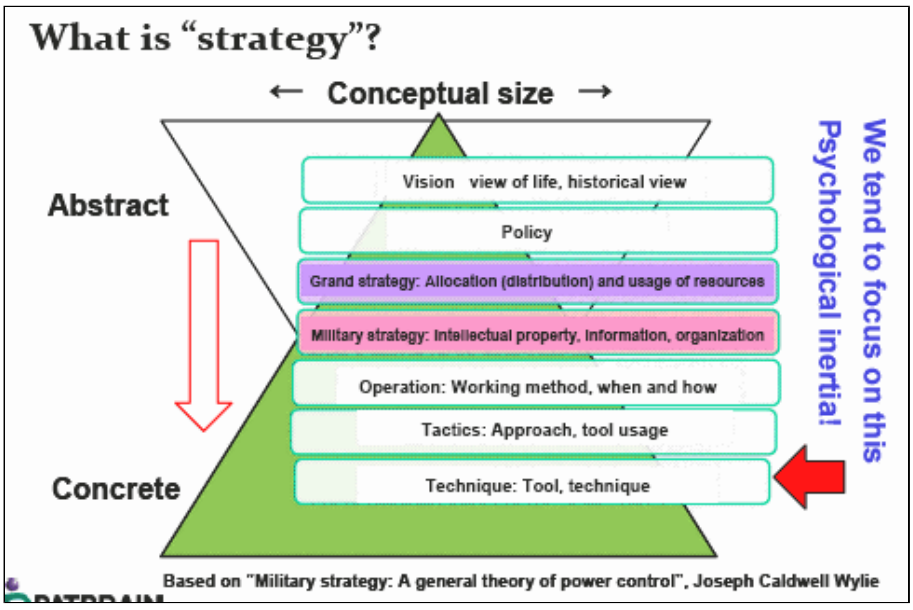


"International standardization and intellectual property" written by K. Ogawa Prof Tokyo Univ. (Reprinted from http://www.kantei.go.jp/jp/singi/titeki2/tyousakai/kyousouryoku/dai3/siryou3.pdf)

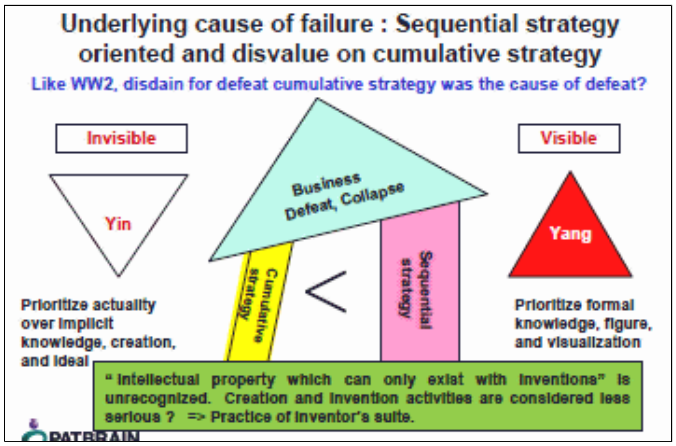
The Author also introduced the book written by Prof. Kenichiro Senoo, Univ. of Tokyo. See the slide (right). Prof. Senoo compares the Japanese LSI companies with Intel. Japanese companies, altogether, have about 10,000 patents but lost 490B yen in business operation in 2009. Intel, on the other hand, has about 320 patents and gained 64B yen of operating profit in 1st quarter of 2009. This is a shocking contrast and urges us a serious study and solutions. Prof. Senoo argues the necessity of trinity management of business, R&D, and IP strategies.

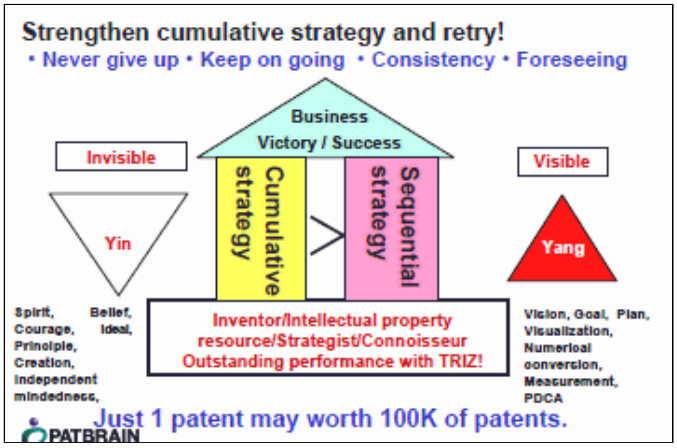
The Author quotes a schematic diagram of the meaning of "Strategy", as shown in the slide (right). Though the scheme was written in J. C. Wylie's book "Military strategy: A general theory of power control", it seems very illustrative in variety of areas. The Author writes 'We tend to focus on this, i.e., technique. Psychological inertia'.

[*** As the Author writes we (and myself) tend to focus on techniques, such as TRIZ, USIT, ARIZ, Su-field analysis, etc. We need to put more attention on approaches/tool usage, working method (when and how), organization, etc., etc.]

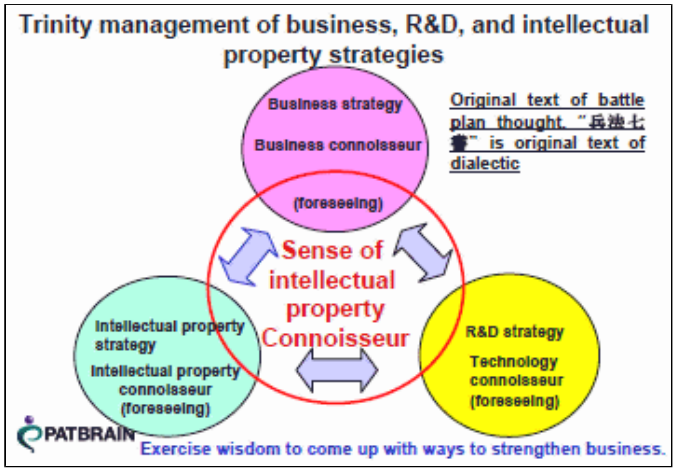


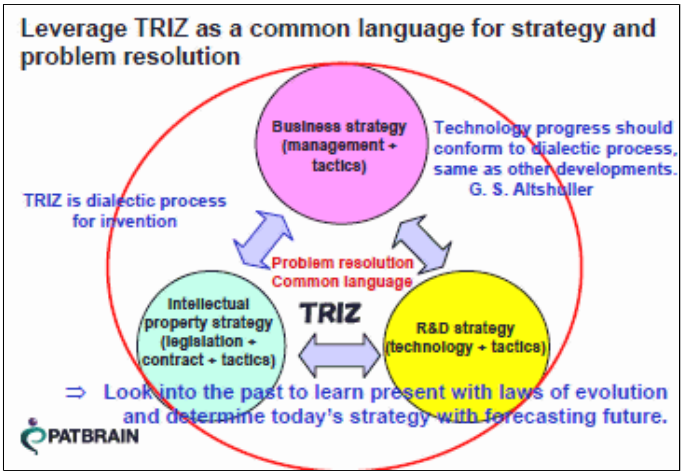
On these bases, the Author illustrates the underlying cause of failure in the slide (below-left). He says that the choice of stronger 'sequential strategy' (i.e., seeking for visible results) and weaker 'cumulative strategy (i.e., accumulating implicit knowledge and seeking for creation and ideal) is the cause of defeat/collapse of business. The slide (below-right) is the Author's vision, taken from his concluding part. For the success of business, he recommends to strengthen cumulative strategy by using 'trinity management of business, R&D, and IP'.



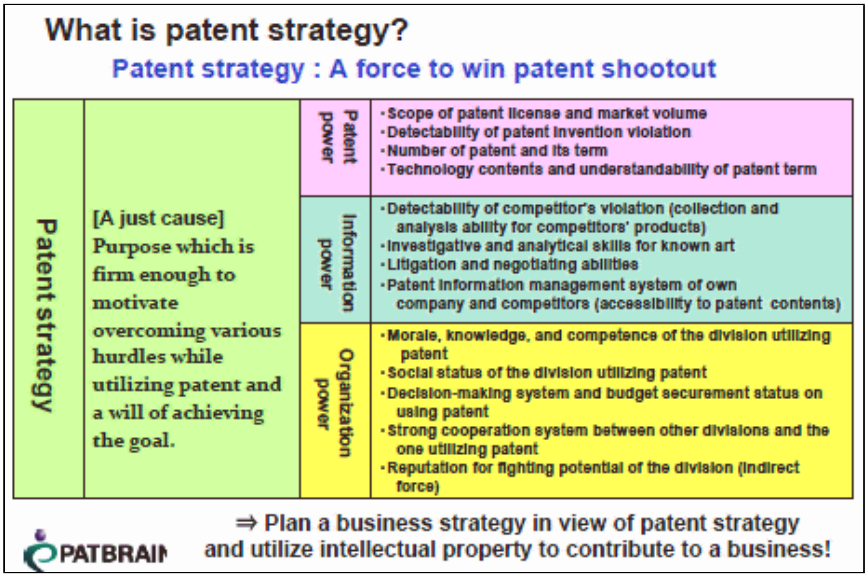


The Author's model of Trinity management of business, R&D, and IP strategies is illustrated in the slide (below-left). He further shows the role of TRIZ as a common language for strategy and problem resolution (slide (below-right)).





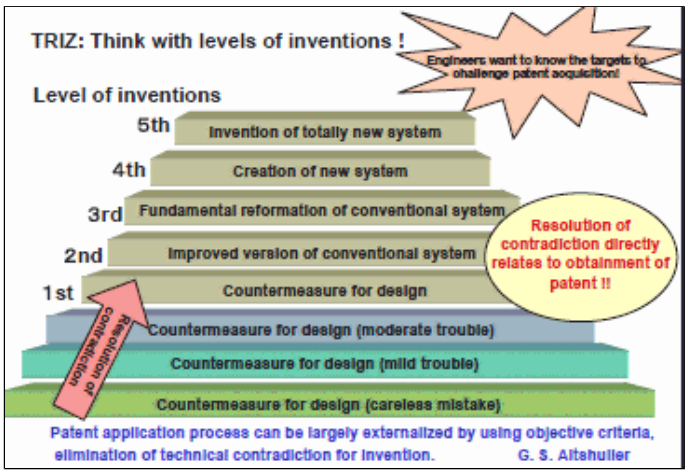
Now the Author starts to discuss about the IP strategy (slide (right)). The patent strategy should consist of 3 aspects. (a) Patent power: strengths and volumes of the patent themselves, (b) Information power: ability of detecting, analyzing, negotiating and managing the information of own company and the competitors, and (c) Organization power: abilities and competence of the organization involved in the patents. He seeks for utilizing IP to contribute business.

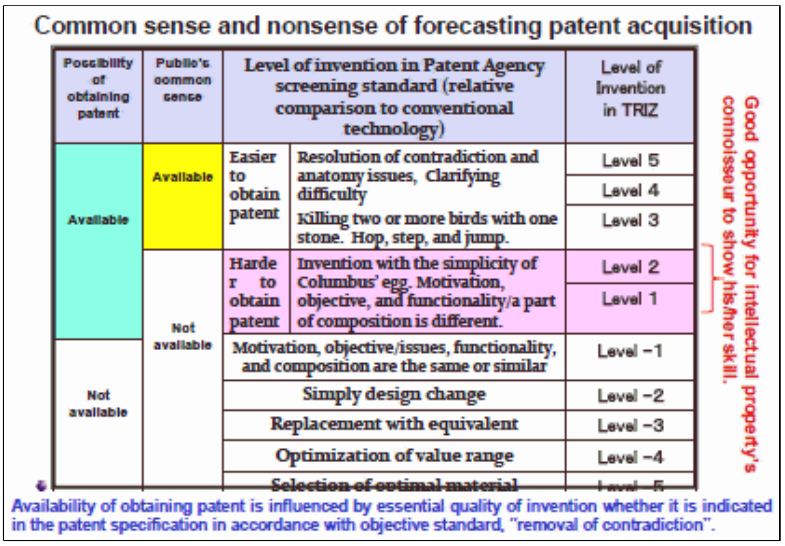


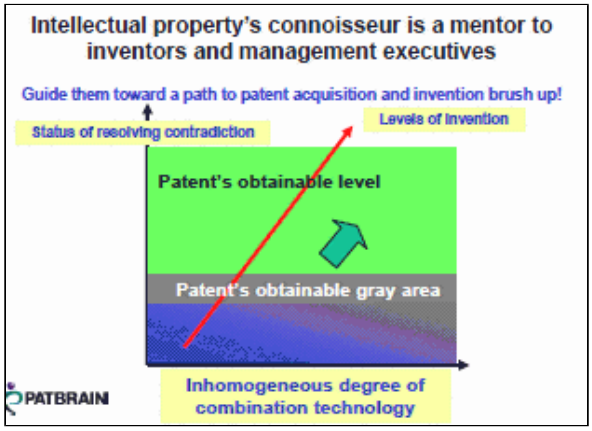
Then the Author discusses about the levels of invention (slide (right)) according to the Altshuller's scheme (levels 1 to 5) and expanding the scheme toward lower levels. In TRIZ sense, resolution of contradiction is a clear criteria for obtaining the patents.

In the slide (below-left) the levels of invention are described some more detail in terms of Patent Agency's screening standard. Level 1 and Level 2 are simple improvements/inventions, which are hard to obtain patents in common sense. However, even these levels of inventions may have chances of getting patents, the Author says. The IP specialists (slide (below-right)) should be a mentor to

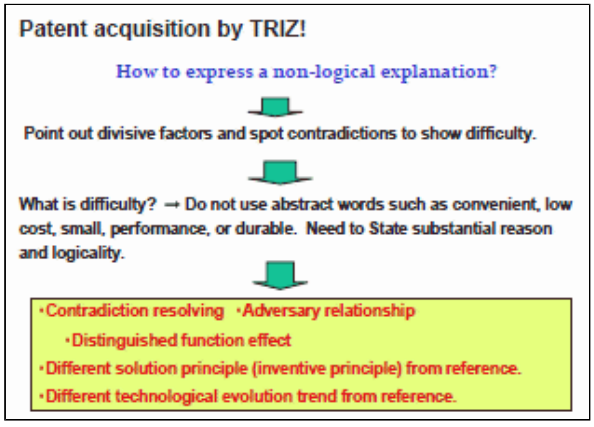
inventors and management executives, and should guide them to patent acquisition and to brushing up the inventions.

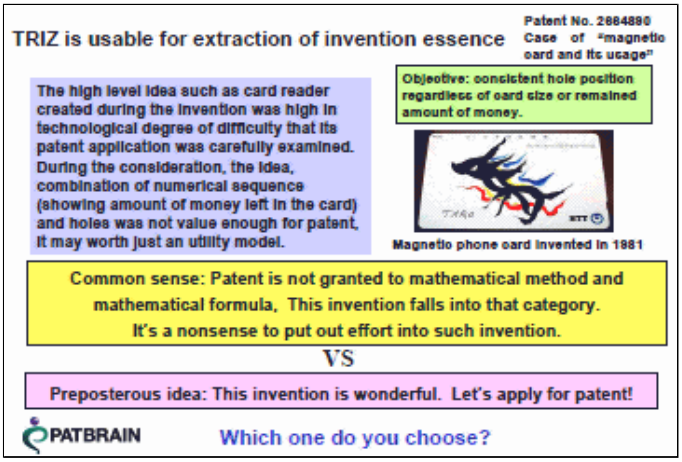






In the slide (below-left), the Author discusses some technical points for overcoming the Patent Agency's screening standards by use of TRIZ. The slide (below-right) shows a concrete case of 'magnetic card and its usage'. The invention was made in 1981 in Anritsu. It was related to the prepaid magnetic cards for public telephones. To show the amount of money left in the card, combination of a numerical sequence and holes were designed. The numerical sequence was chosen nonlinear, such as 100, 50, 30, 10, 5, 1, 0. The Author, as an IP specialist for Anritsu, struggled for obtaining a patent of this invention for 16 years, despite the people's suggestions of withdrawal, and finally succeeded. (He also mentions that the subsequent IC cards which contain a lot of information inside but no visible indicators failed in getting popularity and disappeared in a few years.)

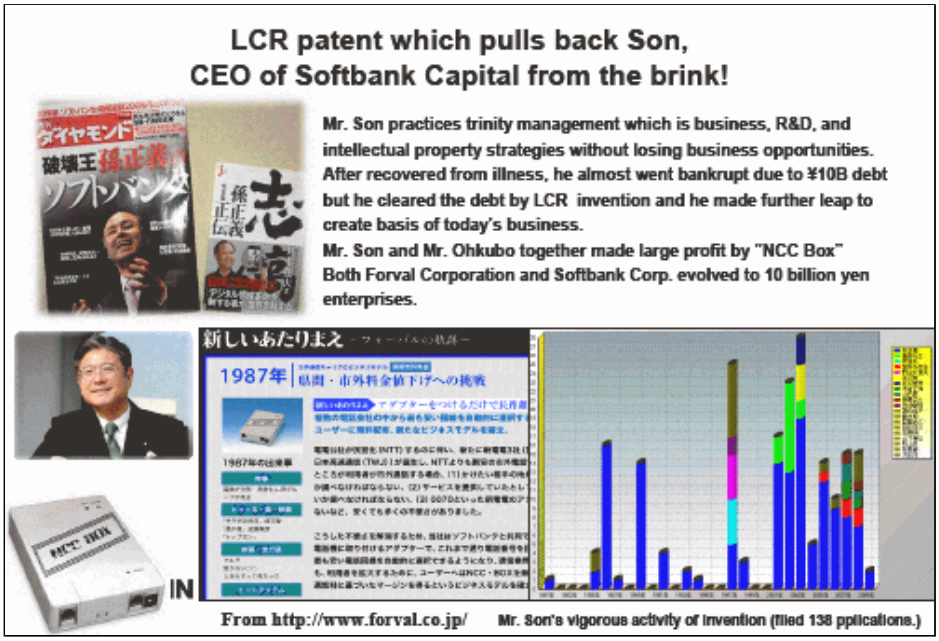




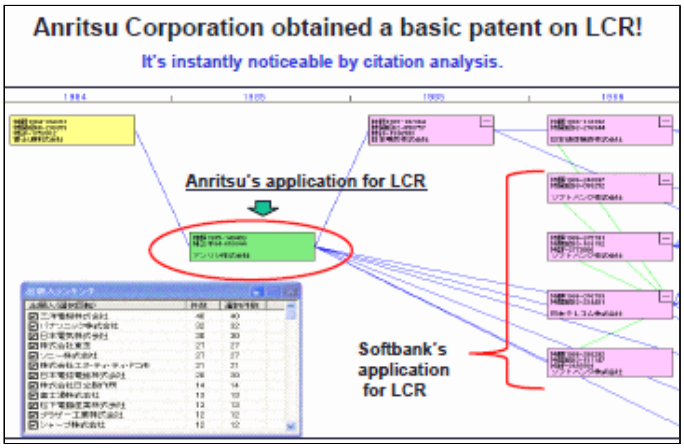
The Author describes another case where companies' IP and business strategies clearly resulted in different effects. The case is related to the LCR (Least Cost Routing) patents.

See slide (right). It is now well known

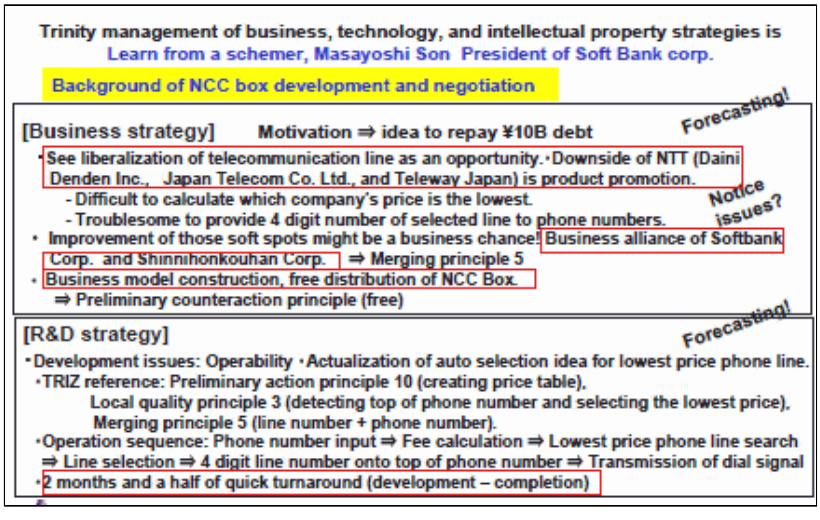
that Mr. Masayoshi Son, CEO of Softbank, made an invention of LCR and obtained large profit by "NCC BOX" and created a basis of his business after repaying 10B yen debt.



However, Anritsu Corp. applied and obtained a basic patent on LCR earlier than Son, the Author writes. The slide (right) is the citation analysis of LCR patents. Anritsu applied for an LCR patent in the first half of 1985, while NEC in the latter half of 1985, and Softbank in the first half of 1986. Softbank built up the business with "NCC Box" quickly. Anritsu, on the other hand, was not much interested in the networking service business because of the company's background as a measuring devices manufacture. Nevertheless, since Anritsu obtained a basic patent on LCR, there was a possibility of using the patent rights against Softbank and other network-service companies. The Author was involved in this case as an IP specialist for Anritsu.



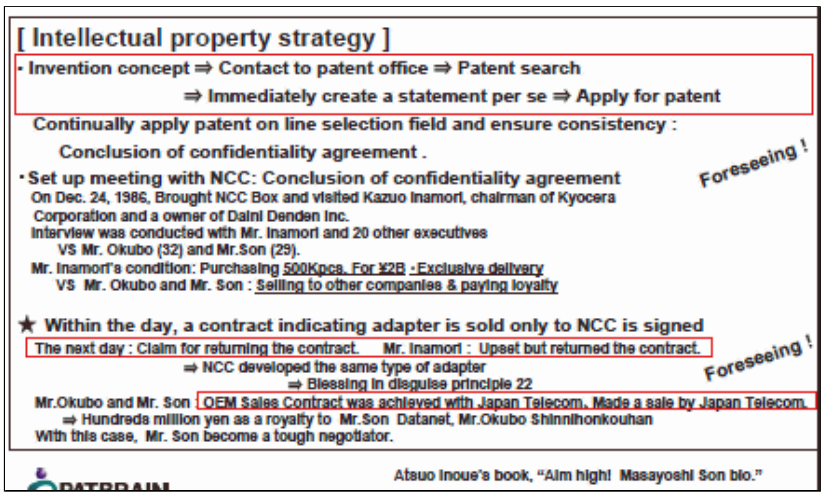
To understand the historical situation better, I would like to show you the Softbank's story before Anritsu's, reverting the order in Author's presentation. The Softbank's story in the two slides (right) is summarized by the Author from the book "Aim high! Masayoshi Son bio" (by Atsuo Inoue).



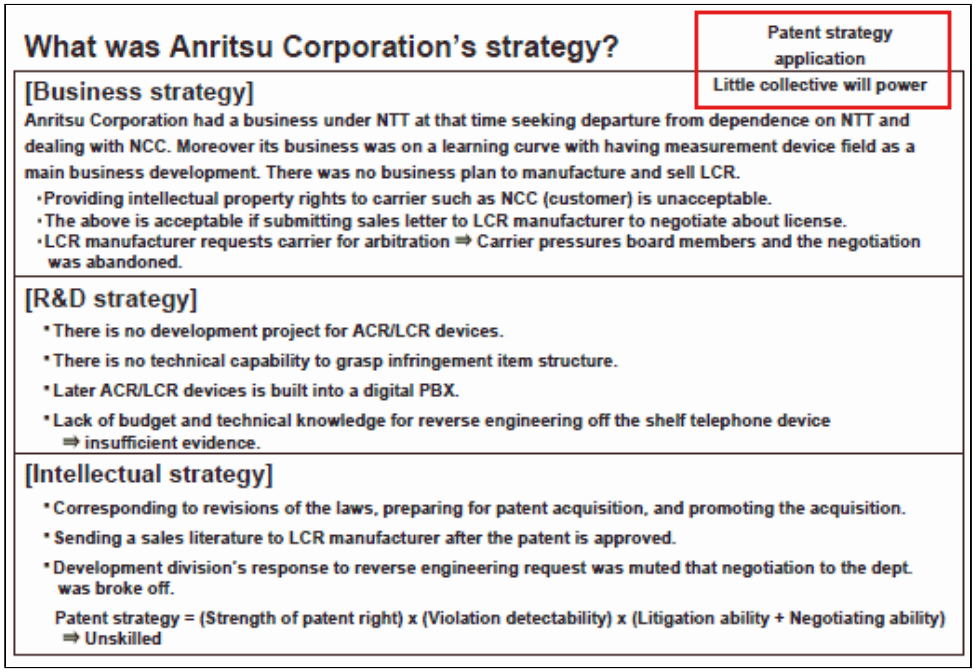
In those days, business of telecommunication lines was liberated from the national operation through NTT and several new companies started their services. It was difficult for customers to choose lowest price service for each call. Masayoshi Son got the idea of LCR. He immediately made a contact to a patent office for patent search and wrote the patent application for himself on the same day. Then he made a business alliance with Mr. Okubo (Shinnihonkouhan). They developed the "NCC Box" quickly in 2.5 months.
Their negotiation with a NCC, i.e. Daini Denden, is described in the slide (right-bottom). They once agreed a contract but cancelled it on the next day. They made a new contract with Japan Telecom. They provided the NCC Box to Japan Telecom as OEM and obtained royalty.

It is clear that Masayoshi Son handled all the aspects of Business, R&D, and IP in a strategic way. This is a case of Trinity management of Business, R&D, and IP strategies, the Author

says.



Now the Author reviews the strategy of Anritsu (slide (right)). The situations of Anritsu's business are described: Anritsu, originally as a measuring device manufacturer, had a business with NTT and with NCC. It applied and obtained the LCR patent, but not in the main stream of its business. It had no development project of LCR devices and no business plan to manufacture and sell LCR. IP department was always busy. When the LCR patent was approved, Anritsu's IP department sent a sales letter to LCR manufacturer for licensing. The R&D departments were weak to make reverse engineering for revealing the LCR's infringement. The LCR manufacturer used the carrier companies for giving pressure to Anritsu's management. Thus Anritsu's IP negotiation was abandoned.



At the bottom of the last slide, the Author summarizes:
Patent strategy = (Strength of patent right) x (Violation detectability) x (Litigation ability + Negotiation ability)
In other words, using the Author's previous slide, this may be rephrased as:
Patent strategy = (Patent power) x (Information power) x (Organization power).

*** Some details of patent descriptions are skipped in this review for the purpose of clarifying the Author's message about the importance of strategic thinking. The main message of this lecture is summarized to be:
Company's strategic power = (Business strategy) x (R&D strategy) x (IP strategy).

[The original presentation slides of this Special Interest Lecture are already posted in the Official Web site of Japan TRIZ Society . In this Web site "TRIZ Home Page in Japan", I have posted a new HTML page of this presentation for convenience of reference . (Dec. 30, 2010)]

Kimihiko Hasegawa, Nozomu Takeuchi, Teruyuki Kamimura, Toshimitsu Kataoka, Narumi Nagase, Shigeru Suzuki, Atsushi Nagayama, Hiroshi Ueda, Toshiaki Masaki [Intellectual Property Creation Study Group, Japan TRIZ Society] [J09, P-A1] gave a Poster presentation with the title of "Analysis of Inventions in Patent Journals -The 3rd version". This Study Group has been working since 2007, with about 15 voluntary members coming from different industries, and has reported their activities every year in the Japan TRIZ Symposium. The Authors' Abstract is quoted here:

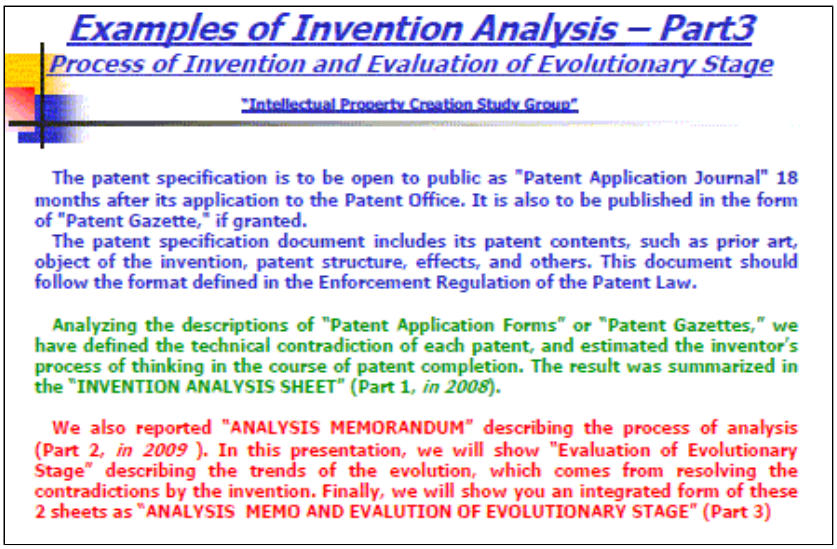
> In the 4th TRIZ Symposium in Japan, we presented the "invention analysis sheets," which summarized the result of our analysis of inventions disclosed in the selected Japanese patent journals in several technical fields, from a viewpoint of how the inventions solved specific technical contradictions. In the 5th TRIZ Symposium, we presented - as supplements for the above-mentioned "invention analysis sheets" -

the "analysis memorandum sheets," which showed our comments on how we analyzed the inventions and the original text of portions of the patent journals we used as the basis for our invention analysis.

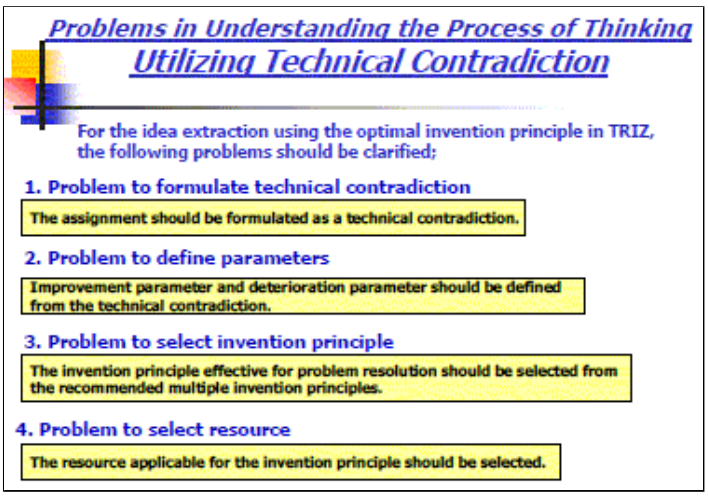
In this 6th TRIZ Symposium, we present the result of our new analysis of total 100 inventions including the previous inventions and new additional inventions, not only from the previous viewpoint of how to solve technical contradictions but also from a new viewpoint of how each technology evolved along specific patterns/trends of technical evolution as a result of solving the contradictions.

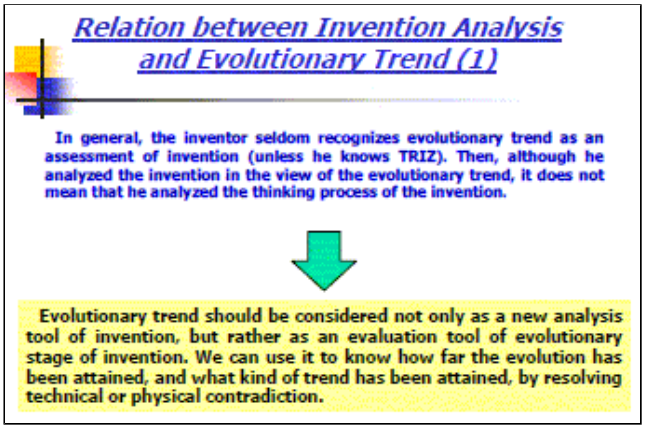
For each invention, we selected one or more patterns/trends of technical evolution which seemed to us to be suitably applicable to the invention, from the 19 patterns according to Invention Machine Corp., the 12 patterns according to Ideation International Inc. and the 35 trends according to Darrell Mann.

I am going to show you the 4 slides in English used in the Poster Introduction Session. The slide (right) explains their approach of using patent journals for accumulating the cases of reverse analysis with TRIZ. They have been developing the "Invention analysis sheet" for these 3 years and improved it into the 2-page form of "Analysis memo and evaluation of evolutionary stage" in this presentation.



One of the features of the form is the description of a patent with the analysis of Technical Contradiction. The slide (below-left) shows the process of reverse analysis, whose details are discussed in Japanese slides but are omitted here. In the present report the Authors introduced the analysis with Evolutionary Trends (slide (below-right)). It is interesting that the Authors used the Evolutionary Trend analysis as a method for evaluating how far the invention made a progress.





They describe each case in the 2-page format. The first page (not shown here) is called 'Invention Analysis Sheet', where the outline of the patent and its analysis in the framework of Technical Contradiction are described. The 2nd page is demonstrated in the slide (right). This

page is a memo of some detail on the Technical Contradiction analysis, and also the evaluation of evolutionary stage. They use the 35 Trends of Evolution in the Darrell Mann's textbook, and summarize their evaluation in a table in the diagram.

The Authors have published their collection of about 250 cases.

Analysis Memo and Evaluation of Evolutionary Stage(2nd page)

Analysis Memo and Evaluation of Evolutionary Stage

Title	Robotic cleaner	Document No.	JP2003 310489A	IPC	A47L5/14	Date	2010.07.24	Editor	Kimihiko HASEGAWA

Technical Contradiction and Conflicting Parameters

<Definition of Technical Contradiction 1>
"In order to remove allotrios attached to the carpet" (improvement function), even if magnify suction pressure (improvement means), it is impossible to remove all the allotrios from the floor(deterioration function)
..... continuing

<Conversion from Technical Contradiction to Conflicting Parameters>
(Darrell Mann Matrix 2003) // Improvement : 19 X Deterioration : 32
-> (15, 35, 17, 13, 3, 30, 31)
..... continuing

<Description of patent journal>
[0004] ---also, in the main body of the cleaner, a motor which generates suction power, storage box for allotrios and filter are installed. The suction power of the driving motor is transmitted to the suction port located under the main body of the cleaner, allotrios like dust scattered on the cleaning surface are absorbed into the suction port by the suction pressure. [0005] However, according to the abovementioned structure, the robotic cleaner moves on automatically along the defined cleaning surface following to the defined manner, easily passes through the area leaving the allotrios closely attached to the floor ..... continuing

Conflicting Parameters and Inventive Principles

<Definition of Technical Contradiction 2>
"In order to raise the suction pressure" (improvement function) if larger battery may be installed (improvement means), the cleaner becomes too large for the purpose (deterioration function)
..... continuing

<Conversion from Technical Contradiction to Conflicting Parameters>
(Darrell Mann Matrix 2003) // Improvement : 18 X Deterioration : 7
-> (19, 38, 2, 35, 25, 5, 15, 4, 14)
..... continuing

Newly added contents

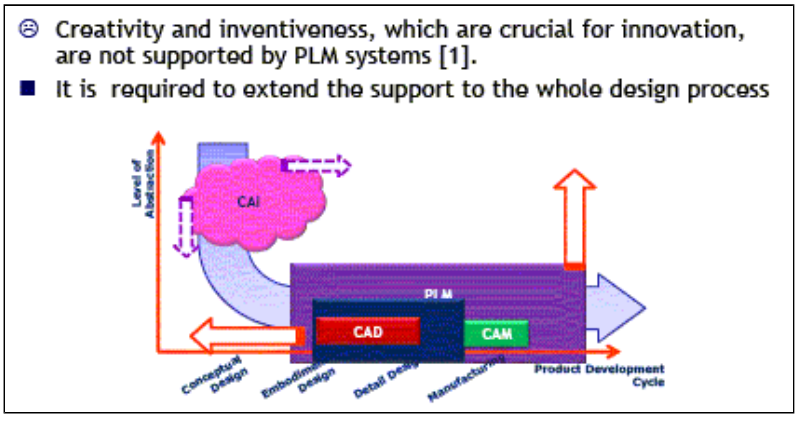
Evaluation of Evolutionary Stage

Selected Trend	Prior Art	Invented Step	Outcome
11: Geometric evolution	Flat plain structure	Blow up floor dust by circling brash	Able to remove allotrio
12: Mobility improvement	Non-mobile system	Prepare flexible sealing material to follow	Maintain stable suction
14: Rhythm adjustment	Continuous action	Make suction movement periodical	Improve suction efficiency
16: Mono-bi-poly	Mono-system	Make 2 drive wheel to 4	Improve mobility
28: Design viewpoint	Single operation	Add flushing action to suction movement	Suction finer dust efficiently

Yuri Borgianni (*1), Niccolò Becattini (*2), Gaetano Cascini (*2), and Federico Rotini (*1) (*1 Università degli Studi di Firenze, Italy; *2 Politecnico di Milano, Italy) [E06, O-1] gave an Oral presentation with the title of "**Computer-Aided Problem Solving: A Dialogue-based System to Support the Analysis of Inventive Problems**". Gaetano Cascini was the presenter. The Authors' Abstract is quoted here first:

> The paper presents the research activity developed by the authors in the field of Computer-Aided Inventive Problem Solving: an original dialogue-based software application has been developed by integrating the logic of ARIZ with some OTSM-TRIZ models in order to guide an user also with no TRIZ education to the analysis of inventive problem. The proposed software system, even if still at a prototype stage, is radically different from any existing TRIZ-based software tool and it has been already tested both with students at university and with employees of a few Small and Medium Enterprises. The full presentation will detail the structure of the algorithm and the results of the first testing activities.

The slide (right) shows the Authors' motive for their present research. They want to make a computer-aided support tool in the stage of conceptual design (CAI). Since they wanted to make a software tool based on TRIZ but original and different from existing ones, they started the discussion of system requirements, as shown in the two slides (below).



Their found the main system requirements to be 'step-by-step algorithm' along the problem solving process. The Algorithm should support the analysis of the problem and organization of the related information according to the TRIZ knowledge-base. The tool should be a dialog-based system for problem analysis, the Authors say.

System Requirements

- Step-by-step algorithm for the analysis of the problem and organization of the related information according to the TRIZ knowledge-base, in order to support the problem solving process.
  - Capability to face
    - Difficult problems by giving priorities to the objctives
    - Non-typical problems by highlighting conflicting requirements and depicting the main characteristics of the desired solution
    - Ill-structured problems, turning them into well-structured by means of their proper definition
    - Inventive problems by helping the user in retrieving useful information and data from available resources in various domains
  - Provide useful stimuli to the problem solver in order to leverage his/her knowledge and creative skills
  - Drive the problem solver in useful information searches that may widen its design space and then the space of solution
    - Definition of search criteria that allows automatization in order to require minimum efforts to the designer

System Requirements

- Main characteristics of the dialogue-based system for Problem Analysis:
  - limited amount of training
  - "natural" language
  - speed up the information search
  - no patent-mining competences required

The Authors further discuss on which strategy and approaches they should choose. Between the cognitive approach (i.e., stimulating/relying on user's thinking ability) and the systematic approach (i.e., showing/guiding logical and systematic procedure), the Authors have chosen a conciliated approach in a step-by-step method. (See slide (below-left).) Slide (below-right) shows 4 kinds of computer assisted systems, according to T. Lubat [9] (2005). As shown by the red arrow, the Authors have chosen the coaching-type system.

Related art: Problem Solving Approaches

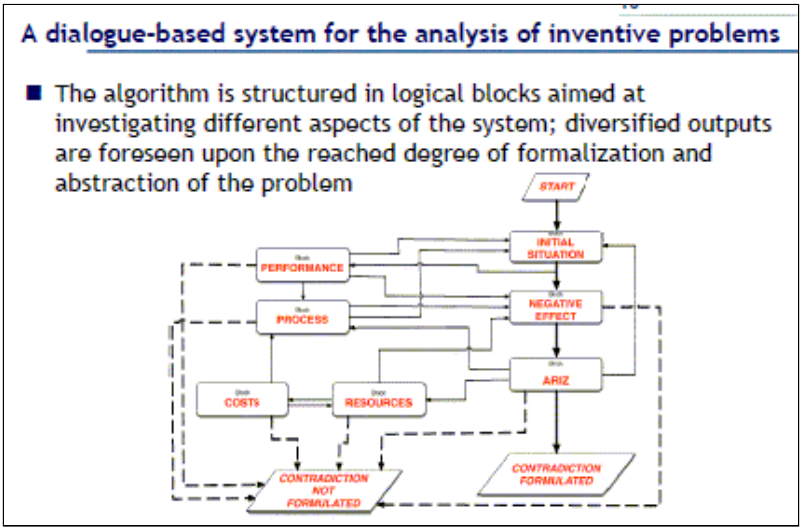
- TRIZ cannot be considered as a purely systematic methods since
  "... ARIZ is a tool to aid thinking, but it cannot replace thought itself (...) it is exactly the sparks of imagination that lead humans to produce creative non-typical ideas". [7]
- The plain differences between cognitive and systematic approaches should be conciliated in a step-by-step method that leverages individual's tacit knowledge since:
  "...design methodology should therefore foster and guide the ability of designers, encourage creativity, and at the sam time drive home the need for objective evaluation of the results" [8]

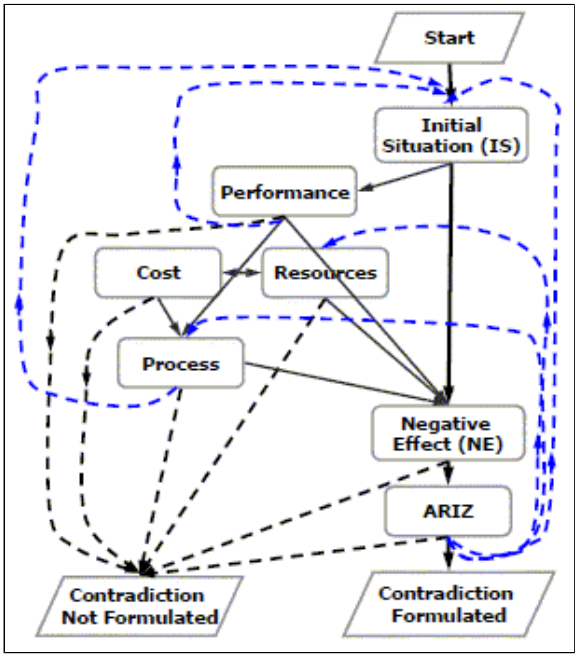
Computer-Aided tools for Problem Solving

- Four kinds of aiding the user within Computer systems for problem solving [9]:
  - by facilitating the management of the working process, encouraging the perseverance of designer in the research of innovative solutions;
  - by easing the communication between design team members, since circulation and integration of ideas play a relevant role in the creative process;
  - by aiding the designer with a coaching activity, acting as an expert system that guides the user throughout cognitive processes;
  - by cooperating in the creative process, thanks to the Artificial Intelligence systems that contribute to ideas generation.

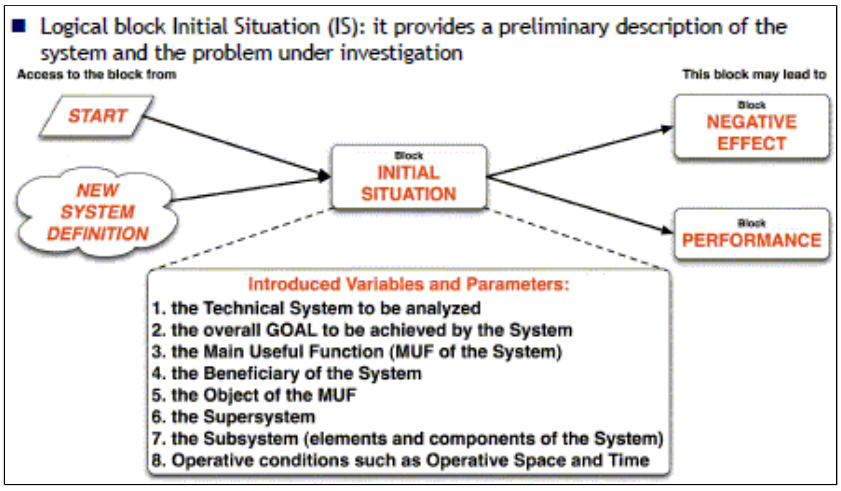
As the reference system for the problem solving algorithm, the Authors used OTSM-TRIZ developed by Nikolai Khomenko.

Then the Authors have built a dialog-based software system having the structure as shown in the slide (below-left). It has 7 logical blocks, carrying-out each block of procedure which will be explained below.
[*** The flow diagram shown by the Authors in the slide (below-left) is not easy to read, for me. So I have redrawn it without changing their logic but with some of my own interpretation, as shown in the slide (below-right). 'Forward passes' are shown in black straight arrows, while the 'feedback passes' in blue dotted curves, and 'unsuccessful passes' in black dotted arrows. The tightly-coupled Negative Effect and ARIZ blocks are located at the entrance by the Authors but they also have the nature of the final logical blocks for finding the contradictions, and hence they are placed at the end having three feedback passes. The four other blocks (i.e., Performance, Cost, Resource, and Process blocks) are mutually connected with somewhat complicated relationships.]



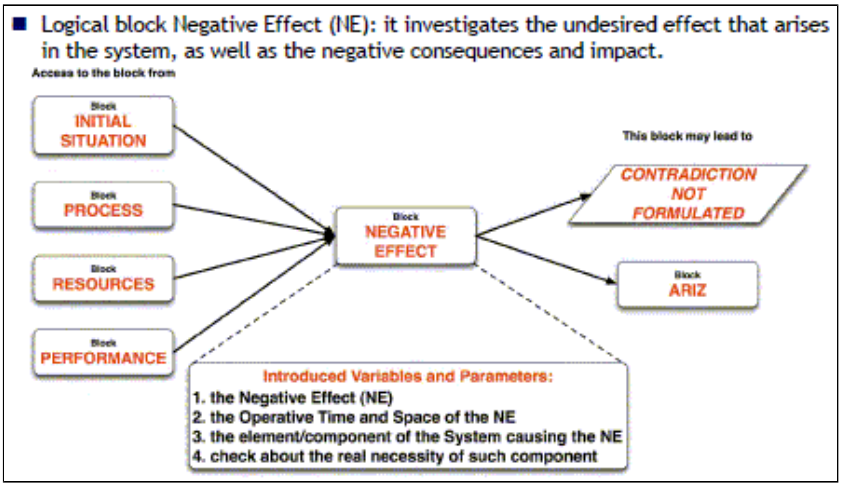


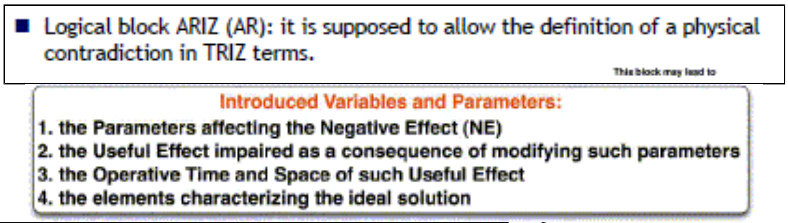
Then the Authors describe the seven logical blocks one by one. The first block is 'Initial Situation (IS)', as shown in the slide (right). Its role is to make a preliminary description of the system and the problem under investigation. While using this logical block, the user is guided by the system to describe the information shown in the bottom part of the slide. Such information is stored in the system according to the variables and parameters as shown here. The connections from other blocks and to other ones are shown in the middle part of the slide.

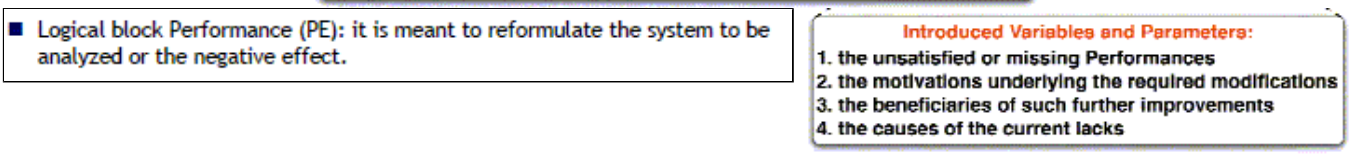


The second block (according to the Authors' sense) is the Negative Effect. Its role is to investigate the undesired effect that arises in the system, and its negative consequences and impacts. The user are guided to input the information shown in the text box at the bottom part of the slide (right).

Similarly the Authors describe five more logical blocks. They are listed below, after omitting the connection diagrams.







- Logical block Resources (RE): it deepens the investigation of the system, in terms of the excessive amount of resources spent during its employment.

Introduced Variables and Parameters:
1. the critical resources of Time
2. the critical resources of Space
3. the critical resources of Information
4. the critical resources of Material
5. the critical resources of Energy

- Logical block Costs (CO): it investigates the reasons of incurring high costs.

Introduced Variables and Parameters:
1. the critical resources of Time causing high expenses
2. the critical resources of Space causing high expenses
3. the critical resources of Information causing high expenses
4. the critical resources of Material causing high expenses
5. the critical resources of Energy causing high expenses

- Logical block Process (PR): it investigates the criticalities of the manufacturing or delivering process.

Introduced Variables and Parameters:
1. the unsatisfactory aspects of production
2. the unsatisfactory aspects of business process
3. the characterization of such aspects

The Authors have already built the prototype software of the present system and made test use by university students and by SME engineers. The part of their test results is omitted in this review.

The Authors concluded as shown in the slide (right).

[*** The dialog-based algorithm seems to be flexible and effective in coaching the users to input (or think) necessary information along the problem solving procedure. It must be useful if the knowledge-bases of TRIZ are well incorporated in this system. We look forward to their further development.]

Conclusions

- The dialogue-based algorithm shows positive results both with students and with technicians in industry
- Such Dialogue-based system constitutes a systematic guide to enhance individual's cognitive capabilities
- The support to the problem solving process by means of external knowledge is under testing also through integration of custumized field thesauri
- A more extensive validation and improvement process has been planned (industrial cooperations are welcome)

Darrell Mann (Systematic Innovation Ltd, UK), Paul Filmore, and Mir Abubakr Shadad (University of Plymouth, UK) [E08, O-8] gave an Oral presentation with the title of "Computer-Aided (Systematic) Innovation: New Tools and New Ways of Thinking". Paul Filmore was the presenter. The Authors' Abstract is quoted here first.

> The paper discusses recent research to proceduralise and automate aspects of the TRIZ/Systematic Innovation process. Three particular areas are discussed:
> 1) The development of a toolkit (AEGIS) aimed at increasing the speed with which designers can evolve designs using TRIZ-based 'intelligent mutation algorithms.
> 2) The development of a piece of software (ApolloSigma) aimed at speeding the process of identifying high potential patents from the global patent databases.
> 3) The development of a toolkit (iTrenDNA) aimed at helping engineers and designers to better understand unspoken consumer and market needs.
> Each aspect of the work will be described in the context of a range of exemplar case study examples:

[*** I missed to attend at this presentation due to the double track agenda. So I am writing this introduction without seeing their demonstration of software tools.]

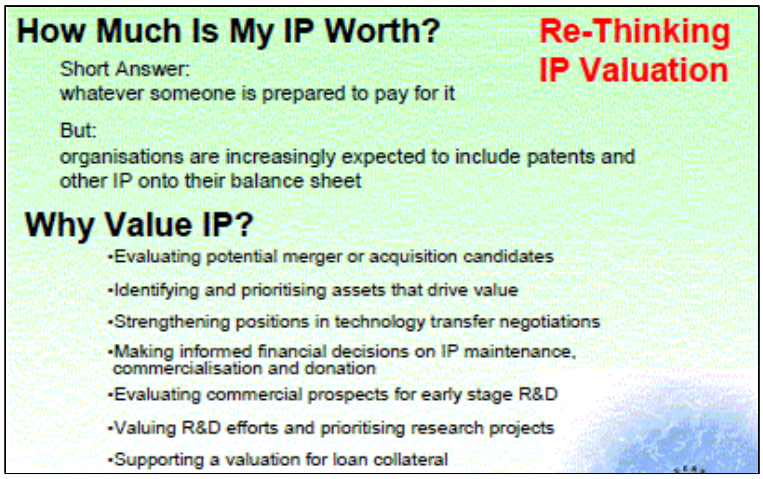
(1) The first software tool is named 'Accelerated Evolutionary Graphics Interface System (AEGIS)'. The slide (center) shows its interface, for Version 6. Given a parent design (show in the top-left image) and options of mutation algorithms, the software generates number of modified images as shown in other cells (in the left part). Version 6 has the new feature of multiple layers for constructing the images. The mutation

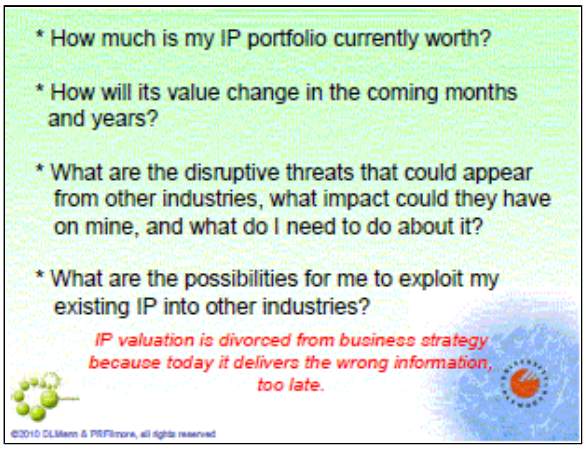
Applied in V6:
Trends
- Surface segmentation
- Space segmentation
- Asymmetry
- Geometric Evolution
- Increasing use of colour

Principles
- Merging
- Segmentation
- Colour changes

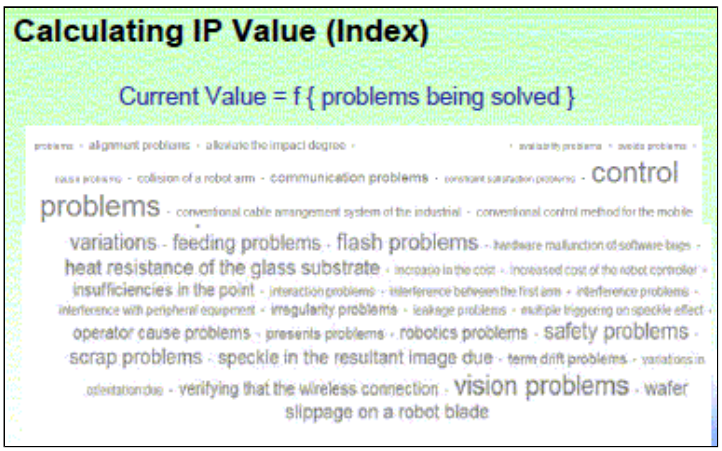
algorithms are partly random and partly oriented with TRIZ-based knowledge of Trends and Principles, shown in the slide (right). Selecting one of the new images and set it as a next parent, the mutation can be calculated repeatedly. Thus the design work can be carried out quickly by testing a lot of random variations under some control.

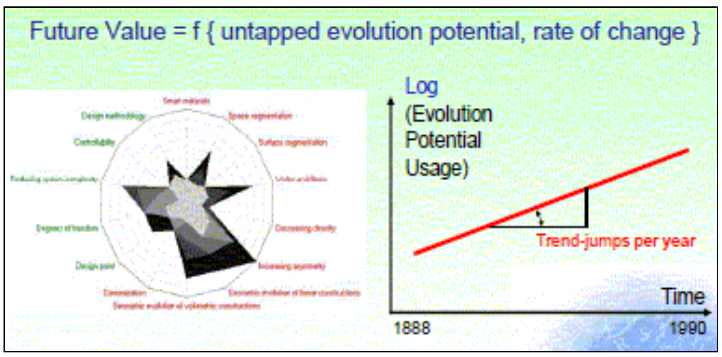
(2) On the second topic, the Authors discuss to re-think the valuation of Intellectual Properties (IP). Evaluation of specific IP's is of course demanded as shown in the slide (below-left). There are needs of evaluating (a group of) IP's in a larger scope, as shown in the slide (below-right). However, "IP valuation today delivers the wrong information too late" and hence "IP valuation is divorced from business strategy", the Authors say.

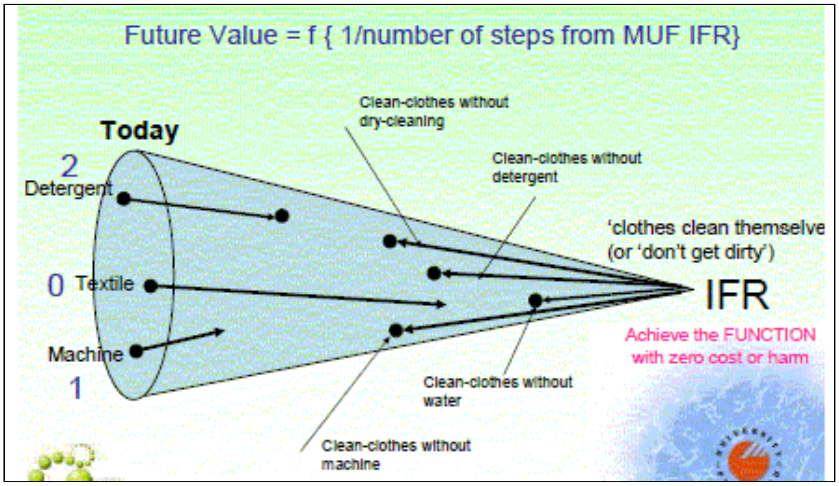


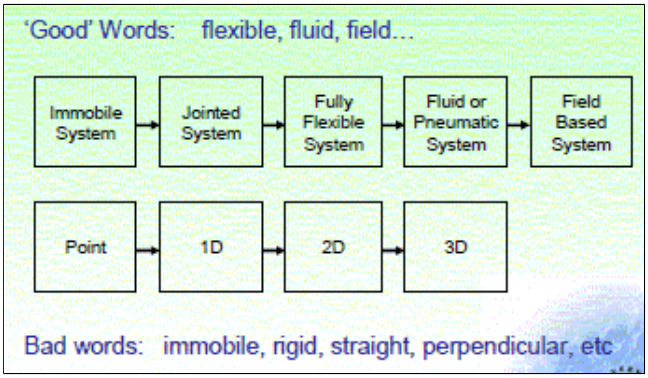


For overcoming this situation, the Authors have proposed four different indexes for calculating the IP values. (See the slides (below).) (a) An index to show the current value, which is calculated with the keywords detected by semantic analysis. (b) An index of future value, which is evaluate with the untapped evolution potential and rate of change in the concepts of Trends of Evolution. (c) Second index of future value reciprocally related to the number of steps from the Ideal Final Results (IFR) of Main Useful Function (MUF). (d) 'Good' words/'Bad' words in relation to various Trends of Evolution.

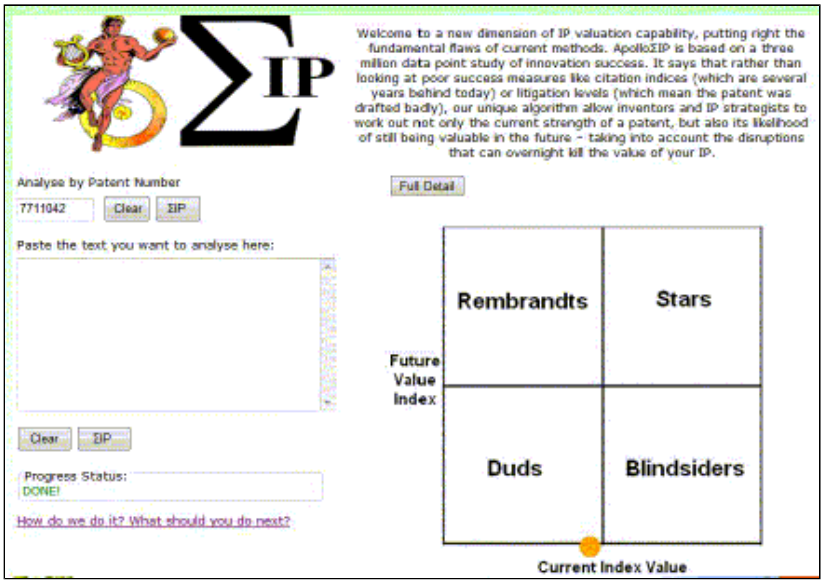


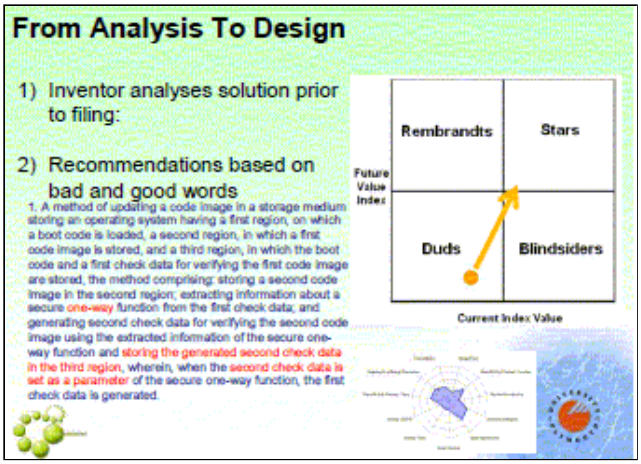




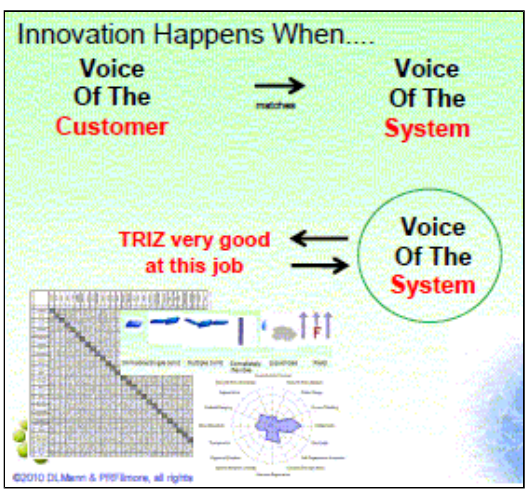


The slide (below-left) shows the interface of their new software tool, named 'ApolloSigma'. A patent (using its Patent Number) or any text may be input to this piece of software, then its evaluation is output as an orange circle in the right window. The window is a two-dimensional (x, y) space composed of the Current Value Index (x) and the Future Value Index (y). The Authors suggest, in slide (below-right), to use this evaluation software for the purpose of evaluating the solution prior to filing a patent and of improving the solution by use of the recommendations based on bad and good words.

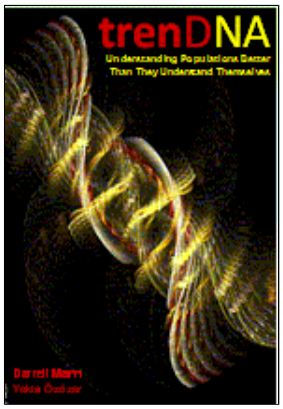


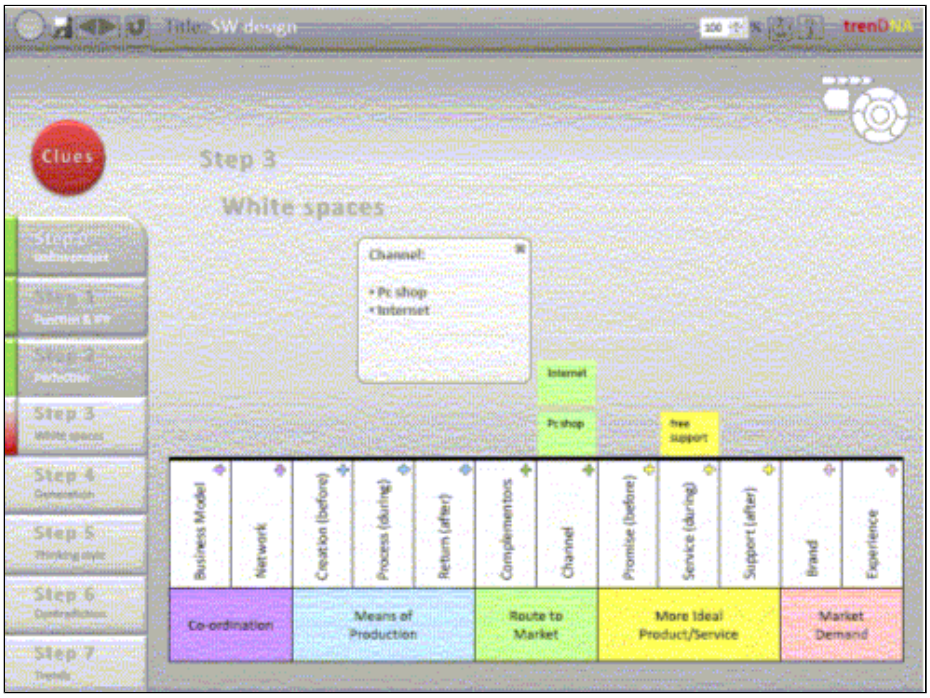


(3) The Authors further go on to discuss how to understand the customers/market's needs. The slide (below-left) shows that Innovation happens when 'Voice of the System' matches with 'Voice of the Customers'. And, they say, TRIZ is very good at the job of finding and meeting with the 'Voice of the System'. For example, as shown in the slide (below-center), concerning to 'What is the Perfect Shirt?', TRIZ can show us various Ideals, e.g. 'Big AND small', 'Thick AND thin', and SELF-cleaning, SELF-ironing, etc. And TRIZ can guide us in finding such Ideals. However, from here on which directions should we pursue?, the Authors pose. At this position we need to find the 'Voice of the Customers' and follow that direction, the Authors suggest.



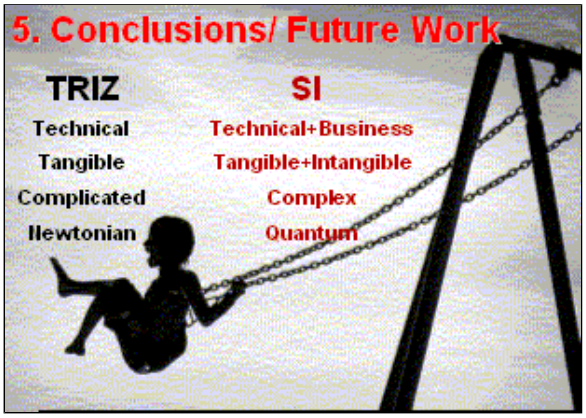
For finding the 'Voice of the Customers', the Authors group have published the textbook 'trenDNA' (slide (below-left). It shows a large number of big trends (in the global/country scale) and their enhancing/conflicting relationships, and suggests a procedure for finding opportunities in the resolution of conflicting big trends. In the present paper the Authors have shown a prototype of their new software tool, named 'iTrenDNA', as shown in the slide (below-right).





The slide (right) shows the Authors' Conclusions/Future work. Here they state their position of 'Systematic Innovation (SI)' in contrast to TRIZ. In place of Technical areas for TRIZ, they try to cope with Technical + Business areas for SI. In place of Tangible knowledge for TRIZ, they are going to handle Tangible + Intangible knowledge for SI. In place of Complicated problems for TRIZ, Complex problems for SI. These are the directions for SI beyond TRIZ, the Authors state.

[*** This is a presentation full of insights and background research. We should keep watching and follow their progress with interest.]



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Part G. Patent studies	Part H. Non-technical		TRIZ Symp. 2010 Official Page (Preparation)	TRIZ Symp. 2010 Official Page (Results)	Japan TRIZ Society Official Site	Japanese page of Personal Report (Top)

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