

Applying TRIZ To TRIZ

(Identifying Where TRIZ Will Evolve In The Future And Why)

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Abstract

TRIZ represents the output of the world's biggest study of creativity and innovation. Despite its undoubted power, it is clear that the TRIZ story is an incomplete one. The world moves forward and TRIZ needs to move forward with it. The aim of this paper is to identify some of the likely future evolution directions of the philosophy, method and tools that make up TRIZ.

One of the main elements of the current methodology involves the finding that the evolution of all systems is predictable. If this is true, then we ought to be able to apply known trends of system evolution in order to first identify the current level of maturity of TRIZ, and then second to establish where there might be untapped evolution opportunities. The paper utilises the author's proprietary 'Evolution Potential' assessment techniques to examine three aspects of the TRIZ evolution story. In the first analysis the paper compares the current state of TRIZ relative to the 35 known trends of discontinuous technological evolution. The aim of this analysis is to try and establish where and why the method itself will evolve. In a second analysis section, we compare TRIZ with the business trends in order to see where it is likely to evolve in terms of the ways that it might best be deployed as a concept into organisations and the global innovation market at large. In the third section we then shift the focus to TRIZ-based software tools in order to see where future software implementations of TRIZ might be headed.

The overriding trend of evolution found in TRIZ is that towards increasing system ideality. With this in mind, the next section of the paper discusses what an ultimate version of TRIZ – a version that can be described as an Ideal Final Result – might look like for different types of user.

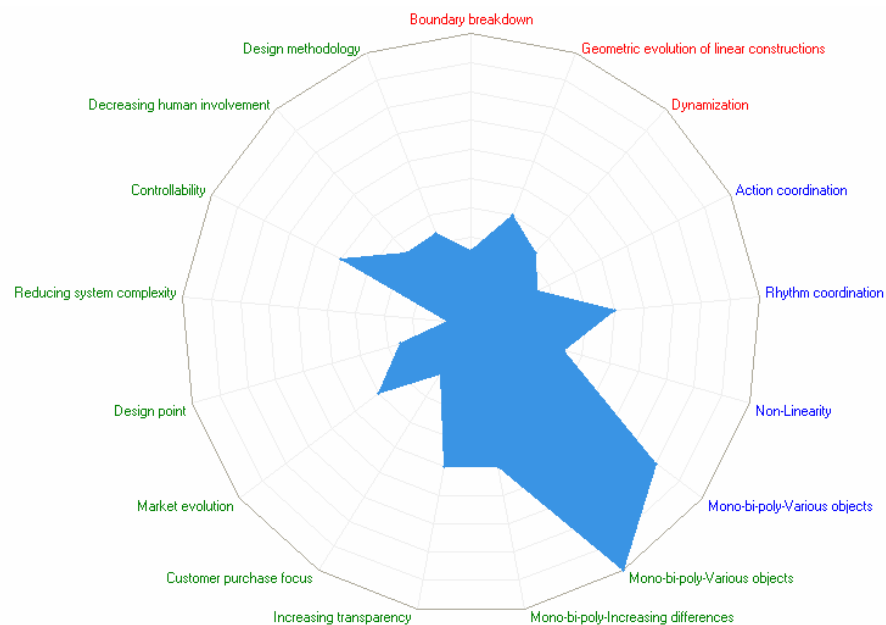
A final section of the paper then takes these IFR-TRIZ definitions and examines some of the key conflicts and contradictions that will need to be overcome if today's versions of the method is to successfully make the transition to a more ideal state. During this discussion, the paper will discuss a number of these contradictions in more detail, using the method itself to suggest how they may be eliminated. Specifically in this section of the paper, we will examine such contradictions as:

- * how TRIZ can be simultaneously 'simple and complex'
- * how to solve the Not-Invented-Here and Invented-Here buy-in issue
- * how to create a method that has both 'Steak' and 'Sizzle'
- * how to create a method that is both standardised and personalised
- * how to create a method that is both academically rigorous and useable in a practical sense

1) Applying TRIZ to TRIZ – Technical Evolution Potential

Several previous papers and the book Hands-On Systematic Innovation have discussed the concept of Evolution Potential. The basic method emerging from the concept is that there are known patterns of system evolution as they make discontinuous shifts from one paradigm to another. Based on the analysis of over 2 million technical systems, currently around 35 such discontinuous evolution trend patterns have been identified. When we compare a system to these 35 trends, we will typically find that some are not relevant. A well known trend is one known as Space Segmentation. This is a trend that describes the material evolution of physical objects as they pass from being solid lumps to highly porous structures. While such a trend is highly relevant to the evolution of systems like turbine blades and the soles of shoes, it is difficult to make a meaningful connection to a system like TRIZ. As such this is a trend that we are likely to classify as irrelevant to the future evolution of the method.

Figure 1 illustrates a high level analysis of TRIZ showing the trends that we believe *are* relevant to this system. What we see in this figure is that meaningful connections can be made with 17 of the 35 trends. Each of the spokes on the plot represents one of those 17 relevant trends, and the shaded region highlights how far we believe that TRIZ has evolved along each of those trends.



Before getting into the details of the meaning and implications of each trend, what a high level view of the plot suggests is that there is considerable untapped potential in what we have today, compared with what we might interpret as a global standard of best practice (as denoted by the perimeter of the plot).

Let us now examine some of these trends in a little more detail in order to ascertain where TRIZ currently is and where it is therefore likely to evolve in the future:

Mono-Bi-Poly(Variou) Trend – this is the trend where TRIZ has to all intents and purposes gone as far as it can. TRIZ is very definitely a ‘poly-system’ in that it contains a large number of constituent parts. This is to be expected in a methodology with an ambition to offer users assistance in such a wide variety of different problem solving situations. When we place our analysis at the end of this trend it is to signify that we

believe the system has reached some kind of a point of maximum viable complexity. It seems clear from the feedback of early and infrequent users of TRIZ that they are easily overwhelmed by the number of tools and techniques available. Despite attempts to simplify the process of deciding which tools to use in which circumstances and in what order by several in the community, there is still a considerable problem for many potential users.

What we imagine will happen in the future, therefore is that TRIZ will enter a period of rationalisation. The key here will be to avoid reducing the functionality and capability of TRIZ, whilst simultaneously simplifying what is there. We anticipate this taking on several forms, including two particularly important ones:

- we can already see something of a contest taking place between method developers in terms of trying to make different parts of TRIZ take on the functions of other parts. Many former Soviet developers, for example, have continued to build their version of TRIZ around the Substance-Field Model. Others – mainly Western – have found this tool to be somewhat abstract and have shifted to, in the case of problem definition, the Function Analysis or derivative tools, and in the case of solution generation tools, to integrate the 76 Standard Solutions into other tools. Whilst it is not clear which of these contenders will win, it appears clear that this is an area where there is considerable scope for rationalisation without impacting the efficacy of the method at all.
- ARIZ has been designed as a complete problem definition and solution generation procedure, and as such it is often viewed as being over-complex for many problem situations. It is a tool that has a long learning cycle and in several places contains steps that are inferior to other non-TRIZ tools (for example, in the area of problem constraints). If there is a need for an ARIZ tool at all, it seems likely that it ought to be re-configured to allow users to start from a multitude of different entry points

Dynamization – despite its multiple forms, TRIZ today – especially in its Classical forms - can be viewed as a relatively rigid process, each version with its own 1-2-3 step process. The Dynamization trend gives us a clear steer towards a more dynamic version of the system that permits users to enter it at different places and do things in different sequences. We are in fact already exploring an expert system based approach to our own problem definition process. This system allows a user to conduct the required problem definition tasks in whatever sequence they wish; each completed part then becoming a piece in a jigsaw. The user is then only allowed to progress to a solution generation stage when sufficient definition pieces have been assembled.

Mono-Bi-Poly(Increasing Differences) Trend – in its current form, the various versions of TRIZ indicate a system at the second ‘system with biased characteristics’ stage. The third stage of this trend suggests an evolution towards the ‘opposite function’. While this might not immediately appear to be relevant to the TRIZ story, a very good interpretation might be to see TRIZ as a ‘problem finding’ rather than ‘problem solving’ tool. The primary significance of this shift is that very often the most difficult part of any problem is defining the ‘right’ problem. TRIZ is in fact already very good at defining problems – especially in that it encourages users to find contradictions (something that few other tools and techniques do). Our view is that, particularly in the non-technical problem solving environment, where problems tend to be complex, have missing, incomplete or plain wrong data, TRIZ needs to become far better at the job of finding that ‘right’ problem. Our experience in this regard suggests in fact that once it can be found, its solution becomes self-evident to the point that the traditional solution generation tools (Inventive Principles, Trends, etc) are effectively superfluous.

Controllability – as a process, TRIZ currently fails to give a user any form of feedback that they are doing the right thing. For new users in particular this hurdle often prevents the method from delivering any significant value at all; for more experienced users, it often means that the road to more efficient use is a long and tortuous one. This being said, we feel there is a clear need for the introduction of effective feedback loops.