

Systematic Win-Win Problem Solving In A Business Environment

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ABSTRACT

TRIZ research has shown that the strongest solutions and ideas are the ones in which the problem or opportunity owner has successfully challenged the conflicts and trade-offs that others have assumed to be fundamental. Classical TRIZ includes a Matrix that enables owners of technical problems to quickly identify the inventive strategies used by others facing similar design conflicts. The paper describes the creation of a brand new Contradiction Matrix tool aimed specifically at business applications of TRIZ. The tool is believed to offer problem solvers the same ready access to the best of other business solutions, and as such offers a previously unknown problem solving capability. The new tool has been constructed from the analysis of a large proportion of the published knowledge on businesses that have successfully challenged the win-lose contradictions their competitors had not recognised or assumed were not challengeable. In all, several hundred win-win cases have been identified and included in the analysis. The paper describes some of the most well known of these cases - and how they have influenced the structuring and content of the new Matrix. A short final section of the paper describes how the new Matrix is beginning to be used to successfully generate win-win solutions to real business problems that would normally be solved using conventional either/or thinking strategies.

Introduction

Most leaders and managers are at least beginning to recognize the inherent weaknesses of compromise-based thinking approaches. The idea of win-win solutions is, conceptually at least, highly appealing. The database of win-win solutions in the business environment is, however, sparse. It is also though highly revealing; win-win solutions pay enormous dividends in terms of business performance. Figure 1 illustrates three such examples taken from Reference 1.

In the business environment, win-win is commonly viewed from a 'nice to have, but there is no method, so we can't do it' perspective. There is probably also a considerable element of conditioning to several millennia of either/or thinking systems. One of the basic tenets of the Russian originated Theory of Inventive Problem Solving, TRIZ (2, 3) is that 'someone, somewhere

has most likely already solved your problem’. One of the key findings of the TRIZ philosophy is that different disciplines don’t talk to each other, and consequently much re-inventing of wheels takes place. Another key finding of TRIZ – via the analysis of a considerable proportion of the world’s most successful engineering solutions – is that the most effective solutions occur when a problem solver has identified and ‘eliminated’ a contradiction rather than accepting the trade-offs their prevailing contemporaries have taken to be inherent. The net result of this patent analysis is that there are – so far at least – just 40 different strategies available to help in this process of contradiction elimination. Subsequent research has thus far confirmed that it is precisely the same 40 strategies that are being used in achieving successful contradiction-breaking, win-win solutions in a business context (4).

We explore here the codification of these strategies in their business context and the construction of a tool to help problem, conflict or opportunity owners achieve win-win outcomes in systematically reproducible manners.

	(%) Industry average growth '88-'95	(%) Industry -leader growth in same period
Securities Brokerage	90	520
US Domestic Airlines	80	370
Home Improvement Retailing	40	1500

Figure 1: Differences in Business Performance Between Contradiction-Breakers and Industry Average

Business Matrix

The Contradiction Matrix contained within classical TRIZ (3) enables a user to identify pairs of conflicting parameters from a list of 39 most commonly used engineering parameters – length, weight, power, reliability, etc. The Matrix then provides the three or four Inventive Principles found by others to successfully challenge the particular conflict. The classical Matrix was compiled from an analysis of a substantial number of successful engineering solutions.

While initial work has confirmed the validity of the Inventive Principles in a business environment, the parameters of the classical Matrix bear only passing relevance to the issues of relevance in a non-engineering context. One of the first tasks of the work to generate a business version of the Matrix, therefore, was to formulate a structure offering direct relevance to business issues. The business environment is of course highly diverse, multi-dimensional and highly complex, and there were many possible ways of segmenting the total picture.

The pioneering thinking of W. Edwards Deming (5) in which the production of goods (and services) was drawn as a process for the first time was used as a start point – and resulted in a segmentation of problem areas in terms of the different fundamental parts of that process – initial research, development and ‘pre-production’ activities, the production process, the supply process and the post-supply ‘support’ activities. Within each of those elements, then, the primary parameters of interest were segmented in terms of physical attributes (essentially specification,

quality, capability, and means), time attributes, cost attributes, risk attributes and, in-line with emerging thinking (6) that it is often not the ‘things’ but the ‘thing between the things’ that are the important elements, ‘interface’ attributes. Added to this basic framework were then the other important attributes that we observed from the business literature that were commonly of interest in tackling business problem situations. In order to make the size of this list manageable, a degree of abstraction was performed similar to that done when the Matrix of classical TRIZ was formulated. The eventually selected list of 31 parameters is reproduced in Figure 2.

- | | |
|-------------------------------------|--------------------------------------|
| 1. R&D Spec/Capability/Means | 16. Product Reliability |
| 2. R&D Cost | 17. Support Cost |
| 3. R&D Time | 18. Support Time |
| 4. R&D Risk | 19. Support Risk |
| 5. R&D Interfaces | 20. Support Interfaces |
| 6. Production Spec/Capability/Means | 21. Customer Revenue/Demand/Feedback |
| 7. Production Cost | 22. Amount of Information |
| 8. Production Time | 23. Communication Flow |
| 9. Production Risk | 24. System affected harmful effects |
| 10. Production Interfaces | 25. System generated side effects |
| 11. Supply Spec/Capability/Means | 26. Convenience |
| 12. Supply Cost | 27. Adaptability/Versatility |
| 13. Supply Time | 28. System Complexity |
| 14. Supply Risk | 29. Control Complexity |
| 15. Supply Interface | 30. Tension/Stress |
| | 31. Stability |

Figure 2: 31 Parameters of the Business Contradiction Matrix

Throughout the subsequent process of identifying case studies that fitted the structure, and beyond to the present time, a philosophy of flexibility and amenability to change has been adopted. As it happen, the analysis has supported the segmentation structure used, but as with any new tool, the current version is very much viewed as a ‘useful start’ rather than a ‘definitive end’. The new Matrix is intended to function in much the same way as the classical Matrix; the user is encouraged to think about what they are trying to improve and then what is stopping them from making the improvement. The numbers in the boxes representing the intersection of the improving and worsening parameters then represent the inventive strategies used by others who have successfully challenged the particular either-or trade-off under consideration. The idea is illustrated in Figure 3.

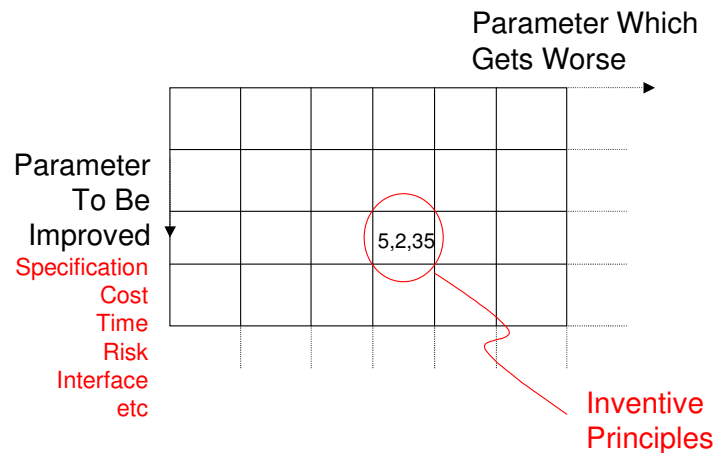


Figure 3: Sample of Completed Matrix Highlighting Method of Operation

Unlike the original technical Matrix, this new one has been constructed in a symmetrical form (i.e. the same results are obtained by looking up an A versus B as a B versus A contradiction) in order to

ease use. In the fullness of time, as more examples emerge, it is likely that the Matrix will be expanded to allow any dis-similarities in strategy between improving one of a pair of conflict parameters over another to be presented to the problem solver.

In constructing the Matrix, each box was completed through a combination of two mechanisms; the first involving an equivalent of the original TRIZ research – identifying successes from known existing solutions and abstracting the information they contain – the second involving simulation of hypothetical conflict scenarios and one-by-one identifying the Inventive Principles which generated the most effective looking solution directions. With the total number of case studies numbering only in hundreds (as compared to several million patents), the current version of the Matrix is thus viewed as a first step towards eventual maturity as progressively more win-win conflict resolution cases emerge and become integrated into the framework. The next section illustrates a few of the case studies used and the method of abstraction used during the construction of the new Matrix:

1) South West Airlines

The story of South West Airlines' success represents something of a phenomenon across the business spectrum with the book of the story (7) being one of the most widely read business books of the 90s. South West Airlines is known particularly for being 'the' low cost airline with 'positively outrageous service'. Thus, in the terms of a contradiction, they have successfully challenged the conflict between cost and quality; as much in terms of customer interface as quality of service – e.g. food on the airline usually consists of a bag of nuts) which their competitors (and most passengers) assumed was fundamental.

To distill the success of South West into one or two Inventive Principles would be somewhat trite in light of the breadth of solutions that have contributed to their overall success, but for the purposes of the Matrix, the following strategies were abstracted from the reference:

- Principles 38 'Enriched Atmosphere' – for the way the whole organisation works together as a truly empowered team to achieve not just legendary service but the fastest turnaround times, highest ratio of customers served per number of employees, highest customer retention figures and overall profitability of the whole airline industry.
- Principle 1 'Segmentation' – in the way it segments its route plans and determines which cities and airports it will serve
- Principle 25 – 'Self-Service' – in the way it empowers and encourages employees to make decisions themselves.

2) Schwab

The case of security brokerage Charles Schwab's transition to leading e-based share dealer has been discussed on several occasions (8, 9). As discussed in (9), the company has successfully challenged the richness (quality of information or service) versus reach (number of customers reached) contradiction present in many industries. Figure 4 illustrates how they originally adopted trade-off approaches involving first telephone brokerage and then touch-tone dialling as means of increasing reach (at the expense of richness). The figure also illustrates how, when they introduced on-line dealing in 1998 they successfully broke the contradiction and became able to reach a very wide customer base with a service they now claim to offer higher richness than that achievable via a full service broker.

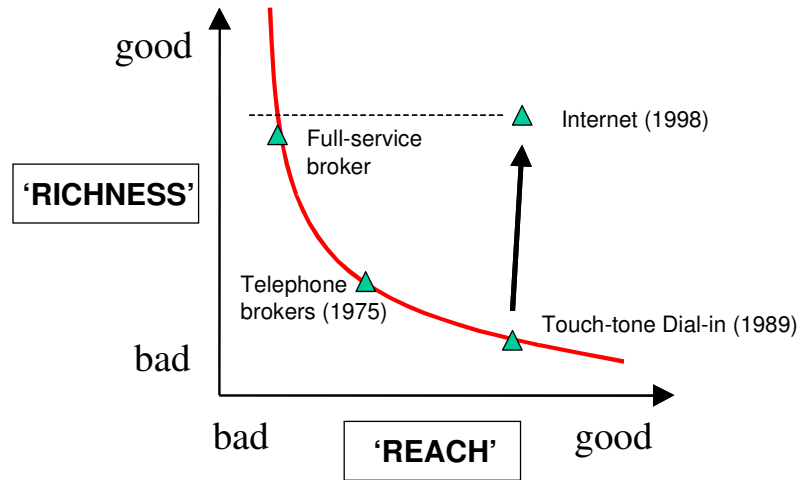


Figure 4: Richness versus Reach Contradiction Broken by the Internet

In terms of the new Matrix, the ‘richness versus reach’ contradiction was judged to most closely match a conflict between the Matrix parameters ‘supply specification’ and ‘supply interface’. The use of an Internet solution to the contradiction represents use of Principle 6 ‘Universality’ (i.e. the Internet provides a universal communication protocol) and Principle 40 ‘Composite Structures’, and both of these parameters consequently appear in the Matrix. Reference (9) also describes other cases of organisations successfully challenging the richness versus reach contradiction. These and other cases feature application of Principles 15 ‘Dynamics’ and 30 ‘Thin & Flexible’ and hence the Matrix tool contains all four suggestions.

3) Benetton

The fashion industry faces a challenge every year in the race to get product to the customer once the season’s colours have begun to demonstrate their popularity. Benetton’s success is to a significant extent built from the way they have solved the contradiction between the time available to commit a production decision versus the versatility of the clothes that get produced. Before Benetton’s arrival, other clothing manufacturers adopted an essentially trade-off based approach to the problem, with often intricately calculated optimizations to achieve acceptable values of product match to fashion demands versus production commitment time.

Benetton overcame the contradiction by first recognizing that the greatest fashion uncertainty was colour and then working out the means to knit and assemble the clothes before they were dyed. In this way they were able to commit to the time consuming parts of the manufacture process early and then once the season’s fashionable colours had emerged, they only had to conduct the final dyeing operation . Thus Benetton used Principle 10 ‘Prior Action’.

The Benetton contradiction is located in the Matrix as the conflict between ‘Production Time’ and ‘Versatility’. Analysis of other cases shows this use of ‘prior action’ to now be a common strategy in solving this type of problem. The Matrix reflects this by placing Principle 10 as the most likely strategy.

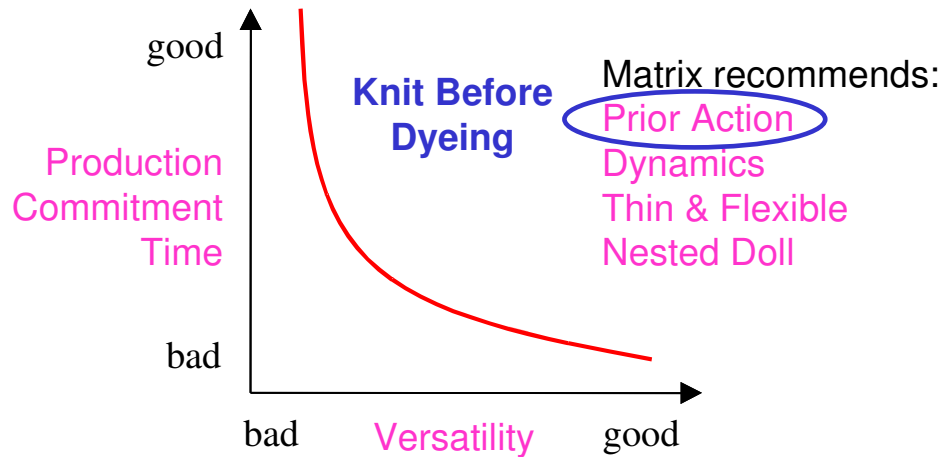


Figure 5: Benetton's Contradiction Breaking Strategy

4) Lockheed Skunkworks

Lockheed Skunkworks is a world renowned centre of excellence in terms of its ability to complete leading edge aerospace R&D in uniquely low lead-times and costs (10). Like many high-technology organisations, Lockheed faced the contradiction between the desire to effectively harness the R&D capabilities of the organization in a cost environment geared up to operate on a production line basis.

Compromise solutions to the conflict usually involve parallel operation of prototype and production facilities with prototype jobs done when there is capacity in the production side of the business. Lockheed, famously decided to completely separate out the R&D operation into what has now become a watch-word in rapid, low-cost prototyping. Although again simplistic, in terms of the Matrix, they used Principle 2 'Taking out' to successfully challenge the contradiction between R&D specification/quality and R&D cost.

Application To Exemplar Problem Situations

The above four examples are but a tiny sample of the several hundred cases examined in constructing the Matrix. Reverse engineering of historical business success stories to help generate a knowledge framework and the subsequent application of that framework to solve as yet unsolved problems are of course two different things. A case in which the tool has been used in this second, more difficult, application role is presented below. Although the case is real, the problem situation has been abstracted and considerable amounts of peripheral details removed in order to increase the relevance to a wider audience. The main point under consideration is the use of the Matrix as a way of structuring the definition of a contradiction and the subsequent use of the generic solutions to generate specific solutions.

Bridging The Gap Between Research and Market

A very early problem on which the new Matrix was used involved a research organisation who wanted to tackle their poor record of transitioning ideas into marketable products. The organisation was made up of around 100 individuals; 80% of who were technical (highly academically oriented)

‘researchers’, with the other 20% made up of ‘market researchers’. The organisation had a very shallow hierarchical structure made up of just two directors, two line managers and a varying number of ‘project managers’.

As with the large majority of business problems, the devil is in the detail. The full solution to the problem thus contains much detail – with several contradictions being defined at different levels as far down as the way one particular individual’s method of working conflicted with those of a colleague. At the highest level, which is where this analysis will focus, the overall problem was viewed as a contradiction between the thing to be improved (‘idea transition’) and the things preventing that from happening (in this case when the question ‘what’s stopping you?’ was asked the responses distilled down to issues of inadequate communication between the technical and marketing people and between the marketing people and the market). The simple process of eliciting this conflict presented a new way of thinking about the problem that had not emerged within the organisation before. Exploring the idea transition versus communication conflict further to see how real it was, it emerged that there was a genuine either/or perspective within the organisation that said they could either spend all of their time getting the product specification right or they could do the technical work necessary to transform specification into reality, but not do both. The traditional trade-off solution to this problem, would involve adjustments in the ratio of technical to market oriented people in the organisation. This is in fact what the company was looking to ‘optimise’ before TRIZ was applied to the process.

In order to utilise the new Matrix the specific idea transition versus communication conflict requires abstracting into the terms of the Matrix. In terms of the improving parameter ‘idea transition’ there was no directly obvious link to the Matrix parameters. After some discussion, the gap between specific and generic proved useful in that it crystallised the idea that the real issue was getting the product specification right. Thus the improving parameter selected was R&D specification. The conflicting parameter then was ‘communication’. The discussion to match this to the Matrix again (as intended during the formulation of the Matrix parameters) provoked further consideration of the real issue. In this case it was seen as, first, an interface problem within the organisation, and second, a lack of feedback from intended customers. Thus two worsening features were matched in the Matrix; R&D Interface and Feedback from Customer.

With these two conflict pairs defined, it was possible to use the Matrix to identify the inventive strategies used by anyone who had successfully achieved win/win solutions to the conflicts. The Matrix thus suggested the following strategies:-

Principle 24 – Intermediary (“Use an intermediary carrier article or intermediary process”)

Principle 13 – Other Way Around (“turn the process upsidedown”)

Principle 3 – Local Quality (“Change an object's structure from uniform to non-uniform, change an external environment (or external influence) from uniform to non-uniform”)

Principle 33 – Homogeneity (“Make objects interacting with a given object of the same material (or material with identical properties)”)

Principle 14 – Curvature (“turn flat things into curved things”)

These suggestions were then used as the basis of a systematic brainstorming session to connect the principles to the problem at hand. The Principles have been constructed in such a way that they make best use of the tremendous idea connecting capabilities of the human brain (11).

Among the eventually implemented ideas generated from these triggers were the identification of a (free) intermediary means of extracting both ideas from customers and non-customers and also simultaneously improving communications within the organisation, a switch from ‘technology push’ to ‘market-pull’ strategy, the exposure of the technical personnel to the realities of the

prospective customers, the matching exposure of marketing people to the realities of solution constraints imposed by (for example) the Laws of Physics, recognition that not all projects were the same size, and that therefore they did not require the same structure or number of team members, and recognition that not only were there different types of customer, or that every customer was different, or that even the same customer can be different under different circumstances, but that everyone in the organisation had to 'be the customer'.

Even the obscure and apparently not connectable 'curvature' suggestion provoked useful solution strategies – not least of which was a decision to allow everyone to 'go around' their line manager if they felt the needs of the project demanded it; and the idea that instead of the organisation seeing their customers through a window, there should be a 'floating bubble' that enabled a team to view the customer from all angles (and from inside as well as out).

Final Thoughts and Future Work

The new business Matrix has been borne of a desire to abstract the win-win strategies employed by the world's most successful businesses. Although the benefits of win-win over either/or thinking strategies are apparent to many, the application of TRIZ abstraction strategies to codify the established good-practice of business into a form that makes it generically applicable to organisations in other industries or fields, is only just beginning to emerge. The original TRIZ Matrix was constructed from many thousands of examples of technical success. The equivalent database of 'business success' is far smaller and so the new tool cannot offer the same level of either authority or guaranteed effectiveness as the original tool. On the other hand, based on the growing database of business problems it has been used to solve, it seems at the very least to offer a 'useful start'. The long term aim is to expand the database to include more examples, and a programme of systematic research is underway to continue this process.

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