Supply Chain / TOC / Lean / Six Sigma
- Where & How they fit together.

October 2010
**Definition:** The Supply Chain Operational Reference Model is intended to integrate the well-known concepts of business process re-engineering, benchmarking, and process measurement into a cross-functional framework that all groups can build upon.

**Purpose:** to define the structure and visibility parameters necessary so that companies can apply state-of-the-art systems and proven best practice techniques across functions with a standardized approach.

**Approach Principles:**
- Define supply chain structure and provide common language.
- Establish value stream(s).
- Analyze work, material and information flow(s).
- Measure performance.

**Critique:** SCOR is a structure and framework methodology in the strategic development of an organization so training and learning is limited. The problem solving and opportunities captured are a result of the Lean and Six Sigma activities which makes them complimentary of each other as well as inter-twined for success.
Definition: According to TOC, every organization has - at any given point in time - at least one constraint which limits the system's performance relative to its goal.

Purpose: TOC is an overall management philosophy. It is based on the application of scientific principles and logic reasoning to guide human based organizations.

Approach Principles:
- The 5 focusing steps
  - Identify the constraint.
  - Decide how to exploit the constraint.
  - Subordinate all other processes to above decision.
  - Elevate the constraint.
  - If, as a result of these steps, the constraint has moved, return to Step 1.

Critique: Dr. Goldratt states the methodologies should not compete, they should work together to create better results to generate and disseminate more knowledge.
Lean

• **Definition:** In the simplest of terms, Lean aims to increase value while eliminating waste. Further the APICS dictionary, Lean manufacturing is a philosophy that emphasizes minimizing the amount of resources (including time) used in the various activities of an enterprise. It involves identifying and eliminating non-value-adding activities in design, production and supply chain.

• **Purpose:** The goal of Lean is to maximize process flow and flexibility. Lean deployment methodology has evolved over the last few decades into a highly capable, well-defined multi-step approach that can be applied to administrative processes as effectively as production processes.

• **Approach Principles:** Utilize VSM (value-stream mapping) to identify and eliminate waste.
  – Specify the value desired by the customer.
  – Identify the value stream for each product.
  – Work to make the product flow continuously.
  – Introduce pull requirements between all steps.
  – Strive for a fully balanced process.

• **Critique:** Structured methodology for waste elimination and learning, but does not provide strategic focus and financial measurements tools. Lean efforts alone will certainly yield results but can lead to islands of excellence. This is the collaborative connection to SCOR and Six Sigma.
Six Sigma

• **Definition:** Six Sigma is a statistical quality goal that equals no more than 3.4 defects per million opportunities. Six Sigma is also represented as a business improvement program that targets process variation or Cpk.

• **Purpose:** The Six Sigma "tool set" focuses on reducing defects and variability with a formalized project management structure. Six Sigma is not only for manufacturing, but any process where an opportunity exists for error.

• **Approach Principles:** Six Sigma projects are based on a problem solving methodology called DMAIC.
  – **Define:** the Critical to Quality issues and business processes.
  – **Measure:** the performance of the business process.
  – **Analyze:** the root cause and opportunities for improvement.
  – **Improve:** the process and deploy implementation.
  – **Control:** the improvements to keep the process balanced

• **Critique:** Structured methodology for variance reduction, but lacking alignment with strategic and operational priorities. Six Sigma projects rely on the availability of data and fill the statistical void if combined with Lean execution.
Convergence Cycle

- **TOC**
- **SCM**
- **LEAN**
- **Six Sigma**

- Bottleneck in process
- New Business Opportunity
- Process Improvement
- Quality Failures
• If we look at the strengths and weaknesses of each of these methodologies it is evident that they compliment each other to create overall value across the enterprise.
  – **SCOR** creates the foundation and structure to build upon with visibility into all segments.
  – **TOC** identifies the bottleneck that when subordinated will increase throughput of your process.
  – **Lean** brings focus to constraint and other on the floor opportunities and then drives to capture them.
  – **Six Sigma** is the scientific approach to reduce the variability in the processes.

• For an organization, using all the approaches leads to a holistic process improvement methodology.
When the customer orders a car with leather seats, the cow’s going to flinch.

—Jacques Nasser, Ex-CEO, Ford Motor Company