TRIZ Forum: Conference Report (23-A)

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 A. Keynote Lectures

Reviewed by Toru Nakagawa (Osaka Gakuin Univ., Japan),
Nov. 24, 2010

[Posted: Nov. 28 , 2010; Updated: Dec. 4, 2010]

TRIZ Home Page in Japan

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

Editor's Note (Toru Nakagawa, Nov. 22, 2010)

This page is Part A 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. [E PDF]

The presentation slides of the two Keynote Lectures have been publicly posted in the Official Web site of Japan TRIZ Society [Engl] on Nov. 9, 2010. You may access the PDF files directly: Mahmoud Karimi's lecture [E PDF] [J PDF] ; Nikolai Khomenko's lecture [E PDF] [J PDF] .

Code	Author(s)	Affiliation	Title of presentation	Agenda	Review	Posting of individual paper
EI02.	**Mahmoud Karimi**, Sara Salimi	Iranian Institute of Innovation and Technological Studies (IIITS), Iran	TRIZ Activities in Iran: Transfer to a New Nationwide Paradigm by TRIZ Application and Promotion	1st day PM, Keynote-1	[E]	JTS Official site [E PDF] [J PDF] (2010)
EI01.	**Nikolai Khomenko**	TRIZ Master certified by G.S. Altshuller, Canada	General Theory on Powerful Thinking (OTSM): Digest of Evolution, Theoretical Background, Tools for Practice and Some Domain of Application	3rd day AM Keynote-2	[E]	JTS Official site [E PDF] [J PDF] (, 2010)
JI03	**Mamoru Zenko**	IDEA, Co., Ltd	Tutorial: "Let's Know TRIZ"	1st day AM Tutorial	[E]	-- no --

[**Editor's Note (Toru Nakagawa, Dec. 4, 2010)**: Thanks to a feedback from Mahmoud Karimi, minor revisions are made in the review of his Keynote Lecture; see the phrases written in blue fonts and insertions with [** Karimi: ...].]

3. Keynote Lectures and Tutorial

In the Symposium, two Keynote Lectures were given: one by Mahmoud Karimi (Iran) and the other by Nikolai Khomenko (Canada). They are introduced here closely. A Tutorial was given by Mamoru Zenko (IDEA Co.), it is introduced just briefly.

Mahmoud Karimi, Sara Salimi (Iranian Institute of Innovation and Technological Studies (IIITS), Iran) [EI02, K-1] gave the first Keynote Lecture on the first day afternoon with the title of "**TRIZ Activities in Iran: Transfer to a New Nationwide Paradigm by TRIZ Application and Promotion**".

This is the first case that an international conference in TRIZ has invited a Keynote Speaker from Iran. This decision may need special explanation first because it is quite natural that readers of this Personal Report, just like the participants of TRIZ Symposium, would be puzzled with it. Iran is a developing country in industry and is under some conflict in international politics, and its TRIZ activities have never been presented before out of its border, hence it is natural to suppose that TRIZ is not known well there. Nevertheless, as being known to several world TRIZ leaders, such as Darrell Mann, Valeri Souchkov, and Nikolai Khomenko, TRIZ has been penetrating in Iran very widely. I was invited to give a video presentation in their PPST 2006 Conference _Engl_, and I had a chance of getting acquainted with Mahmoud Karimi at ETRIA TFC2008 . I was amazed with his TRIZ activities in Iran. He wrote a draft of presentation for our TRIZ Symposium 2009 _Engl_, but it arrived at my hand only in December 2009 due to a network trouble.

On the basis of such information, Japan TRIZ Society decided to invite Mahmoud Karimi as a Keynote Speaker of the Symposium and announced about it in the Call for Papers in February 2010 _Engl_. To our pleasure he sent us a new articles on his activities prior to the Symposium, and hence I posted them in this site "TRIZ Home Page in Japan" _Engl_. These articles were accepted well by readers in Japan and overseas. The visa for his entering Japan was issued very smoothly in early July by Japanese Government, to our relief. By virtue of these prior information, the Keynote Speaker and his Lecture were accepted warmly at the TRIZ Symposium, to our great pleasure.

The slide (right) shows the overview of the Keynote Lecture. The presentation contains many photos and some short videos and is designed very attractive. The overview slide demonstrates vivid records of his activities, e.g., an introductory article published in a newspaper, a photo of the TRIZ seminar in 2001, Late Professor Salimi in a video lecture series, Nikolai Khomenko and the Author in a TV talk show, the auditorium of PPST 2006 conference, the Author talking to the main moderator of Morning Talk Show on the 'Father and Son' strory, and Valeri Souchkov
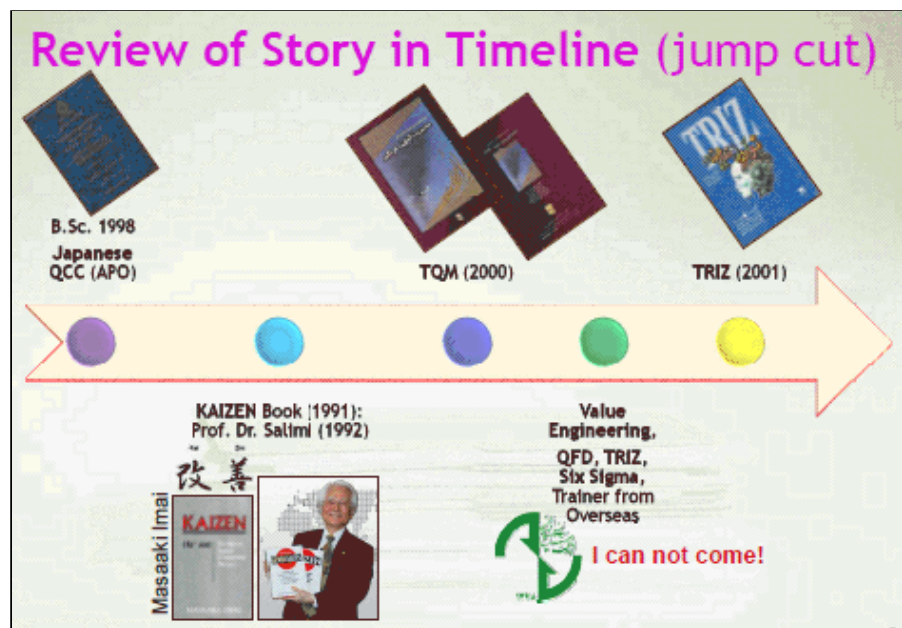
The article we received first in December 2009 was written in a very formal way without showing his personal contribution. Thus I asked the Author to talk on his (and his team's) activities more vividly as 'story telling'. So he wrote two story-telling articles for us later in January and March. The first manuscript of the Keynote was formal again, so I asked the Author to add more personal sense. The slide (right) is the one added in response to my request to show the Author's personal history how he got involved in TRIZ. Mahmoud Karimi has the background of industrial engineering, especially interested in Japanese QCC, KAIZEN, VE, QFD, etc. before much involved in TRIZ. IIIE is an academic society established by young leaders including the Author.

The slide (right) shows the history in early days. The Author was interested in QCC, KAIZEN, TQM, VE, etc. Meanwhile in Tehran Polytechnic University, Late Professor Dr. M. Hosein Salimi was working on KAIZEN, TQM, QFD, Six Sigma, etc. Around 1998, Late Prof. Salimi and his students encountered TRIZ and were puzzled about it. The Author's group in IIIE and Late Prof. Salimi's group joined to form IIITS (Iranian Institute of of Innovation and Technological Studies) in 2000. IIITS is an academic, not-for-profit organization for studying and promoting initially VE and TRIZ but later mostly TRIZ . In 2001 they organized a TRIZ workshop by a trainer from overseas, but the trainer noticed "I can not come!" just two weeks before the seminar. So they quickly invited Prof. Miloslava Zinovkina and Dr. Rifkat Gareev from Moskow and carried out their first TRIZ Workshop Engl.


After the official establishment in 2002, IIITS seems to have grown steadily under the direction of Late Prof. Salimi as President and the Author as Vice President. The Author's introductory articles on TRIZ were published every week in a column of a popular newspaper and also a weekly magazine. Darrell Mann was invited to Iran for a workshop. The International Conference of Problem Solving Strategies & Techniques (PSST 2006) was a successful conference having 11 panels and over 1000 participants, the Author says (see slide, below left). I was invited as a Keynote Speaker; being not able to make a trip, I sent a video presentation. At the PSST my video presentation (13 minutes) (slide, below right) was projected with the Author's introduction. [*** At the present Symposium, I was happy to see my own video presentation for about 30 seconds.] [Last March 2010, I posted this presentation Engl as the record in PPT slides Engl and in PDF Engl PDF .] Professor Salimi passed away in 2007, to their sorrow, and his daughter Sara Salimi succeeded the President of IIITS.
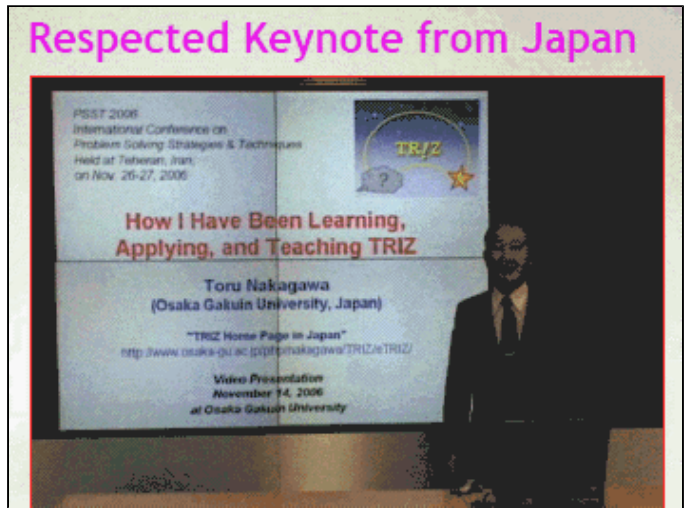
The side (right) shows the recent part of history, with the focus on TRIZ promotion with mass media. The items listed here are really amazing: (a) "Introduction of TRIZ" TV series of 5 volumes (35 minutes, each), broadcast several times on Channels of TV4 and TV7. (b) Live Breakfast Show in TV2 and Night Talk Show in TV4 broadcast more than 160 times (30 minutes each). [**Karimi: 25 minutes to 30 minutes and some time more than that. Also, all the 160 times was not mainly about TRIZ. The approach was creativity in different fields of science and application, education and innovation. TRIZ was the subject of several talk shows in my morning TV experience.] (c) New projects in TV7 starting in 2010. etc.
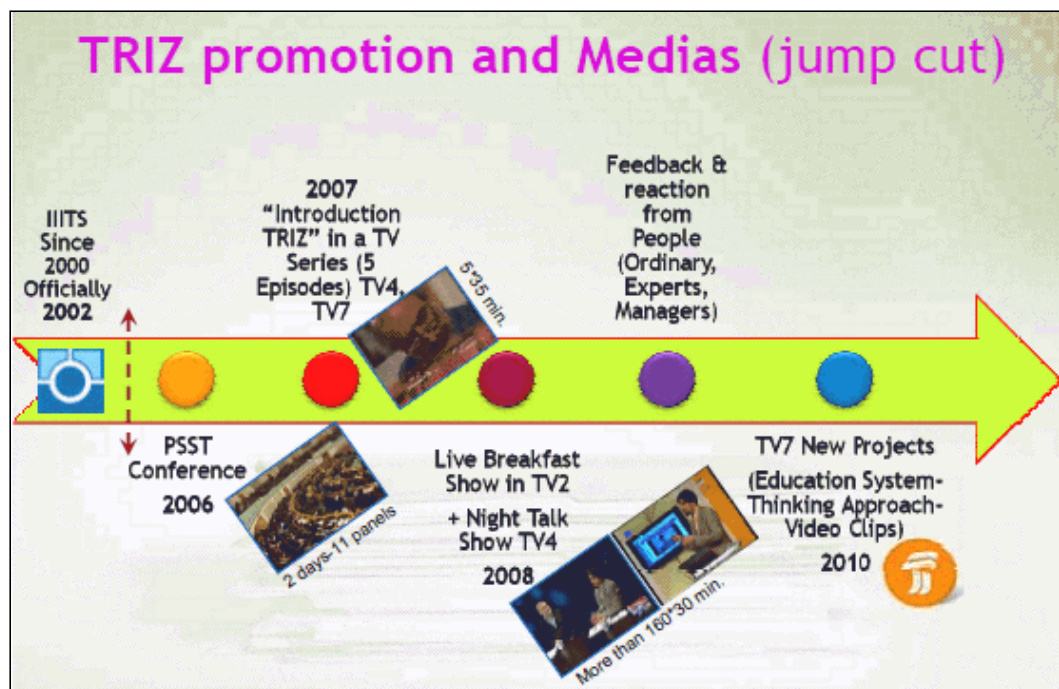
After telling these stories somewhat informally, the Author started his talk more officially, as you see in the PDF file of the presentation ![E PDF icon]. Maybe I should better quote his Abstract here [Note: the words in [ ] are inserted by Nakagawa]:

A multidisciplinary group of educated people [became] interested in TRIZ as a new strange term and focused on it since then. What have done in Iran about TRIZ and why Media like TV, Radio and newspapers are used for TRIZ promotion has [been] explained in this paper. The paper is about how people has [been] attracted to ask "What is TRIZ?" and guided to understand its philosophy, methodology and applications in different areas of daily activities to technical problems and business. In the country of motivated people for learning and thinking, they want to understand the core of philosophy of knowledge before applying any tools. So it was important to explore how a new radical approach of thinking like TRIZ could be believed, accepted, developed and applied. TRIZ has [been] used for solving different problems of its application and promotion nationwide. Several problems at strategic level of Ministry of Education and also simple problems of students in school have experienced TRIZ.

Postponing Author's philosophical discussions on nation-wide TRIZ activities for a while, I would like to introduce you their activities more concretely.

The slide (right) makes an overview of their daily activities, which have been carried out already and will be extended further. Among the activities arranged in a circle, Media are placed at the top. For each of these activities one by one, the Author describes their own problems and their solutions they applied.

The Author wrote in his previous article ![Engl icon] about his story how he left the ordinary way of trying to promote TRIZ in individual companies and started to use mass media for wider penetration. He wanted to make TRIZ widely known in newspapers. The slide (right) shows the problem and its ideal solution. He found the editor in science section of a popular newspaper was his former colleague at IIIE. In 2004 with the support by the editor, the Author worked on a weekly column on TRIZ and creativity. The contents of the newspaper articles are summarized in the slide (below-left). The slide (below-right) shows two examples of such articles in the newspaper. Later he

also wrote TRIZ articles regularly in a weekly magazine. He received a lot of responses from the readers of these newspapers and magazines.

12.7. (cont.) **Content of Newspaper**

- Different topic about Innovation methods, tools and techniques: Case Study Review
- Science Fiction: Using Trends of Evolution as the main theme and following the special issue of week
- Analysis and prediction: Using Multi Screen tool and analyze the issue of the week ...
- Imported Experiences: Problems and Solutions around the World and discussion about similarities in Iran and Tehran

12.7. Newspapers and Magazines

Weekly column in "Jam-e-Jam" and "Hamshahri" newspaper

Then IIITS made 5 volume TV series on "Introduction to TRIZ" and broadcast them on TV in 2007. [**Karimi: To be honest, it was a teamwork project. Sara Salimi, Mr. Mehdi Niroumanesh and Mr. Mohammad Hosein Parvin spent lot of time on it, as well as attention and consideration of late Prof. Salimi. I appeared on this TV series as the main character.] He further went on to live talk shows on TV!! The slide (right) demonstrates four snap shots of Morning Talk Show on TV Channel 2. At the top-left, the Author Mahmoud Karimi was introducing the "Father and Son" TRIZ summer work carried out by Katsuya and Taichiro Miyanishi *Eng!*. The work "Why Water Striders can stand and slide on the Water?" has become popular in Iran, the Author says. At the top-right, he talks about TRIZ activities in Japan by showing Nakagawa's photo which I sent him for PSST2006. At the bottom-right, Valeri Souchkov from the Netherlands is talking on TRIZ with his active gesture.

As you notice the Author says he already made this sort of 30-minutes TV shows more than 160 times! [**Karimi: As I have mentioned before all of these 160 were not for TRIZ directly. But for around 20 times, with a partner in this talk show we talked about some innovative products or procedure and analyze it on the basis of TRIZ rules and concepts.] It means one or two live TV programs every week. [**Karimi: This is right that normally

12.1. Media Experiences

Valeri Suchkov, "Father & Son" and ... on Morning Talk Show of **Channel 2**

Next slide (right) is another snap shot where Nikolai
Khomenko and the Author talking together with the Talk
Show moderator.

It must be very difficult to arrange such a talk show,
especially in live broadcasting. The two slides shown below
reveal their key experiences in the radio interviews and also
in TV shows. Talented people and university faculty are
invited to radio/TV studio for interview. The Author, with
the background of TRIZ, talk to them by asking questions on
the guests' specialties. The guests, facing with new creative
questions based on TRIZ, ask the Author "where did you
learn to ask such a question?" Thus they start talking about
TRIZ together and learn/find TRIZ concepts in their
specialty fields.

[*** I recall my experiences in mid 1980s where I visited (as
an researcher leading the in-company SW-QC movement)
several software development teams for interviewing about
their SW-QC activities. After an interview for about 2
hours, the team leader thanked me saying that he never had
chances of talking his own approach in such a full and
systematic way. Asking good questions is always the key to
the start of intimate communications.]

2 Steps to the Morning (Night Talk Show of TV4)
Nikolai Khomenko, Mahmoud Karimi and Dr. Eissa Jalai
(Psychologist-Talk Show moderator)

12.1. (cont.) Radio Experiences

Talking about TRIZ in Radio
- Situation: Talented people and University Faculty invited there for interview (expert in their field, do not know TRIZ)
- Talking to them in the Radio Studio, defining questions based on TRIZ. They face by new creative questions and ask: "where did you learn to ask such a questions?"
- Result 1: Talking about TRIZ with them!
- Result 2: Also learn and find TRIZ concepts in their field of knowledge

12.1. (cont.) TV Experiences

Talking about TRIZ in TV
- Initial problem: Difficult for managers to accept talking about TRIZ as an unknown knowledge
- Satisfied by new ideas for talk show production, asking "How did you find them?" then requested to talk about TRIZ!
- The 5 episodes of "TRIZ introduction" series, broadcasted in Channel 4 (3 times) and then shared with Education Channel (now channel 7) to show.
- Impacts: Current requests to talk about TRIZ concepts, applications and examples in talk shows (Channel 1, 2, 4, 5 and 7)

The Author and IIITS have carried out various other activities, e.g. publishing TRIZ textbooks, presenting in conferences, giving tutorials, seminars, workshops,etc. The two slides shown below are examples of such workshops, one for senior mangers of Teheran Municipality and the other for leaders of 'Tehran Teenagers Culture and Art Center'. It is remarkable in these cases that TRIZ is mainly addressed to society leaders rather than industry engineers.   With the guidance by Nikolai Khomenko they have recently started the promotion of creativity education for kids and parents.

**Senior Managers of Tehran Municipality**
TRIZ Workshop and 3 live case studies:
1. Public Transportation 2. Old Building Risks 3. Citizens
Collaboration in Management of Tehran

TRIZ for leaders of "Tehran Teenagers Culture and Art Center"

With the background of these activities, Sara Salimi, President of IIITS, was recently assigned to be the creativity and innovation advisor of minister in Ministry of Education. Thus the scope of the Keynote Lecture extends to a 'nationwide paradigm' of TRIZ promotion and application. [This is a much bigger extension than the current targets of TRIZ communities in other countries, e.g., USA, EU countries, Japan, Korea, etc.]

The slide (right) shows the key problem in the Author's mind for this direction. It is to make a unity of all the individual actions directed/encouraged by the National Science & Technology Map.

The next slide (below) discusses a framework of national plan for the country. For realizing [the contents of] the National Science & Technology Map, various innovations need to be achieved; such innovations must be supported by thinking principles, culture and civilization, science and experiences, etc. as shown in a bottom box. Such innovations need to be facilitated by innovator organizations and to be achieved by individual innovators. The innovator organizations should be facilitated by innovator government, the slide says.
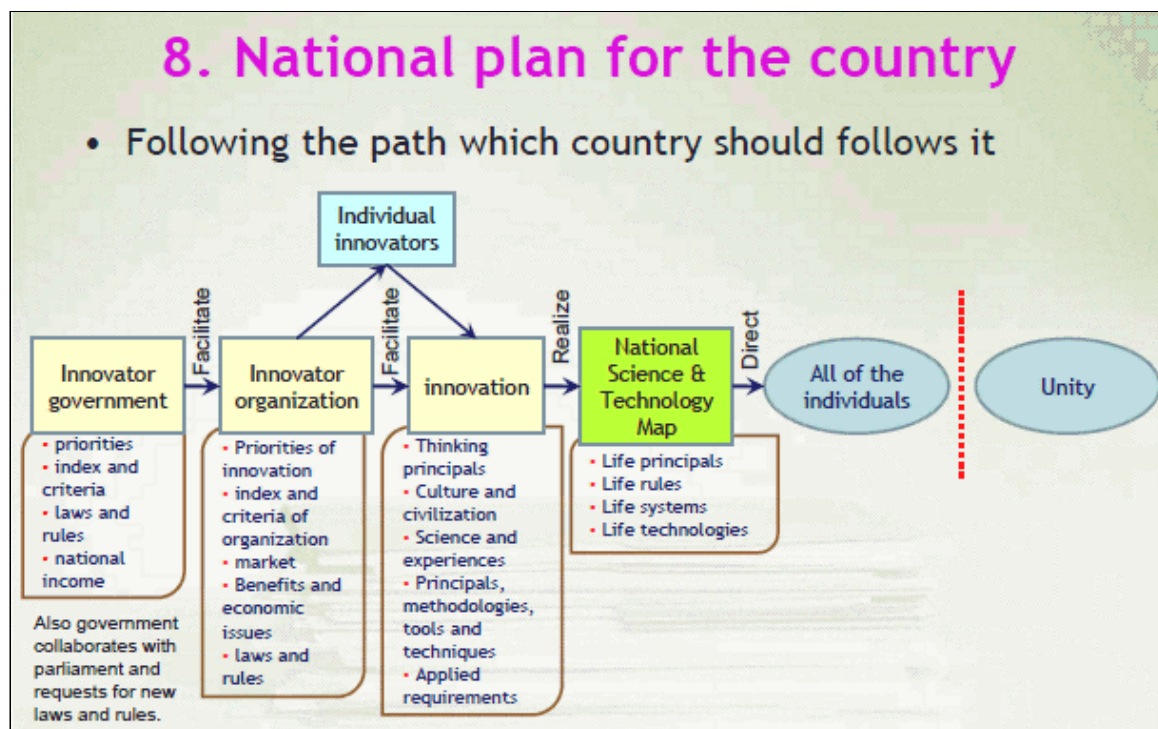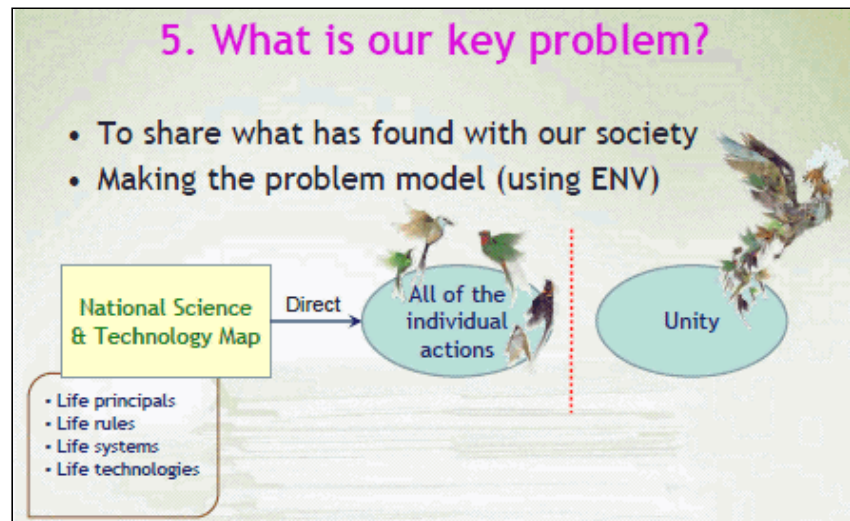
The slide (right) discusses the type of solutions for the Author's organization (IIITS) to contribute to such a framework vision at national level. The Authors (M. Karimi and S. Salimi) write "We (IIITS) are non governmental and independent. [And yet] We wish to affect on top level decisions and plans." The current [tentative] solution is to "establish/shape a semi consortium joint".

The next slide (below) shows such a model. The upper

half of the slide represents the conceptual national framework of auditing, advising, and accreditation of the three levels. As shown in the bottom half of the slide, for the purpose of supporting such framework activities, the Authors envision a "consortium", as a new joint organization for non governmental and independent activities.
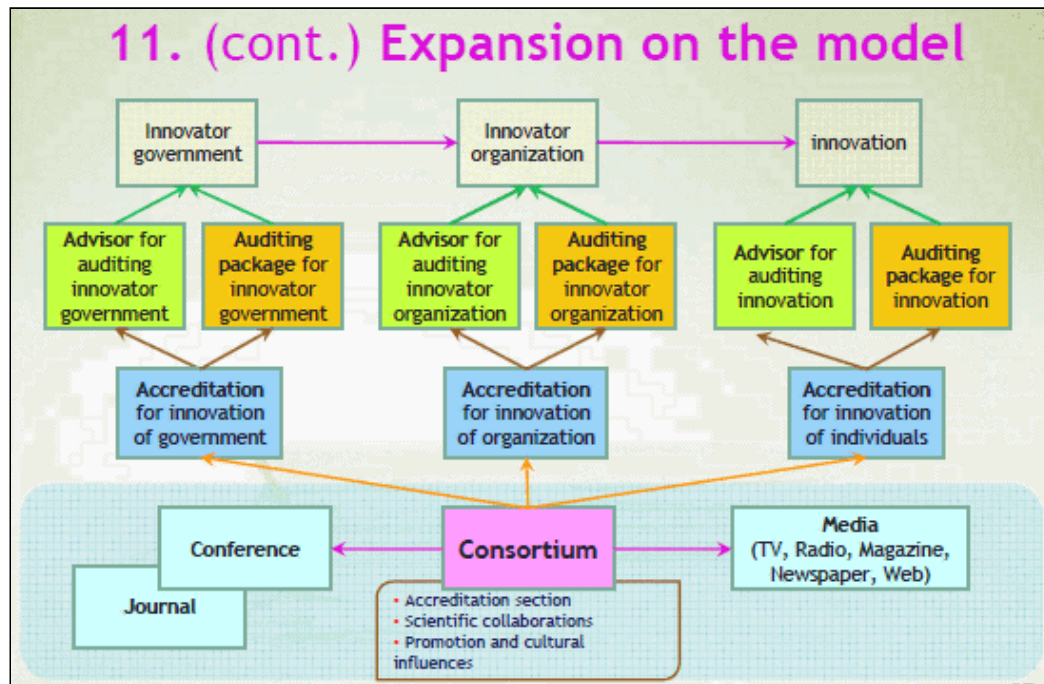
After showing such a nation-wide vision and describing [in section 12 of the Keynote presentation] all the activities the Authors have carried out, the Authors discuss about the current results and how to make their own Innovation activities sustainable. The slide (below-left) summarizes the current status of TRIZ in Iran in the form of feedbacks from organizations and from people. The Authors have received requests from organizations to deploy TRIZ in the organization's master plan and strategic plan. It is remarkable that such organizations include Iran Broadcasting System (IRIB), TV Channel, Police University, Ministry, etc. These are not private industries but public organizations who are very influential on society. They received a lot of feedbacks from ordinary and talented people. The statistics by Google Trends reveals that Iran is the country who has made a largest number of Web search with the keyword of 'TRIZ'. The slide (below-right) discussing how to make their activities sustainable is also very thoughtful. We need to consider TRIZ laws of evolution in promoting TRIZ. We need to have an Ideal system [for promoting/applying TRIZ in the whole country]; thus such a system must be 'self-service and dynamic'. For making the system self-service, collaboration of talented interest people is the key. And a Road Map for everyone and the whole system is helpful and necessary.

*** Keynote Lecture was given vividly with many photos and some videos. It is a real surprise for us all that in Iran TRIZ has already been made so popular among intellectual people by using newspapers, magazines, radios, TVs, etc. [**Karimi: I would like to mention that all of our activities are done by a team and several people who attracts on TRIZ and touch its useful result tries to help for promotion. Especially in IIITS we work together; one acts as the leader in every field and other support him/her.]

The Author, Mahmoud Karimi, wrote his story of starting to use the mass media after being bothered by replying always basic questions to industry managers. His initial solution was "So we discover the solution as a "column". If we have a weekly column for TRIZ we can go closer to ideality." I recall that Mr. Altshuller's solution around 1960 for penetrating his ideas of TRIZ was also a weekly column in a newspaper. Writing an article in a newspaper every week must be a very stressful task for the author. I am writing probably more than 10 pages every month (in an average) for this Web site, but the task gives me less stress because the writing is not a duty, not fixed in schedule, not so widely known, and not quite regular. My choice is practical and easier for me, but consequently it is less influential on people in society. I admire Mahmoud for his work of writing a weekly column in a newspaper, and of his going ahead to have regular weekly program on TV. He has such a talent of writing on a variety of topics and of talking with different people, as the result of his serious study and vision and passion. He is now trying to make all the activities sustainable; his strategy is to make them self-service and dynamic by the collaboration of interested people. We can learn a lot from his approach.

This Keynote Lecture gave deep impressions on the participants. This was a highlight of the Symposium. We are very happy with, honored by, and proud of this Keynote Lecture. Please read the original presentation slides in PDF posted already in the Official Web site of Japan TRIZ Society. The slides were translated into Japanese by Dr. Hiroshi Sakata (Hitachi) and posted there also in PDF . [**Karimi: Referring to the feedback I received in the symposium about impression from video of Boy and Coin maybe the reader likes to hear about it too. This story generated with 4 more stories as the creative short stories for the 90 minutes Story-Documentary video in TV5.]

Nikolai Khomenko (Insight Technologies Lab, Canada) gave the second Keynote Lecture on the 3rd day morning. He is TRIZ Master certified by Mr. Genrich Altshuller. His lecture title was "**General Theory on Powerful Thinking (OTSM): Digest of Evolution, Theoretical Background, Tools for Practice and Some Domain of Application**." I will quote his Abstract first:

OTSM is a Russian acronym proposed by Genrich Altshuller to describe the next evolution of Classical TRIZ. The acronym can be translated into English as the "General Theory on Powerful Thinking". Mr. Altshuller proposed the idea to transition from Classical TRIZ to OTSM in the mid 1970's. Some background ideas for this transition were developed in the 1980's, initiating the formal development of OTSM. Altshuller considered Classical TRIZ had matured as a theory about creating tools for solving technical creative (non-typical) problems. When people began using a TRIZ-based toolbox for non-technical applications, Altshuller posed the question: "How should TRIZ be transformed from a theory for solving technical problems into a domain-free theory for solving complex generic problems?" In this paper the results of 25 years of OTSM research are summarized with proposed directions for further development.

This Keynote Lecture is very comprehensive. Since the time we sent the Keynote invitation to Nikolai Khomenko last January, he has been preparing for this lecture seriously. Our request is an overview of OTSM, assuming the audience have sufficient knowledge and experiences of TRIZ but none of OTSM. TRIZ is a big theory, and OTSM is even bigger in its scope. Thus he feels it very difficult to make a compact 80 minutes lecture of his 25-years research results. (In this situation we were happy to have held a one-day seminar on "Introduction to OTSM-TRIZ" by Nikolai Khomenko on the previous day of the Symposium, having about 24 participants.) The Keynote Lecture was highly abstract and advanced, and hence not so easy to understand for many audience, I am afraid. In this Personal Report, I will try to summarize his lecture by using about 25 slides from his original 70 ones.

At the occasion of the Symposium Reception, an Award of "TRIZ Home Page in Japan" Foundation was presented to Mr. Nikolai Khomenko for his contributions to TRIZ and OTSM for many years, as is described in a separate page . Please refer to Nikolai Khomenko's profile and his reference there.

The slide (right) explains first "What is OTSM?" OTSM is a Russian acronym having the meaning of "General Theory on Powerful Thinking". OTSM was originated by Genrich Altshuller in mid 1970s. He considered that Classical TRIZ had become matured as a theory about creating tools for solving non-

typical problems in technology, and that it should be further transformed into a domain-free theory for creating tools on solving complex generic problems. In mid 1980s Altshuller developed some background ideas towards this direction and Nikolai Khomenko started the development of OTSM under his supervision.

The slide (right-below) shows the requirement for OTSM. It should be a domain-free tool, i.e. applicable to any field not limited to technologies. The tool should be able to present various kind of non-typical problems into canonical form, which can be solved with some proposed routine procedure.


What is OTSM?

- OTSM is a Russian acronym proposed by Genrich Altshuller to describe the next evolution of Classical TRIZ. The acronym can be translated into English as the "General Theory on Powerful Thinking"
- In the middle of 1970s G. Altshuller considered Classical TRIZ had matured as a theory about creating tools for solving technical creative (non-typical) problems.
- Mr. Altshuller proposed the idea to transition from Classical TRIZ to OTSM in the mid 1970's. Some background ideas for this transition were developed by him in the 1980's. Those ideas initiating the formal development of OTSM.
- Altshuller posed the question: "How should TRIZ be transformed from a theory for creating tools on solving technical problems into a domain-free theory for creating tools on solving complex generic problems?"

- *Conclusion:*
  OTSM should be able propose the domain free tool for presenting various kind of non typical problems into canonical form and proposed routine procedure for solve the problem. This routine procedure should activate hidden creative skills of the personality. Same as TRIZ tools do it for engineering problems.

The slide (below) demonstrates the evolution of TRIZ toward this direction, according to Nikolai Khomenko's unique understanding. Thus the whole lecture is to explain about the stages shown here. The stages are:

(a) Simple technique (1940s)
(b) Methodology: integration of several simple techniques (1950s)
(c) Algorithm: integration of several methodologies and other tools into a unified system (1960s)
(d) Classical TRIZ as a Theory about creating effective tools for solving non-typical problems (1970s)
(e) OTSM as a Theory about creating effective tools for managing complex interdisciplinary networks of contradictions (1980s-1990s)
(f) OTSM based Problem Flow Networks (PFN) approach to managing complex interdisciplinary networks of problematic situations, and less complex problems as well. (2000s)
(g) What next ?

He (and Altshuller) regard that the stages (a) to (c) are empirical stage of TRIZ evolution resulting in premature applied science whereas the stages after (d) are for forming (or developing) mature science with theoretical backgrounds.
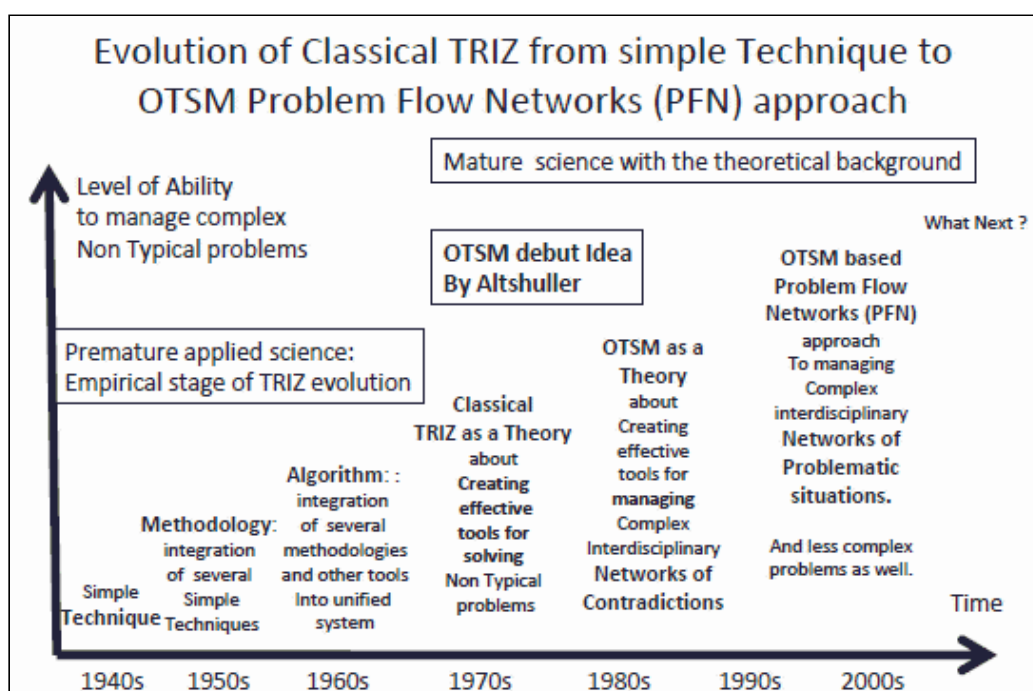
The slide (right) shows the Altshuller's standing point of (Classical) TRIZ as an applied scientific theory and discusses the necessary structure of an applied scientific theory. This structure is a summary of Altshuller's book of "TRIZ As An Exact Science" (1986). Some of the terms in this slide are not well introduced, unfortunately, in current world TRIZ community. They will be mentioned some more later, in the course of explaining about OTSM terms.

A Structure of an applied scientific theory

In general	TRIZ according Altshuller's standing point
1. The key problem or contradiction to be solved by the applied scientific theory	How narrow area of research and avoid useless trials and errors when we develop an appropriate solution for our non typical problem?
2. Postulates or axioms of the theory: Key assumptions were done to solve the key problems	First Postulate of Objective laws of systems evolution (1956). Second Postulate of Contradiction (1956) Third Postulate of the Specific Situation Context (1997)
3. Main models used by the theory. All other models can be derived from these main models.	A. Altshuller's Schema of powerful thinking to represent elements of the problem (4 axes). B. Four main models of a problem solving process: "Funnel" Model; "Tongs" Model; "Hill" model; Initial point of the "Problem Flow" Model.
4. Toolbox for practical needs. The more effective the toolbox the more effective the theory that underlining the tools.	A. Tool for solving NON typical problems – Altshuller's ARIZ-85-C. B. Tool for solving Typical problems – Altshuller's Inventive Standards

Nikolai Khomenko starts to discuss about the target structure of OTSM along the framework shown in the previous slide.

(1) Key Problems: The slide (right) summarizes the Key Problems to be solved by the development of OTSM.

First we need to have theoretical background for creating domain-free tool that can activate human creative skills in order to solve various non-typical problems and to obtain appropriate solutions. The solutions need to be useful for practice, even though the set of rules in the tool are very generic. Thus the OTSM theoretical background (and the tool) should be useful for transforming fuzzy initial situation description into a precise description of appropriate satisfactory solutions.

Summary about Key Problem to be solved by OTSM:

First Conclusion for OTSM development:
We need theoretical background to create universal (domain free) tool that can activate Human creative skills in order to solve various Non typical problems and obtain appropriate solution useful for practices.

Second Conclusion for OTSM development:
Image of the solution of the key problem.

To create a domain free tool we need set of very generic rules, however we have to organize the rules into a system that will deliver a satisfactory solution useful for practice

Third Conclusion for OTSM Development:
Image of the Canonical Procedure:

OTSM theoretical background should be useful for transition from fuzzy initial situation description to a precise description of an appropriate satisfactory solutions.

(2) Axioms: As such a basis of theoretical background, Nikolai Khomenko lists up eight OTSM Axioms, as shown in the slide (right). He explains Axiom of Descriptions (Models) and Axiom of the core of any problem (Contradictions) in this lecture (and a few more in the OTSM Seminar), but not others due to the shortage of time.

The Axiom of Descriptions (or Models) seems to be most basic (see the slide below-left). Models are descriptions of the elements we are thinking about. For thinking process we use models of elements in place of elements themselves. Each model represents the elements just partially, and hence produce mental barriers and restrictions for our thinking. The cartoon in the slide (below-right) tells the partial nature of models (or perception) is the root causes of many disagreements and problems (in human society). This Axiom consequently warns us to overcome the mental inertia we have with our models of problems.

All eight OTSM Axioms

- Main Group:
  - Axiom of Descriptions (models)
  - Axiom of Process
- Axioms of Thinking:
  - Axiom of the core of any problem.
  - Axiom of impossibility.
  - Axiom of independent observers.
- Axioms of World vision:
  - Axiom of Unity
  - Axiom of Disunity
  - Axiom of Connectedness Unity and Disunity

The slide (right) explains the OTSM Axiom of the Core of our Problems. In a problem situation which needs innovative, non-typical thinking to solve, there are contradictions at the core of the problem. We (human) consider the effect of the problem situation negative (non-desirable). There is some objective law behind the Negative effect. Yet we subjectively desire some Positive effect by modifying the situation.
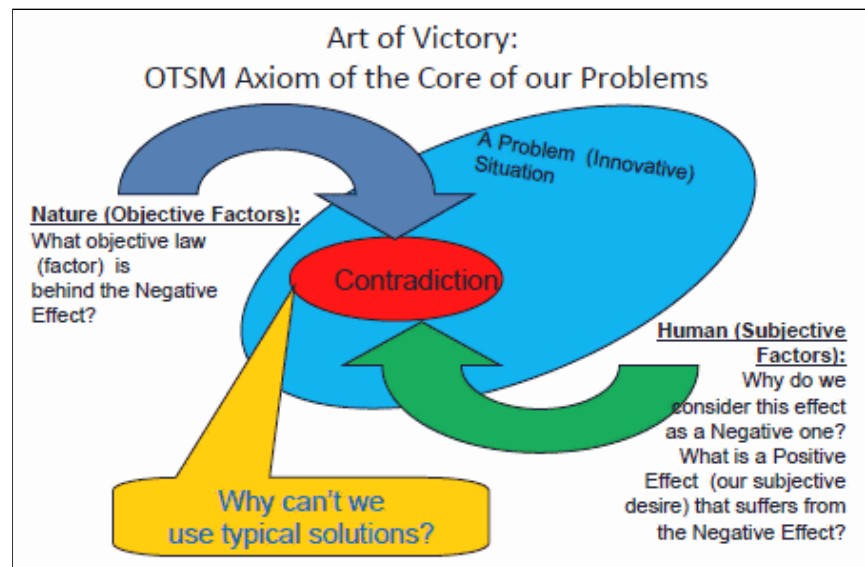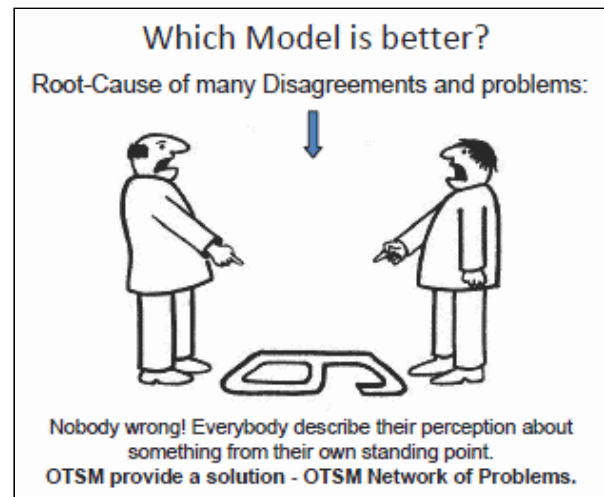
(3) Main Models: Khomenko goes ahead to talk about the Main Models in OTSM (or OTSM-TRIZ).

The first Main Model is the Scheme of Powerful Thinking originated by Altshuller in the Classical TRIZ. Khomenko shows the slide (right) and says that this was the original, four-dimensional picture by Altshuller even though the two-dimensional scheme of System Operator is widely known. Hierarchy of systems (i.e., super-system, system, sub-system) and (historical) time are the two dimensions know lately. The third dimension is the life cycle of every system, as shown by the overlapping multiple S-curves representing growth by improvements. The fourth dimension is the Anti-systems that challenge the evolution of every system. The third and fourth dimensions were unfortunately not shown in the figure when the book of "TRIZ As the Exact Science" was published, Khomenko says. This Model is typically known as 'nine-box model/method' of the System Operator, but originally the dimensions of hierarch and time (and two more) are supposed to be infinite, without being limited by the three levels shown in this slide.
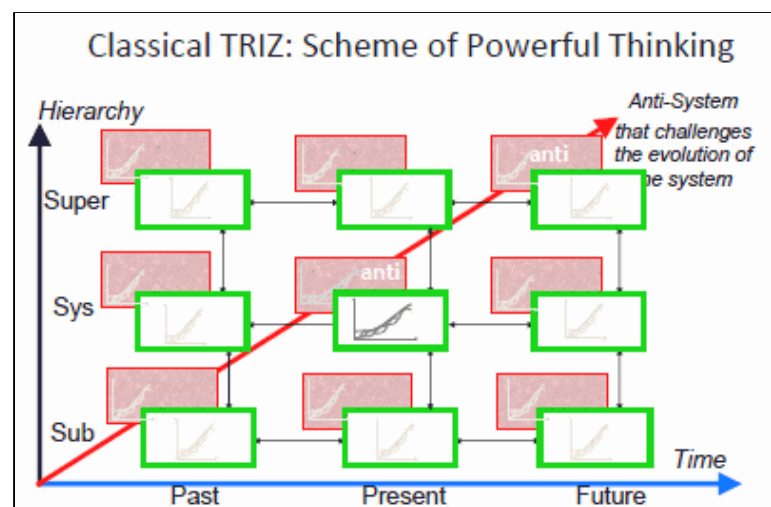
The second Model shown in the slide (right-middle) is the ENV (Element-Name-Value) Model. Each element (or entity, object) can be described by a number of features (or properties, attributes), and their lists of (possible) values. The slide (right) shows a simple example about a tomato, which can be characterized by color, shape, taste, etc. It is noticed that actually features often have some substructures, in a fractal manner (i.e., in a hierarchical and repetitive way).
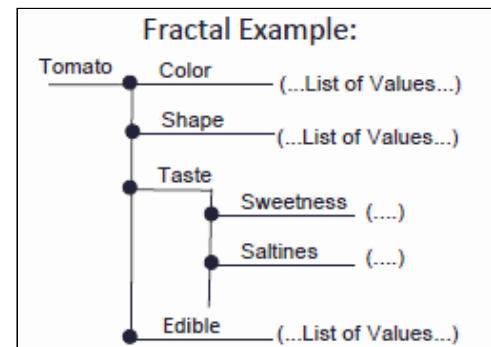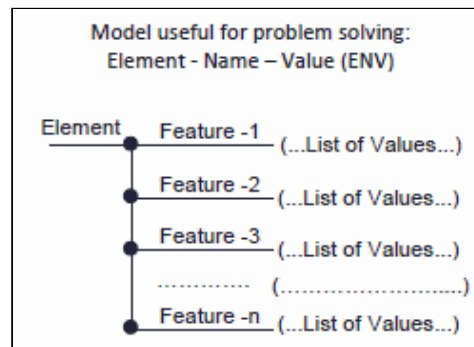
When we apply this ENV representation to the Classical TRIZ System Operator, each element (or system) may be described as shown in the slide (below-left). Khomenko shows the corresponding ENV representation of the Advanced Schema of Powerful Thinking in OTSM (see the slide (below-right)). The four dimensions in the TRIZ System Operator are now regarded as a part of the 'Reality' features and new features like 'System of Goals of modeling' and 'Imagination' are added here.
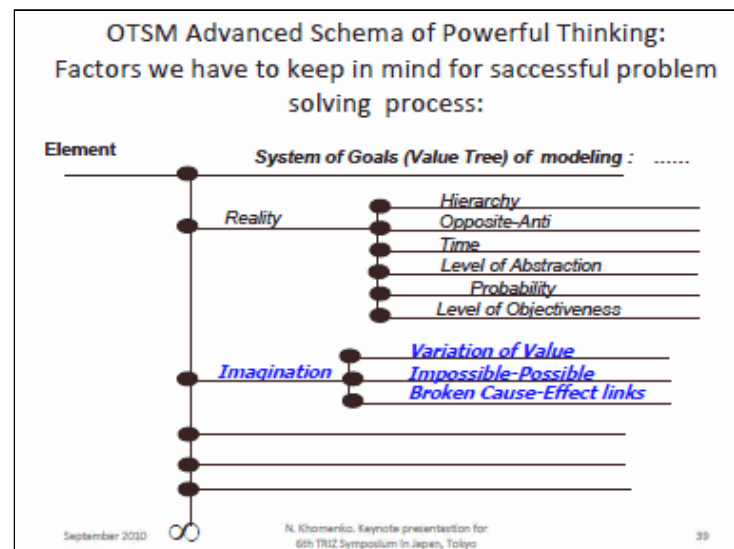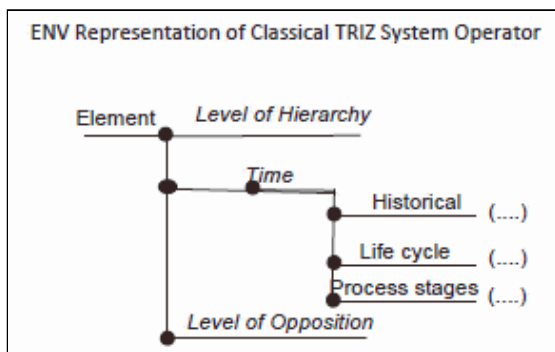
(4) Problem Solving Tools: The fourth category is the tools for solving (non-typical) problems. Nikolai Khomenko shows the most general OTSM based tools in the two generations, as shown in the slide (right).

The first generation of OTSM is the era of 1980s-1990s, when OTSM is still a simple extension of Classical TRIZ and reflect much with the ideas established by Altshuller in the form of ARIZ-85-C. Khomenko evaluates that ARIZ-85-C started a new S-curve in the TRIZ theory. The second generation of OTSM is the era of 2000s, when the Problem Flow Networks (PFN) approach becomes the main tool.

The slide (right) demonstrates the structure of the tools in the first generation of OTSM. There are four technologies. 'New Problem' technology is to capture a problem. 'Typical Solutions' technology is mostly based on the Inventive Standards developed by Altshuller and the use of various TRIZ knowledge bases.

'Contradiction' technology is based on ARIZ-85-C for solving non-typical, inventive problems by use of the concept of Physical Contradictions. 'Problem Flow' technology represents the whole process of problem solving, starting from the initial problem to multiple partial solutions, to converged solutions, to further solutions of subsequent problems, and to final conceptual solutions. The whole process is based on ARIZ-85-C.

In the second generation, OTSM intends to deal with complex, interdisciplinary networks of problematic situations. Thus for representing networks of problems, OTSM use the Problem Flow Networks (PFN) diagram. The slide (right) demonstrate an example of such a PFN diagram. The purple blocks at the top are desirable goals, while green blocks stand for partial conceptual solutions and yellow ones for problems or problematic situations/facts. These blocks are connected with the lines to show the problem-solution relationships. The merit of the PFN diagram is its ability to show all these complex structures in the problem situations in a glance. For solving the complex problems, the PFN diagram is analyzed carefully and added with partial conceptual solutions step by step by using various tools to be discussed below.

Example: Fragment of an Interdisciplinary Network of Problems

The slide (right) shows an overall structure of OTSM-TRIZ problem solving with the black-box representation of the tools. Non-typical problem situation is handled (with OTSM-TRIZ tools) to obtain multiple partial solutions, first. Then they should be converged into a smaller number of satisfactory conceptual solutions. They need to be evaluated objectively and are further selected/enhanced into Prototype solutions and made into Implemented solutions. Feedbacks of solutions are applied in various steps, of course. The vertical broken line in the slide divides the stages of main contribution by OTSM-TRIZ in the left and by subject-matter and real world treatment in the right.

Black boxes stimulate our mind to generate PCS and converge them into SCS

OTSM-TRIZ provides us with instruments (black boxes) to generate effective partial solutions (PS); converge those PS into a Satisfactory Conceptual Solution and evaluate those solutions objectively.

The following four slides show the black-box structure of four main tools of OTSM-TRIZ problem solving. (a) "Tongs" model (see slide upper-left) compares the description of the initial situation and that of a most desirable result and finds the barrier (or contradiction) that prevents from the achievement of a most desirable results, then the contradiction is solved by use of TRIZ separation principle. (b) "Exaggeration" model (see slide upper-right) is used for understanding positive or negative effects and contradictions better by step by step exaggeration of the situation. (c) The "Goldfish" method: [I do not know much about this method. TRIZ BOK by TRIZ Summit lists it up with a line of explanation: 'method of decomposition and synthesis of fantastic ideas'.] (d) The Network of Problems (NoP).

How does it works?

- When we have initial Fuzzy situation we can use "Tongs" model to clarify it and re-frame problematic situation from situation to be improved described in common language into shape of Contradiction.
- Tongs Could be used in many ways for: Solving problem directly, for "network of problems", to understand and fulfil each particular step of "ARIZ" or any other algorithms of OTSM-TRIZ.
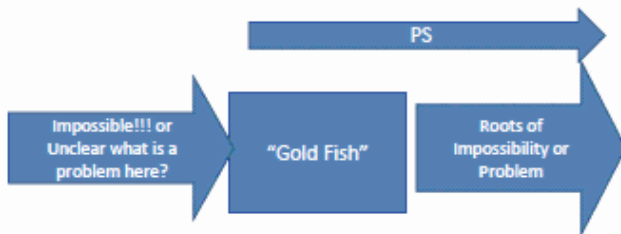
Situation → "Tongs" → Contradiction → Principles of Resolution → PS

How does it works?

- When we have Negative Effect, Positive Effect or Contradiction we can apply Black Box "Exaggeration" and obtain clear understanding on the situation. Remember that exagerration should be done step by step.
- "Exaggeration" could be used for many black boxes: "Tongs", "ARIZ", "Network of problems", "Gold Fish" etc.

NE, PE, Contradiction → "Exaggeration" → Exaggerated: NE, PE, Contr. → PS

How does it works?

- When something seems impossible or difficult identify the core of problem we can use "Gold Fish".
- "Exaggeration" could be used for many black boxes: "Tongs", "ARIZ", "Network of problems", "Gold Fish" etc.

Impossible!!! or Unclear what is a problem here? → "Gold Fish" → Roots of Impossibility or Problem → PS

How does it works?

- When we confront with complex interdisciplinary problematic situation, or just unclear problematic situation, some solution leads us to new fuzzy situation we can use Network of problems (NofP).
- "NofP" could be used for "New Problem", "Forecasting", "Problem flow Networks" etc. In turn all Instruments could be used to develop NofP.

Complex Interdisciplinary or Fuzzy problematic situation → "Network of Problems" → Problems to be solved → PS
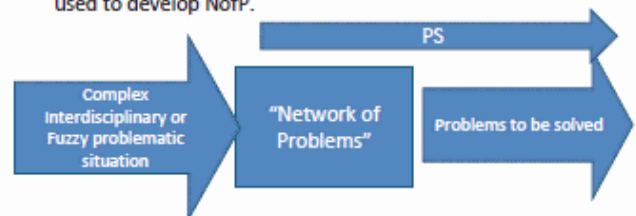
Khomenko discusses an interesting point in the problem solving process in OTSM (see slide (right)). He says that ARIZ-85-C has opened a new S-curve in the model of problem solving process, by better stimulating unconscious creative processes in our mind, even though it seems like a chaos at first look. OTSM follows this direction and has developed instruments to manage the Creative Chaos better. Fractal models in OTSM and the "OTSM Problem Flow Networks" approach are such instruments. At the bottom of the slide (right), he compares OTSM to an "Intellectual Lego" for managing our Creative Chaos and stimulate our creativity skills.

OTSM Chaos and self-organization of a problem solving process

- OTSM follow this direction of Classical TRIZ evolution and develop instruments to manage the Creative Chaos better :
  - OTSM Fractal Model of a problem solving process.
  - To apply the model for practice "OTSM Network of Problems" method was developed.
  - For most complex problematic situation was developed "OTSM Problem Flow Networks" approach.
  - OTSM Contradiction Technology based on ARIZ-85-C.
- Conclusion: OTSM is an "Intellectual Lego" for managing our "Creative Chaos" and stimulate our creativity skills.

So far Nikolai Khomenko has been explaining about OTSM from theoretical/methodological viewpoints. Now in the slide (right), he introduces the practical aspects of OTSM tools.

He says OTSM has been tested successfully in a number of Korean companies (e.g., LG-Electronics, Samsung, Posco, Hundai) and European companies (e.g., Puegeot-Citroen, Airbus, EIFER, Visa, etc.).

He also lists up the domains where OTSM tools have been tested successfully. See the slide (right).

Where OTSM tools were tested?

- **By Companies:**
  worldwide European and Asian companies like: LG-Electronics, Samsung, Posco, Hundai, Puegeot-Citroen, EADS (Airbus), Bombardier, Bosh-Siemens, Renaut, EIFER (EDF), Salomon, Visa, etc.
- **By Domains:**
  Various Engineering domains; Material science; Software developing; Complex system modeling methodology development; European regions and city development planning (Economics, Architects, Energy); Advertising & Public Relations; Scientific research and Investment planning; Business organization, business models and schemas developing; Art; Decision making; Banking; Computer aided Thinking; Knowledge Management.

At the end of the Keynote Lecture, Nikolai Khomenko discusses about the challenges in education and in the model of professional mind. His basic understanding of difficulties in the world is expressed in the slide (right). He quotes a sentence attributed to Albert Einstein: 'The problems that exist in the world today cannot be solved by the level of thinking that created them.' Thus he says "In the world of rapid changes we have to handle non-typical problematic situations effectively. I.e., we must change our way of thinking and change the basic attitude every time we are faced with non-typical problem." and also "Developing those skills require very innovative education -- 'Nonlinear Education' ".

What makes a Problem Difficult?

...The problems that exist in the world today cannot be solved by the level of thinking that created them...
attributed to Albert Einstein

"Making knowledge workers productive requires changes in basic attitude"
Peter Drucker
Management Challenges for the 21-st century.

Conclusion:
in the world of rapid changes we have to handle effectively Non-Typical problematic situations, i.e. we must change our way of thinking and change the basic attitude every time we faced with Non-Typical problem. Developing those skills require very innovative – Non Linear Education.

To understand his points better, we should first learn his comparison between 'the well-filled mind' and 'the well-organized mind'. These are relevant to our visions of educated persons. 'Professionals with the mind well filled in with typical solutions from the past' are certainly the target of modern education systems. But we need persons with more dynamic and well-organized mind, Khomenko says. Well-organized mind is a mind that could process available knowledge in order to obtain satisfactory solutions to unknown (non-typical) problems.

Education Dilemma Which mind is better: well-filled in or well-organized?

- Modern education system produces professionals with the mind well filled in with typical solutions from the past.

- The current situation demands regular and quick innovation which cannot be provided by past typical solutions.
Cross disciplinary problem solving instruments are needed to produce new typical solutions quicker and more effectively than Trials and Errors Method that was used in the past.

Well-organized mind.

- Well organized mind is a mind that could process available knowledge in order to obtain satisfactory solution of unknown (non typical) problems.
It is not only well organized storage of knowledge but creative knowledge processing system as well.
(See also - OTSM Advanced Schema for powerful thinking)

- Dynamic and well-organized mind is a new challenge for education, industry and research.
This mind should be able to manage difficult non-typical problems that are often complex and cross-disciplinary.
- Collaborative negotiation between different professionals is necessary more an more now. This also requires efficient organization of the mind and appropriate tools like OTSM.

For the purpose of education toward well-organized mind, the Author is promoting 'Problem Centered Education' to adult people (see the slide (below-left)). The Author, Nikolai Khomenko, has been the leader in the OTSM-TRIZ education for children and kids. He now promotes "Non-linear education" (mostly) for children. It is a way of education in a surprising manner. "We develop (in children) network of appropriate skills simultaneously, but not step by step as in the linear technology." [Maybe children are flexible enough to handle the 'creative chaos' in their mind, if they are trained in an appropriate way. Khomenko and his collaborators have already produced a lot of results/examples in children education.]

OTSM-TRIZ Education – Problem Centered Education

We teach people to solving Non-Typical problems and networks of problems and contradictions. We teach them how rearrange and evaluate their existing knowledge for thre problem solving. If the knowledge are not in here now, then undurstand what kind of knolwedge can be usefull to solve the problem and how obtain the appropriate knowledge.

OTSM-TRIZ can not replace specific domain knowledge but helps a lot to rearrange the knoweldge in the proper way useful for solving particular problem in the given context.

It is a solid base for Life Long Learning skills development.

OTSM-TRIZ Education:
Linear education versus Non-Linear education

By Using these educational technique we develop network of appropriate skills simultaneously but not step by step as in the linear technology.
This helps to resolve a problem "mass education versus individual education". Individuals learn all topics in the sequence according the best way for their personality.
- Riddle Technology by A. Nesterenko
- Fairy Tale Technology by G. Altshuller
- Yes-No Game Technology by N. Khomenko
- System of creative assignments by T. Sidorchuk
(Ph.D. thesis and book: T.Sidorchuk, N.Khomenko Thoughtivity for kids)

Finally Khomenko mentions his thought

about 'What is creativity'. He says 'The core of Creativity is an productive activity of human mind that can not be completely formalized." [I recall a similar definition of 'Artificial Intelligence' (AI). The three statements in the conclusion of the slide (right) seem to give good answers to the vague questions I have had in my mind.] The higher level of formalization of the procedure we have, the lower level of creativity we need. This is what modern professional education does with our mind, i.e. decrease our creativity. And this is what TRIZ (and OTSM) tries to do in a larger extent, as stated in 3. But at the same time it (i.e., modern professional education as well as TRIZ & OTSM) open our mind to a new horizon of creativity and provide us new opportunity.

What is Creativity?

OTSM standing point:
The core of Creativity is an productive activity of human mind that can not be completely formalised.

Examples: Llinear Prospective, Square Equations.

Conclusions:
1. The higher level of formaisation of the procedure we have the lower level of creativity we need. That is what modern professional education do with our mind – decrease our creativity.
2. Creativity is a kind of Sky-line – Horizon: the closer we arrive to it the far away it moves from us. By increasing level of formalisation for Today Creativity we obtain new and better understanding on whan will be Tomorrow Creativity.
3. TRIZ and OTSM based creativity kill Today understanding of Creativity and transform it to a routin activity but at the same time it open our mind to a new level of creativity and provide us new opportunity.

*** This Keynote Lecture was given in a highly abstract and advanced way. Even for myself, after reading several of his articles/papers beforehand and attending at the OTSM Introductory Seminar on the previous day of the Symposium, the Keynote Lecture at the Symposium was not easy to understand. Only after struggling to complete this part of my Personal Report, I now feel I understand what Nikolai Khomenko talked in this lecture. You may notice that I have rearranged several slides from the Author's original order (see PDF). I hope Nikolai would kindly accept my rearrangement as an effort of my organizing the complex information given.

I am grateful to Nikolai Khomenko for his so much and serious efforts for making this Keynote Lecture rich in contents and yet compact. OTSM is new in Japan. We understood its importance last year through the presentation by Atom Mirakyan, Nikolai Khomenko, et al. at Japan TRIZ Symposium 2009. We know that there are so many big and important projects which could obtain benefits from the application of OTSM-TRIZ approach. We need a lot more efforts to understand and apply the approach fully.

On the second day evening, we had a group discussion on the theme of "Education and TRIZ". Nikolai Khomenko kindly presented his work in the session as well. I will write about it later (in Part F) briefly. Also please refer to the separate page about the Award presented to Mr. Nikolai Khomenko .

Please read the original presentation slides in PDF posted already in the Official Web site of Japan TRIZ Society. The slides were translated into Japanese by Mr. Shinsuke Kurosawa and posted there also in PDF .

Mamoru Zenko (IDEA Co.) gave an Tutorial on the first-day morming with the title of '**Tutorial: "Let's Know TRIZ**". As a rule I have not disclosed the contents of Tutorials in my Personal Report, in order to respect the lecturer's commercial rights. Thus I will quote his Abstract of the Tutorial:

> A dozen or so years have passed since TRIZ arrived in Japan, and here also, considerable research has evolved into "usable TRIZ." At first, many people in companies were complaining not to be able to produce results as they would like because of the complex theoretical system of TRIZ, but after making all kinds of efforts and studies, the application of TRIZ which leads to results have been spreading. The introduction of TRIZ is expanding regardless of the scale of operation from usage centered at large enterprises to new introductions at small and medium-sized enterprises. Also, as for the introducing industry sectors, the usage of TRIZ is expanding from electrical equipment, auto and machinery to fields such as medical equipment, machine tool, food and software. Such being the case, an overview of TRIZ as a fundamental knowledge for newcomers to TRIZ will be presented. This talk will consist of 3 parts, namely, (1) Why TRIZ is needed? (2) How to think for idea generation? and (3) How to generate good ideas?, which will be explained through its benefits and concrete way of thinking, and also through practical product cases in terms understandable also to those who hear about TRIZ for the first time.

Mamoru Zenko is President of IDEA Co., which is one of the most active TRIZ consulting firms in Japan. In the TRIZ Symposium, three consultants of IDEA actually delivered an Oral presentation respectively on their methods of TRIZ applications. Mamoru Zenko is known as a vital and persuasive promoter inTRIZ in Japan. His Tutorial was well accepted by many attendees.

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