What is Missing in Six Sigma, and What Should We Do About It?

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Roger Hoerl – GE Global Research

Outline

- A Quick Review of Six Sigma's Successes
  - Six Sigma's Strengths
- What's Missing in Six Sigma
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  - Non-Technical
- What We Can Do About What's Missing?
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A Quick Review of Six Sigma's Successes

- Six Sigma has arguably been the most successful improvement initiative in history
  - Many companies report billions in audited savings
  - Extensive applications in industry, business, and healthcare; moving into government and academia
- Six Sigma shows no signs of losing steam after almost 20 years, measured by such things as:
  - Books and literature
  - Conferences
  - Consultants

Six Sigma's Strengths

- What gives Six Sigma its staying power?
  - Focuses on delivering bottom line results
  - Provides a flexible deployment methodology and infrastructure
    - These key ingredients were missing in previous improvement initiatives
  - Provides generic models (DMAIC, DMADV) that integrate the diverse tools into overall approaches to problem solving and process improvement

What's Missing in Six Sigma?

- Contrary to popular opinion, Six Sigma is not a holistic system for managing quality
  – It doesn't replace your existing quality systems
- Also contrary to popular opinion, there are many problems and projects for which Six Sigma is not the best approach
- One way to approach this question is to separate technical from non-technical issues

What's Missing: Technical

- Appropriate balance of tools:
  - Too much hypothesis testing; not enough simulation or other non-statistical tools
  - Gage R&R is not a complete measurement system analysis
    - For example, accuracy is missing!
  - SPC is usually brought in too late (control phase)
  - Too much "one size fits all" in terms of tools and training
  - Note: this is dependant on the organization
- Ability to apply to long-cycle processes, e.g., annual recruiting cycle
- Ability to make improvements without availability of good data
  - This is a bigger problem than most of us are willing to admit!

What's Missing: Non-Technical

- Ability to get results with minimal investment
  - Six Sigma requires extensive training
- Routine problem solving
  - Project "sweet spot" is narrow (4-6 months)
- A comprehensive management system
  - Six Sigma is project oriented, not day-to-day management oriented
  - Control plans provide "one-off" controls, but not an integrated system (e.g., for equipment calibration)
  - Doesn't replace Baldrige or ISO

What Can We Do About It?

- Strategic (initiative) level: Think of Six Sigma as a key element of your quality or process improvement system, not as the entire system
  - Need a comprehensive system – more on this later
- Tactical (project) level: Do not fall into the "hammer and nail" trap:
  - Apply Six Sigma to problems well suited for it
  - Apply other methods to problems for which they are better suited than Six Sigma, including knowledge based methods when data are unavailable (more on this shortly)
- Operational (tool) level: The balance of tools is correctable by the individual organization
  - Use the right mix of tools for your problems
    - Emphasize graphical methods over hypothesis testing or probability[8]

Knowledge-Based Methods

- One example of integrating knowledge-based methods is the "Lean Six Sigma" movement
  - Why has this been so popular?
- Interestingly, Lean is not a problem solving method
  - No tools to collect data to identify root causes
- Rather, Lean is a set of principles based on experience and knowledge of the process
- Lean augments Six Sigma well because it allows organizations to make improvements with minimal investment and little/no data
  - Note: much of what is called "Lean" today is actually basic continuous improvement without formal statistics

Six Sigma Or Lean* Project?

- Some general principles to keep in mind when deciding on the best approach to a particular problem (with acknowledgements to Ron Snee)

  – Is the solution to the problem known (Lean) or unknown (Six Sigma)?

  – Is the issue "within a box" (Six Sigma) on the flowchart, or "between boxes" (Lean)?

  – Are good data available (Six Sigma), or will we rely solely on experience and subject-matter knowledge (Lean) to solve the problem?

*"Lean" here could be any knowledge-based approach

A Comprehensive Management System for Quality

- Years ago, Joe Juran* wrote about "Strategic Quality Management", which included:
    - A hierarchy of quality goals
    - A formalized methodology
    - An infrastructure, including Quality Council
    - A control process (review against goals)
    - Provision of rewards
    - Universal participation
    - A common language
    - Training

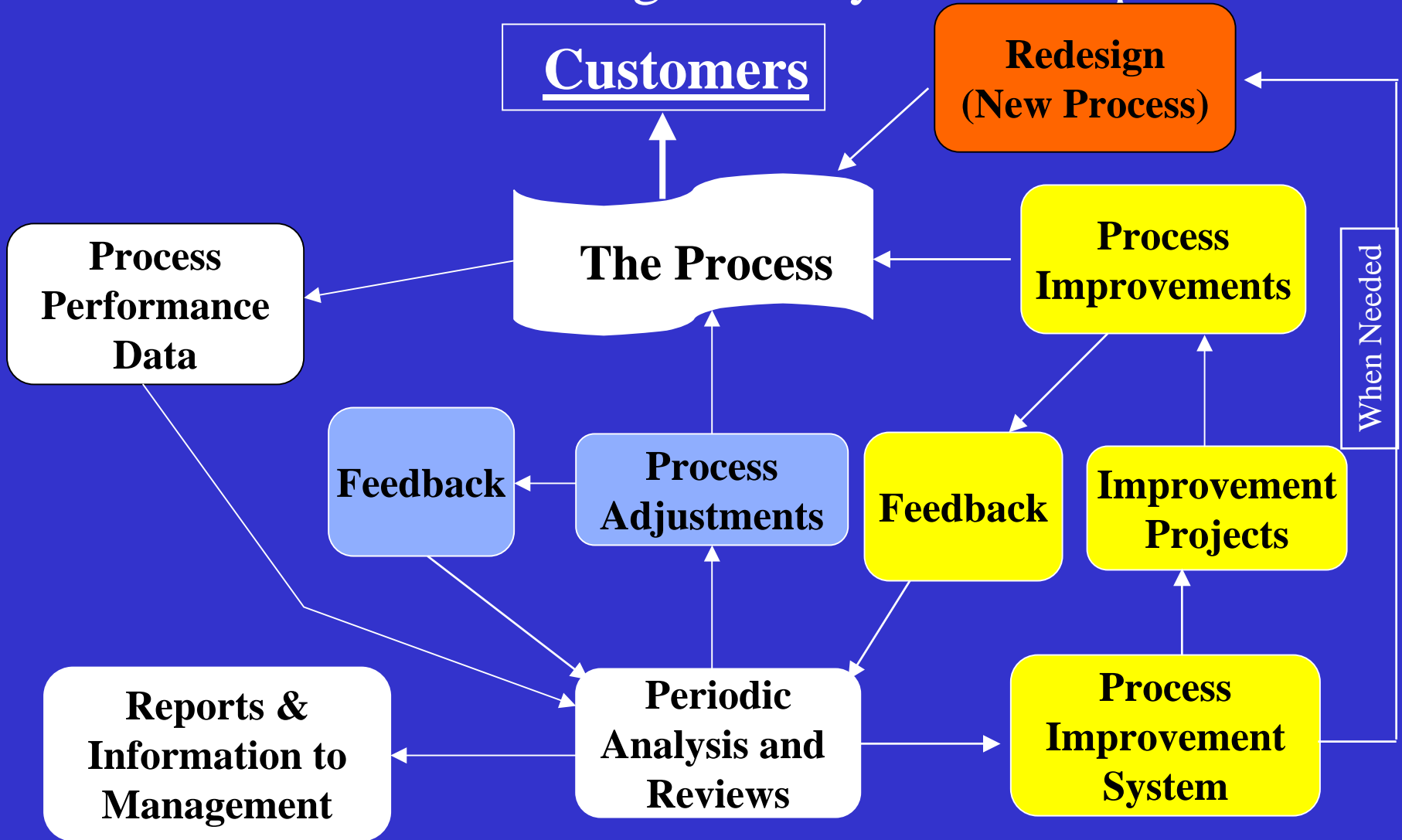*Juran on Leadership for Quality, 1989

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A Comprehensive Management System for Quality

- Before Six Sigma, I don't think many could conceive of what such a system would look like

- Now, I think they could

- It would look a lot like Six Sigma, but would include other methods, and would also engulf what is often managed separately by the Quality Function

A Comprehensive Management System for Quality

- Properly done, this approach would retain from Six Sigma:
  – Focus on bottom-line impact
  – Formal infrastructure
  – Generic improvement models (DMAIC, DMADV)
- It could add:
  – A holistic management system overseeing all aspects of quality, including ISO compliance, integrated control plans, day-to-day problem-solving, etc.
  – Other types of projects; "just do it" projects, Lean projects, DMA-workout-C, etc. (current trend)
  – More tailored training curricula based on actual needs, not "one size fits all"

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The Process Management System Component*

Customers

Redesign (New Process)

The Process

Process Performance Data

Process Improvements

When Needed

Feedback

Process Adjustments

Feedback

Improvement Projects

Reports & Information to Management

Periodic Analysis and Reviews

Process Improvement System

*Snee and Hoerl, *Six Sigma Beyond the Factory Floor*, p 224   14

A Comprehensive Management System for Quality

- Strategic Quality Management, as described by Juran, would consist of an infrastructure sitting on top of the process management system (which he called Operational Quality Management), providing such things as:
  - Direction (goals)
  - Resources (money and people)
  - Oversight (reviews, evaluation)
  - Methodologies (DMAIC, Lean, etc.)
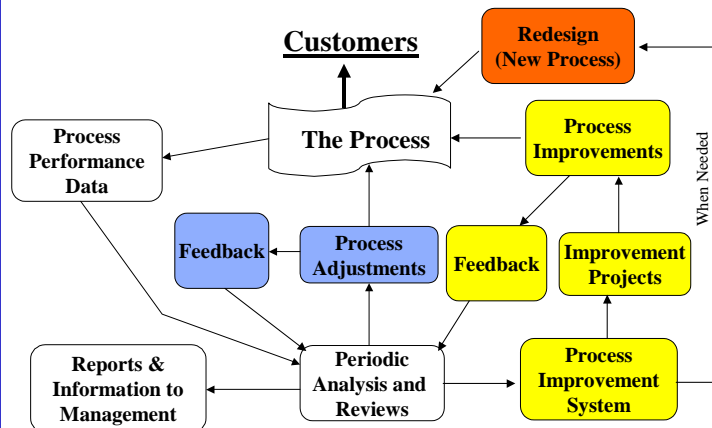 - Training
  - Etc.

A Comprehensive Management System for Quality
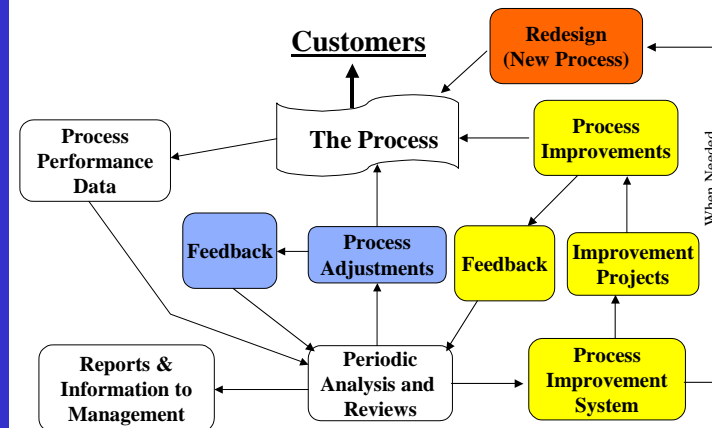
Quality Council

Juran's analogy:
management of finance

Strategic Quality Management System

SUMMARY

- In thinking about what's missing in Six Sigma, let's not lose sight of the tremendous success it has had
  - Perhaps the greatest contribution of quality and statistics in history

- Based on its success to date, Six Sigma shows no signs of letting up today

- Six Sigma does have both technical and non-technical limitations

- Six Sigma needs to incorporate more knowledge-based methods like Lean

- We need a comprehensive system for managing quality that should include Six Sigma, and will look a lot like Juran's Strategic Quality Management