Lean Six Sigma

A Methodology for Cultural Change and Continuous Process Improvement (CPI)
Lean Six Sigma: A Vision

Empowered People Operating in a Culture and Climate of Creativity & Innovation

Constantly Eliminating Waste and Variation

Reduced Costs & Increased Productivity
Lean Six Sigma: What is it?

• Lean and Six Sigma are both process improvement methodologies
• Lean is about speed and efficiency
• Six Sigma is about precision and accuracy – leading to data-driven decisions
• Both rooted in the 1980s (and earlier)
  – Lean arose as a method to optimize auto manufacturing
  – Six Sigma evolved as a quality initiative to reduce variance in the semiconductor industry
Why Lean and Six Sigma

- Six Sigma will eliminate defects but it will not address the question of how to optimize process flow
- Lean principles exclude the advanced statistical tools often required to achieve the process capabilities needed to be truly 'lean'
- Each approach can result in dramatic improvement, while utilizing both methods simultaneously holds the promise of being able to address all types of process problems with the most appropriate toolkit.
  - For example, inventory reduction not only requires reducing batch sizes and linking operations by using Lean, but also minimizing process variation by utilizing Six Sigma tools.
Lean Six Sigma Goals and Benefits

• Achieve total customer satisfaction and improved operational effectiveness and efficiency
  – Remove wasteful/non-value added activities
  – Decrease defects and cycle time, and increase first pass yields

• Improve communication and teamwork through a common set of tools and techniques
  (a disciplined, repeatable methodology)

• Develop leaders in breakthrough technologies to meet stretch goals of producing better products and services delivered faster and at lower cost
Lean Six Sigma Requires Behavioral Change

• Lean Six Sigma Challenges Us to:
  – Think Differently
  – Work Differently
  – Ask Questions and Challenge the Status Quo
  – Make Decisions With Facts and Data
  – Use New Principles, Tools and Methodologies

“Early-on, when culture and change compete, culture wins.”
- Tom Quan, GlaxoSmithKline
To Successfully Deploy Lean Six Sigma

• Start with the customer … listen, listen, listen

• Leadership commitment and alignment … go beyond the words … change behavior
  – Create momentum for change
  – Develop need, vision and plan
  – Communicate, communicate, communicate
  – Repeatedly execute and assess
  – Develop necessary skill sets to obtain the desired future state at all levels of the organization

• Involve Everyone: Leadership, Champion, Master Black Belt, Black Belt, Green Belt, Employees
Basic Questions

- What are the customer needs?
- Do our products or services
  - answer the Voice of the Customer
  - at a price he is willing to pay?
- How do we know?
Lean Six Sigma Principles

• Specify **value** in the eyes of the customer

• Identify the **value stream** and eliminate **waste / variation**

• Make value **flow smoothly** at the **pull** of the customer

• Involve, align and **empower** employees

• **Continuously improve knowledge** in pursuit of perfection
Lean Six Sigma: A Powerful Methodology (DMAIC)

- **Define**: what is important to the customer:
  - Project Selection
  - Team Formation
  - Establish Goal

- **Measure**: how well we are doing:
  - Collect Data
  - Construct Process Flow
  - Validate Measurement System

- **Analyze**: the process:
  - Analyze Data
  - Identify Root Causes

- **Improve**: the process gains:
  - Ensure Solution is Sustained

- **Control**: the process performance measures:
  - Prioritize root causes
  - Innovate pilot solutions
  - Validate the improvement
The Tools and Techniques

Define
- Benchmarking
- FMEA
- IPO Diagram
- Kano’s Model
- Knowledge Based Mgt
- Project Charter
- SIPOC Model
- Quality Function Deployment
- Voice of Customer
- Task Appraisal / Task Summary
- Value Stream Mapping

Measure
- Confidence Intervals
- Measurement System Analysis
- Nominal Group Technique
- Pairwise Ranking
- Physical Process Flow
- Process Capability Analysis
- Process Flow Diagram
- Process Observation
- Time Value Map
- Value Stream Mapping
- Waste Analysis

Analyze
- Affinity Diagram
- Brainstorming
- Cause & Effect Diagram
- e-test
- F-test
- Fault Tree Analysis
- FMEA
- Histogram
- Historical Data Analysis
- Pareto Chart
- Reality Tree
- Regression Analysis
- Scatter Diagram
- t-test
- Thematic Content Analysis
- Tukey End Count Test
- 5 Whys

Improve
- DFSS
- DOE
- Kanban
- Mistake Proofing
- PF/CE/CNX/SOP
- Standard Work
- Takt Time
- Theory of Constraints
- Total Productive Maintenance
- Visual Management
- Work Cell Design
- 5S Workplace Organization

Control
- Control Charts
- Control Plan
- Reaction Plan
- Run Charts
- Standard Operating Procedures
Definition of a Value Stream

The VALUE STREAM is the entire set of processes or activities performed to transform the products and services into what is required by the customer.

A Primary Focus is TIME,
Product and / or Service Flow
Information Flow: Quickly In All Directions
Understanding the Value Stream

• We are often part of a value creating stream
• Ultimately, the intent of the stream is to answer the end-user’s needs
• Knowing who our customers are is the first step in understanding the stream; our primary customer may not be the end-user
• Knowing how the stream and our piece works or doesn’t work in meeting customer needs is what Lean Six Sigma is about
Summarizing the Power of Lean Six Sigma

- Provides a *world class* business strategy
- Encourages a *common vision* and *common language* shared by all
- Promotes *teamwork* and REWARDS success
- Combines *aggressive goals* with a *method* and a set of *tools*
- Requires the *application of tools* throughout *entire lifecycle* of a product or service
- Produces knowledge for *improved cycle time, reduced defects, and lower cost*

**Better products and services delivered *faster and at lower cost***

= **Improved Customer Value**