

# **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**

Question. What have Cisco, Virgin, Schwab, GE Capital, Benetton, Enron, South West Airlines, Home Depot, Wal-Mart, America West, eBay, Barnes and Noble, Body Shop, Sephora, IBM (e-business), Sony Computer Entertainment, Shell, Dell, Disney, Harley-Davidson, IKEA, Tesco, Starbucks, Hotmail and Toyota have in common? Answer. Two things. One; non-linear growth patterns. Two; they have achieved their phenomenal

business performance by successfully challenging the prevailing trade-offs and conflicts of their industry and ‘eliminating’ key contradictions their competitors assumed were inherent.

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 – one of the first published articles quantifying the benefits of win-win approaches.

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

	(%) 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

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 TRIZ (2, 3) is that ‘someone, somewhere has most likely already solved something like your problem’. One of the key elements 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 tools to help problem, conflict or opportunity owners achieve win-win outcomes in systematically reproducible manners.

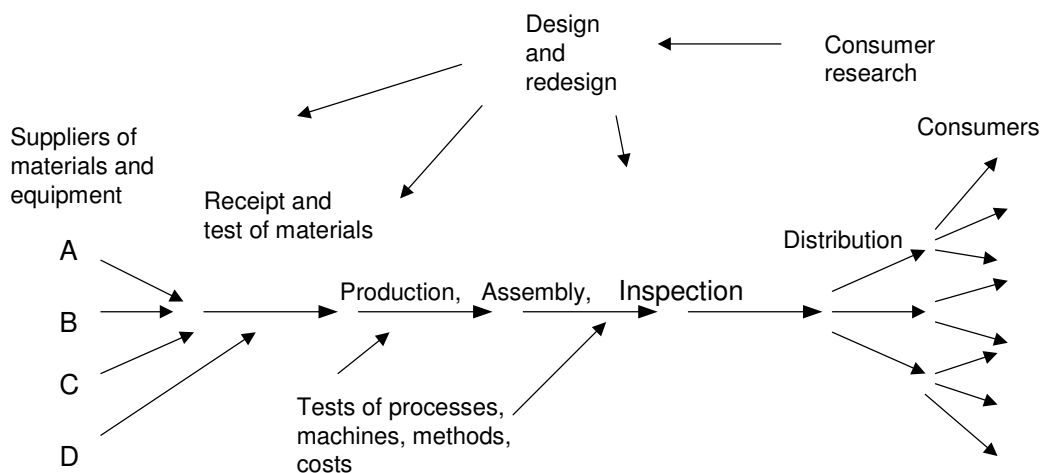
## BUSINESS MATRIX

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. Although the tool is now relatively old, and is dismissed as a ‘toy’ in some parts of the TRIZ community, the concept is believed to be fundamentally sound and that its only current flaw is that it has not been updated to match the evolving world of invention.

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 – Figure 2.

**Figure 2: Production Viewed As A System – W.E.Deming (1950)**



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 3.

**Figure 3: 31 Parameters of the Business Contradiction Matrix**

- |                                     |                                      |
|-------------------------------------|--------------------------------------|
| 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    |
|                                     | 26. Convenience                      |
| 11. Supply Spec/Capability/Means    | 27. Adaptability/Versatility         |
| 12. Supply Cost                     | 28. System Complexity                |
| 13. Supply Time                     | 29. Control Complexity               |
| 14. Supply Risk                     | 30. Tension/Stress                   |
| 15. Supply Interface                | 31. Stability                        |

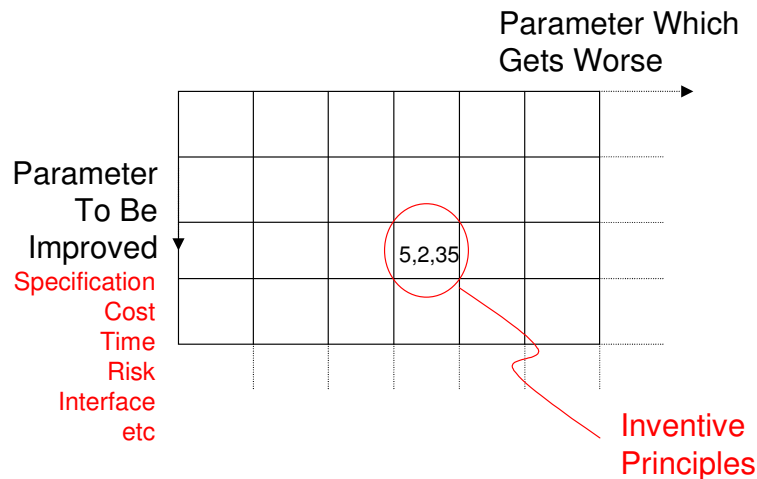
Throughout the subsequent process of identifying case studies that fitted the structure, and beyond to the present time, a philosophy of flexibility and amenability to change has been adopted. As it happens, the analysis has supported the segmentation structure used, but as with any new tool, the current 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 4.

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 available published 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:

**Figure 4: Sample of Completed Matrix Highlighting Method of Operation**



### 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.

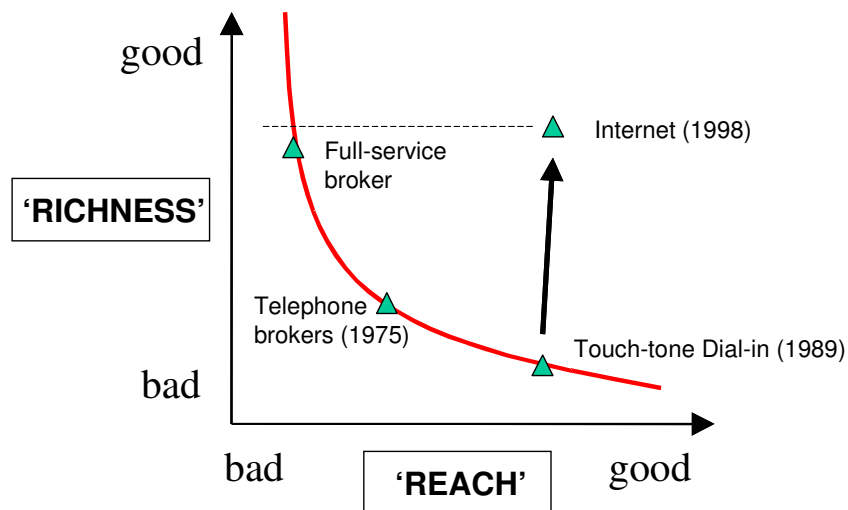
To distill the success of South West into one or two Inventive Principles would be somewhat trite in light of the breadth of solutions that have contributed to their overall success, but for the purposes of the Matrix, the following strategies were abstracted from the reference:

- 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 5 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 5: 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

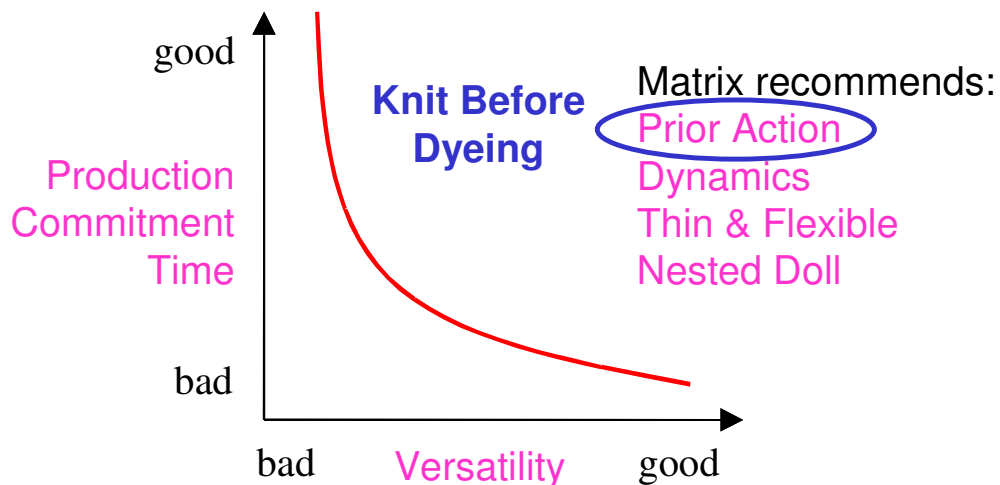
The fashion industry faces a challenge every year in the race to get product to the customer once the season's colours have begun to demonstrate their popularity. Benetton's success is to a significant extent built from the way they have solved the contradiction between the time available to commit a 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' – Figure 6. 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 6: 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 watchword 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.

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. The new Business Matrix has been validated in this application role over the last two years on a number of real business conflict issues. The majority of these cases are unfortunately not available for circulation in the public domain. A case – looking at a problem involving poor transition of research to market – is however available in Reference 11.

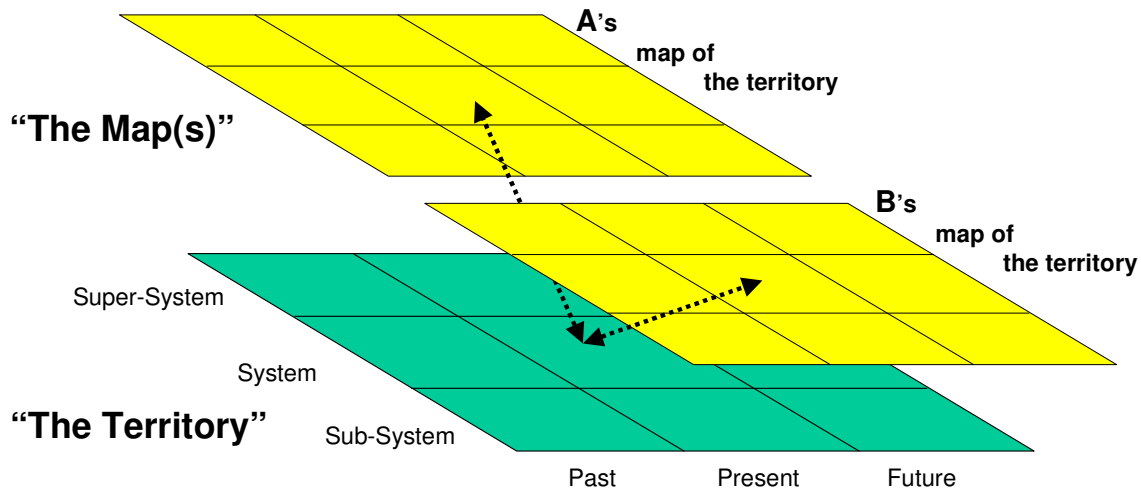
The full Business Matrix is available in electronic form at Reference 12. Further case study applications of the Matrix will be published in coming months. We turn our attention now, however, to the consideration of physical contradictions in a business context:

## **PHYSICAL CONTRADICTIONS**

Physical contradictions of the sort 'X should be Y AND notY' or 'A is right and B is right, but their two rights are different' are very common in business situations. Resolution of such conflicts is often amenable to use of the strategies contained within the separation tools within classical TRIZ. It is important to note, however, that a vital prior step is to gain a clear understanding of the root causes of the conflict. We have found that the most effective means of achieving this understanding comes through the use of the three-dimensional form of the TRIZ system operator tool described in Reference 13. The concept of segmenting space, time and 'interface' (14) and the key phrase 'the map is not the territory' (15) – see Figure 7 – are crucial in terms of identifying where, when and how conflicts arise. A very simple means of applying the Figure 6 tool is to describe the given problem situation in each of the boxes. The emergence of differences between boxes then identifies the form of contradiction present.

The most common type of contradiction to emerge based on experience to date is the one drawn in the figure – that of different interpretations (maps) of the actual situation (territory). Often the conflict is resolved immediately upon drawing this picture. In cases where it is not, the physical contradiction separation strategies become the next available set of triggers to act as a focus for identifying win-win (as opposed to win-lose compromise), after the figure has been used to identify the type of contradiction present. In this regard, we have found that the time, space, condition and transition separation strategies found in classical TRIZ apply equally well in business situations. We have also found that the same basic list of Inventive Principles is relevant in each separation strategy – albeit the size of the lists can be usefully expanded to encompass more of the 40 available Principles. The list typically then used for business-type physical contradiction situations is reproduced in Figure 8.

**Figure 7: ‘The Map Is Not The Territory’ in a Business Conflict Context**



**Figure 8: Physical Contradiction Resolution Strategies in a Business Context**

Separation In Space	Separation in Time	Separation on Condition	Separation by Transition
1,2,3,4,7,13,14,17,24,26,30,37	1,9,10,11,15,16,18,19,20,21,29,34	12,28,31,32,35,36,38,39,40	1,5,6,7,8,13,22,23,25,27,35

Of the four separation strategies, we also note differences in the rate and power of application. Thus, for example, analysis of published cases suggests that Principle 1, ‘Segmentation’ is easily the most commonly applied means of resolving many physical contradictions. On the other hand, the strategies recommended by the separation on condition and transition contradiction types seem to present the opportunities for the most substantial win-win outcomes.

By way of a simple illustration of both of the above points, a brief example is illustrated below. The case is real, but the details have been abstracted in order to make it relevant to a TRIZ audience.

### **The Patriarch**

X is a self-made man. He has set up a pre-prepared food products company and nurtured its growth over a period of 20 years. The company now employs over 200 people. X has been the source of nearly all of the sales made by the company to the extent that the company does not possess a sales team. The basis of X’s success has been the personal relationships he has built up with the client base over the life of the company. It is now time for X to retire, however, and he is in the process of handing over the running of the company to his oldest son. He has stated that he still wants to help in the sales area during

the transition. One of the first things the son does, however, is to appoint a sales manager. He does this because a) he is not interested in the sales side of the business, and b) because he wants to help his father transition to a happy retirement as soon as possible. Within two months of the appointment of the sales manager, two major clients have been lost, and total sales are down by over 20%.

(As initially presented, this problem was expressed as ‘how do we recover/improve sales?’ – the above description is the result of an initial problem definition session using the ‘why/what’s-stopping’ root cause analysis described in reference 16.)

The outcome of the root cause analysis was a recognition that the father and the new sales manager had very different maps of the client territory – the father thinking that the clients were primarily buying from the company because of his personal relationships; the sales manager thinking they were buying because the product offered the best value on the market. It was eventually agreed that the core contradiction was that ‘the father should be present and not present’.

Separation in both space and time using ‘segmentation’ offered an immediate resolution strategy to the contradiction – in that both the father’s and the sales manager’s maps were correct at different times and with different clients. Segmentation turned out to be simple and easy to apply, and it did indeed restore sales very quickly, but it didn’t resolve the longer term issues associated with the fact that those clients who bought from the company because of their personal relationship with the father were eventually going to be disappointed when his retirement was full-time.

The eventual solution to the problem came from the – initially un-promising sounding – Principle 27, Cheap/Short Living suggestion emerging from a transition to the sub-system solution direction.

The answer; placing an image of the father on the labelling of the company’s products. The method; the clients who bought from the company because of the father could now see him on every product they bought from the company.

## **FINAL THOUGHTS AND FUTURE WORK**

The new Business Matrix and physical contradiction resolution tools have 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 they have been used to successfully solve, it seems at the very least that they 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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