http://www.qualitydigest.com/inside/quality-insider-article/stop-wasting-improvement-resources.html

Stop Wasting Improvement Resources

Theory of constraints and lean Six Sigma project selection so the enterprise as a whole benefits

Forrest Breyfogle III | 10/22/2009

The financials of an enterprise are a result of the integration and interaction of its processes, not of individual procedures in isolation. Using a whole-system perspective, one realizes that the output of a system is a function of its weakest link or constraint. If you're not careful, you can be focusing on a subsystem that, even though improved, doesn't affect the system's overall big-picture output.

In lean Six Sigma and lean *kaizen* event programs, improvement projects are often selected from a list of potential opportunities that were determined from a brainstorming session. This effort might provide some initial gains when starting a deployment; however, it typically stalls out and the process improvement teams are laid off when times get tough. The reason for this downsizing is that often process improvement efforts are not expended in areas where the overall enterprise benefits the most; e.g., focusing on sales and marketing when excess production capacity is available.

Process improvement efforts need to focus on the orchestration of efforts so that this work concentrates on overall system optimization. Unfortunately, organizational-chart functional thinking can result in competing forces for process improvement labors, where much of this work does not benefit the enterprise as a whole.

With theory of constraints (TOC), systems are viewed as a whole, and work activities are directed so that whole-system performance measures are improved. To illustrate this, consider the system that is shown in figure 1, below. Similar to water flow through a garden hose, squeezing one portion of the hose reduces the flow; i.e., step 5 in the figure.

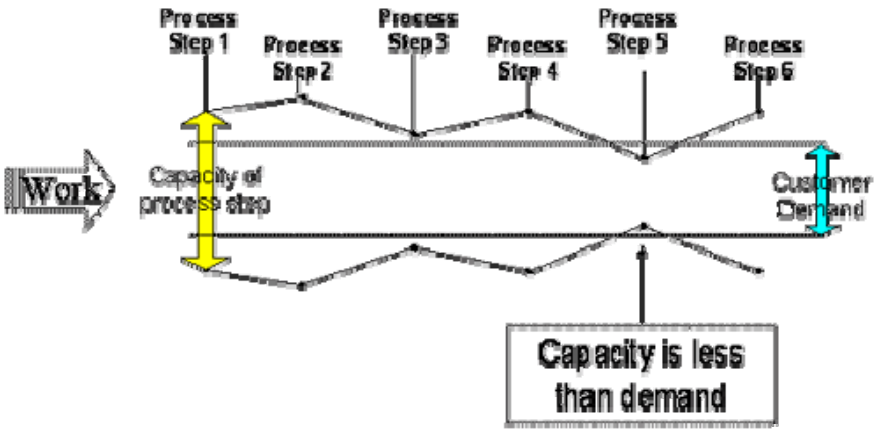

Figure 1: Identifying the overall system constraint.

From Figure 10.1 Integrated Enterprise Excellence, Volume II—*Business Deployment: A Leader's Guide for Going Beyond Lean Six Sigma and the Balanced Scorecard*, Forrest W. Breyfogle III, Bridgeway Books, 2008

Without considering the entire system, we might be spending a great deal of time and effort working on process step 2 because this step is not meeting its objectives relative to operating efficiencies, equipment utilization, and so forth. If we consider the figure to represent a series of departments through which a transaction is processed, where each step has a separate manager who is trying to support a strategy to improve the capacity of the business, without the theory of constraints concept, each department would apply resources to improve its step only. This would create a situation in which only one sixth of the improvement resources are being applied to the single location that is limiting the system capacity. From this figure, we note that improvements to process step 2 will not significantly impact the overall system and may actually degrade the overall metrics if additional work-in-process is created from the improvements.

The TOC system chain extends from market demand through the organization chain to suppliers. Let's consider an example when this high-level view of the overall system is not addressed. An organization works at improving internal process efficiencies. Capacity then increases. Excess inventory is then created because there is not sufficient demand. It is then discovered that the constraint is really the sales and marketing process.

Within an organization, there are often constraints that we may or may not consider. Types of constraints include market, resource, material, supplier, financial, and knowledge or competency. We need to look at the rules (i.e., policies) that drive the constraints.

Example: Theory of constraints

In this example, I will use terms typically associated with manufacturing; however, the concepts apply equally to transactional processes.

A simple system is shown in figure 2. Raw materials are processed through four component steps to produce a finished product. Each process step is an overall value stream link. The capacity of each step is described in the figure along with the market demand of 105 units per day. The goal is to make as much money as possible from the process.

Note that in situation 1 in figure 2 the capacity of Step C is 75, which is less than the market demand of 105. Even though other steps in our value stream process may not be performing up to their equipment utilization and efficiency goals, focus should be given first to increasing the capacity of Step C. From this enterprise-system analysis, Step C would be an opportunity for a lean Six Sigma improvement project.

Upon completion of this project for Step C, the process then exhibited the characteristics of situation 2 shown in the figure. An analysis of this situation indicates that the constraint is now at Step A. From this enterprise system analysis, it would now be appropriate for a lean Six Sigma project to focus on Step A.

Upon completion of a lean Six Sigma project of Step A, the process then started exhibiting the characteristics of situation 3. An analysis of this situation indicates that all four steps of the process have enough capacity to meet the market demand. The internal system constraints relative to satisfying a market demand of 115 units per day have been removed. The constraint has moved outside the system to the market place. The next lean Six Sigma project should focus on determining what can be done to increase product demand through improvements in the marketing and sales processes.

This example illustrates the importance of analyzing the big picture to determine where efforts should focus when creating projects. Losing sight of the big picture can lead to the ineffective utilization of resources and the sub-optimization of processes.

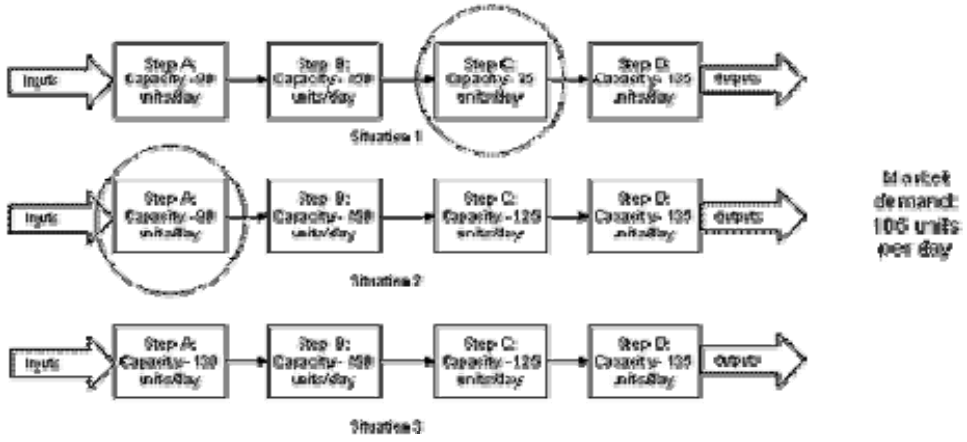

Figure 2: System constraint identification and resolution. Click here for larger image.

From Figure 10.1 Integrated Enterprise Excellence, Volume II—*Business Deployment: A Leader's Guide for Going Beyond Lean Six Sigma and the Balanced Scorecard*, Forrest W. Breyfogle III, Bridgeway Books, 2008

Shortcomings of traditional process improvement efforts

The implementation of traditional total quality management (TQM) and lean Six Sigma has often been accomplished by dividing the system into processes and then optimizing the quality of each process. This approach is preferable to chasing symptoms; however, new problems can be created if the individual process is not considered in concert with other processes that it affects.

The theory of constraints approach focuses on reducing system bottlenecks as a means to continually improve the performance of the entire system. Rather than viewing the system in terms of discrete processes, TOC addresses the larger systematic picture as a chain or grid of interlinked chains. The performance of the weakest link determines the performance of the whole chain.

TOC considers three dimensions of system performance in the following order: throughput (total sales revenues minus the total variable costs for producing a product or service), inventory (all the money which a company invests in items it sells), and operating expense (money a company spends transforming inventory into throughput). Focus on these dimensions can lead a company to abandon traditional management cost accounting while at the same time causing an improvement in competitive price advantage.

Application of TOC in an overall business system

Previous articles have described the following aspects of the nine-step integrated enterprise excellence (IEE) business-management-governance system, as illustrated in Figure 3:

- IEE Step 2: Predictive Performance Measurements: Going beyond red-yellow-green scorecards
- IEE Step 2: Are Your Business Metrics Measuring the Right Thing?: Don't base your metrics on your organizational chart
- IEE Step 5: The Balanced Scorecard: Issues and Resolution

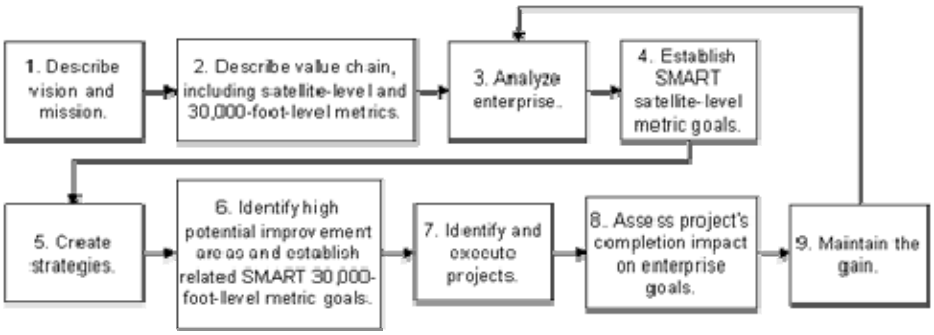

Figure 3: Integrated Enterprise Excellence System. Click here for larger image.

From Figure 4.7 Integrated Enterprise Excellence, Volume II—*Business Deployment: A Leader's Guide for Going Beyond Lean Six Sigma and the Balanced Scorecard*, Forrest W. Breyfogle III, Bridgeway Books, 2008

TOC would be part of the Integrated Enterprise Excellence "analyze enterprise" (step 3), which would provide input to the following sequence:

1. Determination of realistic business financial goals (step 4).
2. Creation of analytically/innovatively determined targeted strategies (step 5).
3. Identification of potential improvement focused areas (step 6).
4. Recognition of targeted projects so that the business as a whole benefits (step 7).

The integration of TOC within the integrated enterprise excellence system provides an overall business-management system so that lean Six Sigma and lean *kaizen* events improve the overall enterprise financials.

ABOUT THE AUTHOR

CEO and president of Smarter Solutions Inc., Forrest W. Breyfogle III is the creator of the integrated enterprise excellence (IEE) management system, which takes lean Six Sigma and the balanced scorecard to the next level. A professional engineer, he's an ASQ fellow who serves on the board of advisors for the University of Texas Center for Performing Excellence. He received the 2004 Crosby Medal for his book, Implementing Six Sigma.

E-mail him at forrest@smartersolutions.com

Additional Smarter Solutions Resources

1. Breyfogle, F. W. (2009) "The Elephant in the Room – Corporate Performance Management Issues and its Reinvention: Going Beyond Lean Six Sigma and the Balanced Scorecard," Smarter Solutions, Inc.
2. Breyfogle, F.W. (2009) "Creation of Effective Organizational Predictive Metrics that Lead to the 3 Rs of Business" Smarter Solutions, Inc.
3. Breyfogle, F. W. (2008), *The Integrated Enterprise Excellence System*: An Enhanced, Unified Approach to Balanced Scorecards, Strategic Planning, and Business Improvement, Bridgeway Books, Austin, TX.
4. Breyfogle, F. W. 2008. *Integrated Enterprise Excellence Volume I—The Basics*: Golfing Buddies Go Beyond Lean Six Sigma and the Balanced Scorecard, Bridgeway Books, Austin, TX.
5. Breyfogle, F. W. (2008), *Integrated Enterprise Excellence Volume II—Business Deployment*: A Leaders' Guide for Going Beyond Lean Six Sigma and the Balanced Scorecard, Bridgeway Books, Austin, TX.
6. Breyfogle, F. W. (2008), *Integrated Enterprise Excellence Volume III—Improvement Project Execution*: A Management and Black Belt Guide for Going Beyond Lean Six Sigma and the Balanced Scorecard, Bridgeway Books, Austin, TX.
7. Integrated Enterprise Excellence Resource Center containing over 100 articles (http://www.smartersolutions.com/pdfs/online_database/register.php) .
8. Dickman, S. and Breyfogle, F. W. (Winter 2008-2009) "New Methods to Achieve Production and Financial Gains," *M-World*, American Management Association.
9. Video – Integrated Enterprise Excellence (IEE) Case Study: Oracle Packaging (http://www.smartersolutions.com/casestudy/oraclepackaging/orl_asset_orlpck091808.htm).
10. Smarter Solutions' Executive Overview, Achieving Enterprise Excellence,
    Description: http://www.smartersolutions.com/theeaglesview.htm
    Dates: http://www.smartersolutions.com/lsstwcalendar.htm#Exec1day.