Lessons Learned: Lean Six Sigma and Balanced Scorecard

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Intent of this Presentation

◆ Learn the key drivers of value satisfaction in the services sectors and how they translate into the laboratory sector.

◆ Learn the key differences between products and services and their impact on tools used in Manufacturing vs. Services Lean Six Sigma deployments.

◆ Learn how to strategically tie Lean Six Sigma project selection to key value drivers of physicians in the outreach and hospital businesses via Balanced Scorecard or Theory of Constraints.

◆ Learn the key lessons learned for an effective deployment of Lean Six Sigma in an organization.

◆ Learn where Lean Six Sigma is heading over the next years.
Lean Six Sigma and Value of Services
## Service vs. Product

<table>
<thead>
<tr>
<th>SERVICE</th>
<th>PRODUCT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intangible</td>
<td>Tangible</td>
</tr>
<tr>
<td>Inputs of customer at point of service delivery are critical</td>
<td>Inputs from customer segment are based on a design process</td>
</tr>
<tr>
<td>Service delivery transparent</td>
<td>Production not transparent</td>
</tr>
<tr>
<td>Service cannot be inventoried</td>
<td>Product can be fully inventoried</td>
</tr>
</tbody>
</table>
Key Expectations of Service

◆ Two levels of services:
  
  ◆ **Value-added service:** The primary reason for delivering a service is to resolve a key problem of the customer—clinical report of test results to support the diagnosis of a patient.

  ◆ **Service failure recovery:** Breakdown of the “value-added service” results in investigations that are handled by “customer service.”

◆ Key expectations of value-added services are related to:
  
  ◆ **Effectiveness of problem resolution** (quality of report, electronic vs. paper report, etc.).

  ◆ **Timeliness of resolution** (reporting turnaround time).

◆ Additional key expectation for second-level “customer services” are related to:
  
  ◆ **Responsiveness to service breakdown** (Customer Inquiry via Customer Service).
Key Focus of Lean Six Sigma Deployment in Services

Focus of Lean Six Sigma Deployments in Services

Value creation through:

◆ Effective resolution of problem.
◆ Timeliness of solution.
◆ Responsiveness to process breakdown.
Strategic Deployment of Lean Six Sigma

Timeliness x Effectiveness x Responsiveness

Lean Aspect
Quality Aspect
Service Aspect

Lean Six Sigma for Value Creation
Key Drivers of Value Satisfaction in the Outreach Lab Industry

- **Timeliness**: Timely Report/Bill
- **Effectiveness**: Accurate Report/Bill
- **Responsiveness**: Quick Problem Resolution

Satisfaction With Value → Loyalty

Findings Based on Large-Scale Study in the Outreach Business
Key Drivers of Value Satisfaction in the Hospital Lab Industry

- **Timeliness**: Report in Chart When Physician Sees Patient
- **Effectiveness**: All Test Results in One Chart and Accurate
- **Responsiveness**: Quick Access to Lab

Effective Patient Care

Satisfaction With Value

Findings based on voice of customer Interviews in 14 hospitals
Lean Six Sigma and Services/Organizational Size
Key Elements of Lean Six Sigma Deployment

◆ Key variables that affect Deployment Strategy
  ♦ Manufacturing vs. Service.
  ♦ Size of the organization.

◆ Key decisions
  ♦ Overall strategic approach to deployment.
  ♦ Approach to project selection.
  ♦ Criteria for project selection.
  ♦ Roles and responsibilities.
  ♦ Curricula and training.
  ♦ Employee involvement.
Key Factors Affecting the Deployment of Lean Six Sigma

Effective deployments are determined by two key factors:

- Manufacturing vs. Service Organization
- Large vs. Mid-sized or Small Organizations

Large Organization

- High Structure
- Classical Six Sigma and/or classical Lean
- Challenge to improve cross-functional processes

Manufacturing
- Flexible Structure
- Classical Six Sigma and/or classical Lean
- High opportunity to improve cross-functional processes

Services
- High Structure
- Hybrid Lean/Six Sigma
- Challenges to improve cross-functional processes

Small Organization

- Flexible Structure
- Classical Six Sigma and/or classical Lean
- High opportunity to improve cross-functional processes
Lean Six Sigma and Organization Size

◆ Large-Scale Organization
  ♦ Large amount of human and other resources.
  ♦ Challenge of integrating interlocking processes into the scope of one project (PSC and Billing).
  ♦ Very formalized deployment structure:
    ❖ X% of employees to be trained as Black Belts or Green Belts.
    ❖ N amount of projects to be completed by Black Belts or Green Belts.
    ❖ Project selection often driven by “isolated” champions.
Lean Six Sigma and Organization Size (cont.)

◆ Mid-sized/Small Organizations

◆ Small amount of human and other resources.
◆ Opportunities to integrate interlocking processes into the scope of one project (PSC and Billing).
◆ Flexible deployment structure:
  ❖ Limited amount of Black Belts or Green Belts needed.
  ❖ Projects need coordination with other efforts based on resource constraint (non-productive hours).
  ❖ Projects most likely conducted by Green Belts rather than Black Belts.
  ❖ Projects most likely selected based on very specific strategic needs.
  ❖ Potential need to subsume regular project management under the umbrella of “Lean Six Sigma” for a full deployment.
  ❖ Less formalized processes to involve other resources such as IT, Human Resources, etc.
Lean Six Sigma: Special Challenges for Services

◆ Key differences are:

◆ **Manufacturing:** Supplier, producer, and customer are separated: (Supplier → Producer → Customer).

◆ **Services:** Customers are both suppliers and customers (Customer ⇔ Supplier).
  
  ❖ Physicians are both suppliers (orders) and customers (reports).

  ❖ Integrated standardization of processes and controls need to occur at the supplier (input) → throughput → customer (output) sides.

  ❖ Transparency of the process occurs at a breakdown in the process.

  ❖ Customer Service is a critical element in demonstrating the value of the service in case of a breakdown.

    ❖ Effective recovery from services enhances the perception of satisfaction with value, which in turn increases loyalty.

    ❖ No process break-down makes the service “invisible” to the customer.
The basic principles of Lean and Six Sigma are applicable to both manufacturing of products and delivery of services.

However:

- Engineering specifications are more difficult to establish, particularly in customer contact areas.
- Certain Lean tools such as Heijinka or Kanban systems are less complex in service environments.
- There is no big need to apply complex statistical tools such as design of experiments in a service environment on a regular basis.
- There are other tools such as ongoing customer feedback, interviews, focus groups, and survey research that are more important in service organizations.
- Service levels are highly dependent on “capacity”, i.e., FTE availability. Capacity is the “buffer” in services that is equivalent to “inventories” in manufacturing.
Lean Six Sigma: Special Opportunities for Services in Mid-sized Organizations

- Cross-functional teams that review the total value-stream from Ordering → PSC draw → Transportation → Accessioning → Resulting → Reporting → Billing are easier to facilitate.
  - Result: Quicker and more effective impact on end-customers.

- With a focused approach based on key tools such as process mapping, value stream mapping, FMEA, and basic root cause analysis, many problems can be solved effectively.
  - Impact: Training can be rolled out with less intensity of training.

- The involvement of first-line supervisors and employees is easier to establish because of fewer layers in management.
  - Result: Buy-in from employees can be more effectively established.

- Channels of communication to discuss improvement opportunities can be quickly established due to shortened communication chains.
  - Impact: Feedback on measurements and analysis can be accomplished faster through immediate feedback from managers/directors.
  - Impact: Shorter project cycle time.
Using Balanced Scorecard and Theory of Constraints to Identify Strategically Lean Six Sigma Projects
Approaches to Project Selection: Overview (1)

◆ Opportunistic Approach (Brainstorming leads to project selection):
  ◆ Projects are scattered over the organization.
  ◆ Projects address current problems.
  ◆ Momentum often for several months only.

◆ Strategic Approach (Projects are tied to strategic plan):
  ◆ Projects chosen by key process areas.
  ◆ Projects prioritized based on key measurements.
  ◆ May result in short-lived momentum.

◆ Value Creation Approach (Projects are tied to VOC and Value):
  ◆ Projects are driven by perceived value and customer satisfaction/loyalty.
  ◆ Projects are driven by performance relative to competitors (benchmarking, balanced scorecard, value proposition).
  ◆ Ensures that projects are externally focused on the marketplace.

Adapted from Snee & Hoerl (2003).
Approach to Project Selection: Overview (2)

- Voice of Customer
- Strategic Plan (External/Internal)
- Financial Performance
- Value
- Process Performance
- Design/Redesign Projects
- Lean Projects
- Error Reduction (Quality) Projects
Balanced Scorecard and Lean Six Sigma: Making the Scorecard Operational

<table>
<thead>
<tr>
<th>Financial Results</th>
<th>Satisfaction</th>
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<tr>
<td>Learning and Growth</td>
<td>Operational Performance</td>
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</table>

Key Drivers of Value Satisfaction and Loyalty
- Driver A
- Driver B
- Driver C

Operational Scorecard for driver

- Key Drivers of Value Satisfaction and Loyalty:
  - Driver A
  - Driver B
  - Driver C

- Operational Performance
- Learning and Growth
- Financial Results

- Reduction in defect rate
- Lowered costs
- Employee growth
- Increased satisfaction

Lean Six Sigma project to eliminate waste for driver
Balanced Scorecard and Lean Six Sigma: Establish Operational Measurement

Step 1: Identify Key Drivers of Satisfaction
- Client wants fast access to representative
- Client wants issue resolved on the first call

Step 2: Develop Operational Scorecard

Outcome Measures
- Average Speed of Answer
- Uptime of Voice Respond Unit
- Rate of Resolution (on first, second, etc., call)

Support Measures
- FTE Available
- Non-productive Time
- Turnover
- Training Hours

Financial Measures
- Cost for Month
- Budget
- Variance from Budget
Balanced Scorecard and Lean Six Sigma: Review Variance of Operational Measurement

Step 3: Identify Key Measure that Does Not Meet Goal

- Example: Rate of Resolution

What we learned: 43% of calls are resolved on the first call (cost = $2.50), 33% require outbound call (cost = $7.50), 24% are solved on weekends at the end of the month requiring overtime (cost = $10).
Balanced Scorecard and Lean Six Sigma: Identify and Conduct Lean Six Sigma Project

Step 4: Analyze and Review the Current Process
- High level process map of call transfer

What we learned: The current process creates unnecessary costs. Opening of tickets takes on average two minutes, 2nd level rep makes outbound call after the ticket was put in queue. Process:
- Results in lost time due to queuing.
- Results in additional costs due to outbound calls.
- More tickets are created than 2nd level reps can handle.
- End-of-month overtime to resolve month’s issues.
Balanced Scorecard and Lean Six Sigma: Make Change and Measure Impact

Step 5: Make Changes and Measure the Impact
- Reduction in open tickets to less than 500 a month

What we learned: Rather than open tickets, the calls are now transferred real time. This resulted in:
- Decreased costs (estimated at $500,000 per year).
- Improved satisfaction with resolution.
- Empowerment and growth of employees.
Theory of Constraints and Lean Six Sigma: Identify the Right Projects

Challenges

◆ Partial roll-outs in organization (lab, radiology, etc. only).
◆ Theory of constraints shows us that:
  ◆ The key bottleneck needs to be improved for results to improve throughput.
  ◆ The bottleneck will move once it has been removed.

Implications

◆ Improvement of key measurements for partial roll-out area may not result in tangible outcomes to the customer.
◆ Projects (multigenerational) need to “follow” the bottleneck.
◆ The bottleneck should be pushed out of operations into the market.
Theory of Constraints and Lean Six Sigma: Example

**Problem:** TAT from received to verify is affected by % of duplicate order.

In **Project 1**, the duplicate order was to be reduced to stabilize the process.

In **Project 2**, the lab was leaned out to improve the turnaround associated with actual testing.
Theory of Constraints and Lean Six Sigma: Example (cont.)

![Cancellations by Hour Graph](chart.png)

**What we learned:** The duplicate orders are cancelled between midnight and 4 PM. 3 FTEs are involved with investigating the duplicate orders at night. This creates inefficient allocation of resources and instability in the input → throughput → output process and unpredictable turnaround times.
Lessons Learned About Key Elements of a Successful Lean Six Sigma Deployment
Lessons Learned: Criteria for Project Selection

◆ Tied to a key process of Company value chain.
◆ Tied to key metrics such as:
  ◆ Quality: DPMO, Sigma score (< 3.5 $\sigma$), or high customer impact.
  ◆ Cycle Time (long or highly variable relative to customer expectations).
  ◆ Savings/Revenues ($50K - $250K annually).
  ◆ New Products/Services.
  ◆ Critical infrastructure (IT/New Offerings).
◆ Completed within four to six months (if not Multigenerational Plan).
◆ Focus on Value creation and Operations Excellence.
◆ Viewed as critical by the Champion and the Leadership Team.
◆ Process owner clearly exists or established through the project.
◆ Prioritized based on impact to the total organization.
◆ High probability of feasibility and success.
Lessons Learned: Roles and Responsibilities

◆ Develop a Lean Six Sigma Council:
  ◆ Deployment strategy.
  ◆ Project selection criteria.
  ◆ Ongoing monitoring of progress.

◆ Develop a Belt Infrastructure:
  ◆ Adapt roles and number of trained Belts to the resources and needs of the organization.
  ◆ Adapt training to the resources and needs of the organization.
  ◆ Emphasize coaching and mentoring by experienced Black Belts or Master Black Belts.
  ◆ Work closely with HR to develop transition plans into Six Sigma and back into operations.
  ◆ Balance analytical skills with change management skills.
Lessons Learned: Employee Involvement

◆ Video/DVD production:
  ◆ What is Lean/Six Sigma? (10-15 minutes).
  ◆ How do we deploy Lean/Six Sigma at Company? (10-15 minutes).
◆ Communication of annual strategy at Staff Meetings and regular updates.
◆ Articles in “Newsletters.”
◆ Message on “Message Board.”
◆ Key Metrics displayed when project in progress or in control phase.
◆ Ongoing communication to all employees: Tell ’em, tell ’em, tell ’em.
◆ Involvement through Yellow Belt training.
◆ High visibility of project success.
◆ Emphasize team building.
◆ Get operations employees involved in the first year of the program!
Lessons Learned: Curricula and Training Systems (1)

◆ Fewer opportunities to run experiments: Transactional exchanges are less conducive to controlled manipulation than processing of unanimated products.
  
  ➔ Less emphasis on design of experiments or complex hypothesis testing techniques.

◆ Critical-to-qualities are more complex to establish: Services are individualized.
  
  ➔ More opportunities for rigorous voice of customer research including interviewing and data mining techniques.
Lessons Learned: Curricula and Training Systems (2)

♦ More opportunities for simpler statistical tools and logic-based approaches to problem solving and process improvement:
  ♦ Implementation of key **Lean principles** (FIFO, cell design, 5S, etc.) to improve process flow and ensure **timeliness** of service delivery.
  ♦ **Basic root cause analysis** to improve quality and ensure consistent problem resolution.
  ♦ **Standardization of processes** to maintain process stability to ensure consistent problem resolution.
  ♦ **Risk analysis** of customer inputs and process inputs (FMEA) to ensure ongoing control of existing processes and consistent problem resolution.
  ♦ **Training of employees** and effective interaction of employees with clients/employees to ensure avoidance of and quick responsiveness to process breakdowns.
Where is Lean Six Sigma Going?
Current Trends (1)

◆ Lean Six Sigma is in a maturity phase.
  ◆ Stronger integration of various methodologies including Lean, Six Sigma, Theory of Constraints, Balanced Scorecards, Relationship Management, Service Quality.

◆ Lean Six Sigma means different things to different organizations.
  ◆ Every organization has to find its way to incorporate Lean Six Sigma into its cultural fabric.

◆ Lean Six Sigma is more and more deployed in mid-sized to small organizations.
  ◆ The rule of thumb approach in large organizations (1% of the population are Black Belts, project savings require > $250K, etc.) often do not hold in smaller organizations.
  ◆ Multiple priorities (Employee Training, Lean Six Sigma, Quality, etc.) need to be taken into consideration for an organization to sustain a full-scale implementation.
Current Trends (2)

- **Lean Six Sigma moves from being a quality program to becoming an integrated part of strategic decision making:**
  - Lean Six Sigma is integrating more and more elements from classical marketing into its “toolkits” (Voice of Customer Research, Quality Function Deployment, etc.).
  - Marketing and other functions are discovering the advantages of a process view of their activities.

- **Healthcare is becoming the new frontier for Lean Six Sigma.**
  - Key challenge: Adapt the methodology to the needs, opportunities, and constraints of healthcare organizations.
  - Get physicians involved as stakeholders, process suppliers, and customers of the process outputs.
Current Trends (3)

Functional Approach

Marketing  ➔  Strategy  ➔  Operations

Value-added Approach

Marketing  ➔  Strategy  ➔  Operations

Value  ➔  Strategy  ➔  Operations  ➔  Excellence
Follow-up

Any questions or comments regarding this presentation can be forwarded to:

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