Approach to TRIZ introduction at JNC Ltd.

The 9th Japan TRIZ Symposium in 2013
2013/9/6

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JNC Ltd.

JNC Company

Outline of company

Trade name: JNC Ltd.
Establishment: January 12, 1906
Establishment: January 12, 2011
The capital: 31.15 billion yen
Number of employees: 3,303 people (connection)
Holding company: Chisso Corporation
Headquarters: 〒100-8105
Tokyo Chiyoda Ward Marunouchi 2-2-1 New Ohtemachi Bldg 9F

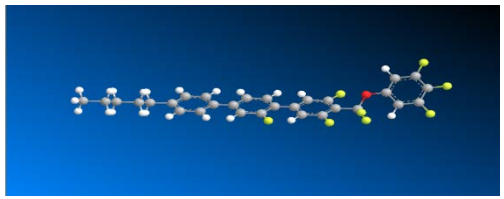
Sales in fiscal year 2012: 200.4 billion yen

Business outline "Chemistry" is sold, and the product that includes many things as a key word is manufactured and sold.

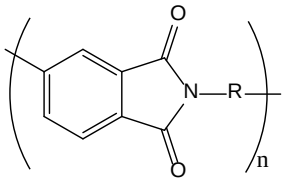
Meaning of the logo mark

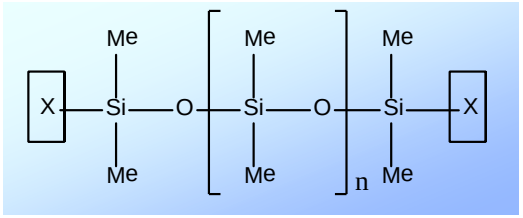
Three Core Technical Competencies

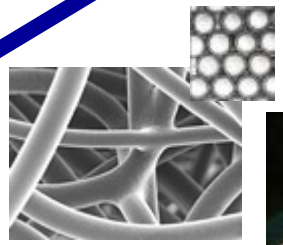
Discrete Organic Molecules



Polymers and Silicones

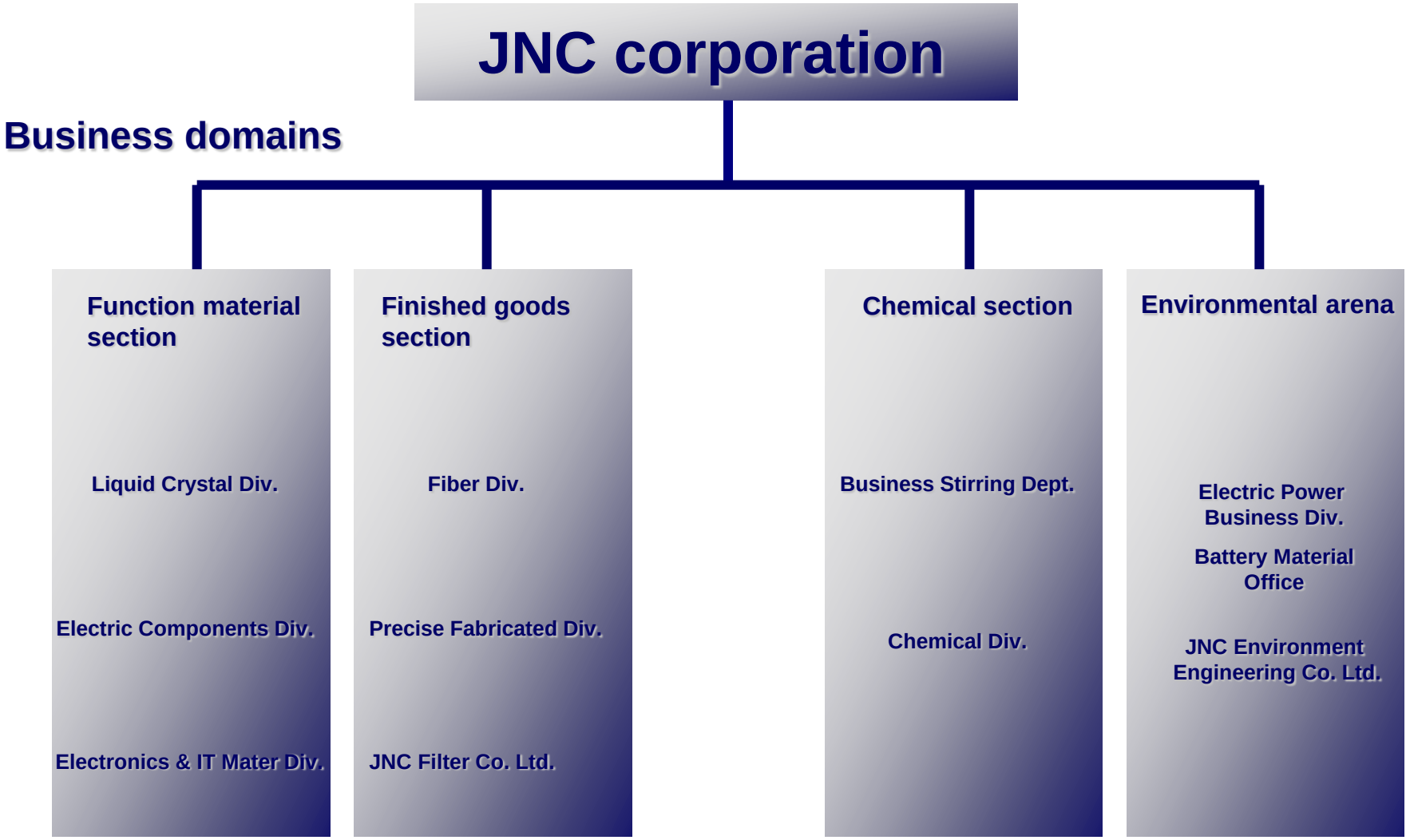






Polymer Handling and Application Technology

Business Segments



Outline 1 of business

Function material field

Liquid crystal composition

Thin film material
Film for liquid crystal distribution
Greatcoat

Electronic parts
LSI mounting

Organic EL material
Electronic transportation material
Hole transportation material
Luminescence material and others

Electronic information material
IJ sensitized material
IJ insulating material
Transparent [michibiden] ink
Functionality thin film

Finished goods field

Plastic product
Glass fiber strengthening PP
Polypropylene
Polyethylene

Textile goods
Unwoven cloth and composite fiber
Filter

Precise finished goods
Precise coating film
LiB separator

Outline 2 of business

Chemical field

Alcohol and solvent
Alcohol
Aldehydes
Ketones
Fatty acid and esters

Silicon compound
Organic silicon
Reactiveness silicon
Three chloridization silicon
Silicon tetrachloride

Life Chemical
Animal diagnosis medicine
Spheroidal cellulose
Fish origin collagen
Hyaluronic acid

Life Chemical
Synthetic collagen
Luminescence protein
Luminescence base material

Fertilizer
High-complex fertilizer
Coated fertilizer
Earthing up for gardening

Energy and environmental arena

Waste water treatment
Reactor biotechnology system

Power generation
Water power and thermal power plant

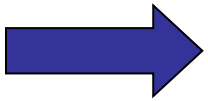
Li ion rechargeable battery
Material in surrounding

http://www.jnc-corp.co.jp/index.html

Research and development policy in fiscal year 2010

- **Review of research and development system**

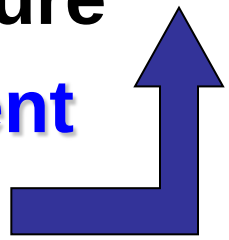
・Cooperation with productive technique



・Competitive edge improvement of productive technique
・New productive technique establishment
・Manufacturing reduction in costs

- **Research and development infrastructure**

・Introduction examination of development supporting tool (TRIZ)



Background of policy

・It is necessary to correspond by the research and development worker and the production technology examination worker to whom a lot of themes were limited.

↓

・The development speed from R&D to production (make to the business) is requested to be accelerated more and more.

↓

・It is necessary to compete with a powerful major competitor in a lot of fields.

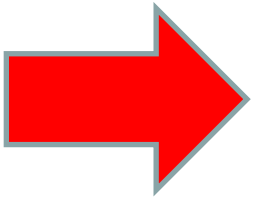
↓

・The competitive edge strengthening and the personnel training are attempted by going ahead of the competitor and taking the new method and the tool.

Problem to be solved

－　－　＊　＊　＊

Then, waste mixes *.



It defective is generated by end-products.

⇒Complaint from customer

The problem along TRIZ

Standpoint of TRIZ

"The innovation is caused by needs. "

What are needs to the current state?

①It doesn't function preferable and profitably.

②A preferable, profitable function is insufficient.

③There is an adverse effect that accepts.

The problem along TRIZ

There is an ideal solution

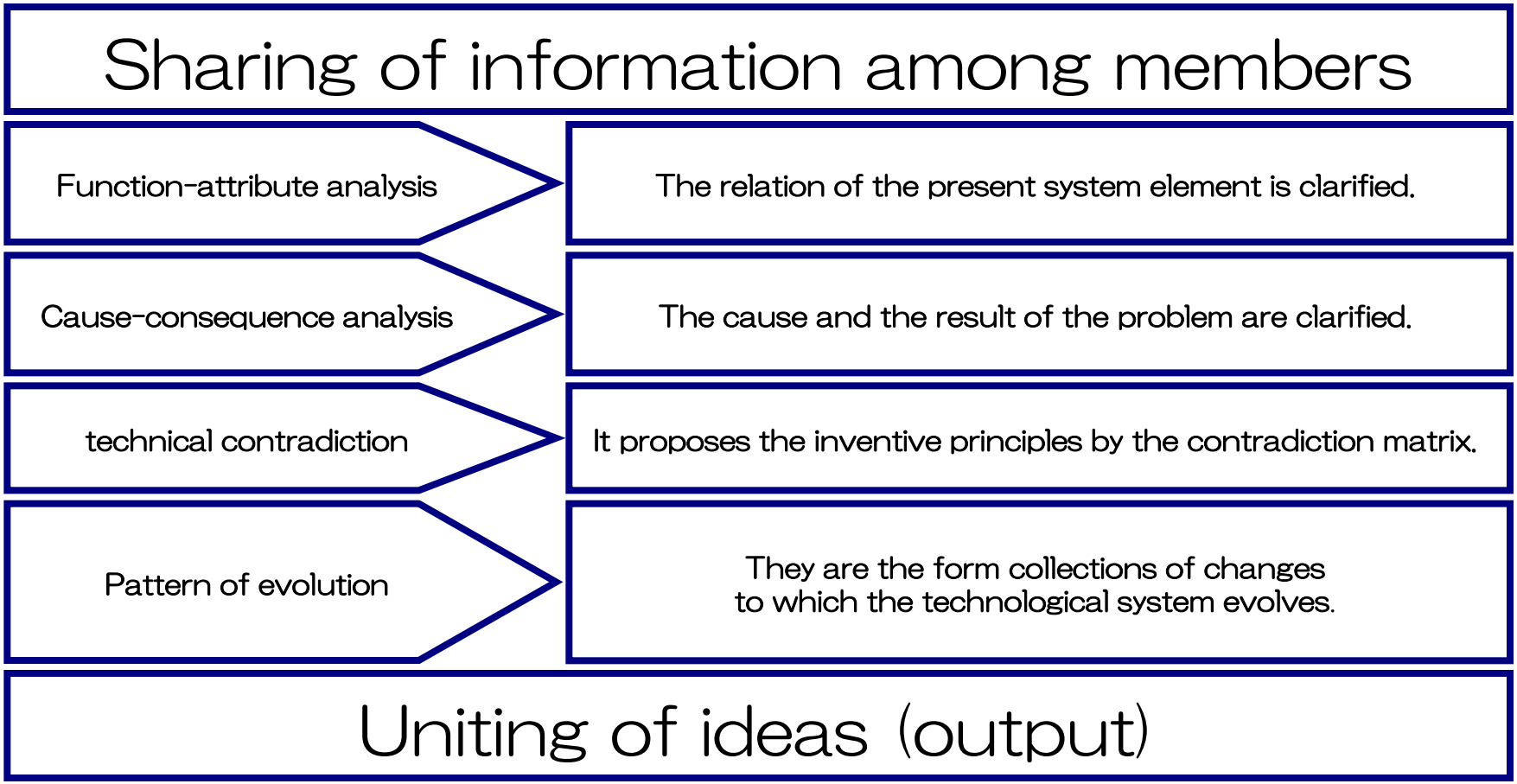
②A preferable, profitable function is insufficient.

- - * * is insufficient.

③There is an adverse effect that accepts.

- A large amount for - and a long time * *

Used TRIZ tools



Member composition

- One manager of headquarters R&D
- Researcher of another laboratory (different field) One person
- Researcher of Minamata laboratory (outside charge) Three people
- Two charge researchers
- One charge site manager

Sharing of information among members

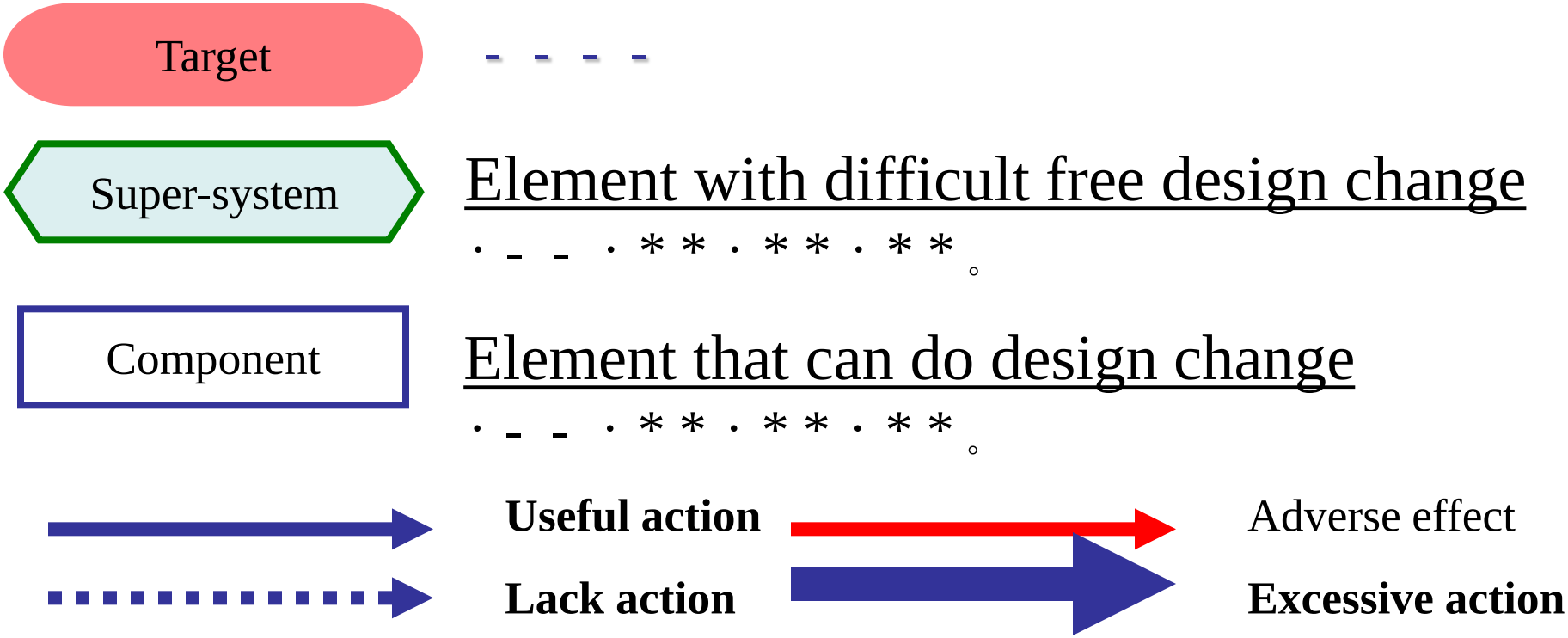
Brainstorming along technique of TRIZ
The output is tag paper.

- Function-attribute analysis
- Cause-consequence analysis
- technical contradiction
- Pattern of evolution

Belonging someone else method

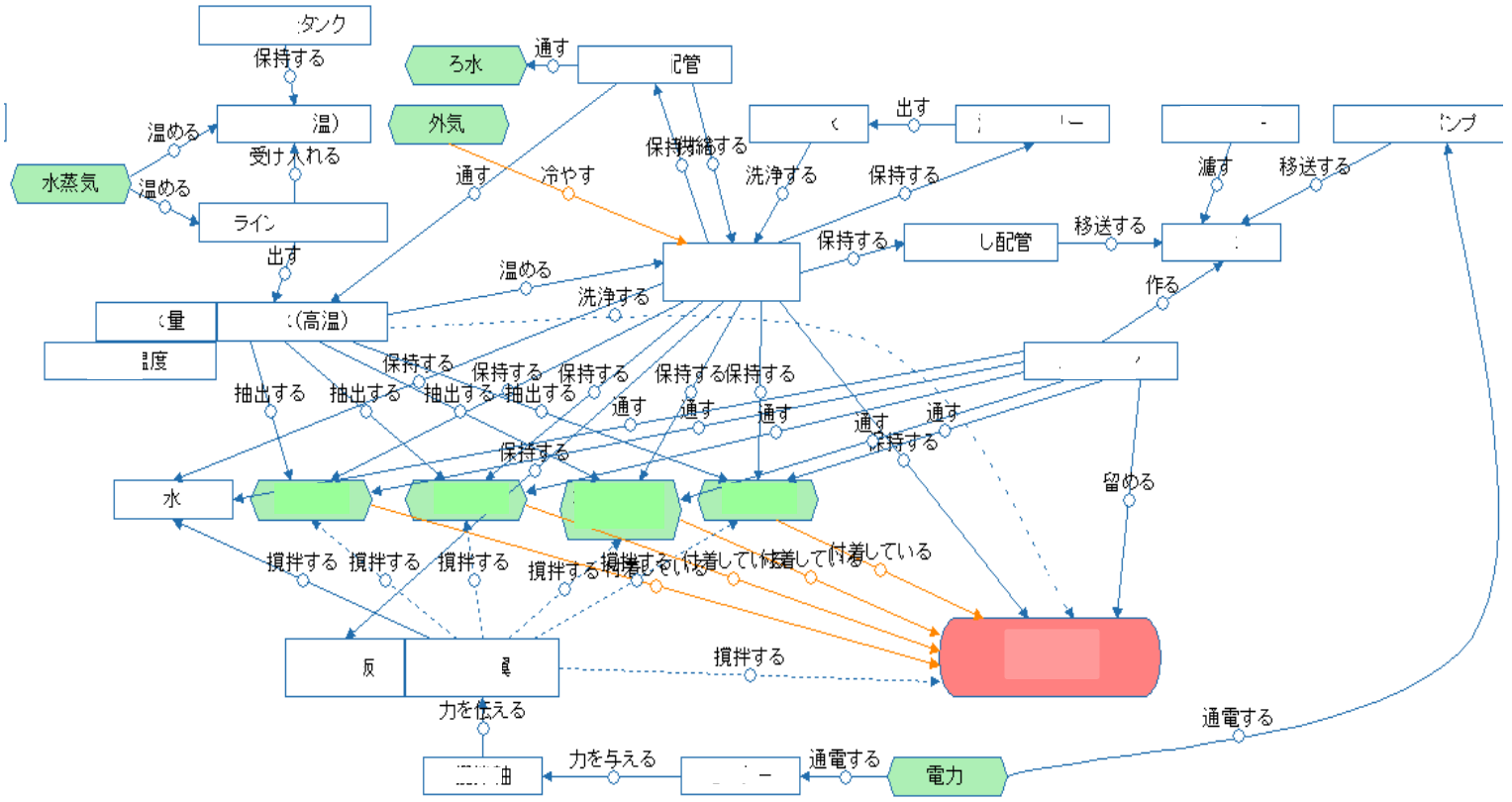
Function-attribute analysis → The relation of the present system element is clarified.

The relation of each element is clarified by the drawing.



Function-attribute analysis

The relation of the present system element is clarified.



Cause-Effect analysis

The cause and the result of the problem are clarified.

The relation of the cause result is drawn.

Unwanted consequence

Writing of factor

Cause

I want to embarrass, and to solve it.

・- * * * cannot be done.

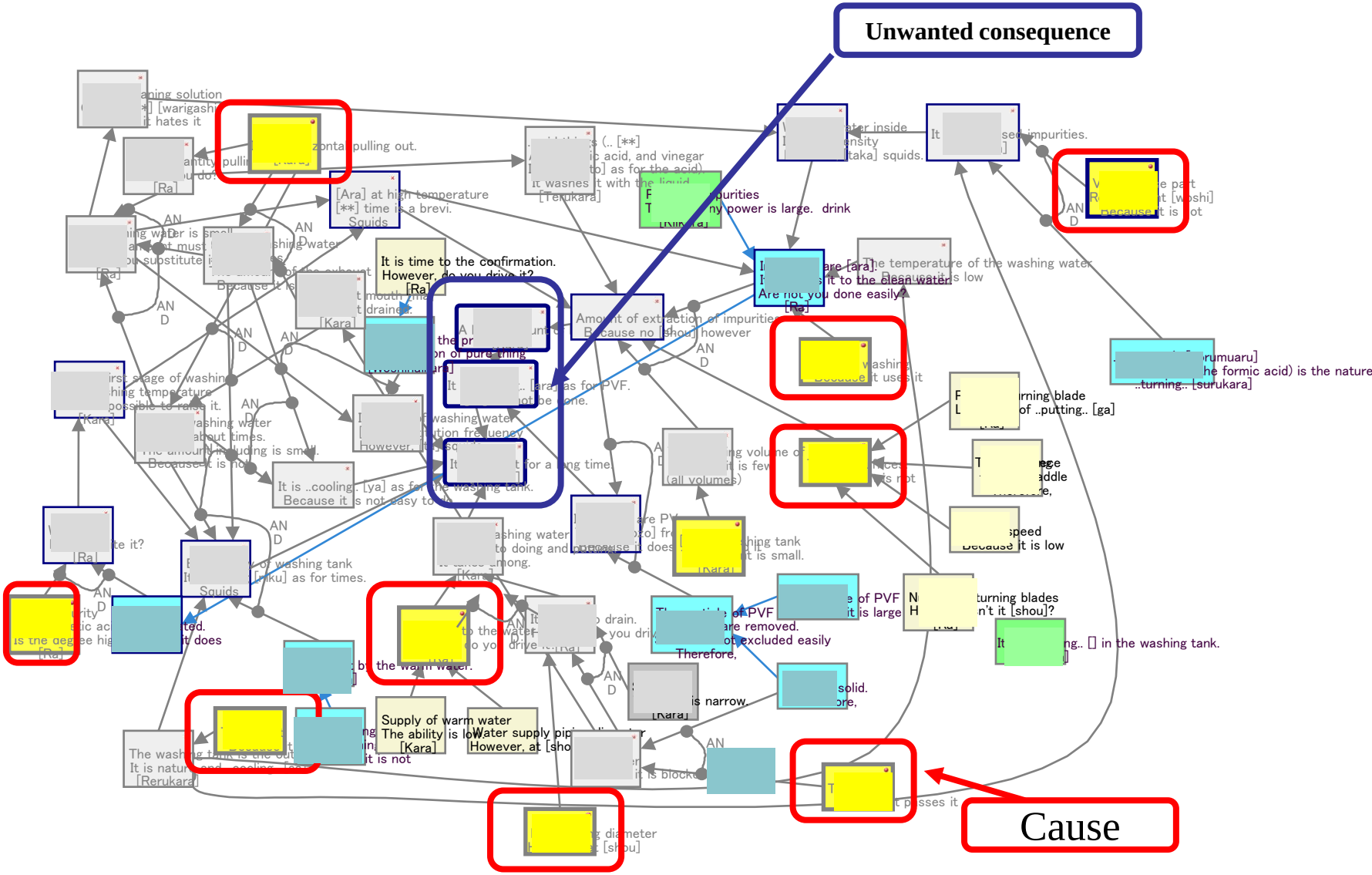
・A large amount of * *.

・- - - - 。

Problem with high ameliorating effect

Cause-Effect analysis

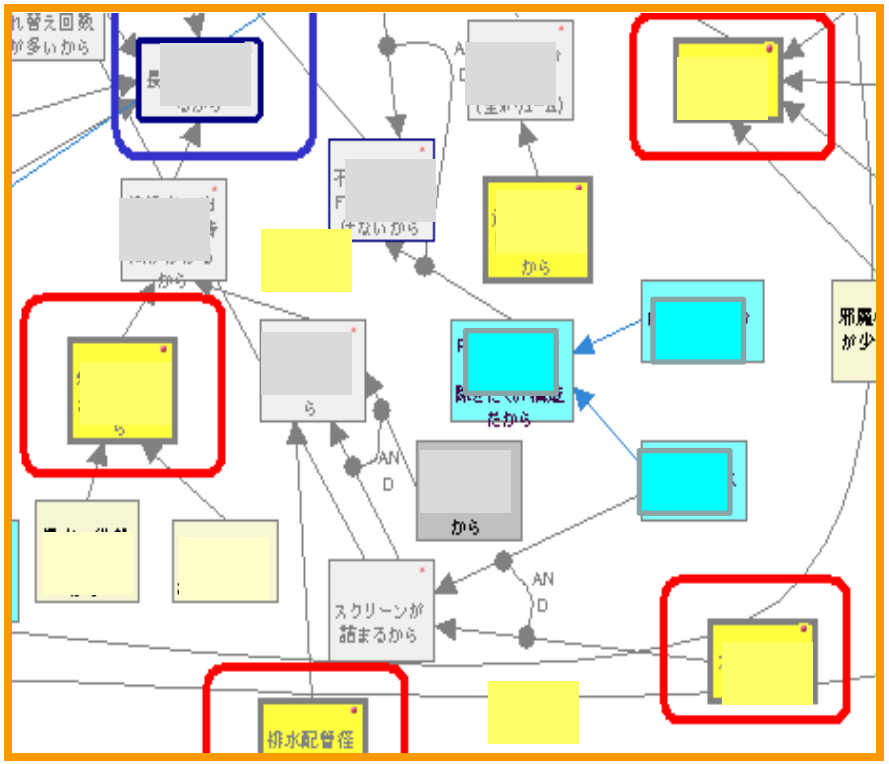
The cause and the result of the problem are clarified.



Cause-Effect analysis

The cause and the result of the problem are clarified.

The cause with high ameliorating effect is clarified.



1. - - * * * Because it is *
2. - - * * * Because it is *
3. - - * * * Because it is *
4. - - * * * Because it is *
5. - - * * * Because it is *
6. - - * * * Because it is *
7. - - * * * Because it is *
8. - - * * * Because it is *
9. - - * * * Because it is *
10. - - * * * Because it is *

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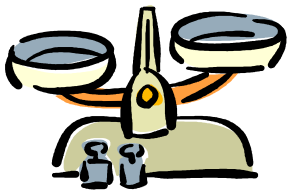
The cause is beaten.

The relation of the trade-off is found.

Deterioration

Improvement



The contradiction matrix proposes the inventive principles.

The idea is shown.

- - * * ..*.. then,

The relation of the trade-off is found.

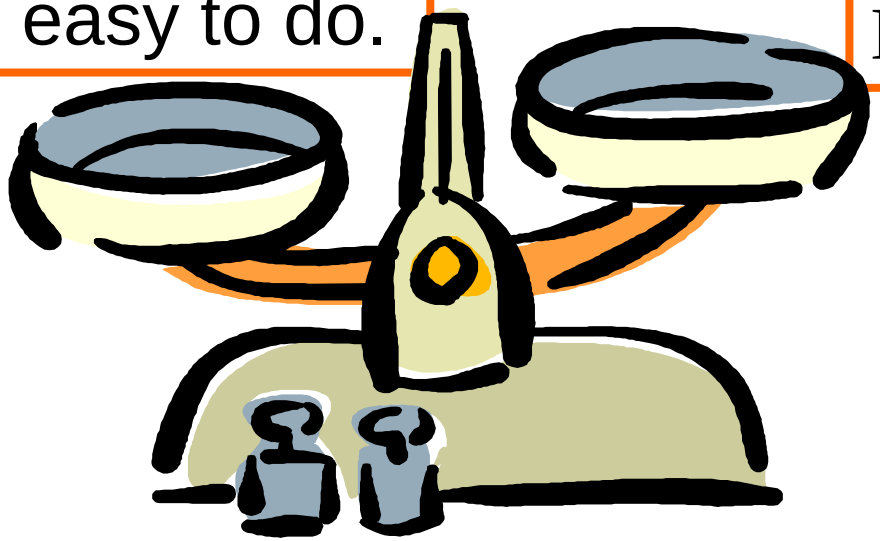
Bad!

- - It is easy to do.

Good!

- - - -

Enough * *



- Rough * * * When you use *

Find the relation of the trade-off

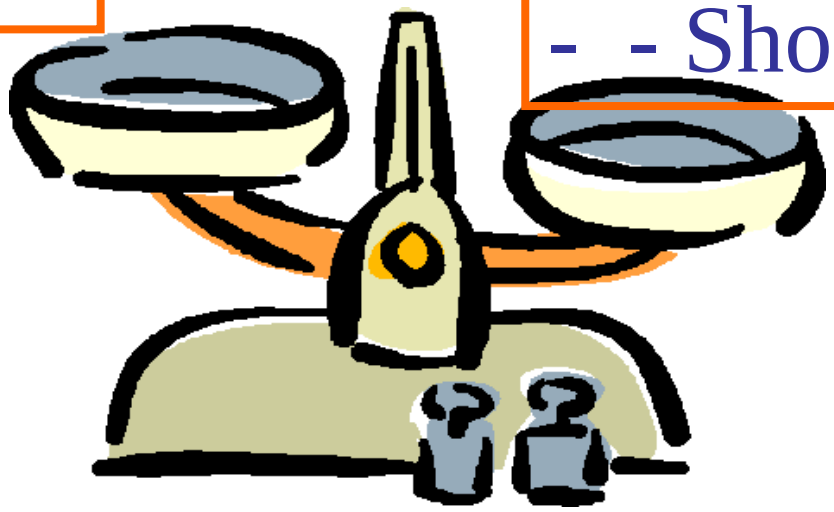
Good!

Bad!

- - -

- - * *

- - Shortage

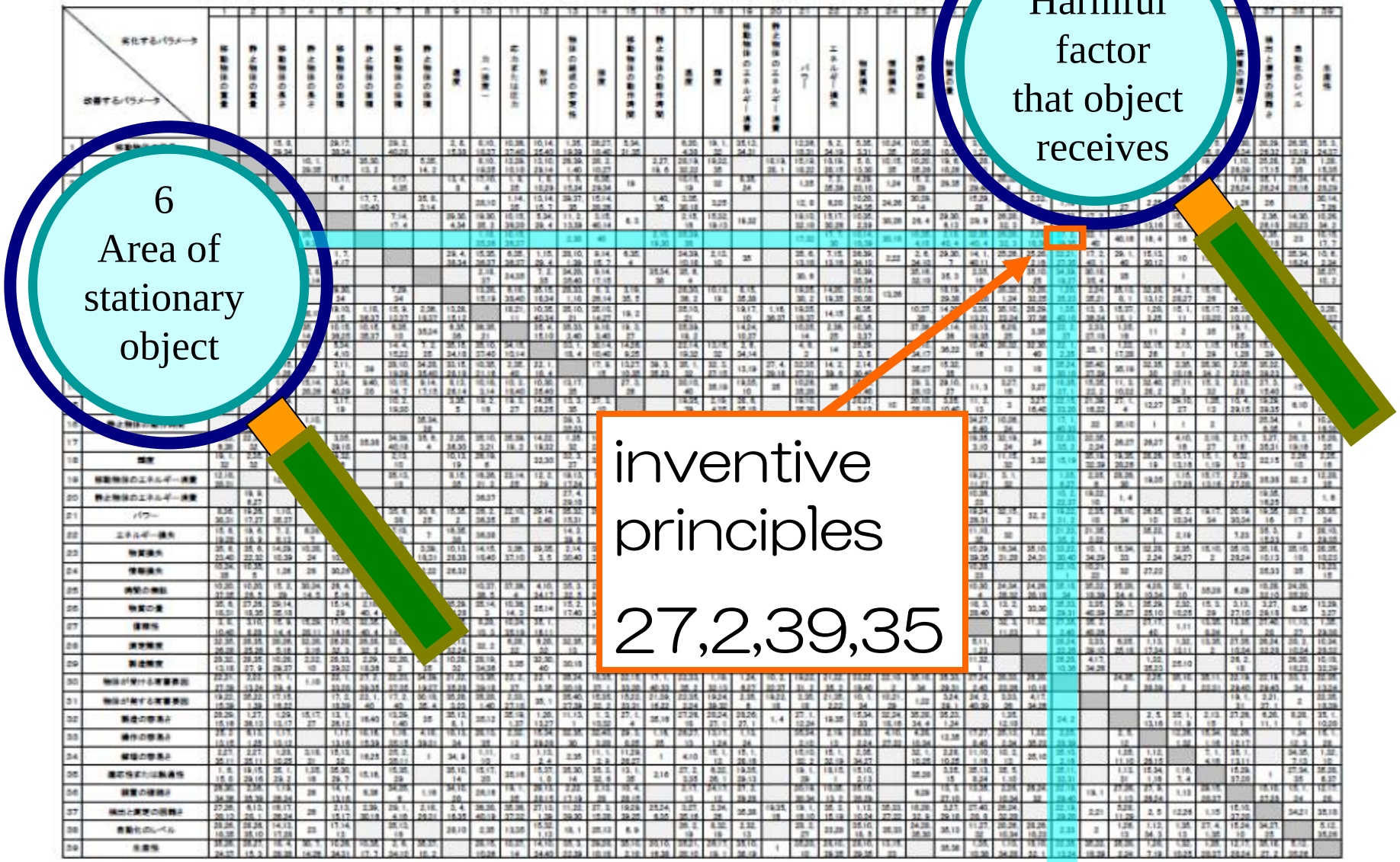


Proposal of inventive principles through the contradiction matrix

Cause 1. - * * * Because it is *

	It is done that it is deteriorated in point :******.		
Improvement - - - - - **is used.**		30. Harmful factor that object receives	25. Uselessness at time
	6. Area of stationary object	inventive principles 27,2,39,35	inventive principles 10,35,4, 18
	12. Shape	inventive principles 22,1,2,35	inventive principles 14,10,34, 17

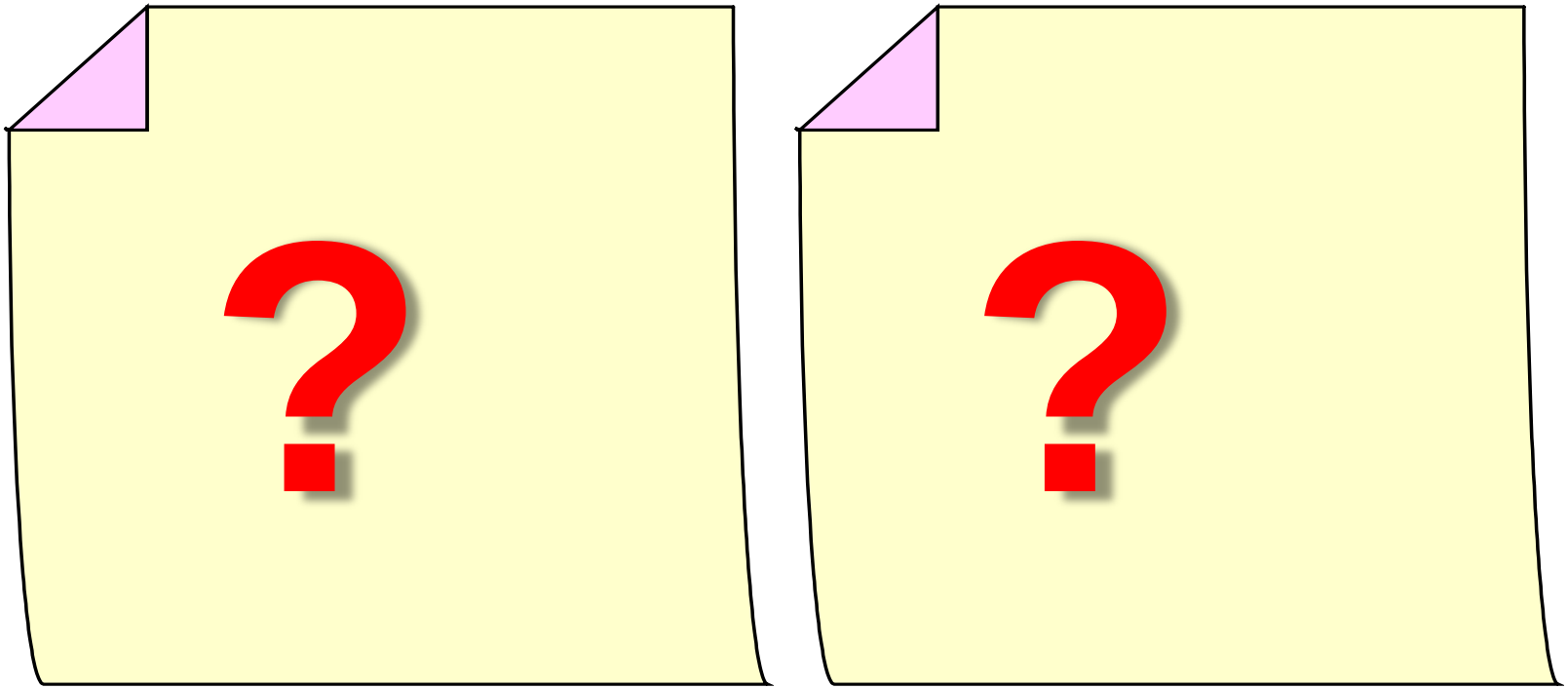
Proposal of inventive principles through the contradiction matrix



The idea is put out referring to the inventive principles

27. Principle of short longevity that is cheaper than expensive long life

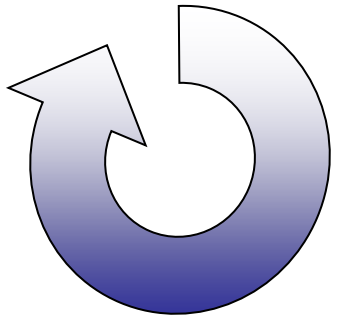
- - * Even if * is used, it is * * * The idea that is not *.



The relation of the trade-off is found

Proposal of inventive principles

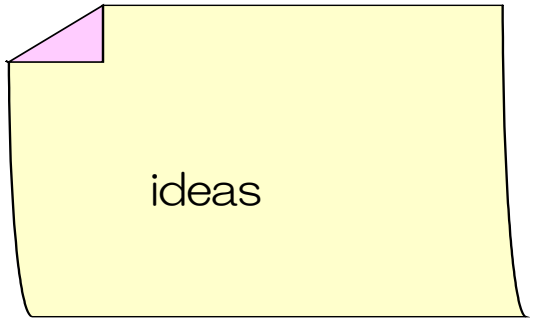
Idea generation



repeating single-mindedly

The idea can be shown covering it.

Pivotal question × inventive principles × ideas

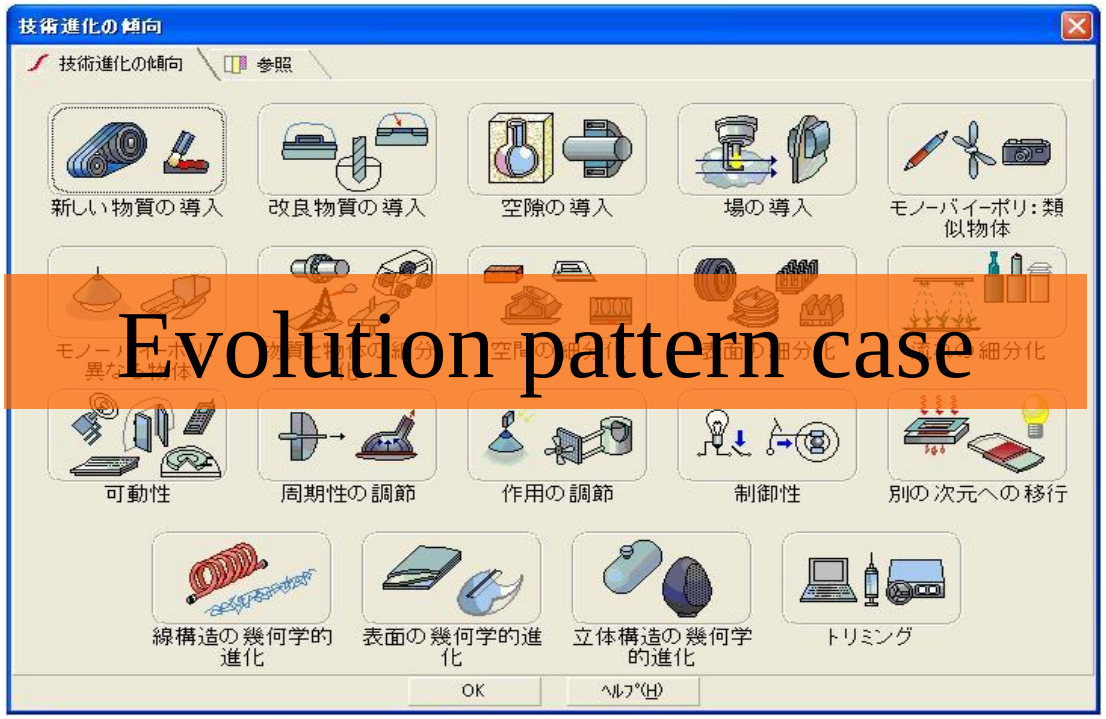


＊ items × ＊−＊ items × ＊−＊ items = ＊＊＊ items

Evolution Pattern

Form collections of changes to which a technical system evolves

The idea is shown referring to the evolution pattern.



Evolution pattern case

Cause

- Matter

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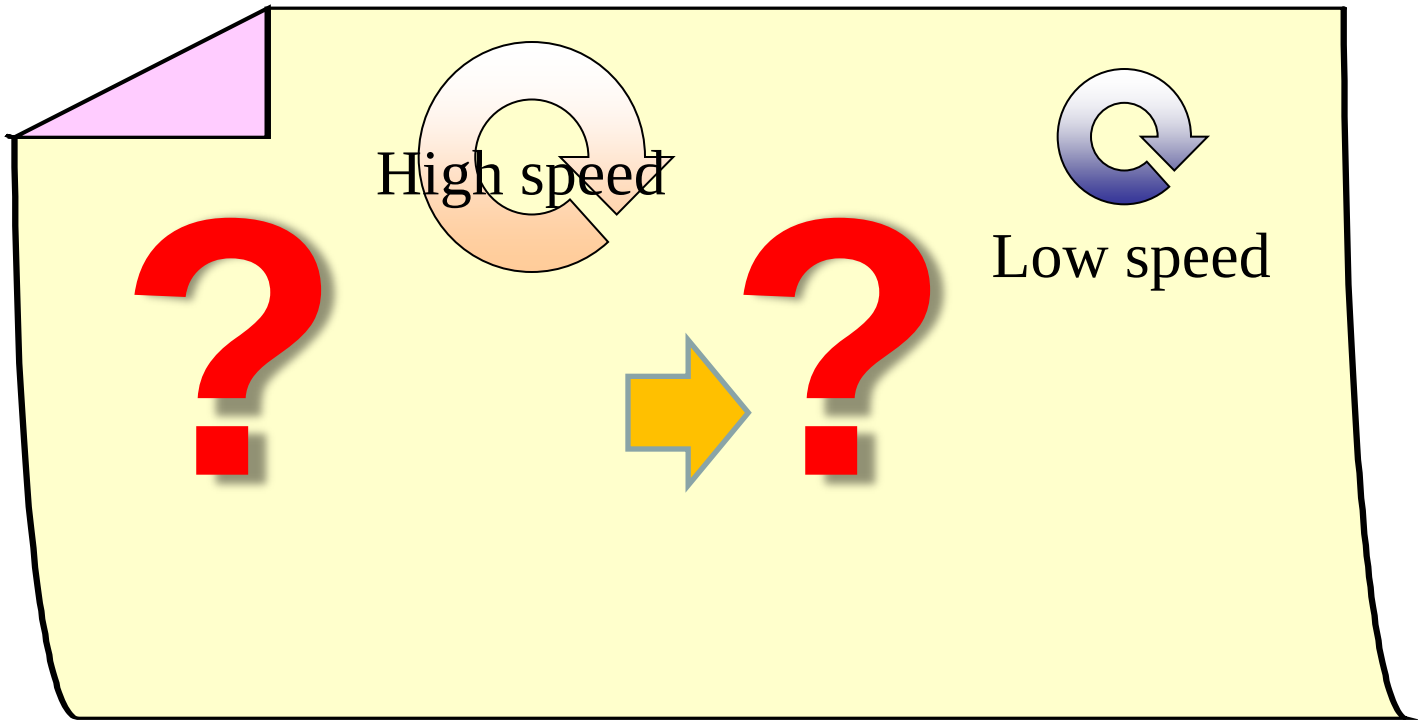
Idea generation from evolution pattern

″**** It is insufficient″ is solved.

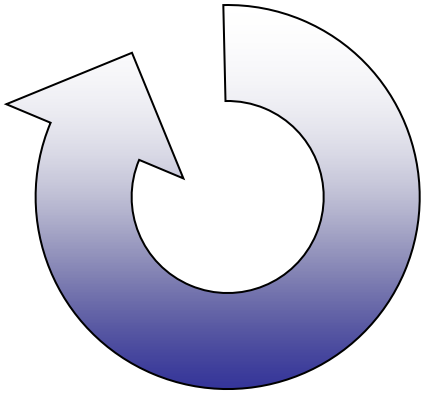
Adjustment evolution of action



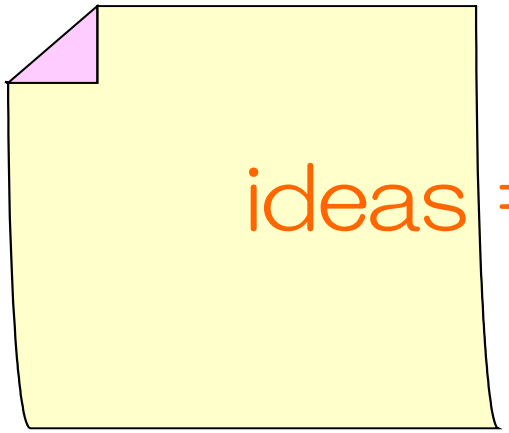
Idea generation from evolution pattern

Good Point!

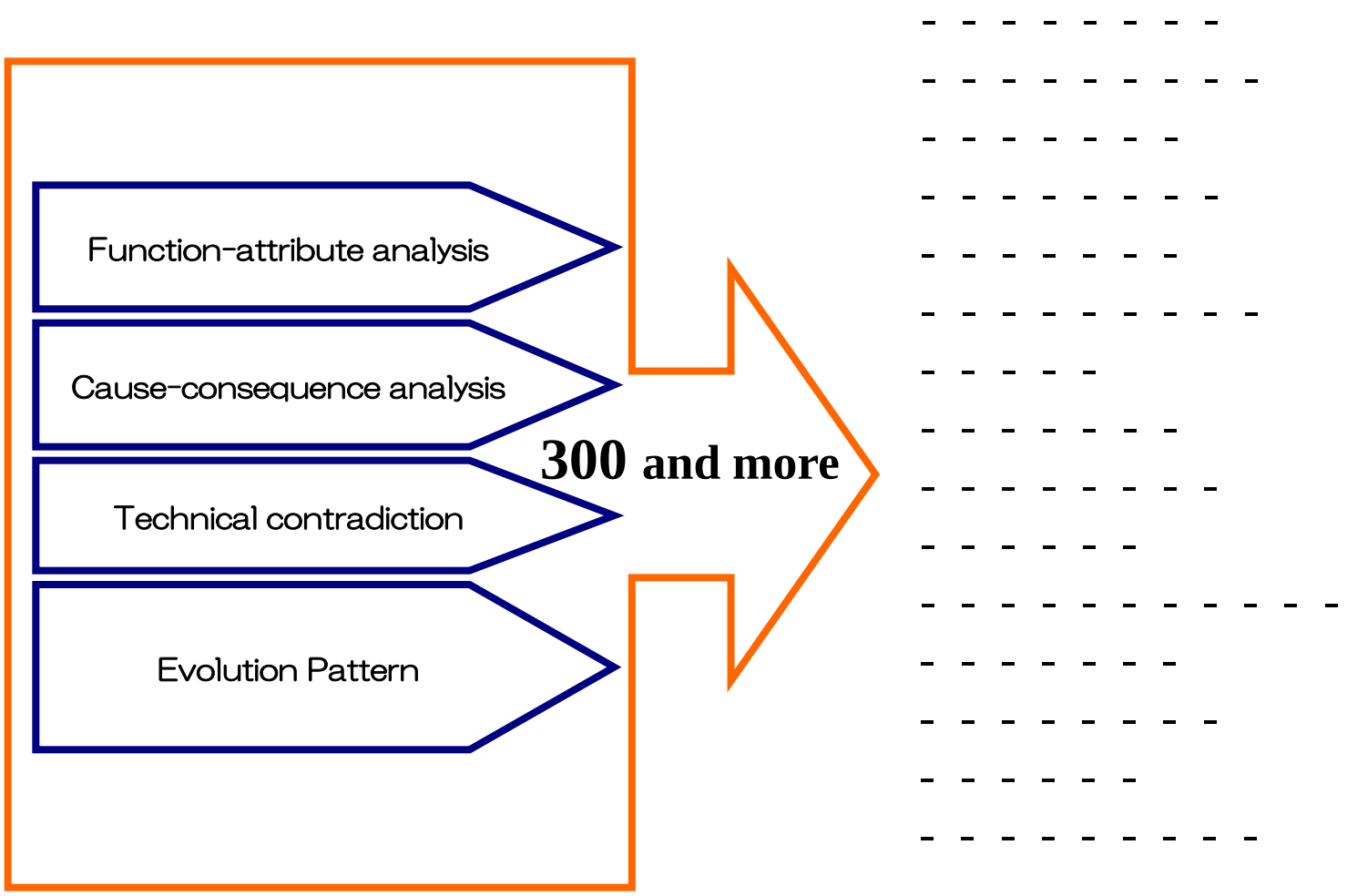
Idea can be exhaustively generated



repeating single-mindedly



Uniting ideas (output)

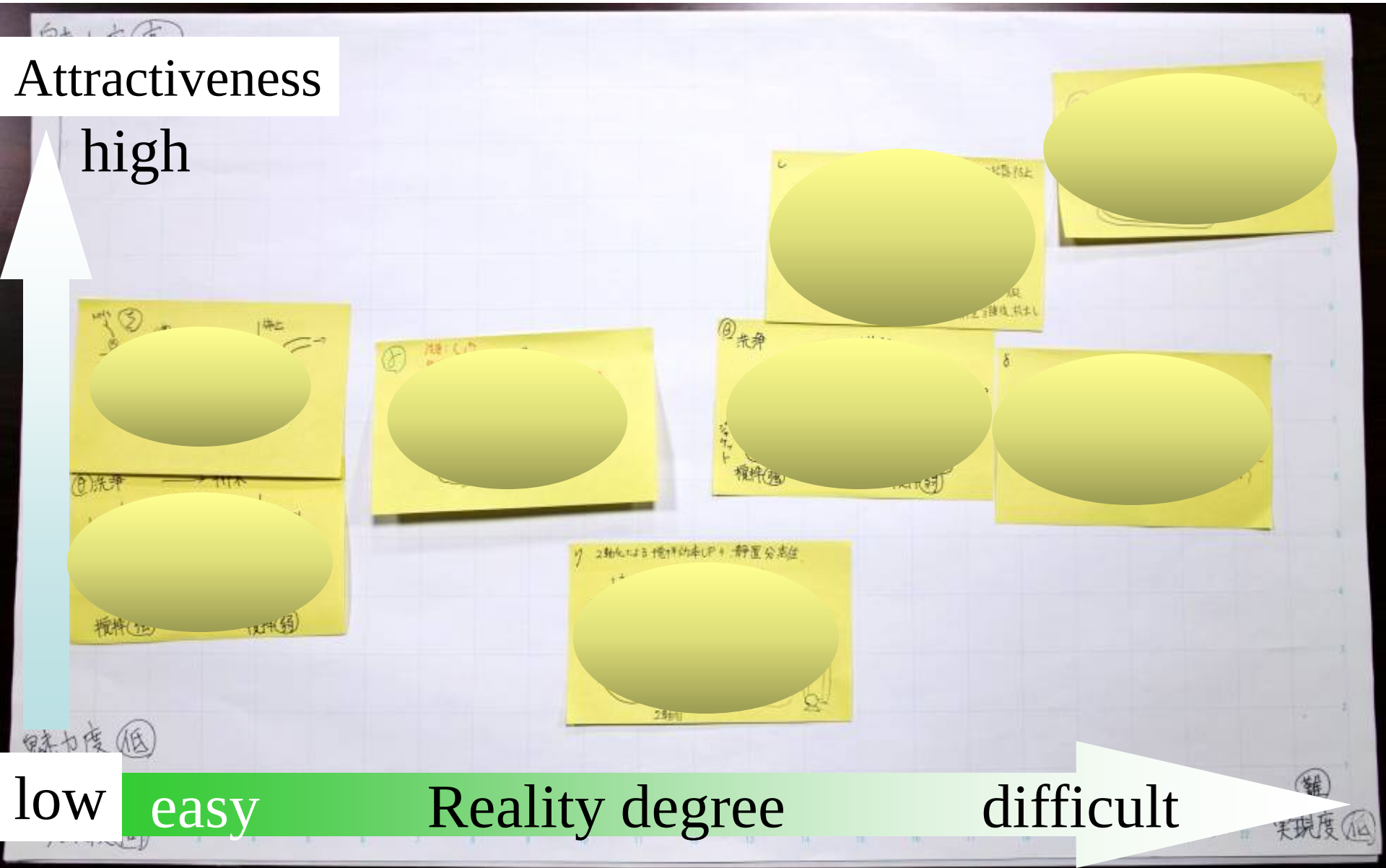


Uniting ideas (output)

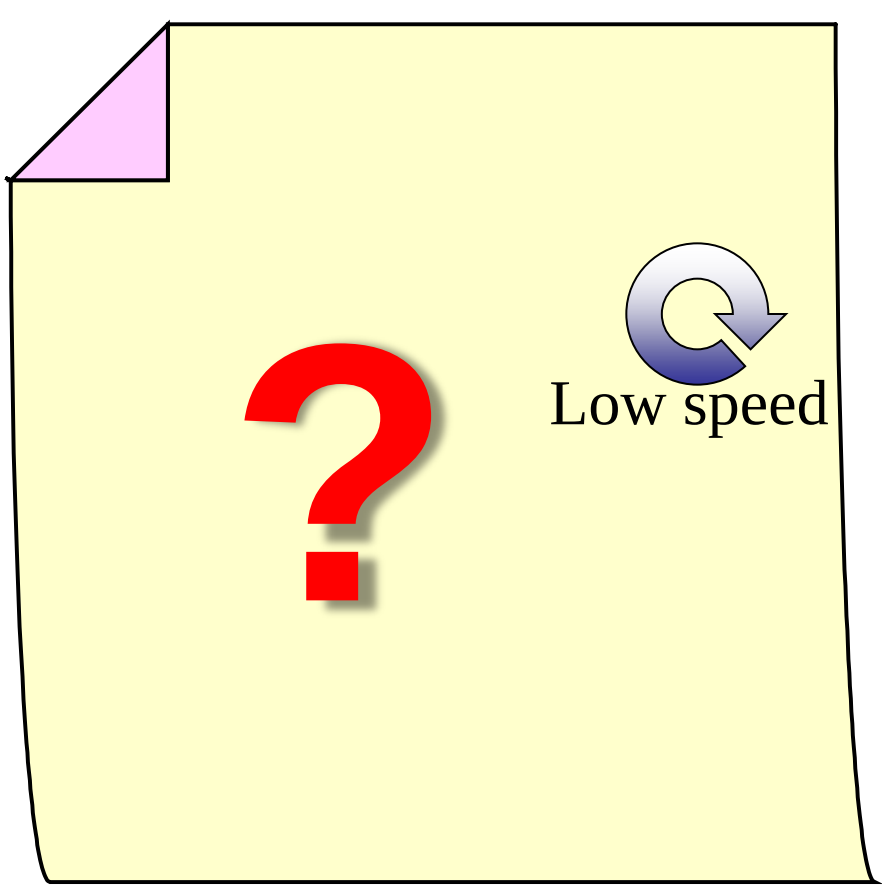
	サブシステムの説明	特性A	特性B	特性	特性C	特性D	特性E	Cost	評価							
現状実力	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]		α	β	γ	δ	η	ι	ξ	θ
A-1-1	[redacted]	S	+	+	S	S	S	-								
A-1-2		S	+	+	S	S	S	-		○	○					
A-1-3		S	+	+	S	S	S	-								
A-2-1		S	+	S	S	S	S	-								
A-2-2		S	-	S	S	S	S	-								
A-2-3		S	+	S	S	S	S	-								
B		+	+	-	+	+	+	+	○							
C-1		+	+	S	+	+	-	-						○		
C-2		+	+	S	+	+	S	-								
D-1-1		+	+	S	+	+	S	-					○			
D-1-2		+	+	S	+	+	S	-						○		
D-2	[redacted]	S	-	+	+	+	+	S		○	○				○	○
E-1-1	[redacted]	+	+	+	+	S	-	-	○							
E-1-2		+	+	-	+	+	-	-								
E-2		+	-	+	-	+	S	-								
E-3		+	-	S	+	+	S	-								
E-4		+	+	S	+	+	S	[redacted]								○
E-5		+	+	S	+	+	S	[redacted]							○	
E-6		S	-	+	+	+	S					○	○	○		
E-7		+	+	-	+	+	-			○						
E-8		+	+	S	+	+	-									
F-1-1		+	+	S	+	+	-				○					
F-1-2		+	+	S	+	+	-									
F-2	[redacted]	+	S	S	S	+	-							○		

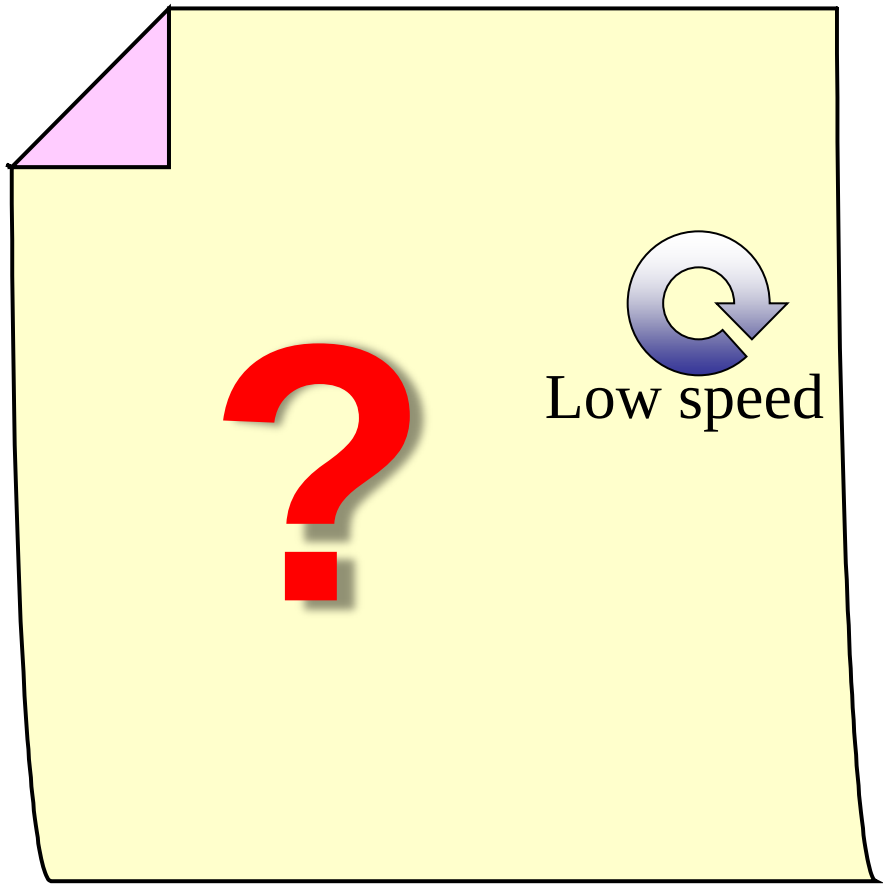
	特性A	特性B	特性	特性C	特性D	特性E	Cost								
	[redacted]														
短期（1～2年）	0	18.75	3	45	173.5	S	0.6							◎	○
中期（3年）	0	12.5	0	30	124	S	0.4		◎	○	△	△			
将来（5年）	0	6.25	0	15	74.5	S	0.2	◎					○		

Integration and evaluation of ideas with high evaluation



Feasible ideas in a short term (1-2 years)





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Having introduced TRIZ

Problem → Labyrinthian problem a little → The conception should leap.

Simplicity

Two or more factors

Solution 1: Prompt decision

・Past experience and finding
・Old-timer's knowledge

The problem is seen.
Immediately, it lights on a solution.

Solution 2: Examination

・Factor analysis
・Finding of another post

Two or more members
Discussion and examination

Solution 3: TRIZ

・It solves it spending time.
・Technology of another industry

Invented conception

< recognition sharing of situation >
・Function attribute analysis
・Factor analysis

<TRIZ>
・Hint of conception by patent analysis
・Invention technology of another field

Having introduced TRIZ

- **The entire problem can be understood because all project members execute the function attribute analysis and the cause result analysis and it share.**
- **The hint from the knowledge base like the inventive principles etc. supports the idea putting out by using Goldfire.**
- **The member's sympathy is obtained for the solution.**
- **The member with a shallow experience is connected bottom-up.**

- **Time (training) is necessary for the technique acquisition. The in-house consultant's (specialist) promotion is preferable.**
- **Results of a machine and an electric electron system device are many. The improvement (read in a different way) matched to the chemistry or more system is being examined.**

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Effect of Goldfire

Innovation support software

"Innovation support environment that puts one's knowledge" is offered, and the process of the innovation is supported.

【 support environment 】
・Problem analysis and conception technique with results (TRIZ)
・Knowledge retrieval function to use huge finding accumulated in in-house and outside the company for problem analysis and search of hint of solution
・Collaboration function to match not only individual power but also power of organization and to solve problem

Effect of Goldfire

- The huge finding (data) accumulated in in-house can be used for the hint of the problem analysis and the solution by using the knowledge retrieval function. The use of the in-house accumulation data to boast of the history for 100 years or more and the survey data that is accumulating recently rapidly is enabled.

- "Knowledge base" can be customized. It can take the existence data base on Web, and keep the open database.

Address of thanks

Idea Ltd.

President Mamoru Zenko
Mr. Hajime Kasai
Mr. Masahiro Kuwahara