Application Area of
Thinking Tool or Problem Solving Tool

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0 . Preface

Different kinds of problems require different thinking tools and different problem solving tools, operating on the object of the process. The extension of TRIZ to non-technical problems makes the identification of the type of problem, the appropriate tools, and the object of the process somewhat more difficult.

Many articles were issued as to non-technical problem solving (such as business problem or management problem). [2]~[6]
In "TRIZ Beyond Technology: The theory and practice of applying TRIZ to non-technical areas" Boris Zlotin, Alla Zusman, Len Kaplan, Svetlana Visnepolschi, Vladimir Proseanic and Sergey Malkin said " Basic TRIZ concepts such as ideality, contradictions and the systems approach are fully applicable to non-technical problems and situations. Analytical tools and psychological operators are directly applicable or can be easily modified to accommodate non-technical applications." [2]
And, in "TRIZ for Non-Technical Problem Solving" Ellen Domb said " Some of the perception that there are two categories of TRIZ, technical and non-technical, depend on the views of the practioners." [6]

But not enough grounds are given to the application area of problem solving tool or thinking tool until now. So I give some basic backgrounds for application area of problem solving tool or thinking tool.

To discuss non-technical problem solving it is necessary to consider not only "system object" which is usually physical entity but also "process object" which is the process as object. Practically thinking tool or problem solving tool has been dealt with "process object" implicitly. So I discuss "system object" and "process object" on equal terms.

1 . Technical system and Institutional system

A creature came into the world as a step of natural history. Next step was the birth of human being.
A creature has generally the ability of recognition from the environment and operation on the outside world. Among other creatures human being is characterized as having the indirect way of recognition and operation via medium. Mankind is the existence that has been accumulating this media. Thus until now we have had the vast accumulated indirect media called "culture" that is born by the technical means or common concept in the area of recognition and operation.

In the area of operation on the outside world "technology" born by the technical means and "institution" born by common concept are made and made use of (Fig.1). [1]

For example an organization of a company which is one of the institutional system is not a physical entity but rather a structure of idea based on common concept of

concerned people. Mrs. A is a CEO essentially because everyone thinks so.
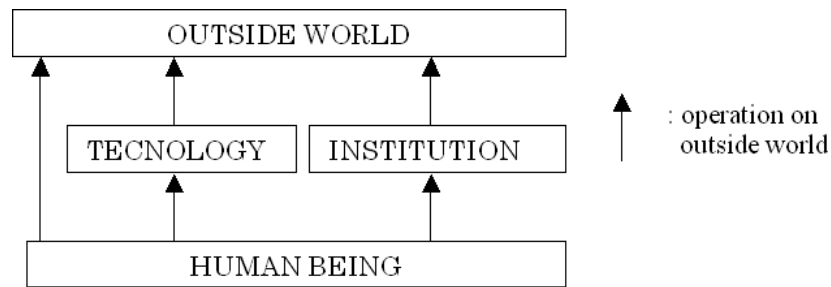

Fig.1 Operation on the Outer World

2．System object and Process object

The first step activity of human being in the history of mankind is taken without any technical means or institutional system. But he or she may have to decide the process that is a series of action in advance.

The second step activity is to make use of existing technical means or institutional system as they are. But he or she may have to decide the use process that is a series of use action beforehand.

The third step of human activity in the history is to decide or change the contents of technical means or institutional system beforehand.

Characterizing the decision making ability of human being is the ability of solving the problem or design which is to decide the image of contents of "object" before their realization in the real world in advance.

Most people tend to grasp "object" as physical entity.　But we must think "object" is everything to be selected and decided to solve a problem or to design something.

Thus we can grasp that "object" is not only "system object" consisting of the element of technical system or institutional system to make but also "process object" consisting of the element of process of system action or human action mentioned above.

As "process" is a series of action of system or human being, and large process itself may have several processes in it in some cases, therefore "process object" is process itself or the action that is the element of process.

In summary we have two types of object: "system object" and "process object" to be handled. This classification is from the viewpoint of formal type of object.

In design, decision is to change something called object what has required functions and attributes to achieve our purpose.

To solve problems is to design something. These two are equal and invention is the special part of solving problem or design something.

3．The area of thinking tool or problem solving tool

Technical area has technical means as system object and process or action of technical system as process object.

Institutional area has institutional system as system object and process or action of institutional system as process object.

Personal area has process or action of human being as process object only. (Table 1)

Table.1 Applied Area and Object (Operation on the Outer World)

OBJECT ＼ AREA	System Object		Process Object		
	Technical Means	Institutional System	Process or Action of Technical system	Process or Action of Institutional System	Process or Action of Human being
Technical	x		x		
Institutional		x		x	
Personal					x

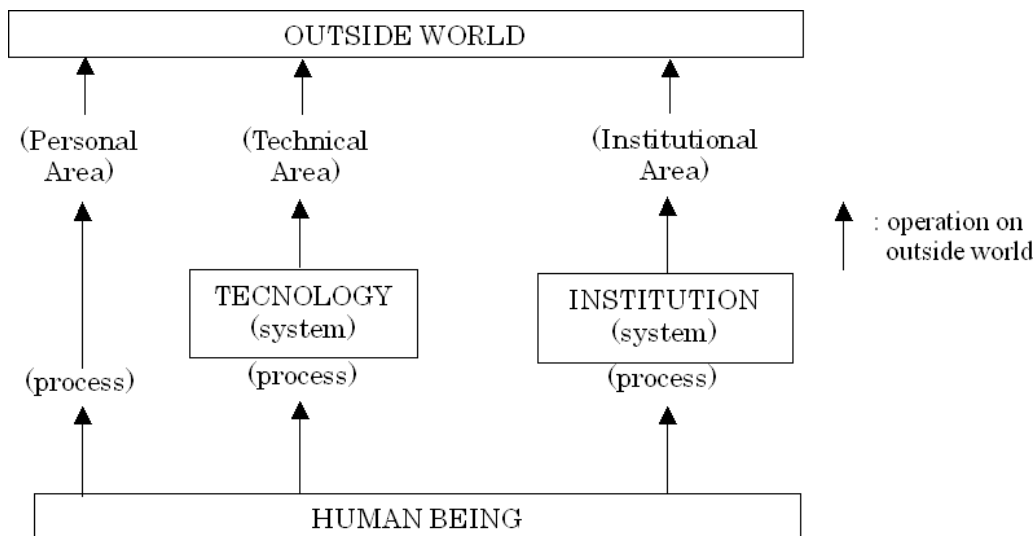We can mix the Fig.1 and Table.1 and we have Fig.1+ as follows.

Fig.1+ Operation on the Outer World

Roni Horowitz said in "Introduction to ASIT", "ASIT can be used to solve business problems, technical problems, and personal problems. ... in fact there isn't any problem that will not surrender to ASIT!" [7].

I think, to be more precise, the areas to which thinking tool or problem solving tool can apply is technical area, institutional area and personal area. In each area thinking tool or problem solving tool can solve technical problem, institutional problem and personal problem respectively. Institutional area is the area including institutional system that contains business area, political area, legal area educational area and family area and so on.

Thinking tool or problem solving tool (including traditional TRIZ, simplified TRIZ, ASIT
 and USIT) has the ability to apply these three areas-- technical area, institutional area and personal area—which are covering every areas of human life from the point view of operation on the outside world.
So I think the areas to which thinking tool or problem solving tool can apply should be technical area, institutional area and personal area rather than technical and

non-technical area. And we must recognize by other axis: "system design" in "system solving area" which deals with "system object" and "process design" in "process solving area" which deals with "process object".

To understand this more clearly following attention must be paid.
First make clear the difference between system object and process object and deal with process object more explicitly.
Secondly in some tools (especially in traditional TRIZ) we need to modify some expressions more abstractly to accommodate non-technical problems to be applicable.

On the other hand recognition whether it is simple or consists of "science" and "art" on the "culture" basis ("science system" and "art system") (Fig.2) [1] is the other half of human life that thinking tool or problem solving tool does not concern essentially except some exception.
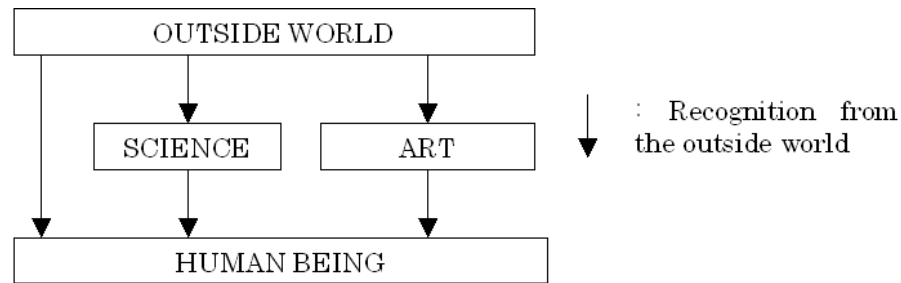

Fig.2 Recognition from the Outside World (Problem Solving Tool does not concern)

4. Conclusion
I made clear the position of "object" especially "process object" in design or problem solving and gave the grounds to the application area to which thinking tool or problem solving tool can apply.
Lastly I express my heartfelt gratitude to Dr. Roni Horowitz and Dr. Ellen Domb for their kind comments.

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TAKAHARA Toshio graduated in science and engineering from Waseda University in Tokyo Japan. He joined FUJITSU Limited where he worked as the engineer of river management. Before retiring its relative company in 2002 he engaged in quality management concerning ISO9001 for a few years. After retired his interest is in Thinking Tool.

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