Can The TRIZ Method Help Improve Your Company?

No matter what industry you work in, or the products your company offers, it's likely you spend at least part of your day working to solve a range of problems, from everyday annoyances to strategic challenges that could change your company's fate for years to come.

And while it probably seems that each new headache is indeed novel and unique to your business, chances are it's been faced in some form or another by someone, somewhere, before.

Wouldn't it be wonderful, then, to discover an approach that let you sort problems and challenges into specific categories, and then apply your creativity and skills to turn those problems into opportunities for innovation, growth, greater profits, etc.?

Brace yourselves, because just such an approach is spreading to more and more businesses around the world. The *TRIZ method*, a Soviet-era approach to formalizing and systematizing the search for new ideas and innovative solutions, may just hold the key to transforming your business process management and give you the strategic and tactical edge you need to accomplish your organization's goals.

What Is the TRIZ Method? A Brief History

The term TRIZ (pronounced “treez”) is a Russian acronym for the phrase *Theoriya Resheniya Izobreatatelskish Zadatch.* This translates as “Theory of Inventive Problem Solving” in English, where it has its own acronym: TIPS.

First developed by Genrich Altshuller and his team during the 1940s in the former Soviet Union, TRIZ was designed to provide humans with a systematic methodology to focus creativity and encourage inventive solutions to problems by formalizing and simplifying the ways in which problems are identified and categorized.

The foundation of TRIZ is systematic logic, derived from the review and analysis of thousands of patents.

Why patents? Because patents were often filed for inventions and processes designed to implement necessary improvements or solve common problems—and often presented iterative improvements as multiple, sequential patents often solved the same problem in different ways or provided incremental improvements to the same solution—Altshuller theorized that examining them *en masse* would provide a view of technological innovation both broad and deep enough to allow his team to build a problem-solving system focused on harnessing that same innovation and creativity.

The patents examined during the early days of TRIZ covered a staggering array of topics and fields.

After narrowing 200,000 patents to 40,000 especially innovative patents, Altshuller spent the ten years between 1964 and 1974 analyzing these patents and assigning them values based on what he called *levels of innovation.*

Not every idea will be world-changing in its ambition or scope, and Altshuller’s levels, ranging from 1 (least innovative) to 5 (most innovative) reflect creative value presented by any given patent.

LEVEL	DESCRIPTION	CONTRIBUTION (%)

1	Conventional or apparent solution, using well-established methods.	32%
2	Small innovations within established paradigms. Improvements introduced, often with some measure of compromise.	45%
3	Essential, transformative improvements to existing systems and technology.	18%
4	Innovation and invention driven by science and creative endeavor rather than technology.	4%
5	Discovery of new ideas and solutions. New systems derived from original and transformative discoveries.	1%

Altshuller's team of researchers found that approximately 95% of challenges faced by engineers in a given industry have been solved, often in multiple ways that have significant overlap, over and over again.

Only 1% of the problems faced would require a Level 5 innovation to overcome.

Instead, most of what Altshuller called "inventive problems" were those that contained conflict between certain common elements. Over time, these problems would be solved again, and again, and again, in the same ways, with years or

decades stretching between each “new” solution.

It occurred to Altshuller that, if folks trying to solve problems had access to the information and methods used to solve the problem in the past, problem solving would be quicker, smoother, and less disruptive.

He also found that optimization of one process or technology often created conflict with an unoptimized but related process or technology.

These conflicts (also called *technical contradictions*) lead to the optimization of the less evolved processes as problem solving skills are applied to address these discrepancies.

The formerly sub-optimal process will then create a technical contradiction with another process or technology, and the process will repeat itself.

Over time, this constant improvement leads to an ideal final result wherein all areas of the problem have been overcome with maximum efficacy, accuracy, and efficiency.

For Altshuller, no technical system stood alone, but was instead a supersystem made up of a network of subsystems performing specific functions.

In addition, every supersystem existed in an environment that was itself a supersystem known as a *field*.

With regard to problem definition within a given system, each unit that performed a function is defined as either a *tool* (S2) or an *object (*S1*).*

The interaction between these two, and the effects of the field upon both, can lead to either useful or harmful action. This is known as an *S-field model*.

Assuming iterative improvement, these interactions push every system toward an optimal state and allow for the expansion of existing understanding of standard solutions for the problems addressed.

Other important terms related to the use of TRIZ methodologies include:

- **ARIZ (Algorithm for Inventive Problem Solving):** The foundational analytical tool of TRIZ, designed to turn complex problems into easily solved ones.

- **Law of Ideality:** As any system moves toward ideality, it becomes increasingly reliable, simple, and effective. All technical systems evolve toward ideality.
- **Ideal Final Result:** The perfectly optimized end goal of any idealized process.

Companies can use TRIZ principles to create new products, develop innovative solutions to difficult problems, and bring digital transformation to their existing systems.

How the Basic TRIZ Method Works

As may be expected of a problem-solving method focused on inventive principles that's been tinkered with by problem-solvers and data scientists for the better part of a century, the theory of inventive problem solving has undergone some refinement itself.

At its heart, the TRIZ problem solving method remains rather straightforward.

1. Those attempting to solve a given problem gather necessary materials, including existing tools, processes, and reference materials.
2. They also collect, organize, and analyze information on competing solutions, practical experience with the problem, and those old scientific standbys, trial-and-error and inspiration.
3. Using ARIZ, the goal is to take the specific problem at hand and transform it into a generic one. Once transformed, generic solutions drawn from the tools at hand can be applied, allowing the problem solvers to refine the generic problem into a specific solution to the original specific problem.

If this sounds complicated, never fear. The assumption driving TRIZ methodology is, in effect, "most problems are not original to our circumstance or even our industry, and someone, somewhere, has already faced and overcome this issue, likely in various ways."

Beyond ARIZ, the TRIZ ideation process centers around what's known as a *contradiction matrix*. This matrix puts to work two important concepts at the root (so to speak) of TRIZ:

- **The 40 Inventive Principles**, which are 40 patterns for inventive problem-solving Altshuller's team extracted from their patent analysis. These inventive principles cover everything from physical events or descriptions such as composite materials and mechanical vibration to concepts such as continuity of useful action, "nested doll," and "turning lemons into lemonade."
- **The 39 Engineering Parameters**, or traits of the system or process being examined and improved through the TRIZ process. Each parameter covers scientific effects and descriptive traits such as physical dimensions, reliability, temperature, and complexity.

The contradiction matrix itself measures 39 x 39, allowing for all the engineering parameters to appear on both axes.

The Y axis represents parameters improving at the junction of a particular conflict, while the X axis represents those worsened by the improvement of those on Y.

These conflicts may include, for example, physical contradictions, such as increased loss of time (which is to say, lower cycle times for production), but increased thermal expansion during the process.

Solving complex problems with TRIZ tools means identifying necessary trade-offs and discarding solutions that fail to achieve the proper improvements to the desired parameters.

Problem-solving specialists apply the 40 inventive principles to the conflicts identified using the contradiction matrix.

Each cell of the contradiction matrix offers suggested principles to apply, allowing the user to narrow their efforts and apply existing knowledge without eliminating the breathing room necessary for creativity and innovation.

TRIZ Methods: Practical Benefits

Whether you call it TIPS or TRIZ, it's clear that it has powerful transformative potential for ideation and problem solving for companies of all sizes and types.

It's hardly surprising, then, to discover that it's already in use by more than 5,000

companies and government organizations around the globe to augment human creativity and innovation.

TRIZ integrates extremely well with other established business process improvement frameworks, and can be a powerful tool when used in conjunction with robotic process automation and advanced data analytics.

Some companies have radically transformed their entire organizations solving problems with TRIZ. Samsung, for example, has long partnered with Russia (and the former USSR) to achieve important scientific and commercial innovations.

This relationship gave them access to TRIZ in 2000, nearly a decade before some of their competitors in the West.

Samsung was also implementing other performance enhancing methodologies such as Six Sigma at the same time, but TRIZ quickly became the heart of all its business processes.

The result? Samsung garnered more than 50 patents in 2003 alone, and saved more than $100 million from a single project in 2004. In the years since, Samsung has centered its strategies for innovation and growth around TRIZ, and created a "creative elite" within the company that uses TRIZ to transform problems into patents and profits.

Not all companies are quite as engaged in TRIZ as Samsung, of course. For some, like pasta manufacturer Muellers, TRIZ is a source of surgical, strategic creativity that leads to competitive innovations like "Pot-Sized" pasta that solves an enduring, but largely ignored, issue within the pasta industry: "Why are pasta, linguini, bucatini, etc. almost always too long for the pot used to cook them?"

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Regardless of how it's embraced, TRIZ offers companies of all sizes, industries, and ambitions a range of benefits, including:

- A greater number of high-quality, low-cost solutions in less time.
- Additional innovative tools that encourage creative development in engineers, analysts, and other problem-solvers.

- A large pool of innovative scientific tools and principles within TRIZ knowledge bases, allowing even companies with minimal TRIZ training and experience to quickly generate a higher ratio of useful, actionable ideas.
- A systematic, rather than random, approach to problem solving and innovation.
- Enhanced data management and a much larger, richer datasphere for the company. In the age of Big Data, more information that can be readily leveraged across business units is a competitive advantage not to be overlooked.
- A broad variety of "templates," i.e. patterns for inventive solutions to generic problems, reducing the risk of overlooking a winning option.

Let Creativity and Innovation Take Root with TRIZ

If your current problem-solving methods are more "futility" than "ideality," it might be time to consider how the tools of TRIZ can help you put your creativity to work.

By integrating TRIZ with your process management environment, you'll save time and frustration with standard solutions for common problems while gaining the advanced tools you need to overcome more unusual challenges in competitive performance, productivity, and operational efficiency.

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