

Our Army at War...

Relevant and Ready, Today and Tomorrow

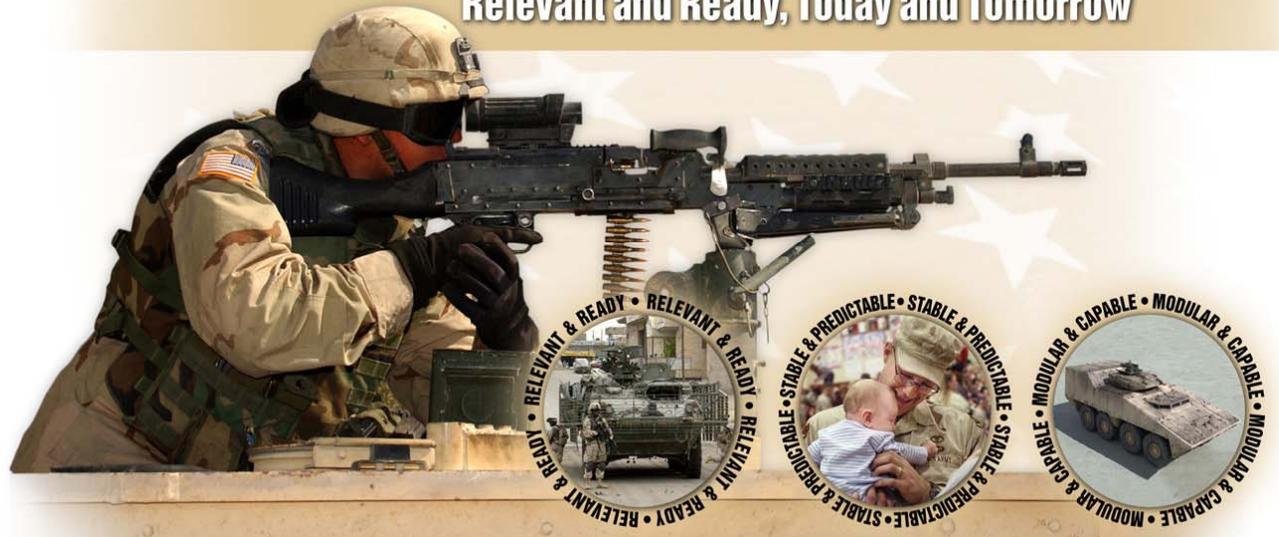


A Campaign Quality Army with Joint and Expeditionary Capabilities

An Introduction to: Lean Six Sigma, Value Stream Analysis and Project Charters

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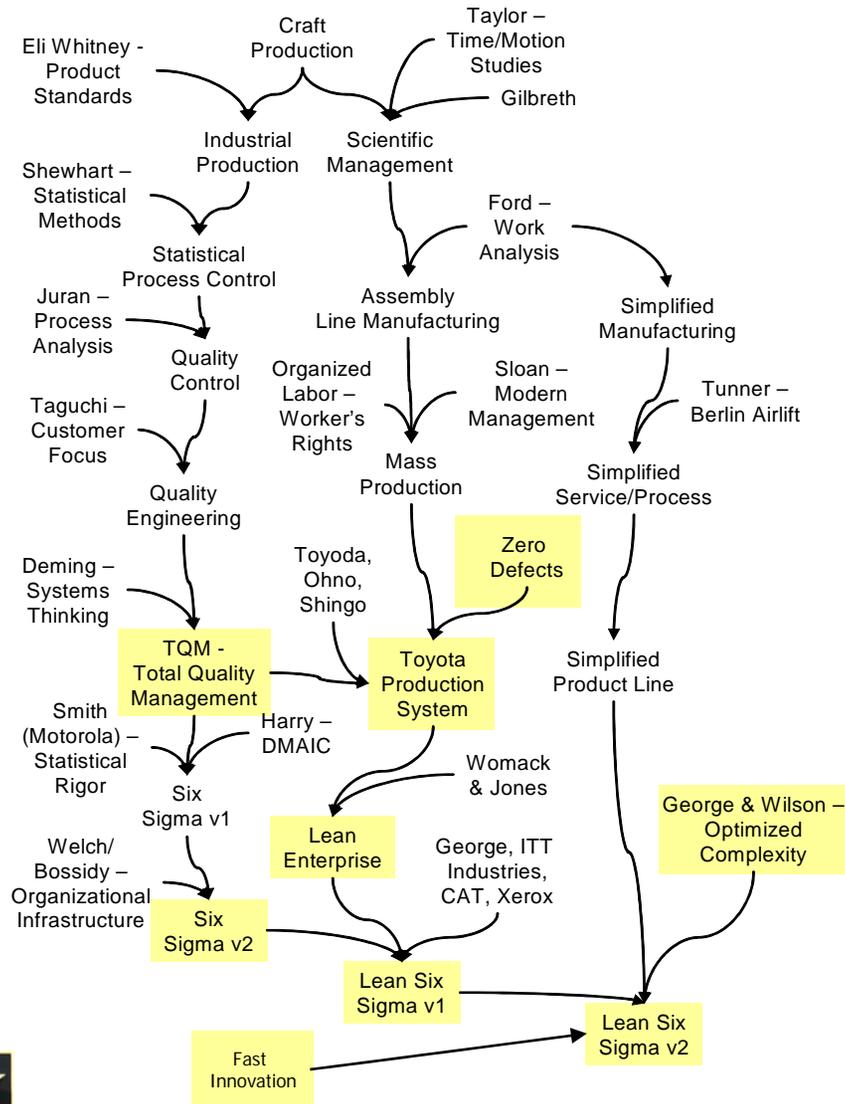


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Lean Six Sigma Origins and Concepts



Lean Six Sigma Builds Upon a Foundation of Continuous Improvement



- ◆ Continuous Improvement can be traced to Taylor's time studies
- ◆ Toyota focused on lead time and achieved Henry Ford's cost with GM's variety
- ◆ Motorola initiated "six sigma" to organize TQM tools into DMAIC
- ◆ Deming, Baldrige and Shingo Prize's are Descriptive systems
- ◆ GE evolved six sigma into a Prescriptive quality system
- ◆ Lean Six Sigma integrates Lead time, cost and quality; strategy drives projects





Lean Production History

- ◆ Concept pioneered by Toyota – 1950's
- ◆ Goals: Henry Ford's low cost, fast lead time, high Quality with Sloane's variety of product
- ◆ Toyota achieved these goals by 1980's
- ◆ Adopted by other Japanese manufacturers and discovered much later by Western manufacturers
- ◆ Known by many names:
 - Toyota Production System
 - Just-In-Time
 - Lean production
- ◆ Originally focused on reducing waste in manufacturing
- ◆ Now huge gains are being achieved by applying Lean to transactional and service environments
- ◆ Lean lacks:
 - An implementation infrastructure (e.g., 1% dedicated Black Belts)
 - A culture driven by Leadership *engagement*
 - Sustained results





Mathematical Foundation of Lean: *Little's Law**

$$\text{The Lead Time of Any Process} = \frac{\text{The Number of "Things" in Process}}{\text{The Completion Rate}}$$



Example:

- The Procurement Department Processes (12) Orders per Hour
- There is a Backlog of (89) unprocessed orders
- A 90th order is put into the queue
- How long must the 90th order wait to be processed?

$$7.5 \text{ Hours} = \frac{90 \text{ Orders in Process}}{12 \text{ Orders per hour}}$$

Lean is a set of tools to reduce the number of Things in process without reducing the completion rate



* First proven by Dr. John D.C. Little, MIT, 1961

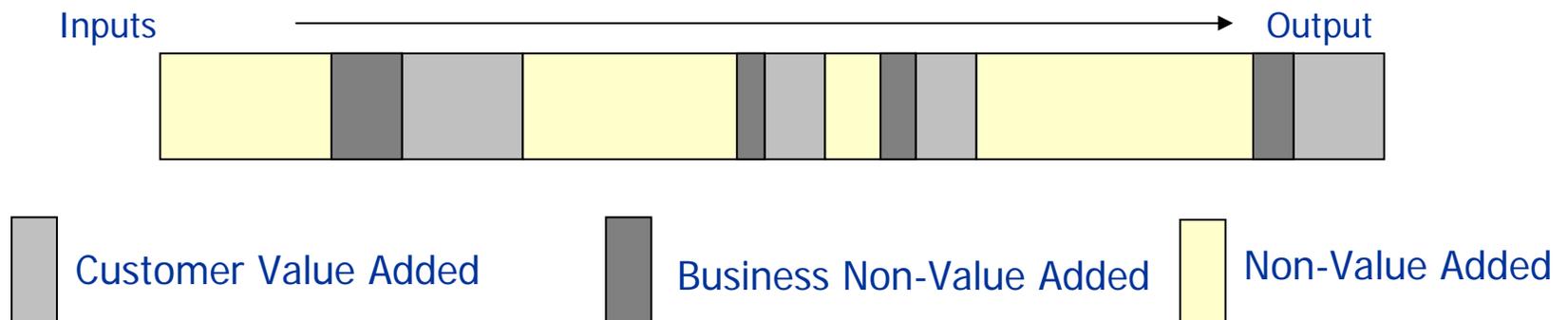




Determine Non-Value Added Activities And Reduce or Eliminate

- ◆ The end goal is to Reduce Process Waste:
 - Minimize the Non-Value Added Processes
 - Minimize the Business Non-Value Added Processes
 - Streamline the Customer Value Added Processes
 - Eliminate All Waste

Process Leadtime



A typical process adds value less than 5% of the total cycle time





What Is Six Sigma?

- ◆ A statistical measure for determining process capability (Six Sigma Quality level equates to 3.4 defects per million opportunities)
- ◆ A proven set of tools and tactics for reducing variation
- ◆ A successful business strategy (in use by GE, Motorola, Texas Instruments and Allied Signal)
- ◆ A comprehensive philosophy about operational excellence
- ◆ A complementary discipline to existing tools

Focus on Customer Satisfaction, Improving Process Capabilities, and Organization-wide Involvement





Six Sigma History

- ◆ Motorola was the first advocate in the 80's; gathered momentum in late 80's/early 90's
- ◆ Six Sigma involves use of statistical tools and structured problem-solving approach to attack high payback projects
- ◆ Uses Project implementers called "Black Belts" and "Green Belts" with support from "Project Sponsors"
- ◆ Implementers expected to deliver annual financial benefits through 3-6 projects per year
- ◆ Companies embracing Six Sigma include GE, Allied Signal, Sony, ITT, and Caterpillar





Six Sigma Terminology

- ◆ "Sigma" (σ) = Standard Deviation
 - Key measure of Variability
 - Emphasizes need to control both the average and variability of a process

- ◆ **Six Sigma Quality**
 - "Sigma Quality Level" (SQL) measure used to indicate how often defects are likely to occur
 - Realization that 99% Yield is not good enough
 - Unsafe drinking water almost 15 minutes each day
 - 2 short or long landings at most major airports each day
 - No electricity for almost 7 hours per month





The Goal of Six Sigma

- ◆ Which airline process would you assume has a process sigma of 6 or better?
 - Would 99% be acceptable?
- ◆ Which airline process or processes would be lucky to reach 99%?

σ	DPMO*	Yield
6	3.4	99.9997%
5	233	99.977%
4	6,210	99.379%
3	66,807	93.32%
2	308,537	69.2%
1	690,000	31%

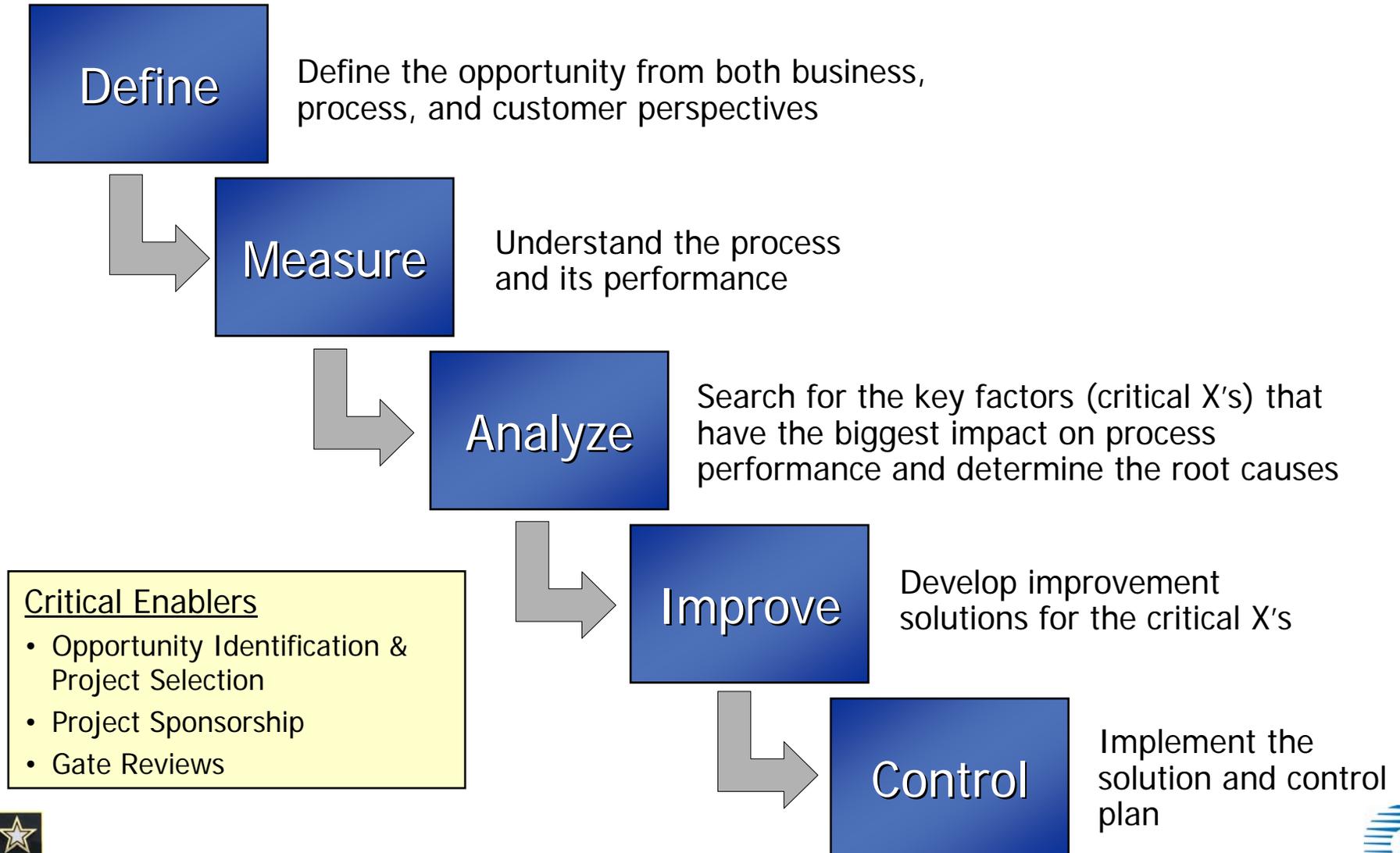
* *Defects Per Million Opportunities*

Not every process needs to be at a Six Sigma Quality Level

DPMO very valuable in analyzing high traffic volume processes



The Lean Six Sigma Improvement Process



World Class Operating Excellence Demands Integration of Lean and Six Sigma



Lean

Speed + ~~Waste~~ +
Implicit Infrastructure

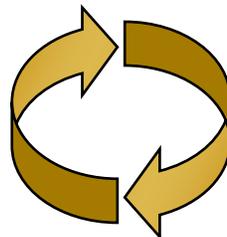
- ◆ **Goal** – Reduce waste and increase process speed
- ◆ **Focus** – Bias for action, Lean tools to eliminate TIMWOOD
- ◆ **Method** – Rapid Improvement Event events, Value Stream Mapping

Six Sigma

Quality, Cost +
Explicit Infrastructure

- ◆ **Goal** – Improve performance on Customer CTQs
- ◆ **Focus** – Use DMAIC with TQM tools to eliminate variation
- ◆ **Method** – Management engagement, 1% dedicated as Directors and Black Belts

Lean Speed Enables
Six Sigma Quality
(Faster Cycles of
Experimentation/learning)



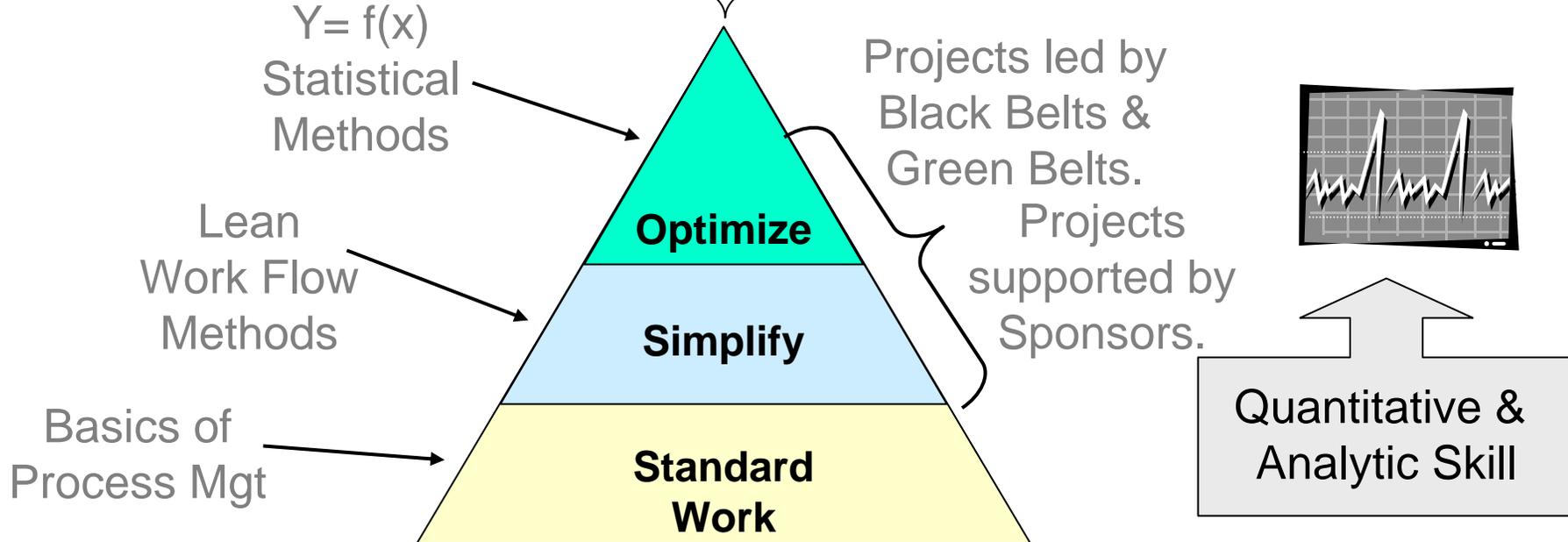
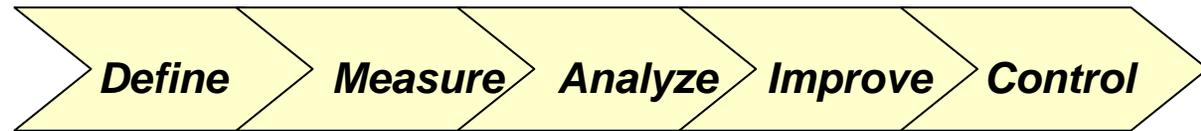
Six Sigma Quality Enables
Lean Speed
(Fewer Defects Means
Less Time Spent on Rework)





What Are the Methods and Tools for Improvement?

DMAIC Process



- Various methods can be used throughout DMAIC to drive improvement.
- Black Belts & Green Belts, skilled in these methods, play key leadership role.
- Sponsors support the teams - accountable for capturing & sustaining results.





What is different about LSS?

- ◆ Lean Six Sigma is a fact / data based, rigorous and disciplined process
- ◆ Capitalizes on and develops the major asset and talents of The Army – its people
- ◆ Led from the top
- ◆ Focused on the needs of the customer
- ◆ Driven by 100% dedicated, trained, talented resources
- ◆ Requires critical measures
- ◆ Provides a common language for the organization
- ◆ Works for all aspects of business
- ◆ Delivers significant positive financial impact

LSS projects will typically “maximize value by achieving the fastest rate of improvement in customer satisfaction, cost, quality, process speed, and invested capital.”

Michael George





The Synergy of Lean and Six Sigma

Today's Environment...

- ◆ Too Many Hand-Offs
- ◆ Too Much or Not Enough Information
- ◆ Too Much Rework
- ◆ Manually Intensive
- ◆ Missing Customer CTQs
- ◆ Long Cycle Times



Where We Need to Be...

- ◆ Reduced process complexity
- ◆ Timely Information
- ◆ Doing It Right the First Time
- ◆ Improved Systems
- ◆ Satisfied Customers
- ◆ Shorter Cycle Times



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Wrap-up



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Top 10 Reasons for: Less Than Successful LSS Projects



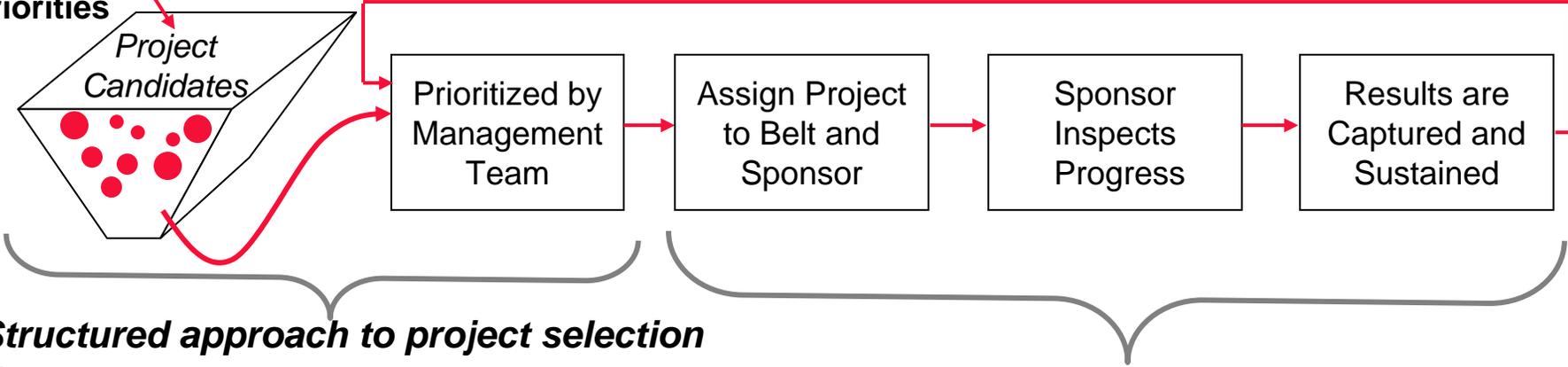
1. Project Scope – either **initially too large** and/or “scope creep”
2. **Lack of direct link between the focus of the project and real Impact**
3. Team members are not honoring time commitments
4. No organizational buy-in into solution – need to involve stakeholders throughout the process
5. **Poorly defined Project Charter** – results in team spending considerable amount of time in “Define” phase
6. Team not focused – either trying to “boil the ocean” or “paralysis by analysis”
7. Lack of understanding of process requirements from customer
8. **Not a good Lean Six Sigma project from the beginning** – solution is known or a process doesn't exist
9. Impatience – going from “Define” to “Improve”
10. **Project Sponsor not actively involved in project**



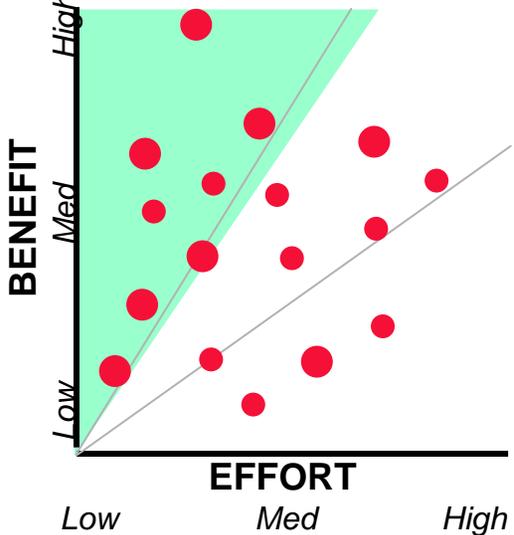


DMAIC (Structured Project Execution)

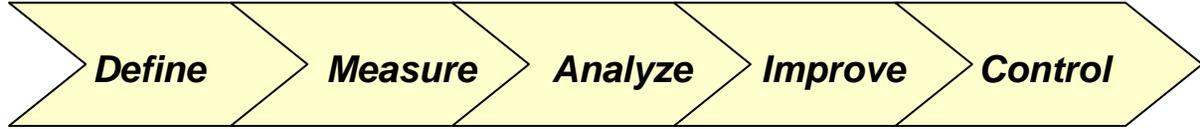
- Customer Issues / Opportunities
- Business Strategy
- Goals / Objectives
- Priorities



Structured approach to project selection



DMAIC is the project management framework



Sponsor inspects deliverables & checkpoints for each phase

- Define** project purpose and scope
- Measure** current performance
- Analyze** causes & confirm with data
- Improve** by removing variation and non value-added activities
- Control** gains by standardizing