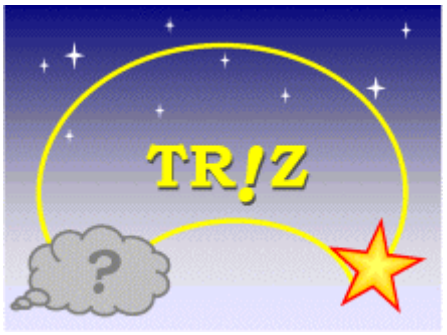
TRIZ Forum: Conference Report (22-C)

TRIZ シンポジウム 2009
The Fifth TRIZ Symposium in Japan



TRIZ Home Page in Japan Jap.

Personal Report of The Fifth TRIZ Symposium in Japan, 2009

Held by the Japan TRIZ Society, NPO, on Sept. 10-12, 2009, at National Women's Education Center (NWEC), Saitama, Japan

Part C. Integral Use of TRIZ with Relevant Methods

Reviewed by Toru Nakagawa (Osaka Gakuin Univ., Japan), Nov. 28, 2009

[Posted on Dec. 6, 2009]

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

Editor's Note (Toru Nakagawa, Dec. 5, 2009)

This page is Part C of my Personal Report of Japan TRIZ Symposium 2009. 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.

Note: (TN, Mar. 11, 2010) Click here for the PDF file of this page of Personal Report. E PDF

C1.	**Toru Shonai**, Junji Shigeta	(Central Research Laboratory, Hitachi, Ltd.)	Survey on Thinking Methods for Invention and Discovery — A Step for Combining TRIZ with non-TRIZ methods—	E
C2.	**Osamu Kumasaka**, Fumiko Kikuchi, Akio Fukushima	(Pioneer Corp.)	The Role of TRIZ in the System of Monozukuri Solution Methods	E
C3.	**Koji Tsumagari**, Masaaki Sakai	(Logo Corp.)	Make an Effective Use of TRIZ Result: Project Management with TOC and the Practical Use	E

Top of this page	Parent page	1. Outline	2. Organization	3. Keynotes	4. Methods in TRIZ	5. Integration with other methods	6. Case Studies	7. Promotion	8. Education and Academia	9. Patent Studies
10. Non-technical		11. Miscellaneous	12. Concluding	TRIZ Symp 2009 Official page Engl	TRIZ Symp 2005 Personal Report Engl	TRIZ Symp 2006 Personal Report Engl	TRIZ Symp 2007 Personal Report Engl	TRIZ Symp 2008 Personal Report Engl	Japan TRIZ Society Official Page	Japanese page Jap.

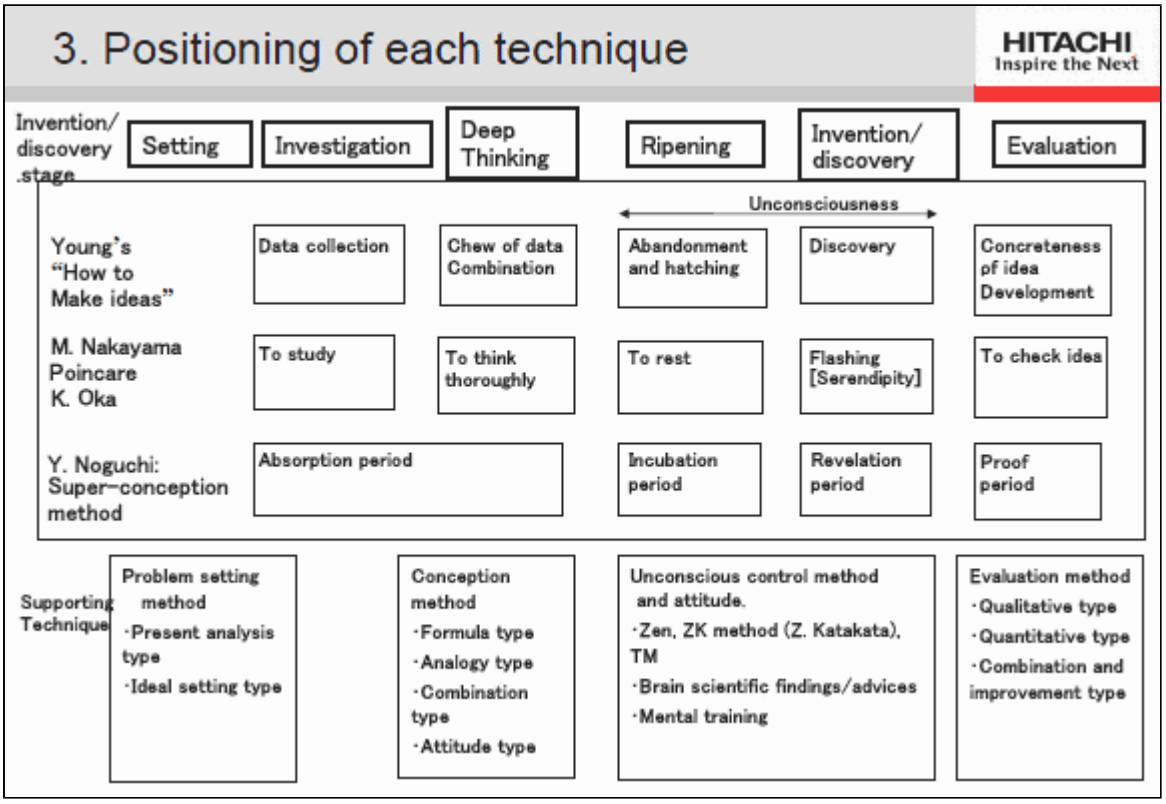
5. Integral Use of TRIZ with Relevant Methods

Toru Shonai, Junji Shigeta (Central Research Laboratory, Hitachi, Ltd.) [J13 P-A5] gave a Poster presentation on **"Survey on Thinking Methods for Invention and Discovery — A Step for Combining TRIZ with non-TRIZ methods—"**. The Authors' Abstract is quoted here first:

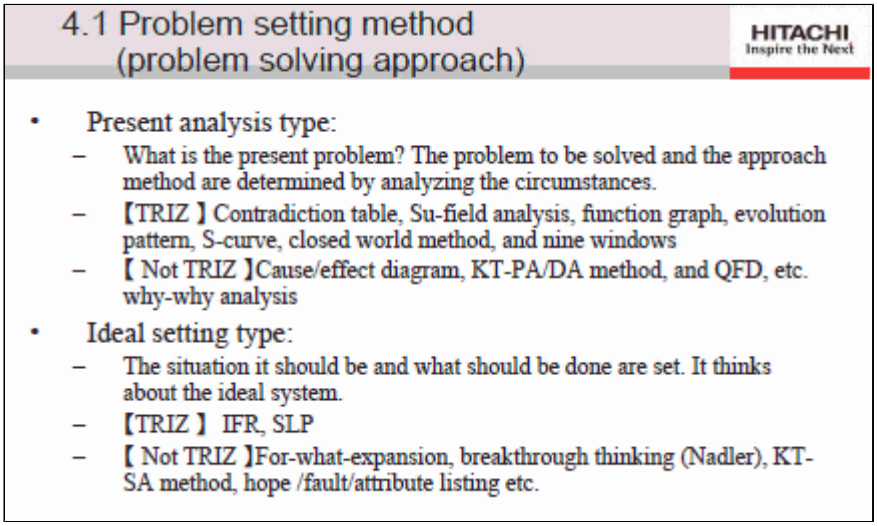
We have been assisting inventive activities in a company's laboratory for a decade. TRIZ is the

only systematic methodology for inventive problem-solving, which is developing now. Although we consider it as the most reliable methodology for invention, because there are no empirical studies that TRIZ can assist for highly excellent inspirations beyond anyone's expectations in high probabilities, we had better absorb and exploit non-TRIZ methodologies aggressively. For this purpose, we are now investigating various inventive and inspiring methodologies from the past and distilling their essence. This presentation will describe Aristotle's and Peirce's philosophy of science, discovery method in geniuses in various academic fields, western and Japanese inspiring methods, approaches from brain science, and serendipity.

As stated in the Abstract, this presentation has a very wide scope of surveying research. In their Poster presentation, 15 detailed slides were shown both in Japanese and in English. For the sake of space here, I have to skip several slides where the Authors introduce individual methods, especially originated by Japanese researchers, including the Equivalent Transformation (ET) theory (by Kikuya Ichikawa), the KJ method (by Jiro Kawakita), and the NM method (by Masakazu Nakayama). [*** See an introductory paper on ET by K. Ichikawa (1966) in Japanese reproduced in this Web site "TRIZ Home Page in Japan" (2001) Jap. .] The Authors show the positioning of various techniques along the commonly-understood invention/discovery stages (see slide below).



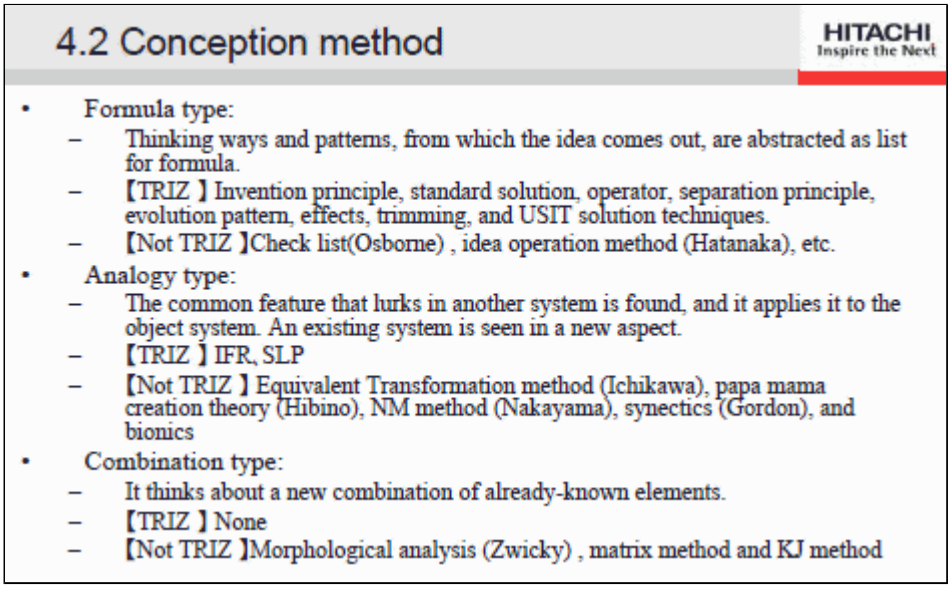
Then the Authors summarize the supporting techniques after classifying them in the 4 stages (see the bottom half of the above slide).



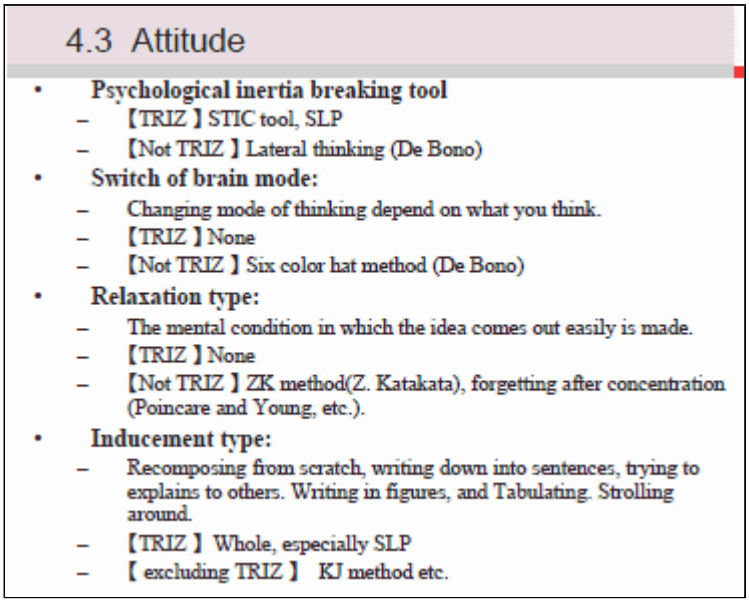
The first stage (slide right) is the problem setting (or (initial) approach for problem solving). The Authors recognize two basic approaches, i.e., one from the analysis of the present situations and the other from the setting of the ideal situations. Various methods coming from TRIZ or not are listed here.

The second stage is called Conception, i.e. generating concepts/ideas (see slide

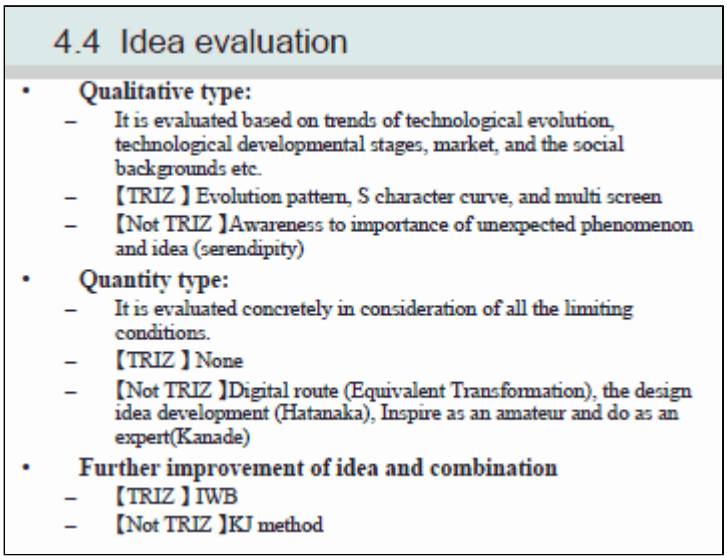
right). One important type of methods for idea generation is called 'Formula type' by the Authors. TRIZ has a rich set of methods here. USIT is a derivative of TRIZ, while Hatanaka's idea operation method was developed independently of TRIZ. Second type of methods is called 'Analogy type' here. Several non-TRIZ methods are listed in this category.



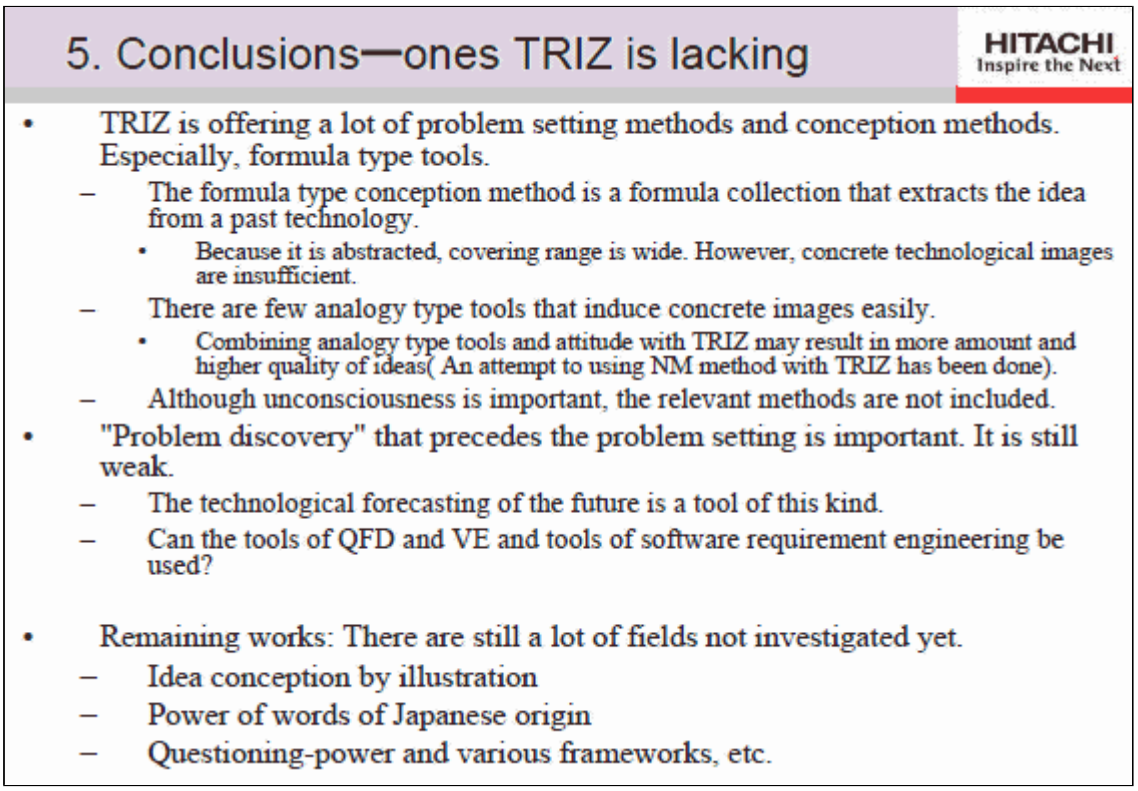
The Authors put the title of 'Attitude' in this slide (right). Referring to the previous slide of 'Positioning of the methods', the approaches/methods listed here belong partly to the second stage (i.e. Conception) and partly to the third stage (i.e. Unconscious ripening and invention/discovery). The Authors list here four types of methods, i.e., breaking psychological inertia, switching the brain mode, relaxation of mind, and inducement. There seems to be various approaches outside TRIZ, especially for trying to control or enhance unconscious thinking.



The fourth stage is idea evaluation (slide right). The Authors list up 3 TRIZ methods as the Qualitative type. For the Quantitative type, they list 3 other non-TRIZ methods. (I suppose Hatanaka's method mentioned here is a derivative of Axiomatic Design.)



The Conclusions written by the Authors are shown in the slide (below). Since they are carefully written, I just quote the slide in a large enough size for you to read.

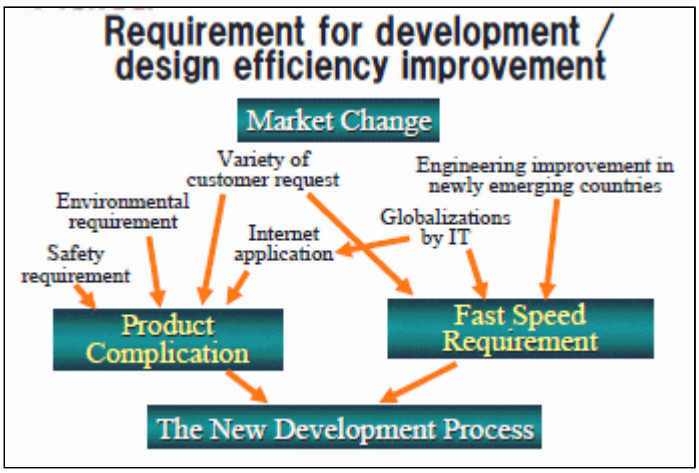


*** This presentation shows an excellent framework of the research the Authors have been carrying out and will further extend, I believe. For the sake of space, I have skipped several slides which describe individual methods of Japanese origin and References (mostly in Japanese). I wish the Authors extend this work further and publish the results step by step in the near future. It is my desire that the present site "TRIZ Home Page in Japan" becomes a base stage for their publications.

Osamu Kumasaka, Fumiko Kikuchi, Akio Fukushima (Pioneer Corp.) [J19 P-B2] gave a nice Poster presentation with the title of "The Role of TRIZ in the System of Monozukuri Solution Methods". This presentation is also based on an intensive wide-scoped research for many years, and has obtained the 'Best presentation for myself' Award after the voting by Japanese participants. 'Monozukuri' is the Japanese word for 'making things' in a wide sense, including all the processes of planning, designing, manufacturing, production, etc. The Authors' Abstract is quoted here:

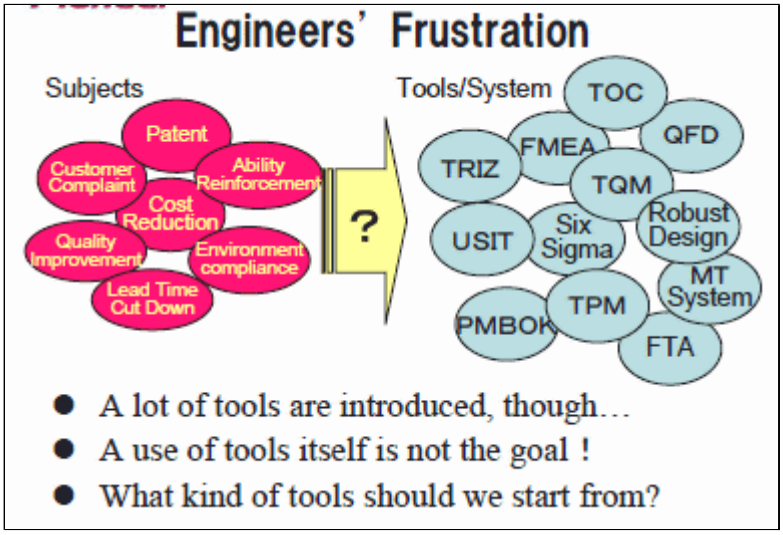
> Complication and difficulty of the Monozukuri process in Japan has been increasing according to the change of social condition. While many subject solution tools are introduced, some engineers are frustrated to choose one for their problem. Therefore a subject indexed matrix was systematized for the benefit to related engineers. And the role of TRIZ in this system was studied by means of evaluating interrelations and synergistic effects among those tools. As a result, possibility of TRIZ contribution was indicated on wide steps of the Monozukuri process as a new idea creation tool.

In the slide (right-upper), the Authors summarize the requirements on the engineers for improving the efficiency of developing/designing new products.



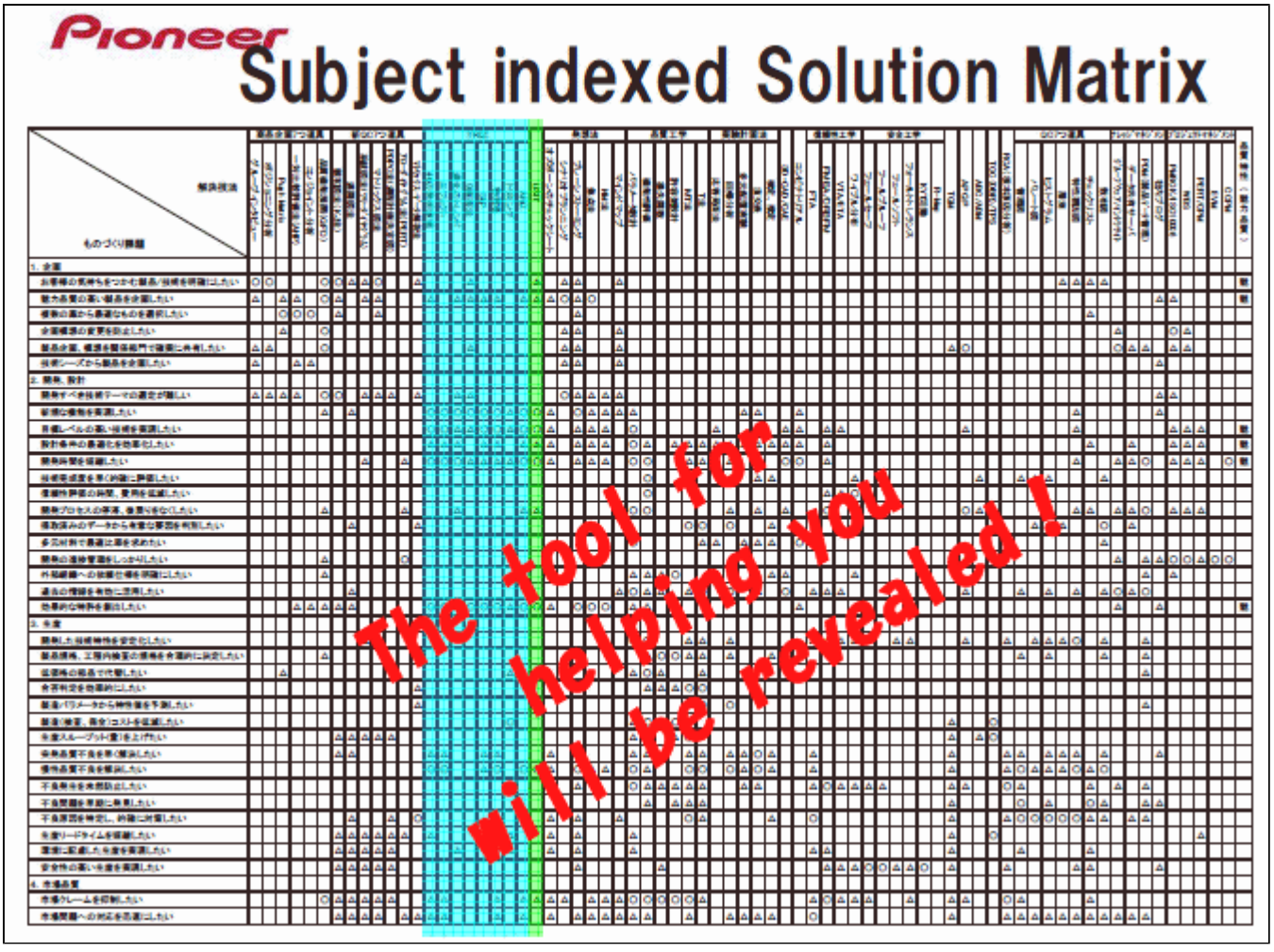
Such requirements come to the engineers in different forms, as shown in the next slide (right-lower). Engineers are requested to meet them and, of course, they want to fulfill the requirements as much as possible. But they are heavy tasks. A lot of methods and tools are introduced (in the world, or sometimes in the engineers' company). But usually each method/tool is explained/taught individually and hence

the engineers have to learn any of the methods/tools one by one before becoming able to apply it to their own job. Learning a method/tool and even using it are not their goal by themselves. The engineers want to obtain results in their jobs effectively. They want to learn what kind of methods/tools are useful for their purpose in their current stage of jobs and environments.



For improving such a situation of presenting methods and tools to the engineers, the Authors have built an Index Matrix for finding useful methods/tools from the current phases of jobs of Monozukuri. The key idea of making the Index Matrix is to list up the engineers' intentions/questions along the phases of the whole Monozukuri process.

The big table shown in the following slide (below) is the Index Matrix for finding useful methods/tools from the subjects/requests in various phases of Monozukuri process. The Authors built this table and posted it in their intranet Web site in Pioneer Corp. The Index Matrix is so big that you cannot read the individual rows of subjects and individual columns of methods/tools. In individual cells, the circle states that the method/tool is effective for the subject/requirement, while the triangle represents partial/weak effectiveness. The columns in light blue show 8 components of TRIZ and another column in green shows USIT.



For realizing the value of this Index Matrix, we should closely look at the subjects (rows) and the methods (columns). The subjects (written in Japanese) are composed of:

1. Planning:
   -- Want to find a key product/technology which can grasp the hearts of customers.
   -- Want to plan a product which can have highly attractive quality.
   -- Want to select the best among multiple of alternative plans. (and 3 more rows.)

2. Development & designing:
   -- Want to define the technologies which we should develop for ourselves.
   -- Want to realize a novel functionality.
   -- Want to reduce the time of technology development. (and 11 more rows)

3. Manufacturing:
   -- Want to stabilize (or make robust) the newly-developed product characteristics.
   -- Want to define rationally the standards and tolerances of products and of process inspections.
   -- Want to replace a part of the system with cheaper ones. (and 12 more rows)

4. Quality in the market:
   -- Want to reduce the claims for the market.
   -- Want to respond more quickly to the market problems.

The methods and tools in the columns are:

- 7 tools for merchandise planning (including: group interview, Pugh's matrix, AHP, QFD, etc.)
- New 7 tools for QC (including: KJ method (or Affinity diagram), Relations diagram, PDPC, etc.)
- TRIZ (including: 40 Inventive Principles, Effects DB, Trends of evolution, 9 windows, SLP, Su-field analysis, Trimming, and ARIZ)
- USIT
- Idea generation methods (including: Brainstorming, NM (Masakazu Nakayama) method, Mind mapping, etc.)
- Quality engineering (or Taguchi method) (including: Parameter design, Functionality evaluation, etc.)
- Design of Experiment (including: Regression analysis, etc.)
- 3D CAD/CAE
- Reliability engineering (including: FMEA/DRBFM, etc.)
- Safety engineering (including: Fail safe, Fault tolerance, etc.)
- TQM
- TOC
- RCA (Root cause analysis)
- 7 tools for QC (including: Cause-effect diagram (or Fish bone diagram), Scattered diagram, etc.)
- Knowledge management (including: Groupware/intranet site, Data sharing server, etc.)
- Project management (including: PMBOK, PERT/CPM, CCPM, etc.)
- Quality characteristics (or Attractive quality)
- etc.

*** As shown above, the Index Matrix built and provided in the company's intranet site contains a very rich information about many methods and their effectiveness evaluation. This presentation is indeed a valuable contribution to the industrial and technological society. The contents of the Index Matrix should be validated and refined by many people. And the Index Matrix will give us number of suggestions for further development in various technological methodologies. Congratulations to the Award given by the paticpants voting!

Koji Tsumagari, Masaaki Sakai (Logo Corp.) [J27 O-17] gave an Oral presentation with the title of **"Make an Effective Use of TRIZ Result: Project Management with TOC and the Practical Use".** The Authors' Abstract is quoted below.

> For the product in own core business can be achievable with accustomed ordinary processes, that the market introduction would have no matter. To use TRIZ method effectively for smooth market introduction it is necessary to involve an appropriate set up plan. In case of the product is innovative and revolutionary, the product procedures development through production & logistics will have new tasks which nobody has the experience and the procedures see the stake-

holder changes as inevitable. In other words, the framework like the new business establishment is necessary. The project management method comes in valuable for this solution.
We introduce “Project Management CCPM / 6 Modules with TOC” which the authors developed the method for Japanese engineers including TRIZ practitioner.

This presentation was given in Japanese without slides in English.

General index	New Information	Introduction to TRIZ	TRIZ References	TRIZ Links	TRIZ News & Activities	TRIZ Software Tools	TRIZ Papers and Tech Reports	TRIZ Lectures	TRIZ Forum	General index Jap.
Home Page	New Information	Introduction to TRIZ	TRIZ References	TRIZ Links	TRIZ News & Activities	TRIZ Software Tools	TRIZ Papers and Tech Reports	TRIZ Lectures	TRIZ Forum	Home Page Jap.

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