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Applications of Purpose Axis as a part of Multi Screen Thinking

Yoon Hong-yul

TRIZ Center, Seoul, 120-771, Korea

Abstract

Multi Screen Thinking or ‘Talented Thinking’, was suggested by G. Altshuller in order that problem models may reflect the real world of the relevant problems. As for him, the world is complex, dynamic and dialectically evolving and then our models must be capable of treating such characteristics of the world. In his Multi Screen Thinking, Time Axis, System Axis and Anti System Axis were given to fulfil the requirements. Many additional Axes have been suggested during TRIZ development. Especially, N.Khomenko developed a variety of Axes of Multi Screen Thinking in accordance with his own OTSM viewpoint of problem model transformation to solve difficult problems. The axes of Multi Screen Thinking were not always originally novel but many of them had been used in other fields for the benefits of their own. That means new axes can be suggested if they can serve the essential roles of Multi Screen Thinking. This paper offers Purpose Axis as a part of Multi Screen Thinking. The author has gotten lots of benefits by considering purpose relationship among problems over some typical application of TRIZ. Purpose Axis will be discussed on its usefulness and applicability to engineering problems like patent design-around and business problems like blue ocean creation.

Keywords: Multi Screen Thinking, Talented Thinking, Purpose Axis.

1. Introduction

According to Souchkov, V., ‘Multi Screen Thinking’ is known to have originally the name of ‘inventive system thinking’[1]. As for many TRIZ beginners, Multi Screen Thinking has been called ‘Nine Windows Thinking’ which the author believes might have been causing some misunderstanding how to use Multi Screen Thinking. The number of ‘Windows’ or ‘Screens’ is not an important feature when we deploy and use Multi Screen Thinking.

Multi Screen Thinking was introduced by TRIZ founder, G. Altshuller who called it ‘Talented Thinking’[2-3]. According to him, when we make models which reflect the world of our problems, we should follow ‘Talented Thinking’ in order to reflect the world correctly. He said the world is complex, dynamic and dialectically evolving, so that our models from our consciousness must be the same in order to solve our problems. His ‘Talented Thinking’ seems to provide at least three axes composed of Time Axis, System Axis, and Anti System Axis along which we can imagine the evolution of a system. Briefly, Altshuller suggested it as a thinking method for correct description of the world relevant to our problems.

One of the popular modern versions of Multi Screen Thinking is ‘System Approach’ named by Ideation TRIZ experts[4-5]. ‘System Approach’ has the newly-added axes: ‘Cause-Effect’, ‘Input-Output’ and does not give serious attention to Anti System Axis. Ideation TRIZ experts explain that ‘System Approach’ is ‘multi-dimensional creative thinking’ and the unique

ability of an inventor to look beyond the system as an object. Therefore, they believe ‘System Approach’ is a tool for changing the way you think.

N. Khomenko provided ‘OTSM Advanced Schema of Powerful Thinking’ as the advanced version of Multi Screen Thinking which has new axes more than five such as ‘Abstraction’, ‘Objectiveness’, and ‘Impossibility’, etc[6-8]. According to Khomenko’s viewpoint, the advanced Multi Screen Thinking offers the factors to transform the problem models for solving problems. He classified the axes into the groups like ‘reality viewpoint’ and ‘imaginary viewpoint’. The number of the groups would increase from his viewpoint.

There have been several new approaches introducing new axes and applying Multi Screen Thinking to Cause Effect Analysis for increasing the effectiveness of the analysis[9]. Pesetsky, etc. and Leonid Batchilo, etc. introduced Multi Screen Thinking with ‘Operation Axis’ as a way to improve Root Cause Analysis[10-11]. H. Yoon introduced ‘Occasion Axis’ as an additional new axis to examine the problem situation according to evaluation parameters and relevant control parameters[12-13].

In summary, Multi Screen Thinking has been developed for the following aims:

to reflect correctly the world of our problems;

to change the way you think;

to offer the factors to transform the problem models in order to solve difficult problems;

to analyse the problem situation more effectively.

Based on experiences of the author’s own, those aims have been fulfilled with applications of Multi Screen Thinking. The author believes that those aims are never completely and entirely achieved and have to be supported by continuous researches based on real cases.

The above discussion on the aims of Multi Screen Thinking leads us to the ways to add new axes. Through the history of Multi Screen Thinking, almost all of axes are not of ‘original novelty’. They are adopted from already-known and essential viewpoints, such as Time, Causality, Input-Output, and Abstraction axis, etc. Therefore, original novelty is not one of the requirements to be one of axes of Multi Screen Thinking. If there is a certain viewpoint required to be a part of Multi Screen Thinking according to the aims as pointed out earlier, we may as well consider it as an additional axis of our thinking directions. This paper resulted from that prospect. The author already suggested ‘Purpose Axis’ as one of effective thinking directions and shows some cases of its application. This paper discusses ‘Purpose Axis’ as a new additional axis of Multi Screen Thinking and effective use of it over various fields.

2. Purpose Axis and its applications

2.1. Definition

Purpose Axis is an axis along which the purpose level of a certain event changes, where an event is an entity in a certain state or an interaction between entities. Along Purpose Axis, we can identify ‘different events of relatively different purpose levels’ as shown in Fig. 1.

The author believes that Purpose Axis must be distinguished from ‘Why Question Series’ like 5-Whys or 10 Whys, whatever. The ‘Why’ question may confuse us about the true meaning of it, ‘Purpose’ or ‘Cause’.

From the ancient ages, ‘Purpose’ has been an important aspect of understanding things. One of the oldest quotes, the words of Gautama Buddha is known as “Your purpose in life is to find your purpose and give your whole heart and soul to it”[14]. Therefore, purpose viewpoint is not novel but embraced because of its usefulness, so that Purpose Axis has been adopted by

outside of TRIZ field[15-16]. As for TRIZ field, The author first introduced Purpose Axis to formulate contradictions and improve the ways to overcome them[17-18]. The following sections are supposed to explain the already-developed applications of Purpose Axis to show it as a part of Multi Screen Thinking according to the purposes of Multi Screen Thinking discussed earlier.

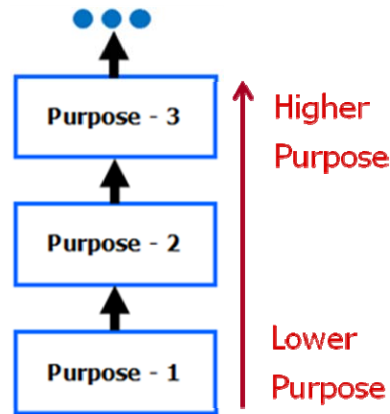


Fig. 1. A schematic explanation of Purpose Axis

A purpose of an event can be described by a state occasion or an interaction. For example, a filter mask is put on the face in order to block dust, which is shown as below:

higher purpose level – we want to block dust;

lower purpose level – we want to wear a filter mask on the face.

However, the purpose relationship is not always one between an object and something beyond it. Sometimes, certain parameters of the same thing have the purpose relation with each other. For example, we want to heat a gas in order to increase volume of the very gas.

Purpose Axis has been applied to several different problems by the author: to extract the initial problem out of the initial situation; to reformulate technical contradictions for resolution of them; to generate ideas for patent design-around; to search for alternative industries for creating Blue Ocean. The following sections are concerned about each of them.

2.2. A guide to extract the initial problem out of the initial situation

This application has been developed mainly to help analyse the problem situation more effectively. In general, the ‘difficult’ problem situation is composed of many trials for resolving a certain unsatisfied situation and the problems out of the trials. The solvers are facing not the first problem situation but the set of trials and problems from the trials.

Fig. 2 shows a typical case of the above situation. The solver might perceive ‘the first seeming problem’ as what he/she should solve. However, if the problematic situation has a long history of many trials, it should be analyzed to clarify the relations among trials to get the whole picture of the problem situation. In Fig. 2, ‘Purpose’ corresponds to ‘what we want to achieve’ through our trial. If we have been doing many trials with different purposes, the initial problem situation might be composed of a network of purposes relevant to the problem solving history. Purpose Axis helps to analyze the history of our problem solving. Additionally, before application of System Axis and Time Axis of the classical Multi Screen

Thinking to this situation, we have to identify which system must be dealt with as ‘System’. Purpose Axis can be used as a part of Multi Screen Thinking for identification of the starting problem formulation from the initial problem situation and ideation of other solution ideas.

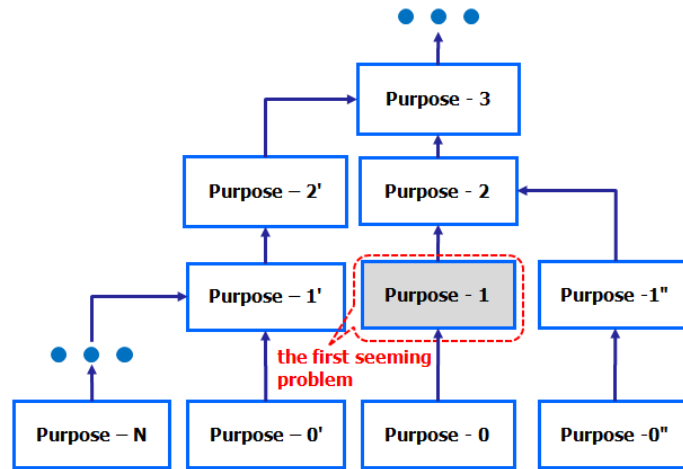


Fig. 2. A schematic of Purpose Axis application to the initial problem extraction

2.3. A guide to reformulate technical contradictions for resolution of them

Purpose Axis can guide a problem solver to reformulate technical contradictions to resolve them, which has been discussed with development of relevant themes like contradiction formulation and Cause Effect Chain Analysis. The benefits from Purpose Axis explained in those earlier works can reach more general cases. When we find difficulty in overcoming technical and physical contradictions, we may come up with resolving ideas by changing technical contradictions along Purpose Axis. Fig. 3 explains schematically how to transform a technical contradiction into a new one by changing the improving parameter of the original technical contradiction along Purpose Axis. ‘A certain event’ corresponds to a physical contradiction. The red and blue links from it with the deteriorating parameter and the improving parameter indicate the relation as a technical contradiction. If you cannot come up with any idea to resolve the contradiction with the left initial contradiction, you may try to reformulate your contradiction into new one by selecting the improving parameter on the higher purpose level along the Purpose Axis. The reformulated contradiction might be resolved to result in the same benefits that you wanted to achieve with the initial contradiction.

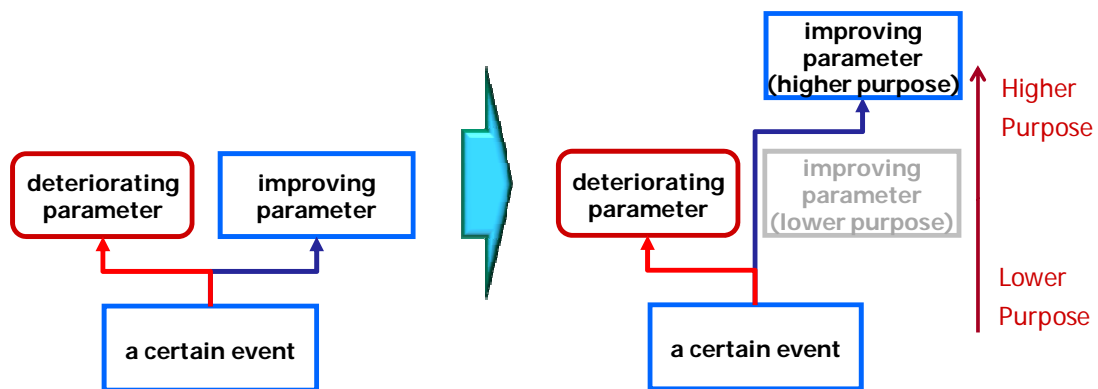


Fig. 3. A schematic of Purpose Axis Application for contradiction resolution

2.4. A guide to generate ideas for patent design-around

Patent design-around is offered in order that, at least, the same benefits are given by using certain approaches from considering those of the ‘design-around’ victim patent while avoiding patent infringement. Generally, avoiding patent infringement must be done in consideration of ‘All Elements Rule’, ‘Doctrine of Equivalents’ and ‘Prosecution History Estoppel’[19-21]. The author suggested that Purpose Axis can offer idea directions to avoid patent infringement in line with ‘All Elements Rule’ and ‘Doctrine of Equivalents’[22].

If we can deploy higher purposes of ‘Elements’ of the independent claims along Purpose Axis, we are able to formulate new problems: how to achieve the higher purposes without the ‘Elements’ of the independent claims in order to avoid patent infringement according to ‘All Elements Rule’. Additionally, we can also formulate new problems: how to achieve the higher purposes and some additional benefits without the characteristics described in the independent claims in consideration of ‘Doctrine of Equivalents’.

For example, let’s suppose that we want to design around US 5954374A that was of a real project even if a patent was yet not granted for. It has several independent claims and the claim 1 is chosen for our discussion. US 5954374A relates to improvements in pipe connectors, especially for use of connecting metal pipe sections of a pipe string in the oil industry[23]. More particularly, the invention relates to improvements in the type of pipe connector. For brevity, the following part is extracted from the claim 1:

... means for supplying hydraulic fluid under pressure between the overlying parts of the surfaces of the members when fully engaged together to at least one of expand the box member and contract the pin member so as to bring the projections out of engagement with the corresponding grooves and permit the members to be disengaged; ...

If we analyze this long and complex description through Purpose Axis shown in Fig. 4, we may get the directions of ideas for patent design around in line with ‘All Elements Rule’ and ‘Doctrine of Equivalents’ without a lot of further work including Function Analysis or Cause Effect Chain Analysis.

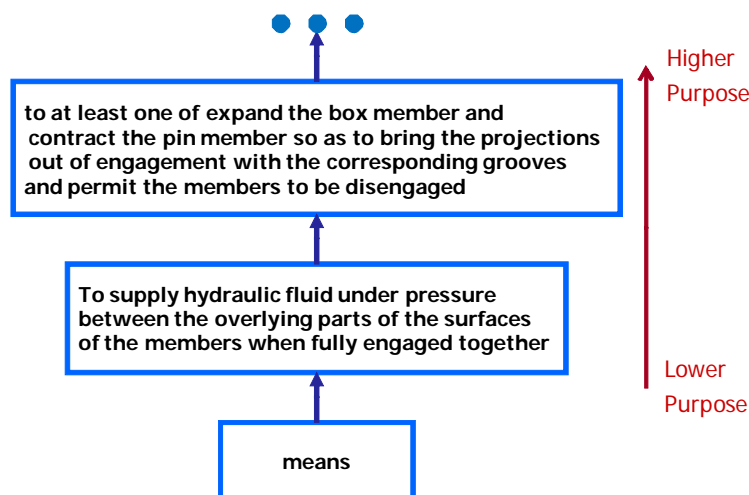


Fig. 4. Purpose Axis Application for the part of the target patent claim 1

If the highest purpose can be achieved without the lower level purpose which requires the means, we can at least avoid the patent infringement according to ‘All Element Rule’. If the same approach results in new ideas which can bring additional novel benefits with a certain

intensity that shows a clear difference from the target patent, we probably avoid the patent infringement according to 'Doctrine of Equivalents' because we adopt different ways or functions from the target patent by removing the lower level purpose which is a way or function of the target patent.

2.5. A guide to search for alternative industries for creating Blue Ocean

Blue Ocean Strategy offered a systematic way to develop the concepts of new industries, services, or products[24]. In 2006, the author suggested integration of Modern TRIZ thinking methods and Blue Ocean Strategy. Following Blue Ocean Strategy, we reconstruct the market boundaries for identification of commercially compelling blue ocean opportunities. The reconstruction is supported by 'six paths framework'. The author insisted that Multi Screen Thinking can provide more other paths or more concrete paths than the six ones of Blue Ocean Strategy. Purpose Axis is one of those from which we can examine 'Alternatives' in order to reconstruct the market boundaries.

Let's think about 'noodle restaurant' as our initially-considered industry. A usual market analysis based on 'NOT-Blue Ocean Strategy' might consider 'other noodle restaurants' as competitors because it focuses on being the best within 'the very industry' of similar ones. From Blue Ocean Strategy, we must think about 'alternatives' by looking across the industries. Typically, alternatives have different functions and forms but 'the same purpose'. The author suggests that the meaning of 'the same purpose' must be extended to 'along Purpose Axis' because the purpose of a certain industry cannot be identified without considering the relative levels of purposes. For example, the purpose of 'noodle restaurant' could be chosen among 'to fill one's stomach', 'to nourish people', or 'to promote one's health', etc. Fig. 5 presents the purpose candidates along Purpose Axis for looking across the industries.

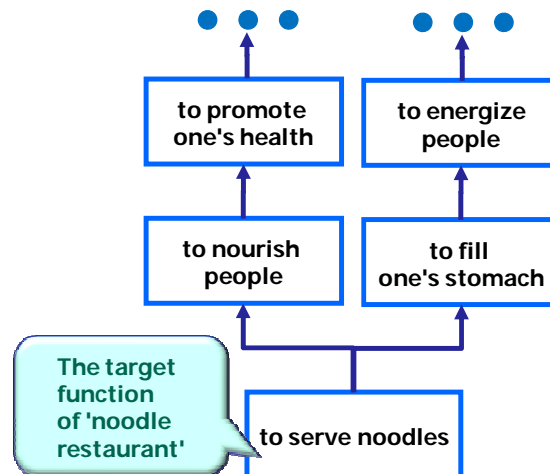


Fig. 5. A schematic of using Purpose Axis for looking cross industries

3. Conclusions

Multi Screen Thinking has been updated through the history of TRIZ. Additional Axes have been suggested in line with the requirements of axes of Multi Screen Thinking. According to these points, the author offered Purpose Axis as a new one of them because of its importance and usefulness during problem solving.

Purpose Axis can reflect correctly the world of our problems and change the way you think and transform the problem models in order to solve difficult problems.

By the author, Purpose Axis has been applied to extraction of the initial problem from a complex initial problem situation, technical contradiction transformation to resolve contradictions, patent design-around, and integration of Blue Ocean Strategy. It has resulted in successful cases for big Korean companies like Samsung, LG, Hyundai Motors, POSCO, and so on since 2002.

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