Six Sigma, Lean and Organizational Change Management Strategies and techniques

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Agenda

- Introduction, Session Objectives and Presenter Background
- Six Sigma, Lean and Corporate Operational Excellence History
- Six Sigma, Lean and Related Methodologies
- Six Sigma and Lean DMAIC Overview and Tools
- Six Sigma and Lean Commonly Used Tools and Techniques
- Change Acceleration Process Review
- Six Sigma and Lean Roles
- Six Sigma and Lean Certification Methods
- Open Q&A

The information provided reflects the experience and usage of Six Sigma and Lean of the presenter. Specific firms may apply these tools, techniques, roles and strategies in a different configuration.

Presenter Background

Lenny Shields has 18 years experience in program/project management and operational excellence positions across financial services, capital markets and insurance industries.

His experiences include tenure in permanent and consulting based positions at KeyCorp, General Electric, American Express, McGraw-Hill Financial (Platts and S&P Ratings), American International Group, EmblemHealth, Deutsche Bank and MetLife.

His certifications include:

- General Electric - Greenbelt, 2000
- General Electric - Black Belt, 2001
- American Express - Black Belt, 2005
- Hess - Lean Certified Practitioner, 2008
- Project Management Institute - Project Management Professional, 2008
- American International Group - Certified Project Manager, 2012
- Professional Risk Manager International Association - Risk Certificate, 2013
- Project Management Institute - Program Management Professional, Expected 2017

Lean, Six Sigma and Corporate Operational Excellence History

- Fundamental tools and techniques were developed originate by statisticians in 1920's and Japanese manufacturing principles in 1940's and 1950's.

- Toyota was one of the first Japanese firms with a strong presence in the United states to apply these tools to their operations.

- During 1970's and 1980's Motorola developed the initial corporate usage of these techniques into their manufacturing and corporate operations to drive profitability and customer centricity. Motorola developed Motorola University, one of the first corporate learning and development organizations to promote the education of Six Sigma tools and techniques.

- In mid 1990's General Electric under the leadership of Jack Welch deployed the use of Six Sigma and Kaizen/Workouts to improve customer centricity and improvements initially across the manufacturing businesses and subsequently GE Capital financial services businesses.

- Following in the steps of GE, other firms deployed Six Sigma including American Express in 1999, JPMorgan Chase in 2000 and Bank of America in 2001.

Transformation into Lean Based Approach

- The initial usage of Six Sigma utilized a combination of customer centricity, statistical based hypothesis testing and value stream tools and techniques.

- Starting in mid 2000's, firms started to move towards core Lean and business process management approach vs. using statistical and hypothesis testing. The original usage by Japanese firms was brought to the forefront by corporate organizations.

- Identification and elimination of waste in processes was the new focus on Lean based methodologies.

- Since the initial expansion of Lean, many firms have applied a behavioral and organizational change strategy to leverage Six Sigma and Lean tools and techniques. McKinsey developed their 7S lens program which has been adopted by many firms to change the leadership and behavioral approach to reduced costs and revenue attainment strategies. The McKinsey approach has been deployed under the name of "Way of Working or Way" at firms including AXA, PNC Bank, American International Group, MetLife and Marsh.

Six Sigma and Lean Methodology Review

Methodology	Phase Structure	Fit for Purpose Use
Six Sigma DMAIC	Define, Measure, Analyze, Improve, Control	Reduce/Eliminate defects. Utilize data driven approach to identify root case and ensure process stability
Design for Six Sigma DMADV	Define, Measure, Analyze, Design, Validate	Develop and design new products and processes. Current process has reached entitlement
Lean DMAIC	Define, Measure, Analyze, Improve, Control	Eliminate waste in process, value stream/flow based analysis.
SSMD - Six Sigma Management Discipline	Define, Measure, Analyze, Improve, Control	Utilize DMAIC tools as needed to apply Six Sigma rigor to projects.
SSPM - Six Sigma Process Management	Identify, Engage, Analyze and Deploy	Used for organizational transformation and change.

Six Sigma and Lean Methodology Review

Methodology	Phase Structure	Fit for Purpose Use
ACFC (At the Customer For the Customer)	Identify, Engage, Analyze and Execute/Deploy	Used to engage key suppliers/customers into joint projects or supplier/customer facing processes
McKinsey 7S (Way of Working)	Strategy, Structure, Systems, Staff, Style, Skills, Shared Values	Similar to SSPM, cultural and behavior changes. Utilizes Lean based techniques
Kaizen / Workouts	Identify, Analysis, Engage, Execute / Deploy	Used when decision making across multiple stakeholder groups is needed. Reduces the time to obtain consensus and decision making. Also applies when the changes can be applied directly without the need for downstream complex analysis

Six Sigma DMAIC - *Activities and Tools*

Define	Measure	Analyze	Improve	Control

Activities

Define

Define the problem
- Identify the customers, their needs, and requirements
- Identify product and/or process to be improved
- Determine scope of improvement effort
- **Resulting in a actionable and worthwhile project opportunity**

Translate the problem
- Establish the defect definition
- Define the performance standards
- **Resulting in a specific problem statement**

Start project planning
- Resource Planning
- Project Scheduling
- Financial Analysis
- Management Support
- **Resulting in an approved project charter**

Measure

Measure baseline capability of process output (Y)
- Establish data collection plan
- Validate trustworthiness of measurement system
- Validate stability of process
- **Resulting in statistics that characterize the baseline process**

Establish performance objective for Y
- **Resulting in measurable goal (how much/by when)**

Thorough exploration of the process
- Process Mapping
- Measurement Studies
- Process Capability
- **Resulting in a list of Process Xs (inputs)**

Analyze

Eliminate least likely Xs
- Explore inputs for importance to the process performance
- Apply cause and effect techniques to evaluate potential root causes
- Apply low level statistical analysis techniques
- **Resulting in a list of potential Critical Xs**

Through experimentation, find Xs that exert leverage
- Isolate inputs that have statistically significant effects on process mean and/or variation
- **Resulting in a list of finalized Critical Xs**

Improve

Define the improvement
- Identify optimal settings of the Critical Xs
- Evaluate potential solutions to manage Critical Xs
- Evaluate solutions for robustness, ease of implementation, and side effects
- **Resulting in a tentative improvement plan**

Implement the improvement
- Pilot improved process using final settings
- Fine tune as needed
- Physically implement changes to process
- Evaluate performance of improved process
- Compare improved performance to baseline performance
- Confirm project objective attained
- **Resulting in a final improvement**

Control

Design a control plan
- Document ways to maintain Critical Xs at optimal settings
- Create Control Plan
- **Resulting in a robust plan to sustain the improvement**

Implement the control plan
- Create needed documents (including approvals)
- Perform necessary training
- Change physical arrangements
- Implement required data collection and ongoing monitoring systems
- Formally hand off to Process Owner
- **Resulting in a sustainable improvement that has been handed off to the Process Owner**

Key Tools

Define
- Business Case
- Project Charter
- SIPOC
- High-level process map
- VOC
- CTQs
- Stakeholder Analysis*
- Resistance Analysis*
- Communication Plan*
- Risk Assessment*
- Kano Analysis
- Affinity Diagram

Measure
- Data Collection & Plan
- Detailed Process Maps
- Data Stratification
- Sampling
- Gage R&R / Measurement System Analysis
- High-level Data Analysis
    – Histograms & Run Charts
- Financial Analysis
- Baseline Sigma Calculation
- Quality Function Deployment

Analyze
- Value Added Analysis
- Data Stratification: Pareto, Scatter Plots
- Adv. Statistical Tools (Hypothesis Testing, Chi Square, T-Tests, ANOVA, Control Charts, Scatter Diagrams, etc.)
- Regression Analysis
- COPQ Assessment
- Benchmarking
- Cause & Effect Diagram, Fishbone
- DOE

Improve
- FMEA*
- Brainstorming, TRIZ, idea generation*
- Decision Matrix
- Decision Making (Multi-voting, consensus, etc.)
- To Be Process Map
- Pilot Testing
- Cost/Benefit – ROI analysis*
- Dashboards*
- New Sigma Calculation
- Implementation Plan (High level & detailed)

Control
- Documentation
- Control Chart*
- SPC
- Process Control System - Continuous Improvement
- Dashboard*
- Best Practices /Replication
- Storyboard
- BPM Project Transition Package
- Capability Studies

* = Tools Used in Multiple Phases

Commonly Used Tools and Techniques

Tool	Description / Calculation	Decision Making Use
SIPOC / COPIS Supplier, Input, Process, Output, Customer	High level process map to align supplier based inputs to outputs and associated customers	Understand various suppliers and customers that align to a given process. Used for project scoping and communication of a given process in a consolidated format.
Kano Model	Graphical representation of customer needs along a curve using a Must Have / Foundational, Nice to Have and Aspirational product/ process configurations	Determine what product / process specifications are required, could be considered for inclusion to provide competitive positioning and aspirational for product development
Measurement Systems Analysis / Gage R&R	Statistical validation that data being collected meets certain standards with accepted variance among different collection methods	Determine if the measurement system / collection method will provide valid data to support analysis and decision making

Commonly Used Tools and Techniques

| Tool	Description / Calculation	Decision Making Use
QFD (Quality Function Deployment)	Uses weighted scoring method to determine critical customer needs and identify key process indicators / metrics that align to critical needs	Determine what KPI's need to be developed and those that align to critical customer needs and should be included in the process / product measurements
FMEA (Failure Mode Effects Analysis)	Risk based tool to determine impact of potential risks / failure modes. Key calculation is RPN (Risk Priority Number) using Likelihood, Risk Severity and Detectability scoring	Used in Analysis phases to determine improvement or process configurations and to support on-going controls to monitor high impact risks. Allows for analytical approach to measuring risks
P Value Calculation	Determines the estimated statistical likelihood that a variance or change is statistically significant vs. random occurrence	A P value of <0.05 indicates a less than 5 % estimation that the variance was not random and due to a specific root cause or change

Commonly Used Tools and Techniques

Tool	Description / Calculation	Decision Making Use
2 Sample P Test	Used to compare the data sets of attribute data to determine statistical significance. Can only be used for statistically normal data	If a P Value of <0.05 is present, a statistical difference in the attribute data is present
2 Sample T Test	Used to compare 2 data sets of variables or continuous based data to determine statistical significance. Can only be used for 2 data sets. Can only be used for statistically normal data	If a P Value of <0.05 is present, a statistical difference in the 2 data sets is present
1 Way ANOVA (Analysis of Variance)	Used to compare 2 or more data sets of variables or continuous based data to determine statistical significance. Can only be used for statistically normal data	If a P Value of <0.05 is present, a statistical difference in the 2 or more data sets is present

Commonly Used Tools and Techniques

Tool	Description / Calculation	Decision Making Use
Mood's Median / Levine's Test	Used to compare the data sets of non normal data determine statistical significance.	If a P Value of <0.05 is present, a statistical difference in the attribute data is present
Control Chart	Plotting of process outputs along a curve to determine standard deviation from the population mean	Any process output point that falls more than 3 standard deviation is considered out of control. If more than 3 points fall out of control, the process is considered to not be under control.
Control Plan	Plan that maps key potential metrics and failures with a measurement and escalation plan for business as usual process management	Used to assign accountability for ongoing controls / monitoring and escalation of control checks with specifications. FMEA can be used to develop the plan.

Change Acceleration Process
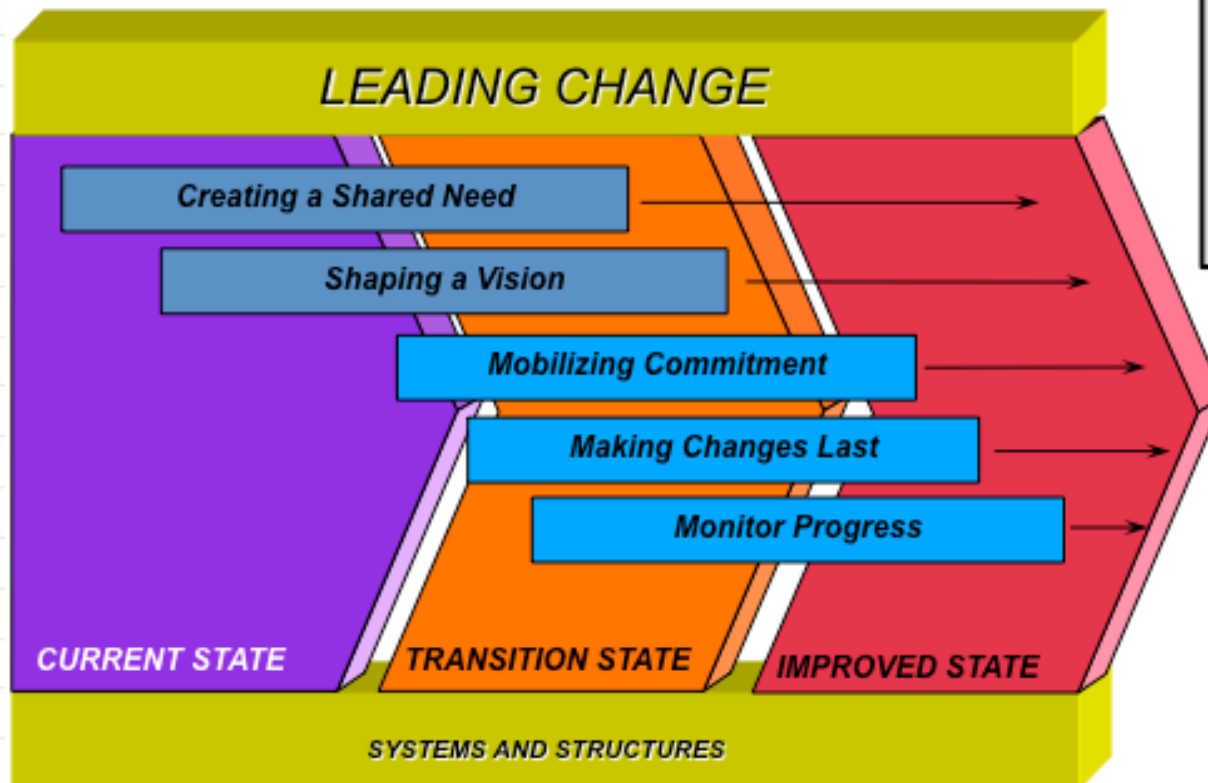
Six Sigma / Lean Roles & Certification

White Belt
- General Exposure to Six Sigma general concepts
- Training is usually in the form of online or general information review. Training is typically 1-4 hours in duration. Also referred to as "all employee education".

Yellow Belt
- Active member of a team that is engaged in the use of Six Sigma tools and techniques. Primarily in a subject matter expert role. Expectation is that the individual will have responsibility for performing process related analysis using an intermediate level tool.
- Training is typically 1-4 hours in duration.

Green Belt / Lean Certified Practitioner
- Not dedicated to managing projects but uses Six Sigma tools and techniques in projects related to current job. Maintains current position. Expectation is that this individual will manage the project that has been assigned.
- Training is typically 2 weeks in duration.
- Certification typically requires completion of 1-2 projects. Exam may be required to show proficiency.

Six Sigma / Lean Roles & Certification

Black Belt

- Dedicated full time position managing 2-3 concurrent black belt level projects.
- Training includes 4-6 weeks classroom with a comprehensive exam usually required. Has project management and tools usage responsibility for projects typically 6-12 months in duration.
- Certification typically includes 2 projects, exam and peer review or certification board.

Master Black Belt / Lean Sensei Master

- Senior level Black Belt or team leader for a team of Black Belts. May have project portfolio responsibility for a line of business or functional area. Typically reports into a Quality leader or operations/finance/functional leader.
- If not already BB certified includes all BB requirements, plus coaching and mentoring 20+ projects. May require additional hypothesis testing related training and MBB level exam. Similar certification process to Black Belt.

Quality Leader

- Ownership of Quality / Six Sigma / Lean deployment across a line of business or overall organization. Similar reporting line as MBB.
- Additional leadership training may be required.
- Certification includes Master Black Belt requirements plus completion of deployment plan and 2+ years of successful deployment.

Certification Methods

- Participate with a firm's internal in-house managed certification program. Timeline expectations include:

  - Green Belt – 1-2 years (completion of 1-2 projects/exam timeline)
  - Black Belt – 18 months – 3 years (completion of 2 BB level projects timeline).
  - MBB / Quality Leader – 2-3 years (20+ project coaching and deployment tenure)

- Partner with a firm that provides certification. You will need to be in a position at your current firm where you can successfully manage required projects. All required training will be provided by the firms with estimated costs $10k-20K.

  - **BMG (Breakthrough Management Group)**
    https://www.bmgi.com/training/browse/certification/certification
  - **Six Sigma Academy**
    http://www.ssaandco.com/training/course-offerings/
  - **ASQ (American Society of Quality)**
    http://asq.org/cert/control/right-for-you
  - **ISSP (International Society Six Sigma Professionals)**
    https://isssp.org/six-sigma-certification/

Make note that a certificate program is completion of a training program but is not certification, which requires project completion and evidence

Open Q&A

For any follow-up questions or inquiries, Lenny Shields can be reached at

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