

The 9th TRIZ Symposium

# In-house promotion of TRIZ use through practice

2013/9/5

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Establishment	December 16, 1949
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The capital	187.4 billion yen
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Sales	Connection Single	3,580,900,000,000 yen 2,276,800,000,000 yen
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Current profit	Connection Single	296 billion yen 195.8 billion yen
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Number of employees	Connection Single	132,276 people 38,385 people
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Number of consolidated subsidiaries	183
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Number of equity method application related companies	32
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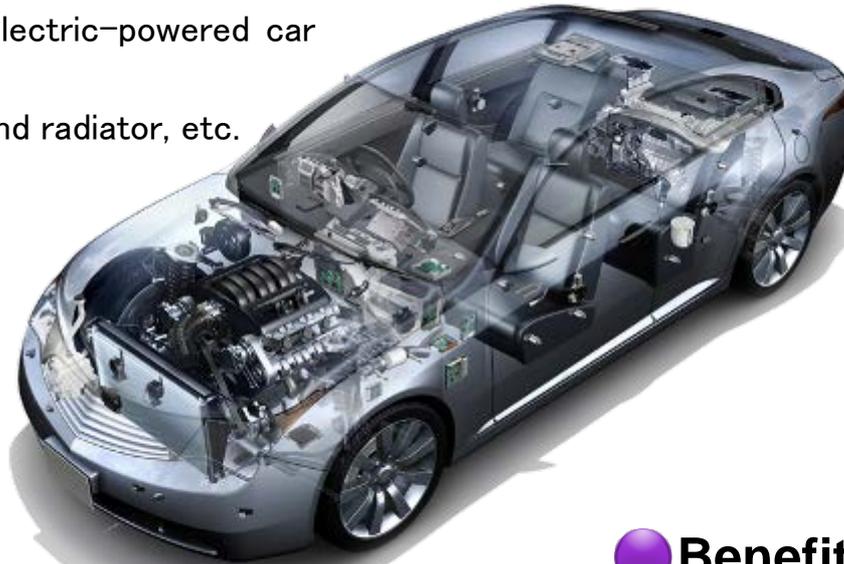
/ As of March 31, 2013

## Environment

Gasoline engine management system  
Diesel engine management system  
Product for gas-and-electric-powered car  
and electric vehicle  
[Suta-ta], alternator, and radiator, etc.

## Comfort

Car air conditioner system  
Air conditioner and air cleaner, etc. for bus



## Safety

Sen Synge system for driving support system  
Actuator & computer for ABS/ESC  
Headlamp control system (AFS)  
Sensor & computer for air bag  
Monitoring system around vehicle and  
combinations meter  
Wiper system etc.

## Benefit and convenience

Car navigation system and ETC on-board  
equipment  
Remote security system  
Remote touch controller and smart key  
Vehicle operation system (AVOS) etc.

Our company introduces TRIZ and ten years have passed. The in-house promotion activity of the TRIZ use of ten years was the one through practice. It has kept first applying TRIZ to actual subject, it learning to the success and the failure, and it groping for the approach and the tool of new TRIZ use.

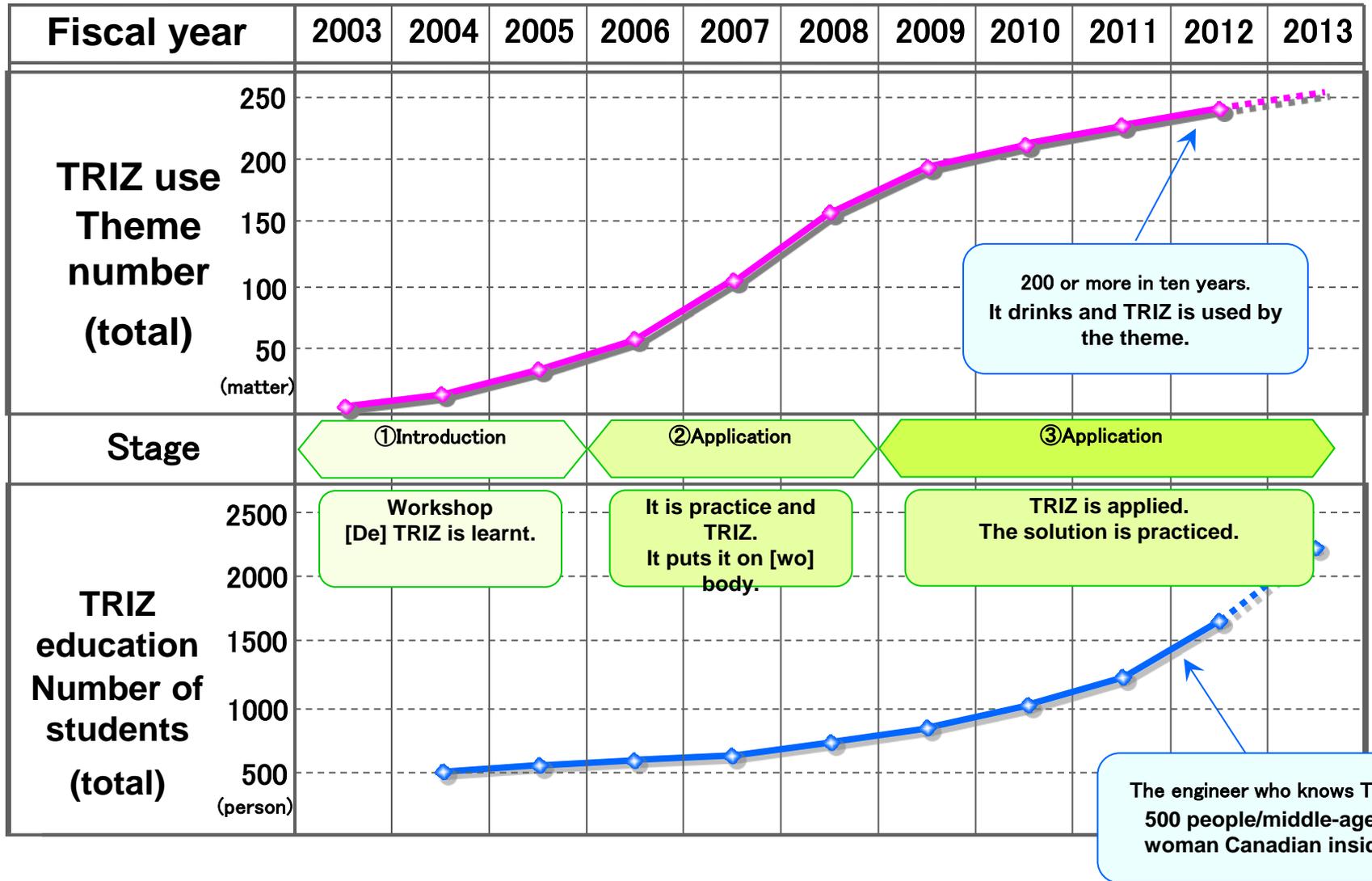
It looks back on the promotion activity for ten years, and this time, what problem exists, and it reports sometimes what improvement on you have tried. Additionally, it introduces the groping case with a new tool.

It would be greatly appreciated if the opinion it becomes your reference and without the diffidence could be sent.

## Contents

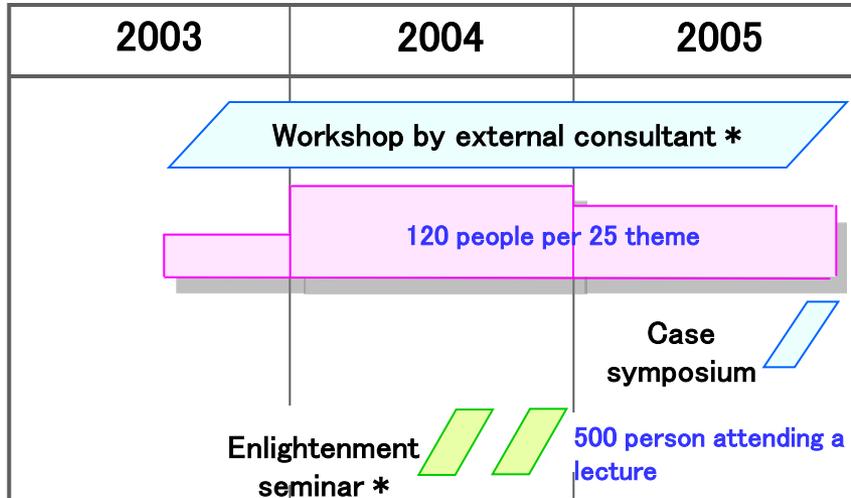
1. Our TRIZ development transition
2. Activity, problem, and improvement at each stage
  - ① Introduction stage
  - ② Application stage
  - ③ Applied stage
3. Combination case with another technique
4. Summary

# 1. Our TRIZ development transition



# 2. Activity, problem, and improvement at each stage (1/6)

## ① Introduction stage



\*It cooperated in the idea lord Ltd..

Workshop	
Lecturer	External consultant
Time	Ten days (about six months)
Participant	Half of half the number nomination + applicants
Theme	An actual development theme is brought together.
Content	TRIZ seat study? Problem analysis? Idea putting out. Concept selection

### Result

- Rapid eminence improvement and content understanding
  - Affirmative evaluation
- After the seminar: 65% that tries. Workshop..expectation.

### Problem

It takes time.

- Workshop: It averages by work + homework the TRIZ study and exclusion 84h.
  - A lot of true opinions
- " It takes time though TRIZ is not bad. "

## 2. Activity, problem, and improvement at each stage (2/6) 6 / 20

② Application stage: Policy (The introduction stage is finished, and TRIZ is applied to a lot of themes).

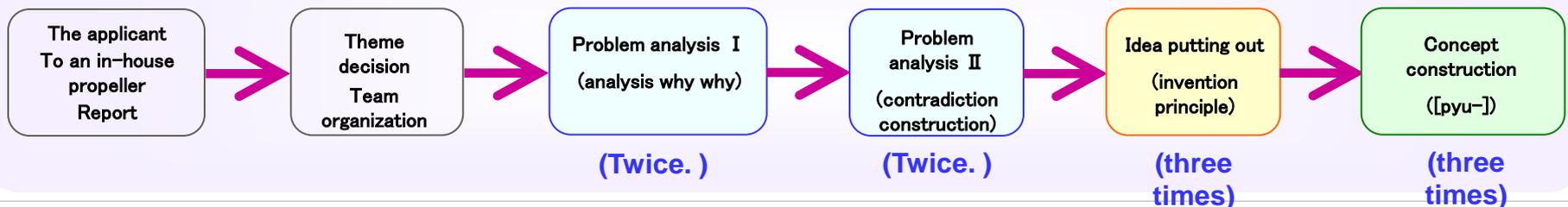
### Policy

"It takes time" ? "First of all practice" / result is put out and TRIZ is acquired.

	Introduction stage	Application stage
Policy	It teaches, and it does.	It acquires it by practice.
Lecturer	Consultant outside the company	An in-house propeller initiates it.
Time	Average 84h	<b>..about 20h.. target</b>
Participant	Half of half the number nomination + applicants	Only the applicant
Theme	Actual development theme	Actual development theme
TRIZ education	Systematic seat study 24h	Seat study none (Only a necessary point : in every case).

== of image at distance of 20h/theme

.. = 20h (2-3 month..)



# 2. Activity, problem, and improvement at each stage (3/6)

## ② Application stage: Practice, result, and problem

2006	2007	2008
TRIZ application practice by applicant and in-house propeller		
	420 120 theme people	
	Introductory chapter education	100 person attending lecture

### Result

- Time crunch: About 80h ? about 20h/theme
- An effective idea conception tool and it evaluates it to TRIZ.  
(Independent TRIZ use in the office has extended.)

### Problem

The satisfaction rating is low as solution \*.

Means on solution \*: business to solve problem and problem

### - Category of theme

120 all themes

Problem solving 35%	Type plan for the next term 25%	Type project for the future 40%
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### - Field of theme

Various themes

Machine 40%	Material 25%	Electron 20%	Software 15%
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### - Activity time (h/theme)

Year	10h or less	20h or less	30h or less	30h or more
06 years			30h or less	30h or more
07 years	10h or less	20h or less		
08 years	45%	20%	30%	5%

### - Number of use

Repeater: 10%

06 years	90 people
07 years	160 people
08 years	170 people

### - User satisfaction rating

Problem analysis	Idea putting out	Concept construction
-		X

## 2. Activity, problem, and improvement at each stage (4/6)

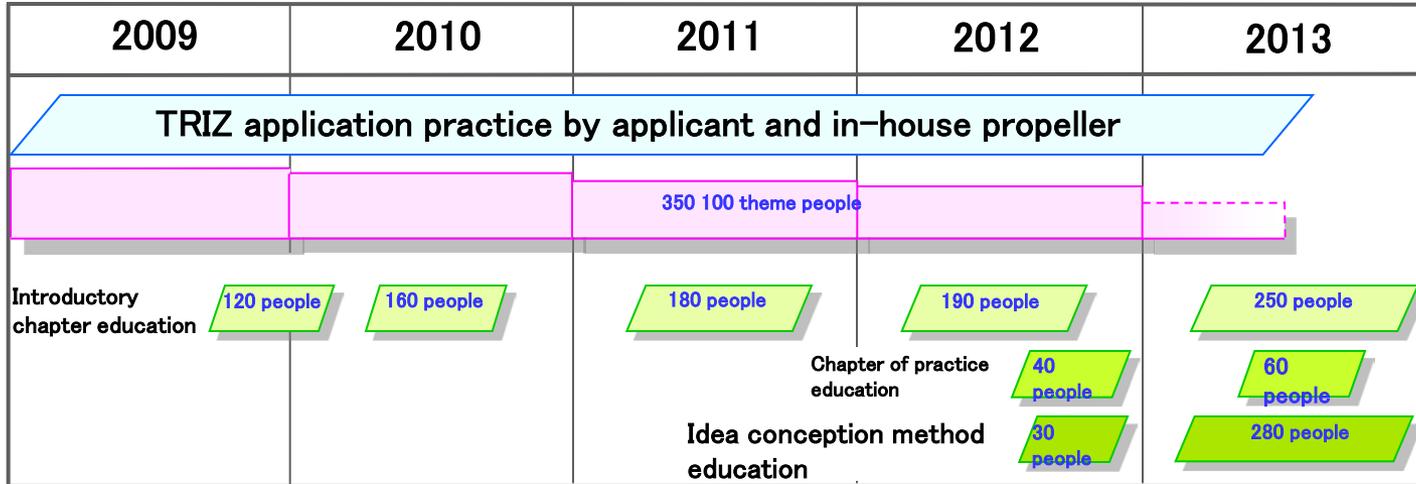
③ Applied stage: Policy (Finish the application stage, and the solution to various themes).



Various approaches according to a variety of problem situations of solution \*:

		Application stage	Applied stage
Policy		TRIZ is applied.	The solution is offered.
Approach		Fixed form TRIZ Problem analysis? Idea putting out. Concept construction	Each category of the theme is changed.
Category of theme		Type project for the future	<p style="color: magenta;">More subdivision ( To six categories. )</p>
		Type plan for the next term	
		Problem solving	
Tool	Type project for the future	Invention principle, evolution trend, SLP, and multi screen	<p style="color: magenta;">The number of TRIZ tools that can be mastered is increased.</p> <p style="color: magenta;">The combination with another technique is tried.</p>
	Type plan for the next term	Invention principle and evolution trend	
	Problem solving	Invention principle	
Education		It acquires it by practice.	Both circles of practice and systematic education

## ③ Applied stage: Practice



– Subdivision of category of theme (To offer the solution to various problems).

Type project for the future	① The target is felt for.	The way it should be, forecast, development scenario in the future, search at chance, and product planning
	② The target is set.	Product planning, road map, rival comparison, theme search, and usage development ...
Type plan for the next term	③ The method is decided.	Product project
	④ Choices of the means are expanded.	Plan design, reduction in costs, patent application, and lightening
Problem solving	⑤ The means is decided.	Performance gain, efficiency gain, and quality improvement
	⑥ Short-term problem solving	Quality issue and problem of factory

# 2. Activity, problem, and improvement at each stage (6/6) 10 / 20

## ③ Applied stage: Result

**Result**

The number of necessary tools that can be used has increased for the solution.

➡ User satisfaction rating: Concept construction X ? - ~\*

- Surplus: TRIZ tool used from application stage

Blue character: Tried TRIZ

Deficit: Another technique

		Problem analysis	Idea conception	Idea settling
Type project for the future  Type plan for the next term  Problem solving	① The target is felt for.	<div style="background-color: #800080; color: white; padding: 5px; display: inline-block;">Case</div>	- Genealogy chart of technological evolution	- Law of eight evolution
	② The target is set.	- S-curve analysis	- SLP    - Personification	- DE
	③ The method is decided.	- Trend analysis of evolution	- Multi screen	- Ultimate ideal solution
	④ Choices of the means are expanded.	- Place material - analysis - Problem hierarchy search	- Physical contradiction - Reverse TRIZ	- QFD-TM* - Trend of evolution of 31
	⑤ The means is decided.	- Resource analysis - Device analysis	- Knowledge retrieval (Gf)	- Effects - Prediction
	⑥ Short-term problem solving	- Restriction analysis - Cause result analysis	- Trim - Engineering contradiction	- Invention standard solution - Invention principle of 40

\*It is introducing it by cooperating in the idea lord Ltd.

# ① Outline of theme brought in and another technique for choosing

Plan of development scenario of technological base concerning A system technology

- The development scenario that doesn't base "Society trend" and "Change in the market trend" is impossible.

However, it is also inevitable that "Technology" becomes a center.

I want to have it.

3h X 8 times of eight members = 24h

**Target**

Development scenario that unifies rationality and consent and has it

Proposal from propeller

Rationality. Forecast in the future based on past analysis

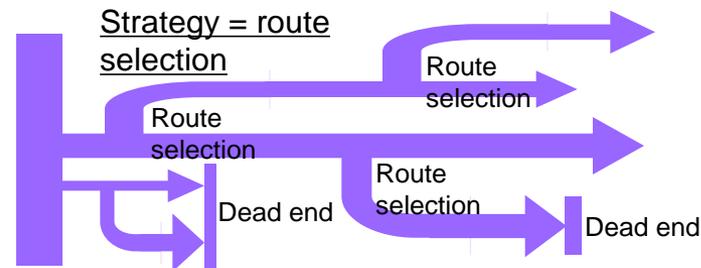
Consent. Selection of development route based on hypothesis

Strategy theory

Selection

Genealogy chart \* of technological evolution

Genealogy chart \* of technological evolution



The genealogy of the organic evolution: The seed of the living thing is ruled by the strategy that facing and all actions aimed at the species preservation on the edge of extinction.

The law of technological evolution: The success in the research and development should search for the direction where the technology that does a better judgment and chooses is not easily exterminated.

## ② Genealogy chart-making of technological evolution

- Genealogy chart made first (shape that tend to be)

The general view chart of a past product queues up in order of the sale.

Age	1990	2000	2010
XXXX	XXXX	XXXX	XXXX
XXXX			

It is understood what to be read there is a lot of volume of information neither.

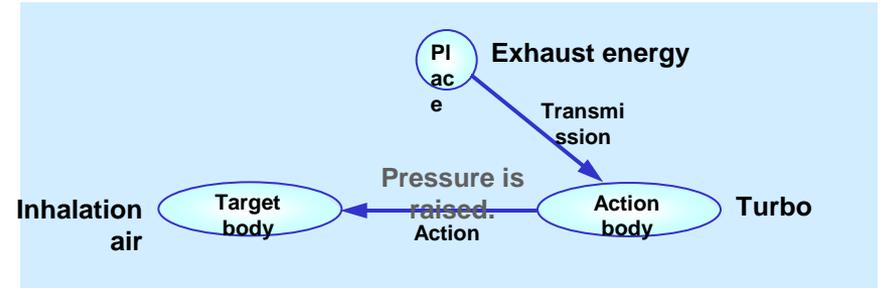
Unexpectedly difficult genealogy chart-making

Transition of the one architecture that should be read

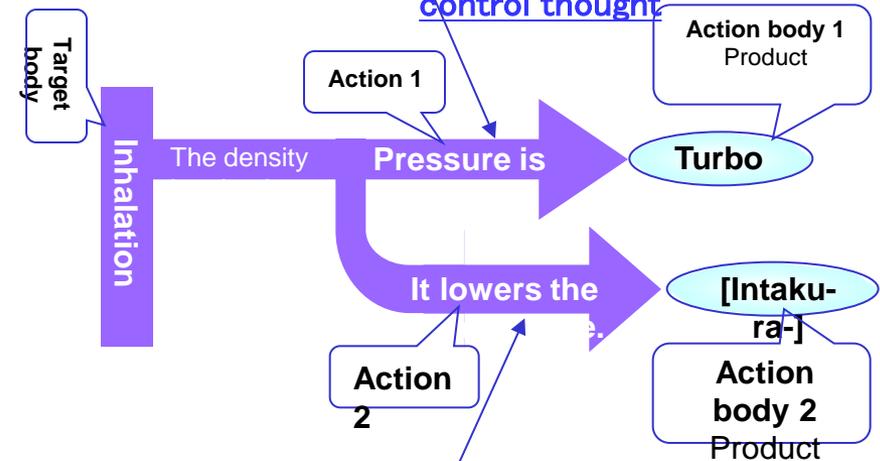
Selection

It restructures by material - place analysis aspect.

Genealogy chart of material-place analysis aspect



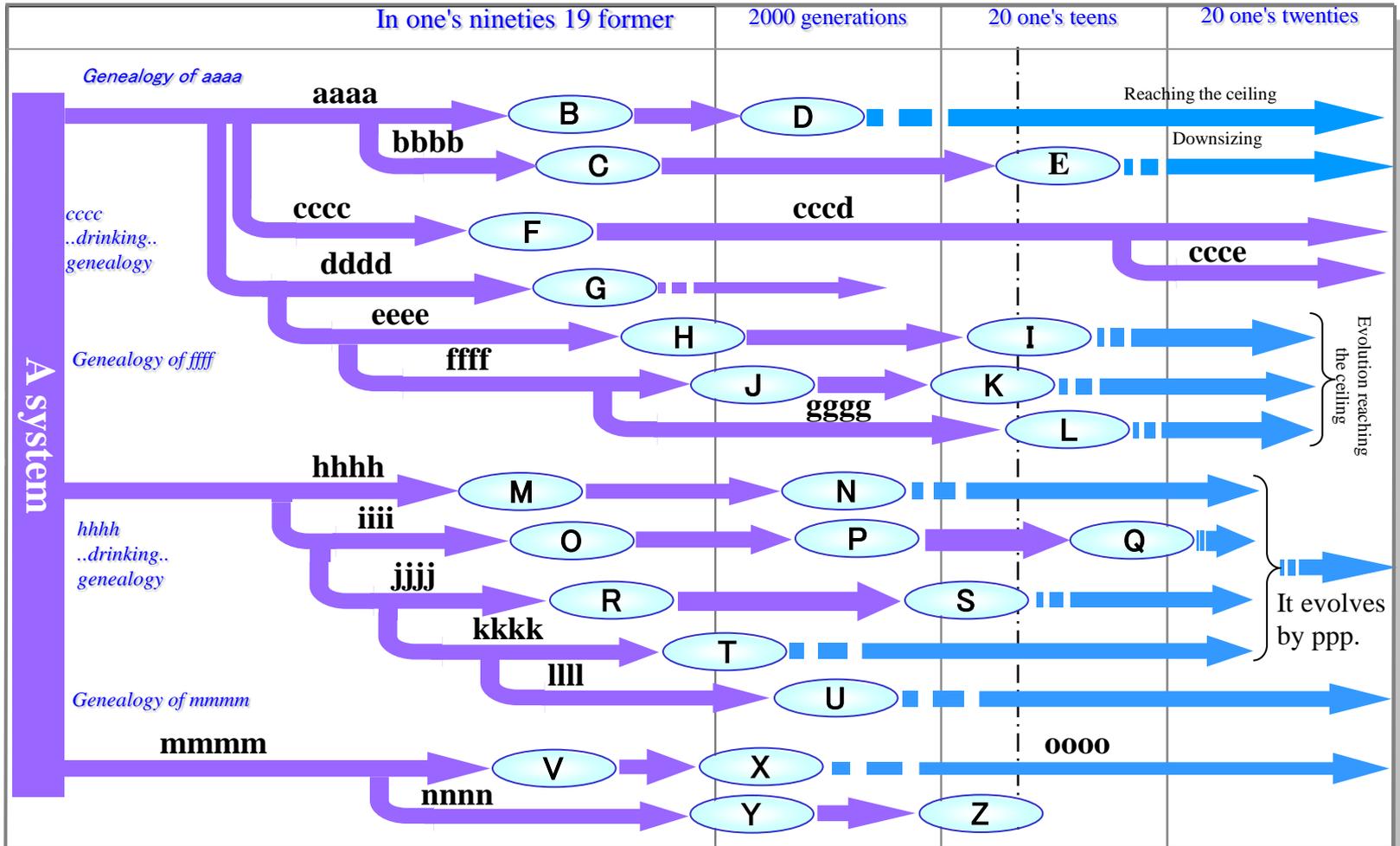
Genealogy of pressure control thought



Genealogy of temperature control thought

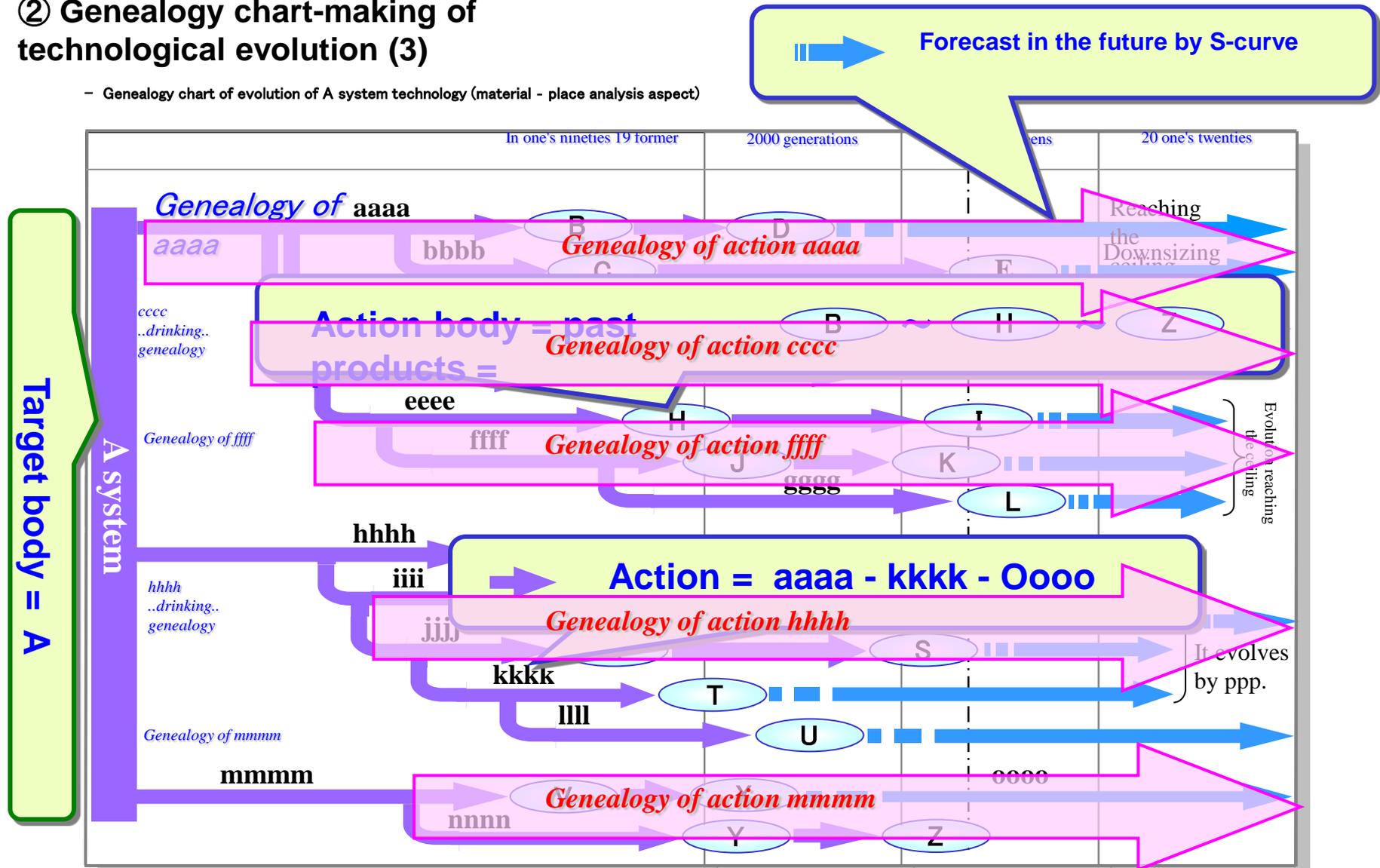
## ② Genealogy chart-making of technological evolution (2)

- Genealogy chart of evolution of A system technology (material - place analysis aspect)

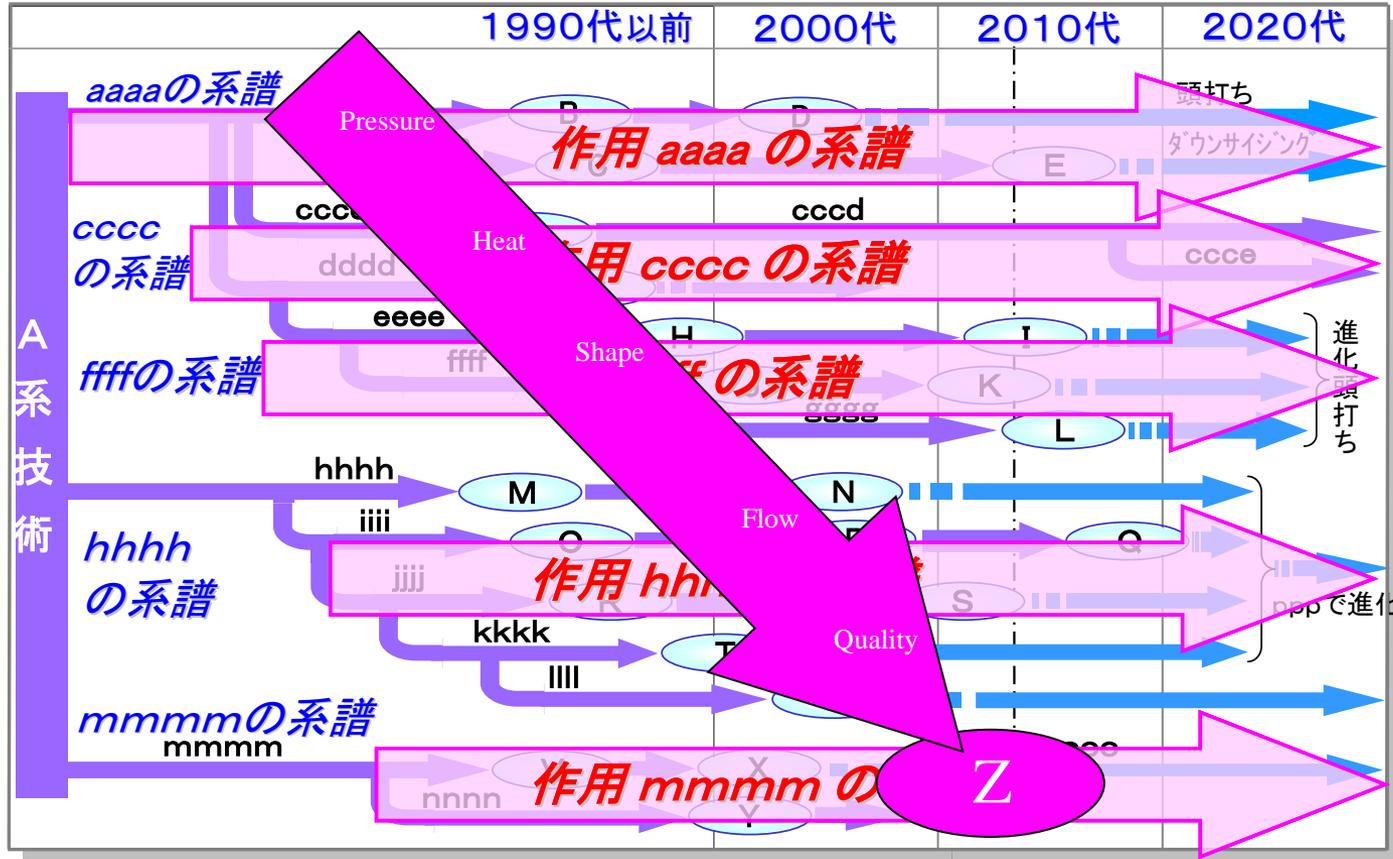


## ② Genealogy chart-making of technological evolution (3)

- Genealogy chart of evolution of A system technology (material - place analysis aspect)



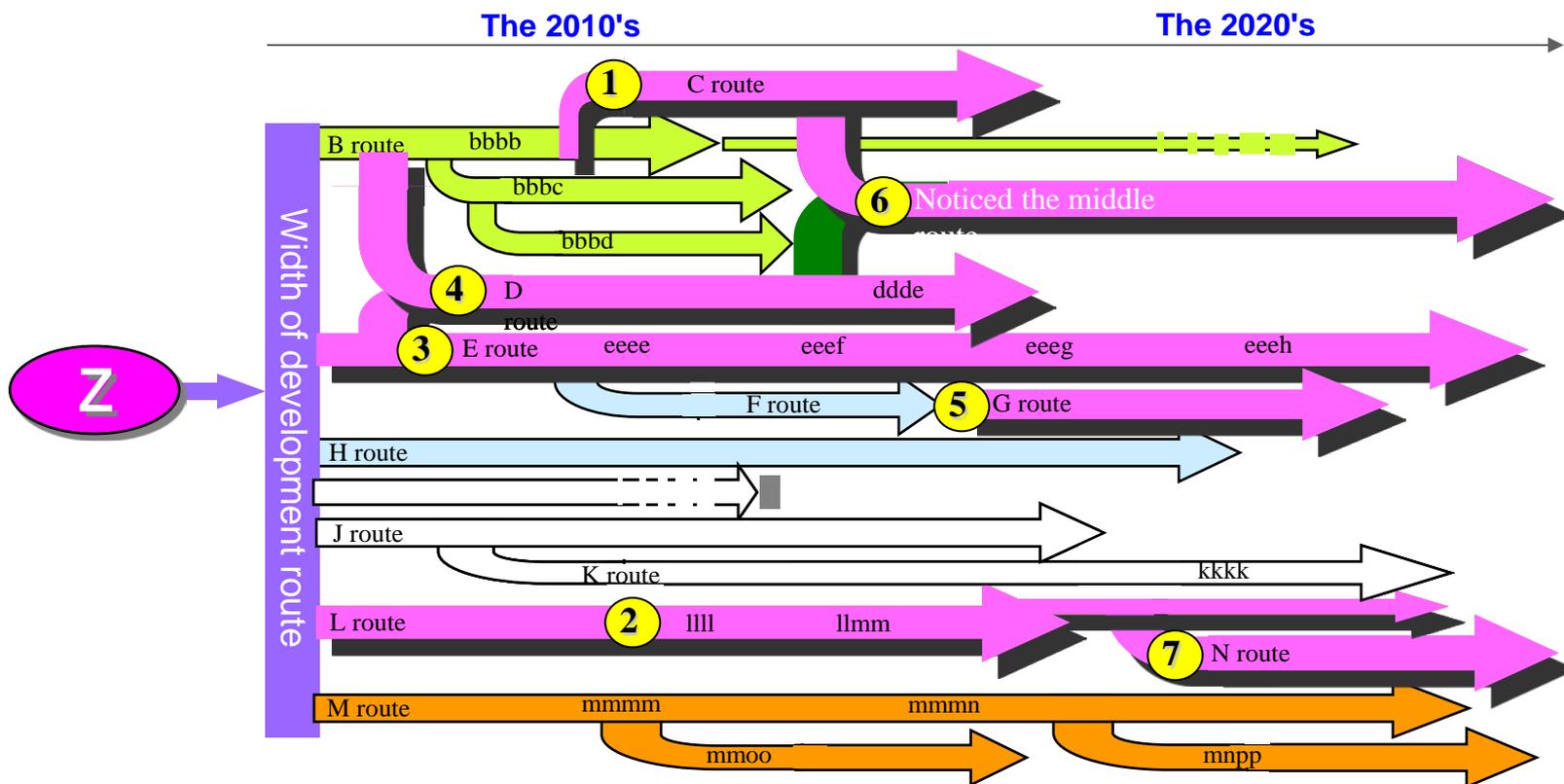
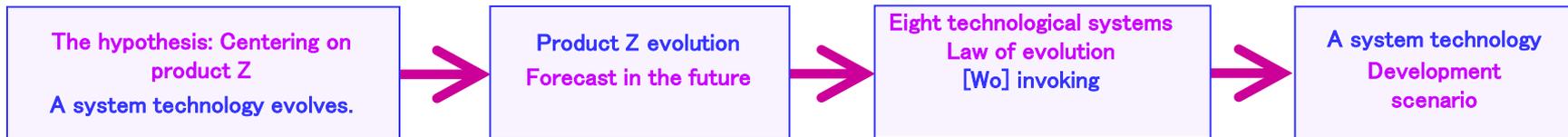
③ It is a hypothesis of overhead view of the lineage tree



The hypothesis: A system technology is history of evolution that starts controlling the attribute of A like pressure and the temperature, etc.

It entered the trend that started making Z that appeared in recent years [\*\*ya] and controlling the quality of A.

# ④ Forecast and development scenario in the future



## ⑤ Result

The development scenario of a technological base that unified the rationality and consent and had it was able to be planned.

User satisfaction rating: \*

 Forecast in the future based on to accumulation of rationality = technology

 Genealogy chart of technological evolution

 Hypothesis setting up

 Forecast in the future

 Look down upon the evolution of the technical field.

 Clear viewpoint that will be forecast in the future

 It searches for the necessity by the evolution pressure.

 Development scenario that clarifies consent = strategy

 Selection of clear development route

 Clear new product rollout time

 The development route not selected either clarifies.

 The turning point of evolution is paid to attention.

 The utility of the combination of the strategy theory tool and the TRIZ tool was able to be shown.

 Genealogy chart of technological evolution

 Development scenario

 Place material - analysis (relief in genealogy)

 Law of eight technological system evolution

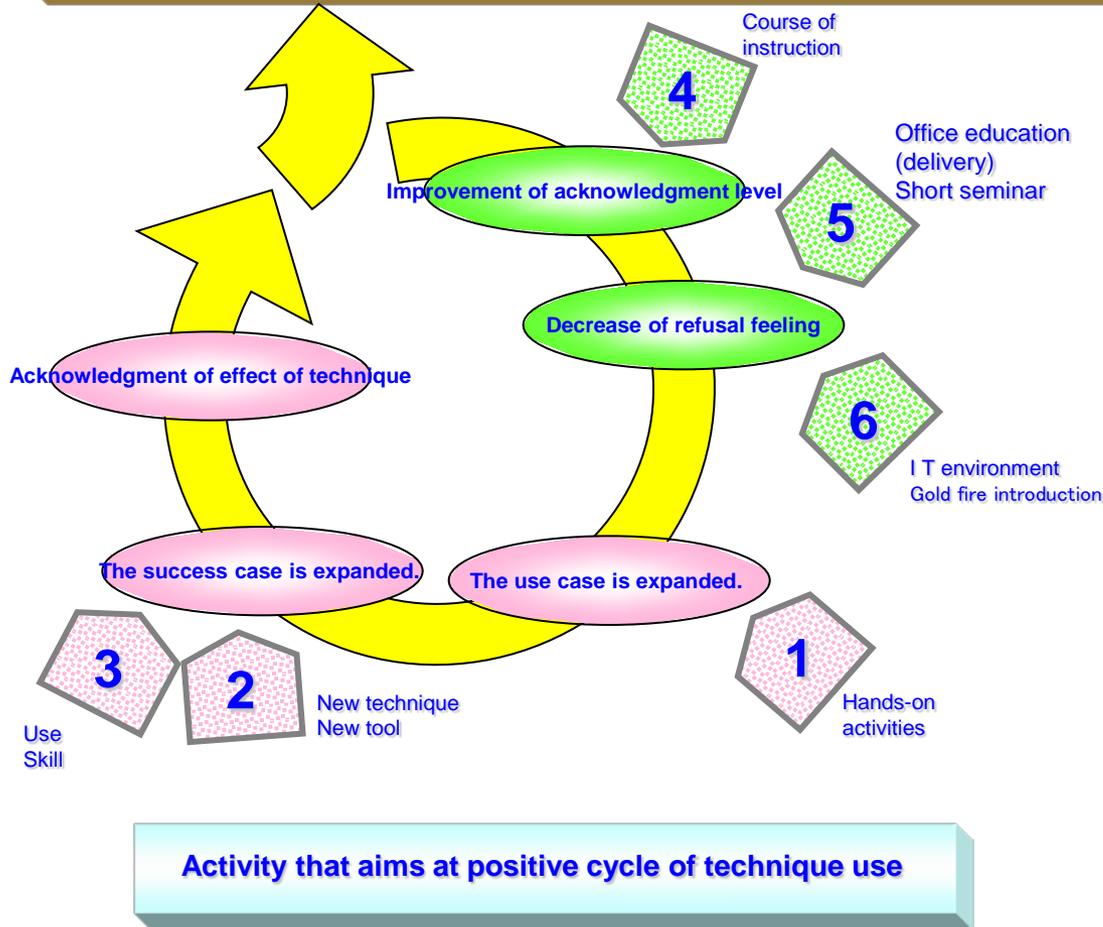
## ① Turning around and problem from four points in TRIZ promotion

	Introduction	Application	Applied	The future
① Promotion policy	Do not miss the bus. TRIZ is learnt. Workshop	TRIZ is developed. It acquires it by practice. Time crunch	The solution is offered. It acquires it by practice. Improvement of satisfaction rating	Solution
② User	TRIZ is understood enough. Prior seat study the third Half of nomination + applicants	Even if it doesn't know TRIZ, it is acceptable. Prior seat study none Only the applicant	Even if TRIZ is not done, it is acceptable. The introductory chapter the first is recommended. Only the applicant	Enhancement of course of instruction independently mastered
③ Consulting	Consultant outside the company It teaches.	In-house propeller It initiates it.	In-house propeller It accompanies.	An in-house propeller proposes technique/tool.
④ Tool	Invention principle- ARIZ Fixed form process	Fixed form TRIZ tool Fixed form process	The number of TRIZ tools that can be used is increased. It combines with another technique.	The range of technique/tool is expanded more.

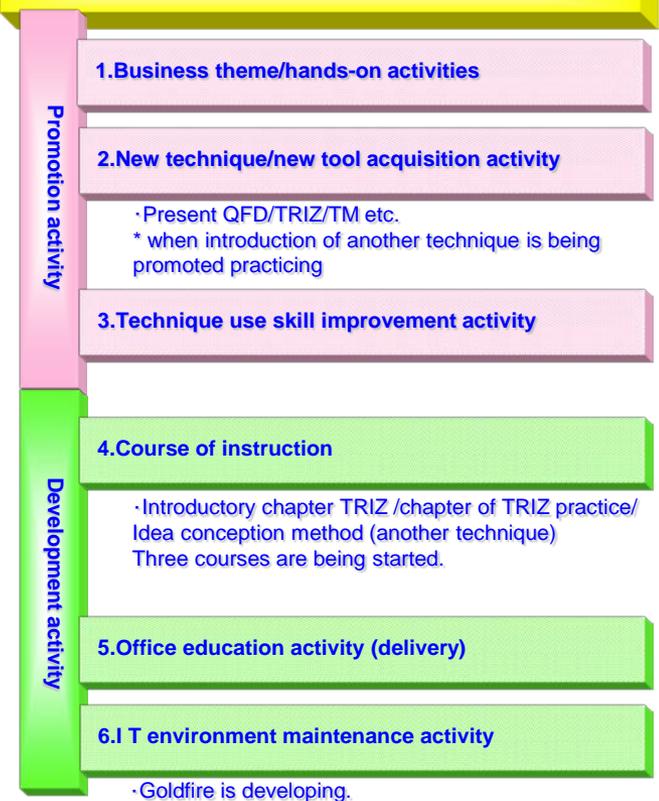
The repetition of "Practice" (accumulation of a success and a failure small for bottom-up and a short time) is one shape of TRIZ promotion (independent use example in the office and increase of the number of applicants of an educational attending a lecture).

## ② Present promotion activity

Shorten of solution/development period/new product development/patent strengthening/creativity improvement



### Technique ( TRIZ ) promotion



\*It depends on the cooperation of the idea lord Ltd..

### ③ Summary

1. There can variously be method of ..TRIZ.. promoting in-house.  
Running promotion is the one shape as for practice.

(Practice: First of all, TRIZ is applied to actual subject.  
A small success and the failure are piled and it learns.  
It gropes for a new approach and the tool. )

2. The purpose of in-house promotion is a solution from the development of TRIZ.

3. It deals with various problems for the solution.

Various approaches and tools are necessary.

The combination to which not only TRIZ but also  
another technique is taken is effective.

- Practice and the education are both circles of the car. It is in-house propeller's role to offer both chances.
- It is necessary to establish the effect and the evaluation method of the TRIZ use told by the third party.

***DENSO***

Thank you for your attention