

Trend-storming and conflict elimination – win-win solution strategies for executives and managers

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Abstract

This paper describes tools and strategies aimed at delivering breakthrough solutions to difficult problems. Starting from a comparison with brainstorming, the paper shows how the weaknesses of this ubiquitous form of ideation have been resolved to create a systematically reproducible problem definition and solution generation scheme. Subsequent sections of the paper describe conflicts and synergistic benefits when the systematic innovation methods are integrated with other management problem solving strategies.

Keywords: trends, evolution, breakthrough, innovation

1. Introduction

The predominant ideation tool across all forms of problem solving is brainstorming. The ubiquity of the technique results in large part from its simplicity. Unfortunately, however, the positive benefits of brainstorming are frequently offset by a number of negative features. Most notable amongst the negatives are the randomness of the process, the willingness or otherwise of participants to share their thoughts, and the inherent limitations of the knowledge and brainpower present in the session.

The Soviet originated Theory of Inventive Problem Solving, TRIZ, was an attempt to eliminate the problems of brainstorming. The research set about achieving this feat by studying large numbers of successful solutions in order to encapsulate the widest possible spectrum of knowledge. TRIZ and its 'Systematic Innovation' (Reference 1) successor have, to date examined and reverse-engineered close to three million such solutions. One of the key findings from this analysis is that there is considerable 're-inventing of the wheel' takes place across every different form of human endeavour in both technical and non-technical arenas. This finding in turn has led to the creation of what are effectively lists of, first, different types of problem, and then second, different solution strategies for resolving such problems. To give an impression of the extent of wheel-re-invention, the collapse of data is such that the three million successful solutions analysed all fit inside a problem framework measured in the low thousands, and that in turn distils down to a total number of different solutions deployed of something under a hundred.

One of our aims in this paper is to describe the range of solution generation tools uncovered by the TRIZ and subsequent researchers, and to describe a spectrum of ways of deploying such tools. In so doing, it is our intention to present a menu of

ways and means by which users can simultaneously begin to get immediate tangible benefit from using the tools, and also see a progression of levels of sophistication in use. We summarise this spectrum in Figure 1:

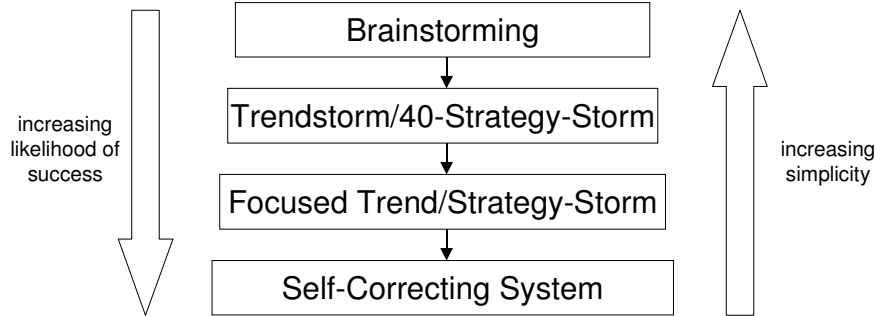


Figure 1: Spectrum Of Solution Generation Tools

Our discussion of this spectrum begins with the concept of ‘trend-storming’:

2. Trendstorm/40-Strategy-Storm

As described by DeBono, very often the ‘real problem’ only really becomes apparent a posteriori (Reference 2). When brainstorming ‘works’, then, it is because it forces people ‘out of the box’ to a place where they can see a new way of looking at a problem. Unfortunately, beyond the idea of ‘out of the box’ brainstorming has little to say about *where* outside the box to go and look. The thinking of TRIZ and Systematic Innovation is based on the idea of telling users the answer to that ‘where’ problem. The method works along the line that the entity that we are currently trying to improve has a voice to tell us where it wants to evolve in the future. We might call this the ‘voice of the product’ or the ‘voice of the system’. With the solution roadmaps provided by these voices, the theory is that we might have a much more elegant means of deriving breakthrough solutions.

The study of three million successful innovations not only reveals there to be only a small number of possible successful solution directions, but also that there are only a relatively small number of problems. Thus, if we adopt one or more of the solution short-cuts found in the method, the chances are very high that we will be solving the same basic problems as anyone else in the past may also have faced. An important concept in Systematic Innovation is indeed that ‘someone, somewhere already solved your problem’. The trend directions and inventive strategies provide us with a means of finding such solutions.

Figure 2 illustrates one of the trends of evolution found within the method. This particular trend is concerned with the evolution of business models. It originates from research at Harvard Business School (Reference 3). Each stage in the trend represents a discontinuous shift from one way of doing business to another, more ideal way. As such, each jump along the trend effectively represents a shift from one way of doing business to another. Other organisations have made a left-to-right shift along the trend because at each stage, a business will hit a fundamental limit. Thus, for example, whenever a business faces a problem of ‘commoditisation’ of their products, the trend shows us that a way they are very likely to resolve that problem

is to make a shift to the right along the trend to a ‘service’ or an ‘experience’. The trend exists because we are not the only people in the world to have faced this kind of commoditisation problem; the trend pattern shows us the direction that others have travelled in order to solve that problem.

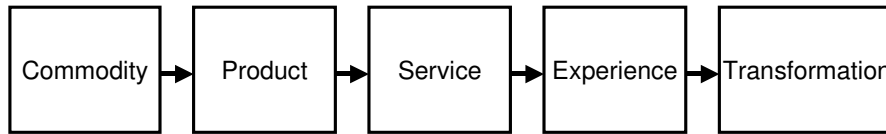


Figure 2: Example Discontinuous Evolution Trend – ‘Customer Expectation’

The solution short-cut offered by this and the other 30 known business trends involves, first, identifying whereabouts along the trend your current system is, then shifting to the next stage (or stages – companies are increasingly looking to ‘leap-frog trend stages’), and then working out how and why making such a shift would be a good thing to do in their situation. In a typical ‘trend-storming’ session, therefore, what will typically happen is that a business model or organisation structure will be compared with each of the 31 known trends (Reference 4), mapped to a current position along the trend, and then any un-exploited trend stages used to generate ideas for better ways of achieving the functions of the business.

In addition to the 31 known business trends, the Systematic Innovation has also uncovered 35 trends relating to the evolution of technical systems (Reference 1) and 26 trends relating to the evolution of software systems (Reference 5). As illustrated in Figure 3, it is common for us to combine the analysis of a system with all of the trends and to construct an Evolution Potential radar plot.

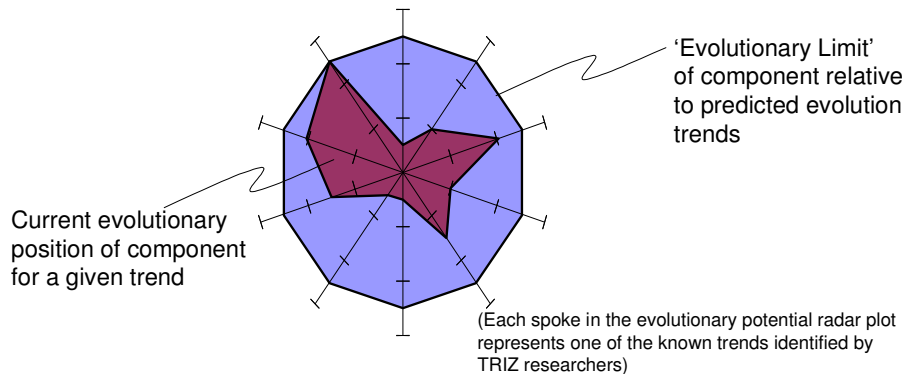


Figure 3: Example Evolution Potential Radar Plot

By constructing these plots with one spoke on the plot relating to each trend it is possible to create a snapshot view of the current evolutionary state of any system relative to known trend jumps in other industries. Basically, the untapped potential highlighted by the plots represents the ‘good solution’ short-cuts that others have found, but your organisation has not yet recognised or exploited.

Figure 4 illustrates another of the trends, this time one of the technical trends. This trend is all about the ways in which the surfaces of objects have evolved in other systems. As with the business trends, the way that we will use such technical

trends is to first map our current system onto a stage of the trend and then use the un-exploited trend stages as the basis for generating ideas about where the object under consideration will evolve in the future. Again as with the other trends, it is entirely up to the user to identify how and why adding things like '3D protrusions' onto a surface might be a good idea, and what problems such a strategy might solve. References 1 and 4 both contain lists of 'reasons for jumps' for each trend in order to help close the loop between solution direction and reason for travelling in that direction.

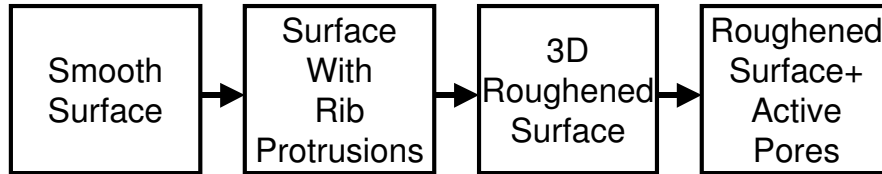


Figure 4: Example Technical System Evolution Trend – ‘Surface Segmentation’

In addition to the known trends of evolution, Systematic Innovation also contains the so-called '40 Inventive Strategies'. These are again 'good solution' short-cuts. This time their focus shifts to known strategies for resolving trade-off and compromise situations. Reference 6 is a free resource showing how these 40 generic strategies are the – so far – only known solution short-cut directions across all forms of human endeavour, from micro-electronics to agriculture, politics to advertising. In effect they are the only known ways of delivering the 'win-win' solutions often talked about as desirable in organisations, but so infrequently actually achieved. The 40 Strategies offer users systematic means of achieving such win-win outcomes.

3. Focused-Trendstorming/40-Strategy-Storming

The 'trend-storming' or '40-strategy-storming' processes are both rapid, short-learning curve (typically a half-day is sufficient to learn either the trends or Inventive Strategies) means of increasing the effectiveness of traditional brainstorming process. Spending 5 to 10 minutes focusing on each trend or on each Inventive Strategy is an extremely potent way to generate a lot of useful ideas. Very often, having a lot of ideas is in itself a good thing – for example it allows us the opportunity to combine individual ideas into stronger overall solutions. On the other hand, 40 strategies multiplied by, say, 10 minutes per strategy is still too long a time for many problem solving groups.

This second level along the Systematic Innovation hierarchy is aimed at resolving this problem. In this extension to the method, instead of storming through all of the trends and strategies, we are encouraged to spend a little more time defining the problem in order to establish a smaller subset of trends and Inventive Strategies likely to help us to generate the best solutions.

At this second level we have a number of additional tools to help us to become more focused on what our 'real problem' actually is. We will discuss three aspects of these tools here; one concerning identification of constraints, one on problem hierarchies, and the last on conflicts and what we might think of as 'root contradictions':

3.1 Constraints

The simplest way of reducing the number of Trends or Inventive Strategies we have to examine for a given problem situation is to apply some of the constraints present in a problem situation. There are several constraint-based rules that can be applied to eliminate the trends and strategies that cannot be used in a given specific situation. The most significant of these rules relates to one of the most important trend patterns uncovered during the TRIZ research. This trend is reproduced in Figure 5.

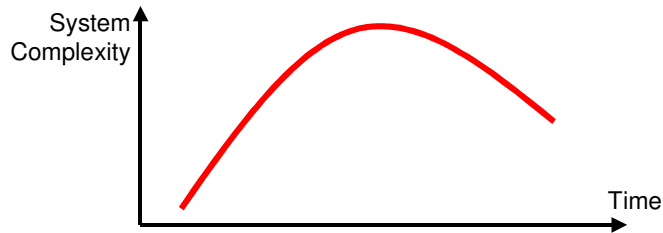


Figure 5: Increasing-Decreasing Complexity system Evolution Trend

The essence of the trend is that as systems of all description evolve, they pass through successive cycles of increasing followed by decreasing complexity. Knowing where our own system is in this cycle is important in determining which of the Trends and which of the Inventive Strategies are relevant to the problem at hand. As described in Reference 1, some of the trends and strategies specifically point the user towards solutions in which the complexity of the system will increase, while others point in directions that are fundamentally about reducing complexity. Thus, knowing where our system lies on its complexity evolution cycle allows the number of relevant Trends and Inventive Strategies to be significantly reduced.

We can likewise use cost as a constraint that will limit which of the trends and Inventive Strategies are relevant to a problem. Trends like 'increasing use of smart materials' or 'increasing feedback' both, for example, tend to increase the cost of a system. If we are faced with a constraint whereby we are not able to allow cost to increase, then there is little point in considering such trends in our focused storming activity.

3.2 Problem Hierarchies

Another of Edward DeBono's contributions to the creativity and innovation debate is his attack on root cause analysis. This attack might come as something of a surprise to those versed in the art of the technique. According to DeBono, there are several things that can happen when we try to find the root cause of a problem. Two of the most significant are, a) we are unable to find the root cause, b) we can find the root cause, but find that there is absolutely nothing we can do to address that root cause. The issue of problem hierarchies lies at the centre of the second of these two phenomena. What we see in many managerial problem settings is that the root cause of a problem lies at a higher layer in the organisational hierarchy, or possibly even outside the hierarchy altogether. In actual fact, these situations are more likely to be present than not; if they were not present, and we were able to resolve the problem at our own hierarchical level or at a subordinate level, then likely as not we would already have done so. Coupled with this effect is the fact that the human brain is

again wired to think at one hierarchical level at a time. The net result of both effects together is that we tend to see a problem at our own level and not at higher or lower hierarchical levels.

Basadur (Reference 8) developed a simple tool to help users to understand such problem hierarchies. An evolved version of his ‘why-what’s-stopping’ analysis tool is reproduced in Figure 6 below:

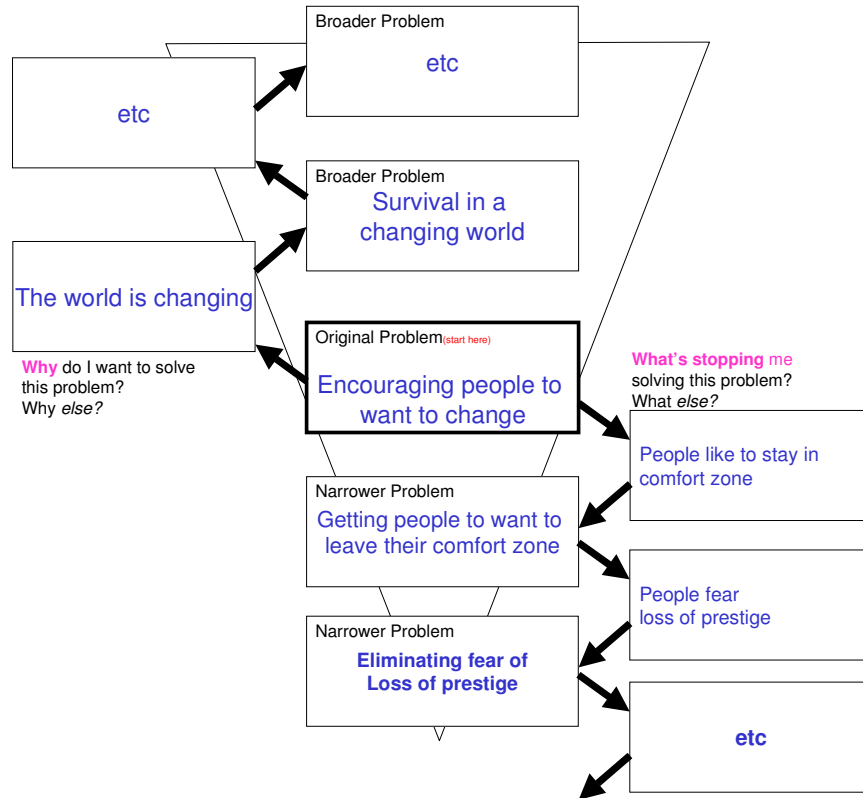


Figure 6: Why-What's Stopping Analysis Method For Problem Hierarchy Definition

The basic why-what's-stopping framework has been completed in the figure for a typical problem example. The basic concept of the tool is that asking the 'why' question is used to broaden our problem definition to higher hierarchical levels, and asking the 'what's stopping' question shifts our perspective to lower levels. The resulting column of problem definitions is designed to act as a selection menu. What usually happens when using the tool is that one of the problem definitions emerges as the 'right' level for applying the solution generation tools.

3.3 Root Contradictions

We can take the problem hierarchy model a stage further by encouraging problem solvers to think about 'root contradictions'. The analysis required to find the root contradiction of a problem is similar to the process of root cause analysis. The big difference between the two techniques, however, is that root contradiction analysis

requires less data and provides more profound insights into a problem. Finding contradictions (trade-offs, conflicts, paradoxes, etc) in systems is a fundamental part of defining breakthrough solution opportunities. Reference 8 describes the root contradiction process in more detail. Essentially it starts from a list of conflict pairs. These conflict pairs are most easily generated by prompting problems solvers to think about two important questions:

- 1) what would you like to improve?
- 2) what is stopping you from making that improvement?

For every conflict pair identified, the user is then prompted to ask a further ‘what aspect of the feature you have selected?’ question for each side of each conflict pair. Successive cycles of ‘what aspect?’ questioning eventually sends the user towards a root contradiction.

Once found, TRIZ provides a tool known as a Contradiction Matrix (Reference 9), to present to the problem solver the top 4 or 5 Inventive Strategies used by others to solve similar root contradiction problems – Figure 6. As such, this tool is a means of down-selecting from 40 strategies down to a much more manageable number.

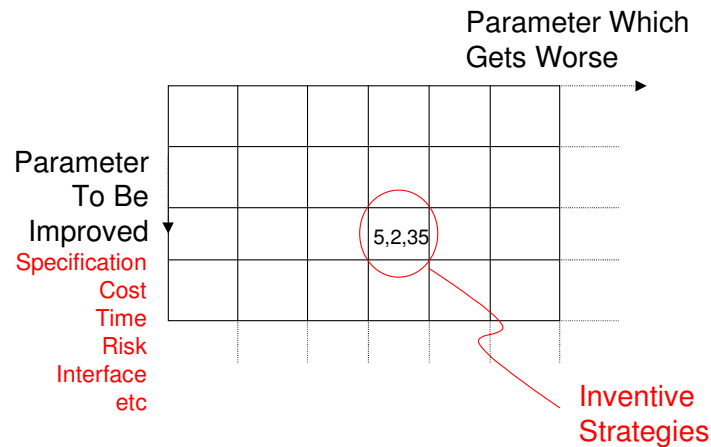


Figure 6: Contradiction Matrix Tool For Identifying Subsets Of Inventive Strategies

Also important psychologically is that this ‘root contradiction analysis’ forces the problem solver to remain in problem definition thinking mode for longer than they would otherwise. They are thus more likely to identify the ‘right’ problem to be solving, before switching to solution generation mode.

4. Self-Correction

To a certain extent the focused trendstorm process of the previous section contains a certain degree of ‘self-correction’. What we mean here is that even though our initial understanding of a problem situation might be quite sparse, the process itself will guide us towards a progressively better understanding of both problem and best solution to that problem.

An important concept in helping to understand this self-correcting nature of the process is the 9-Windows idea illustrated in Figure 7. The 9-Windows are simply a way of segmenting a current situation so that we are able to see that situation from

every different angle. Thus the figure shows that once we have defined our current system and timeframe, then we have defined the central window of the cluster of nine. The other eight windows then denote other possible viewing perspectives on that situation. Thus, by shifting upwards, we see the problem from the perspective of its bigger-picture surroundings (or 'super-system'). Conversely, by shifting downwards into the 'sub-system' we are forced to view our system from the perspective of each of the constituent entities. Then, by moving left and right from the central 'window', we are forced to examine the effects of time on the behaviour of the system – by going left, we venture into the past (possibly measured in microseconds or decades depending on the specifics of the problem), and by moving right, we venture into the future.

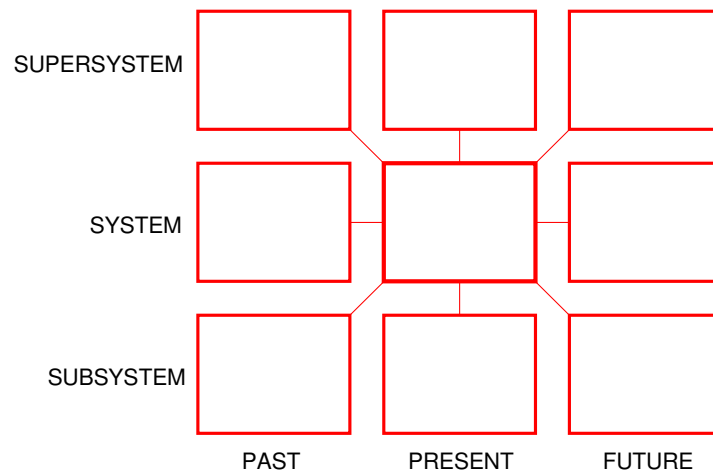


Figure 7: '9-Windows' Problem Perspective Shifting Tool

Once we have established this way of segmenting our world-view, many of the Inventive Strategies and Trends are designed to help us to shift from one window to another in order to find the 'right' problem to be solving. Thus, to take a simple example, whenever a focused storming session suggests use of Inventive Strategy 10, 'Preliminary Action', or the trend known as 'Action Co-ordination, it is a clear indication that others in situations similar to our own have solved their problem by shifting their focus to the 'system-past' window. Figure 8 illustrates how some of the other Inventive Strategies similarly direct the problem-solving attention of the user to different viewing perspectives.

The whole Systematic Innovation method has been designed with the idea of 'self-correction' in mind. At its most sophisticated level of operation, the method contains a complete problem definition scheme. This usually takes the form of a questionnaire based input structure. The basic idea behind this structure is that a user can work through a series of questions, starting from what might be an extremely uncertain start point, and gradually being guided towards a moment where an insight into the real problem becomes apparent. A free electronic version of this structure can be downloaded as described in Reference 7.

Full case study descriptions of the self-correcting process can be found in References 1 and 4.

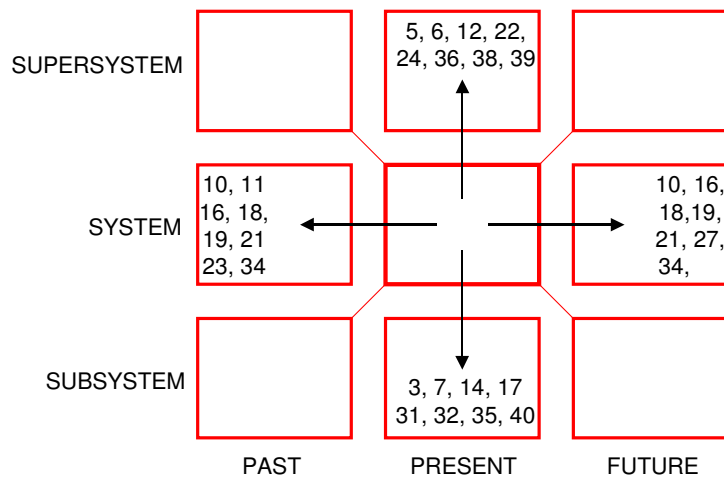


Figure 8: '9-Windows' And 'Self-Correcting' Problem Finding Indicators

9. Putting It All Together

What we have tried to do in this chapter is indicate the possibility of a 'voice of the system'. We have also tried to suggest that this voice can help businesses and managers to generate breakthrough ideas in a systematic and reproducible manner. We have also tried to show that the Systematic Innovation tools assembled to help managers in this ideation role form a spectrum of depth and sophistication. This spectrum exists in order to create the possibility that the method adapts to the user rather than the other way around. The total Systematic Innovation output would require between three and six months of full-time exposure to learn. This should not come as such a surprise given that it is the result of the world's most extensive study of creativity and innovation. That being said, few if any people – least of all busy managers – are likely to devote such time to learning a new method without some clear evidence that their investment will pay handsome dividends. By creating the 'trendstorm' tool it is hoped that we have created a very low barrier to entry into Systematic Innovation. It is our hope that these simple tools represent a simple and effective advance on brainstorming techniques and furthermore that they will enable organisations to deliver a time-to-payback measurable in days or weeks. It is our subsequent hope that such early successes will then lead to the learning of more sophisticated tools, and in turn the creation of long-term sustainable value to both individual users and organisations alike.

References

- 1) Mann, D.L., (2002), 'Hands-On Systematic Innovation', CREAX Press.
- 2) DeBono, E., (1992), 'Serious Creativity', Harper Collins.
- 3) Pine, B. J., Gilmore, J., (1999), 'The Experience Economy', Harvard Business School Press.
- 4) Mann, D.L., (2004), 'Hands-On Systematic Innovation For Business And Management', IFR Press, 2004.
- 5) Mann, D.L., (2005), 'TRIZ For Software Engineers', IFR Press, 2005.

- 6) www.triz-journal.com, '40 Principles and Contradiction Matrix'
- 7) Basadur, M., (1994), 'The Power Of Innovation', Financial Times Prentice Hall.
- 8) Systematic Innovation e-zine, Issues 1, 16 and 40, www.systematic-innovation.com

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