

# TOC and Six Sigma -- Better Together

With my reputation as a vocal proponent of the Theory of Constraints as a framework for management and improvement I often get asked about how it compares with Six Sigma. Coming from a pre-independent background that included working for a pre-six-sigma, mature TQM, Baldrige-winning company that was big into process management, I feel pretty comfortable in both realms. (Despite being a "sans-a-belt" practitioner.)

The two approaches do come to improvement from different directions, although that is not to say that they are in any way incompatible. But rather than rely purely on my own interpretation of Six Sigma, here's a description of it from the [Six Sigma Forum](#)...

## WHAT SIX SIGMA IS

Basically, Six Sigma is a high-performance, data-driven approach to analyzing the root causes of business problems and solving them. It ties the outputs of a business directly to requirements of the marketplace.

## SIX SIGMA GOALS

At the strategic level: Align an organization keenly to its marketplace and deliver real improvements (and dollars) to the bottom line.

At the operational level: Move business product or service attributes fully within the zone of customer specifications and dramatically shrink process variation, the cause of defects that negatively affect customers.

The key words and phrases that I take away from this description, as well as from my reading on the subject, are:

- data-driven approach to analyzing root causes
- deliver real improvements to the bottom line
- product or service attributes/customer specifications
- shrink process variation, the cause of defects

Six Sigma is a problem-solving process. Given a particular problem, the tools and techniques it provides are obviously effective, given the success attributed to it by its proponents. Starting with roots in Statistical Process Control, and with tools that come out of its precursor, TQM, Six Sigma adds a focus on bottom line impact that has made it worth the attention of top management, a necessary condition for effective improvement efforts. It also brings a structure of expertise, with the vaunted "Black Belt" certifications that serves the purpose of helping to focus attention of these experts on one or at most very few projects. This focus is a major benefit in getting things done. Management-supported focus on the details of individual processes and the problems associated with them is, in my humble opinion, the core strength brought to the party by Six Sigma.

If I were to draw up a parallel list of phrases associated with the Theory of Constraints (TOC), it might look like the following:

- logic-driven approach to analyzing root causes
- expand top line performance to drive bottom line growth

- market segment offers/customer value
- assure stable system performance, the source of time and clarity for improvement

TOC is an approach to managing complex systems, i.e., organizations comprised of people working in interdependent, interacting processes. The objective of TOC is to grow a system's capability to achieve more of its goal, now and in the future. It consists of a "theory" of dealing with systems by [identifying and managing constraints](#), which are often based not in the technical limitations of a process (that the tools of Six Sigma are so good in dealing with), but in the paradigms, practices, and policies of the people who are involved with them. Hence, a key component of the TOC "body of knowledge" are the in the logical thinking and communication tools known as the [TOC Thinking Processes](#). These Thinking Processes, when used by people with intuition about the system in question, go a long way to providing what Deming refers to as "profound knowledge," and providing a way for managers to be able to better predict the outcomes of their actions.

**To compare and contrast...**

Six Sigma	TOC
<ul style="list-style-type: none"> <li>• Six Sigma works primarily at the level of a local link of a system's chain, and it's interaction with it's immediate supplier and customer processes.</li> </ul>	<ul style="list-style-type: none"> <li>• TOC works primarily at the level of the chain, driving focus to the weakest link and then to the linkages between that constraint and other aspects of the system.</li> </ul>
<ul style="list-style-type: none"> <li>• Six Sigma, with it's data-based philosophy is great for solving technical issues that are subject to quantitative analysis.</li> </ul>	<ul style="list-style-type: none"> <li>• TOC, with it's logic-based tools, provides strength in dealing with what might be considered "qualitative" analysis, helpful for dealing with "rock and hard place" dilemmas.</li> </ul>
<ul style="list-style-type: none"> <li>• Six Sigma approaches root causes with traditional "quality tools" like the fishbone (Ishakawa) diagram, with searches for many possible root causes of a single problem. This is very appropriate for relatively simple (designed) systems, but is <a href="#">inappropriate for complex, evolved, or self-referencing organizational systems</a>.</li> </ul>	<ul style="list-style-type: none"> <li>• TOC's approach to root cause analysis, centered in the Thinking Process known as the Current Reality Tree, starts with a range of diverse problems with which the system suffers and then builds rigorous cause-and-effect logic to identify one or very few deep causes at the root of them all.</li> </ul>
<ul style="list-style-type: none"> <li>• Six Sigma, with its quality roots, focuses on minimizing</li> </ul>	<ul style="list-style-type: none"> <li>• TOC first strives to build "logistical" processes that</li> </ul>

<p>variation associated with the processes that get put under it's microscope.</p>	<p>are robust enough to deal with current variation, and through concepts like the Five Focusing Steps and "buffer management," identify where attacks on variation will give us the biggest bang for the buck.</p>
<ul style="list-style-type: none"> <li>• The Six Sigma approach to value for the customer is closely tied to assuring that products and services delivered meet or exceed specifications or requirements of those outputs.</li> </ul>	<ul style="list-style-type: none"> <li>• TOC extends its use of the constraint to define maximum value for a market segment or customer in terms of the constraint or core problem of their system. Having identified that, positioning one's product and offering in terms of assisting with that critical issue is the main route to increased value.</li> </ul>

### Maximizing Six Sigma Effectiveness with TOC

I feel that while the two approaches are different, they are highly complementary. TOC, or Constraint Management, provides an environment in which the players can understand their system profoundly. It strives, with it's logistical solutions like [DBR Operations Management](#), [Critical Chain Project Management](#), and [Replenishment Distribution](#), to stabilize those systems to a degree that the places that Six Sigma efforts should be applied is obvious and focused, and that the outcome of those problem-solving efforts can be predicted and capitalized upon to the max.

The basic process of TOC-based improvement is based on the fact that maximum systemic (bottom line) improvement comes from addressing the system's very few current constraints and looking forward to where the next constraint may arise once the current is dealt with. The basic process is to...

- 1 - Identify the system's constraint(s).
- 2 - Determine a strategy to exploit that constraint to its fullest capability.
- 3 - Subordinate all other actions to that exploitation strategy (Drive out foot-shooting policies and activities -- Don't let other aspects of the system inhibit the throughput of the constraint).
- 4 - Elevate the constraint (typically by acquiring more constraint capability or offloading from it to another piece of the system).
- 5 - When the constraint is "broken," and another aspect of the system now becomes its limiting factor, go back to step 1 -- Do not allow inertia to become another constraint.

Project selection, one of the key drivers of Six Sigma success, should take advantage of the profound knowledge of the system afforded by a constraint focus. It should be evident that the best use of Six Sigma is primarily to get more throughput through the constraint (Step 2 - Exploitation). Use Six Sigma projects to drive waste out of the constraint. If the constraint is in a manufacturing process, projects associated with scrap reduction and uptime improvement should be applied to its operation. If the constraint is in the market; that is, if you have more capacity than demand, then internal Six Sigma projects should be aimed at doing things that will make the system's offerings more attractive to potential customers -- typically associated with customer response time and reliability of offered promises.

Secondarily, Six Sigma tools and techniques can be used to drive down disruptive variation in non-constraint system processes that either interfere with or waste the output of the constraint (Step 3 - Subordination). Again using a manufacturing example, once product has passed through an internal constraint process, function, or resource, you want to treat it like gold. After all, to replace it will require another trip through the precious constraint. Projects on downstream processes should therefore focus on serious issues of quality of output and scrap reduction. Projects on upstream processes are primarily aimed at reliability so that the constraint is never starved for work or presented with poor quality inputs.

With these kinds of projects as the focus of Six Sigma efforts, maximum bottom line impact should result. Make sure, however, that when the constraint moves as a result of your efforts, the focus moves with it. Just when you're getting good at getting more through the system in terms of quantity, you may need to shift to thinking about speed instead of volume to attract more market.

Don't waste the precious time and attention of your Black Belts (and your management) on projects that are only strengthening already stronger links of your chain. Instead, use TOC to focus their efforts on the weak links. That is the only place that will yield truly provide systemic, bottom-line improvement.