

Washington State Quality Award Conference Process Management May 3, 2005





Web Sites for Reference

<http://www.wamfg.org>

<http://www.mep.nist.gov>



Category 6 – Process Management

Describe how your organization identifies and manages its key processes for creating customer value and achieving business success and growth.



Category 6 – Process Management Tools

- **Lean Enterprise System**
- **Six Sigma Methodologies**
- **ISO 9000:2000**



Category 6 – Process Management Tools

- **Lean Enterprise System**

The longer an article is in the process of manufacture and the more it is moved about, the greater is its ultimate cost.”

Henry Ford, 1926



Defining Lean

- **Waste elimination**
- **Value creation**
- **Culture of continuous improvement**



Lean Building Blocks

Continuous Improvement

Pull/Kanban

Cellular/Flow

Standardized Work

Batch Reduction

Quality at Source

Plant Layout

Quick Changeover

TPM

Teams

5S System

POUS

Visual Controls

**Value
Stream
Mapping**



Definition of Value Added

Value Added

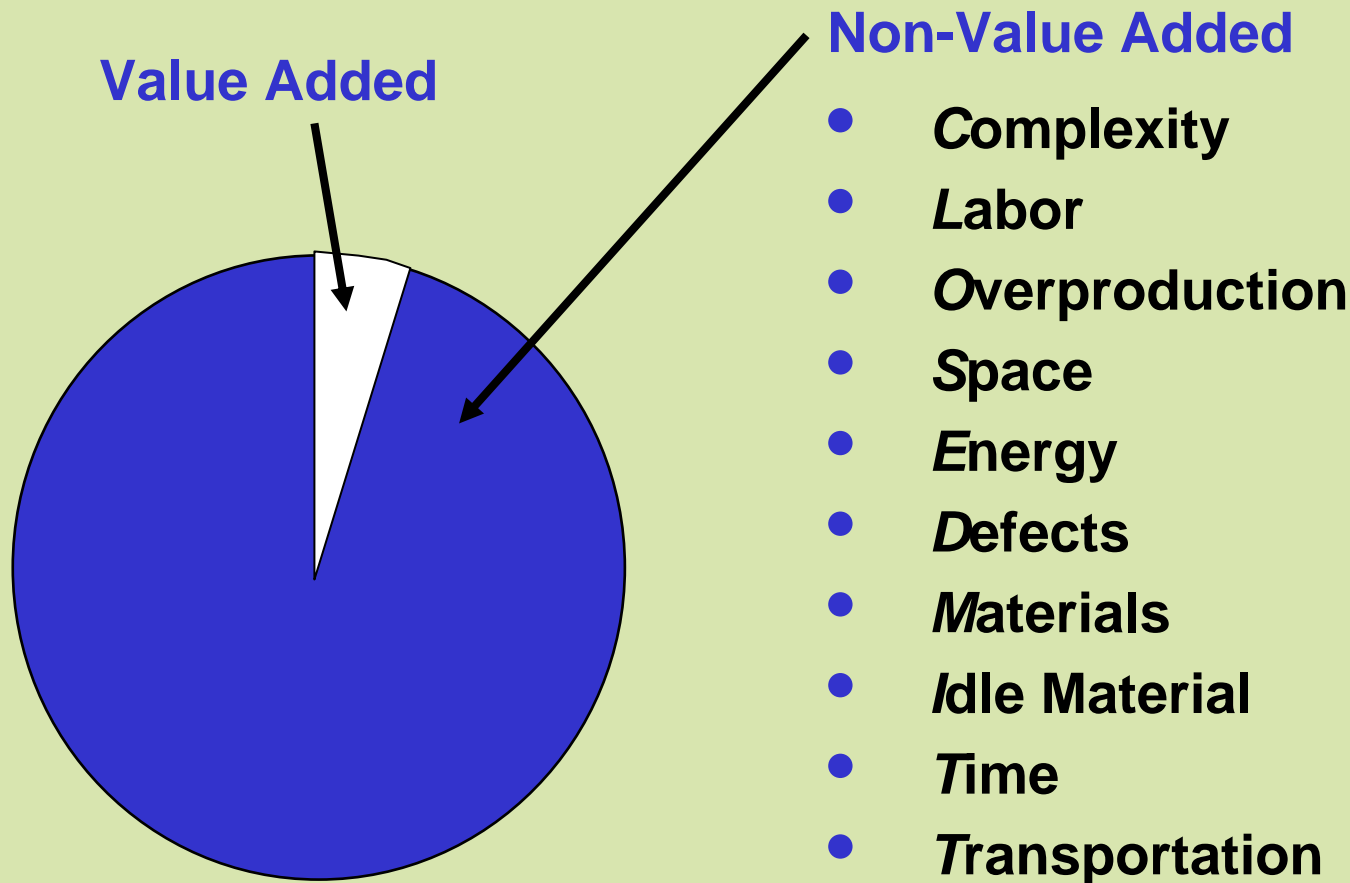
Any activity that increases the market form or function of the product or service. (These are things the customer is willing to pay for.)

Non-Value Added

Any activity that does not add market form or function or is not necessary. (These activities should be eliminated, simplified, reduced, or integrated.)



Lean = Eliminating the Wastes



Hold all waste in a CLOSED MITT

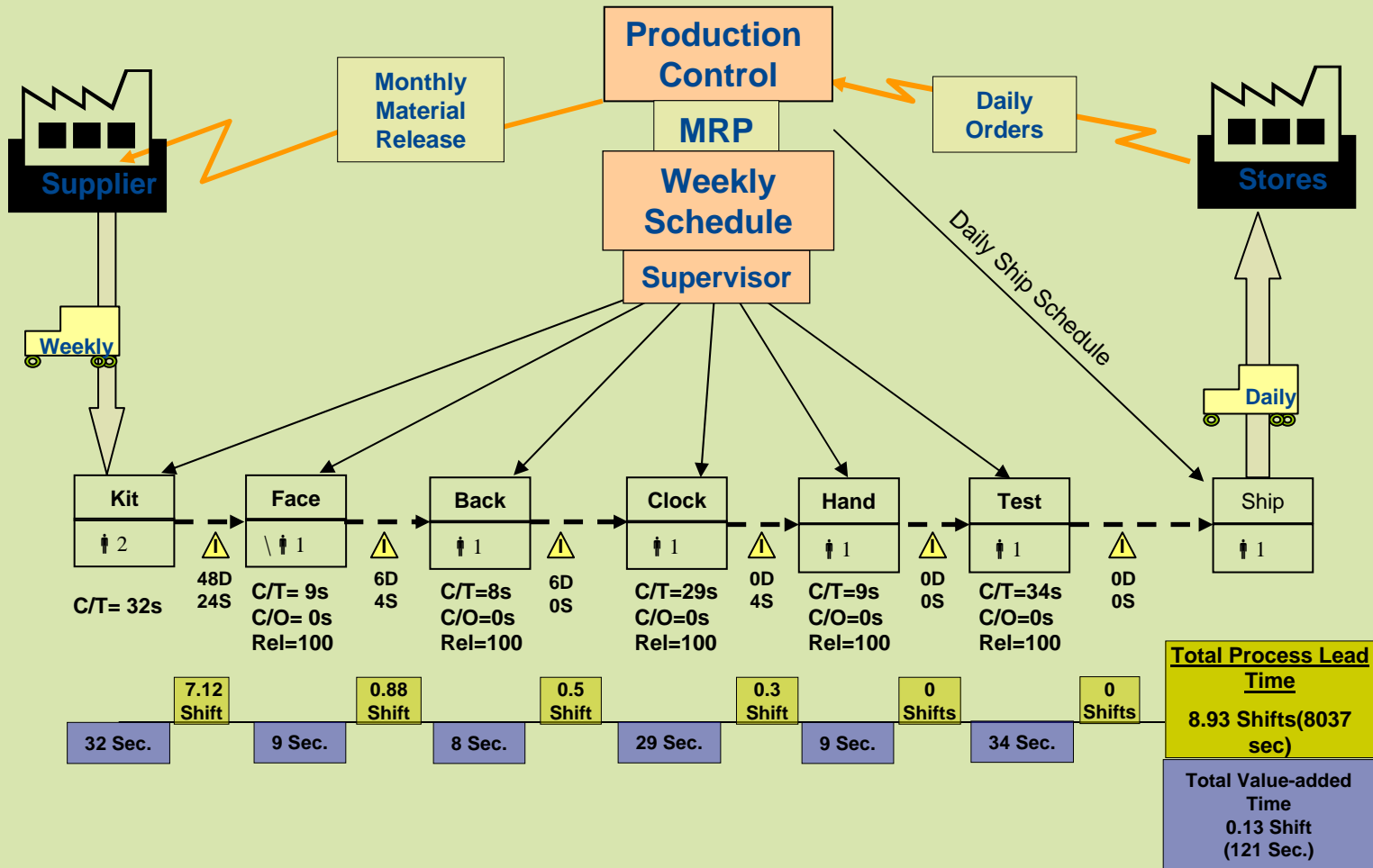
Typically 95% of all lead time is non-value added



Getting Started: The Power of Value Stream Mapping

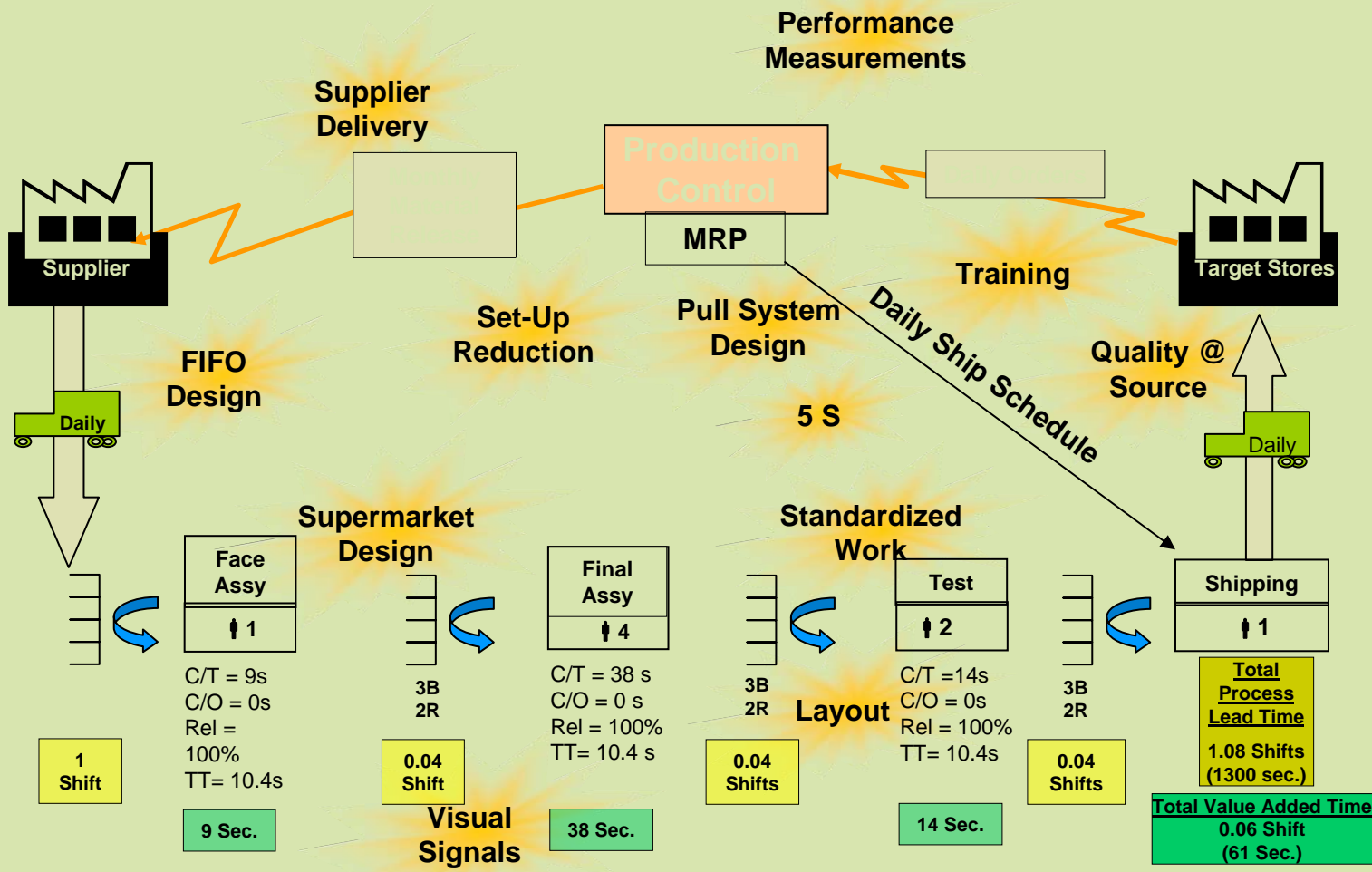
- **A simple, visual approach**
 - **Helps you visualize the total system rather than the single process level**
 - **Links the material and information flows**
 - **Provides a common language for all participants**
 - **Develops a blueprint for implementation of the future state**
 - **Ties Lean concepts and techniques together**

Current State Map





Future State Map





Linking Objectives to Measurements

Value Stream Objectives -----> **Value Stream Measurements**

Increase through-put by 15% with same resources

Reduce order fulfillment lead time from 12 to 3 days

Increase inventory turns to 6 turns

Perfect Quality – Zero product faulty returns

Improve Productivity: Cost per unit of \$17.65 or less

Reduce AR days outstanding to 45

Sales per person

On Time Shipments

Dock to Dock Time

First Time Through

Average Cost per Unit

Accounts Receivable Days Outstanding

Value Stream Gross Profit Percent

OEE at Constraint Work Center



Linking Strategic Goals to Objectives

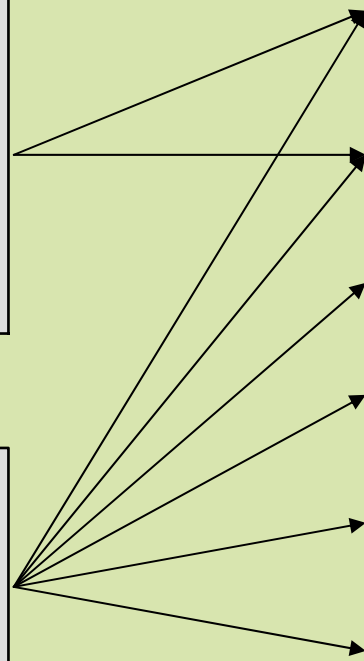
Strategic Goals

Grow our revenue by 25% over the next 12 months and increase market share to 15% in our 3 major Markets

Bring our debt down to less than \$500K and improve cash flow from operations by 25%

Value Stream Goals

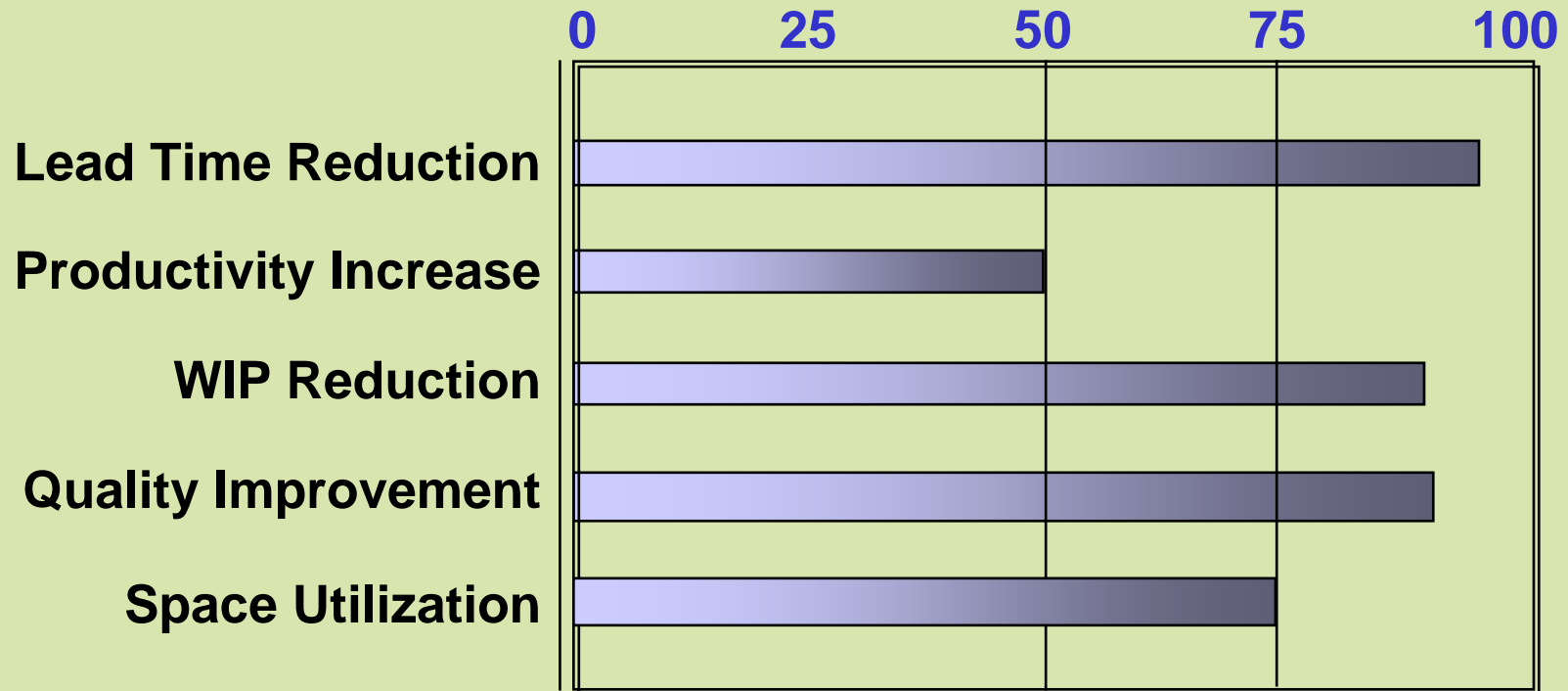
- Increase through-put by 15% with same resources
- Reduce order fulfillment lead time from 12 to 3 days
- Increase inventory turns to 6 turns
- Perfect Quality – Zero product faulty returns
- Improve Productivity: Cost per unit of \$17.65 or less
- Reduce AR days outstanding to 45





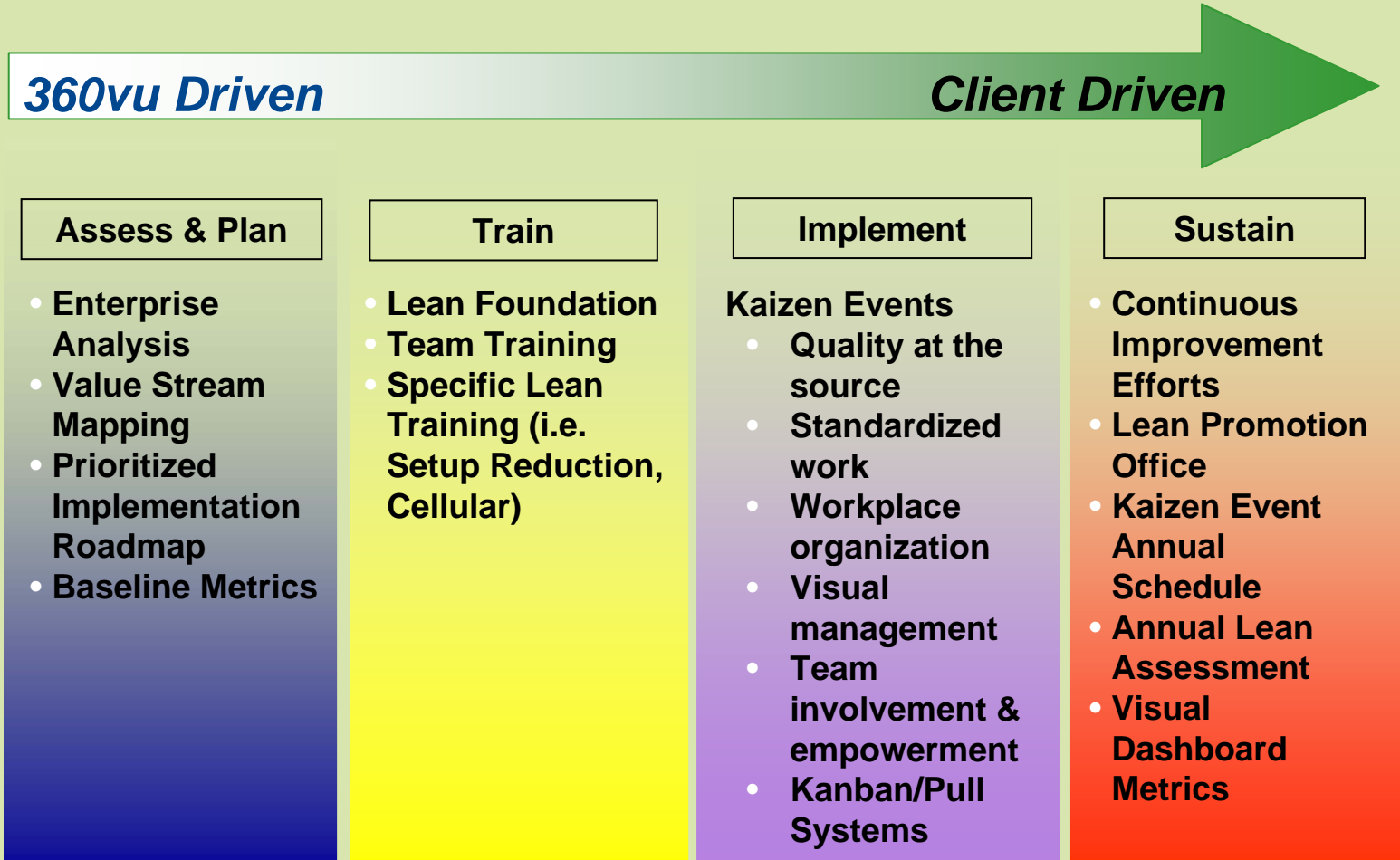
Benefits of Lean

Percentage of Benefits Achieved





What The Lean Journey Involves...





Category 6 – Process Management Tools

- **Six Sigma Methodologies**

"I have Six Stalwart Serving Men,
They taught me all I know,
Their Names are What and Where and When,
And Why and How and Who."

6 Serving Men of Creativity - Rudyard Kipling



Six Sigma Methodologies

- **Sigma is a statistical term that measures how much a process varies from perfection, based on the number of defects per million units.**
 - **One Sigma = 690,000 per million units**
 - **Two Sigma = 308,000 per million units**
 - **Three Sigma = 66,800 per million units**
 - **Four Sigma = 6,210 per million units**
 - **Five Sigma = 230 per million units**
 - **Six Sigma = 3.4 per million units**



Six Sigma Methodologies

- **Customer Focus**
- **Data Driven**
- **Robust Methodology**



Six Sigma Master Black Belt Curriculum and Body of Knowledge

- Overview of Six Sigma
- DMAIC Methodology Overview
- Financial Benefits of Six Sigma
- The Impact of Six Sigma to The Organization
- The Six Sigma Language
- Project Prioritization
- Training the Trainer
- Integrating DMADV (Design for Six Sigma Methodology) with DMAIC
- Leading Organizational Change
- Define
- Project Management
- Project Definition
- Project Charter
- Developing a Business Case
- Chartering a Team
- Defining Roles and Responsibilities
- Gathering Voice of the Customer, Support for Project
- Translating Customer Needs into Specific Requirements (CTQs)
- SIPOC Diagram
- Define Phase Review
- Measure
- Process Mapping (As-Is Process)
- Data Attributes (Continuous Versus Discrete)
- Defining Metrics
- Measurement System Analysis
- Gage Repeatability and Reproducibility
- Data Collection Techniques
- Calculating Sample Size
- Data Collection Plan
- Understanding Variation
- Measuring Process Capability
- Calculating Process Sigma Level
- Rolled Throughput Yield
- Visually Displaying Baseline Performance
- Statistical Software Training
- Measurement Phase Review
- Analyze
- Visually Displaying Data (Histogram, Run Chart, Pareto Chart, Scatter Diagram)
- Detailed (Lower Level) Process Mapping of Critical Areas
- Value-Added Analysis
- Cause and Effect Analysis (a.k.a. Fishbone, Ishikawa)
- Affinity Diagram
- Data Segmentation and Stratification
- Correlation and Regression (Linear, Multiple)
- Process Performance (Cp, CpK, Pp, PpK, CpM)
- Short Term Versus Long Term Capability
- Non-Normal Data Distribution Transformations
- Central Limit Theorem
- Goodness of Fit Testing
- Hypothesis Testing
- Analysis of Variance (ANOVA), Two Sample T-Tests, Chi Squared Test
- Design of Experiments (DOE) - Full, Fractional Factorials
- Verification of Root Causes
- Determining Opportunity (Defects and Financial) for Improvement
- Project Charter Review and Revision
- Statistical Software Training
- Analyze Phase Review
- Improve
- Brainstorming
- Multi-Voting
- Process Simulation
- Quality Function Deployment (House of Quality)
- Selecting a Solution
- Failure Modes and Effects Analysis (FMEA)
- Poka Yoke (Mistake Proofing Your New Process)
- Piloting Your Solution
- Implementation Planning
- Statistical Software Training
- Culture Modification Planning For Your Organization
- Improve Phase Review
- Control
- Assessing The Results of Process Improvement
- Statistical Process Control (SPC)
- Rational Subgrouping
- Establishing Process Standards for Inputs, Process and Outputs
- Developing a Process Control Plan
- Documenting the Process
- Statistical Software Training
- Control Phase Review



Six Sigma Methodologies

DMAIC

- **Define the project goals and customer (internal and external) deliverables**
- **Measure the process to determine current performance**
- **Analyze and determine the root cause(s) of the defects**
- **Improve the process by eliminating defects**
- **Control future process performance**



DMAIC

Define

- **Why must this project be done NOW?**
- **What is the business case for the project?**
- **Who is the customer?**
- **What is the current state?**
- **What is the future state?**
- **What is the scope of this project?**
- **What are the tangible deliverables?**
- **What is the due date?**

Deliverables Of Phase:

- Fully trained team is formed, supported, and committed to work on improvement project.
- Customers identified and high impact characteristics (CTQs) defined, team charter developed, business process mapped.



DMAIC

Measure

- What are the key metrics for this business process?
- Are metrics valid and reliable?
- Do we have adequate data on this process?
- How will I measure progress?
- How will I measure ultimate success?

Deliverables Of Phase:

- Key measures identified, data collection planned and executed, process variation displayed and communicated, performance baselined, sigma level calculated.



DMAIC

Analyze

- **Current State Analysis**
- **Is the current state as good as the process can do?**
- **Who will make the changes?**
- **What resources will we need?**
- **What could cause this change effort to fail?**
- **What major obstacles do I face in completing this project?**

Deliverables Of Phase:

- Data and process analysis, root cause analysis, quantifying the gap/opportunity.



DMAIC

Improve

- What is the work breakdown structure for this project?
- What specific activities are necessary to meet the projects goals?
- How will I re-integrate the various subprojects?
- Do changes produce the desired effects?
- Any unanticipated consequences?

Deliverables Of Phase:

- Generate (and test) possible solutions, select the best solutions, design implementation plan.



DMAIC

Control

- During the project, how will I control risk, quality, cost, schedule, scope, and changes to the plan?
- What types of progress reports should I send to sponsors?
- How will I assure that the business goals of the project were accomplished?
- How will I maintain the gains made?

Deliverables Of Phase:

• Documented and implemented monitoring plan, standardized process, documented procedures, response plan established and deployed, transfer of ownership (project closure).



DMAIC

Is investing in Six Sigma quality, your employees and your organization's culture worth the money?



Category 6 – Process Management Tools

- **ISO 9000:2000**

“Quality is never an accident; it is always the result of high intention, sincere effort, intelligent direction and skillful execution; it represents the wise choice of many alternatives.”

William A. Foster



ISO 9000:2000

What is Quality?

- **A dependable, customer satisfying product or service at low cost. (Deming)**
- **Conformance to requirements. (Crosby)**
- **Fitness for use. (Juran)**



Who is ISO?

- **ISO is the *International Organization for Standardization*.**
- **Founded in the 1947, made up of some 130 national standards institutes from countries large and small, industrialized and developing, in all regions of the world.**



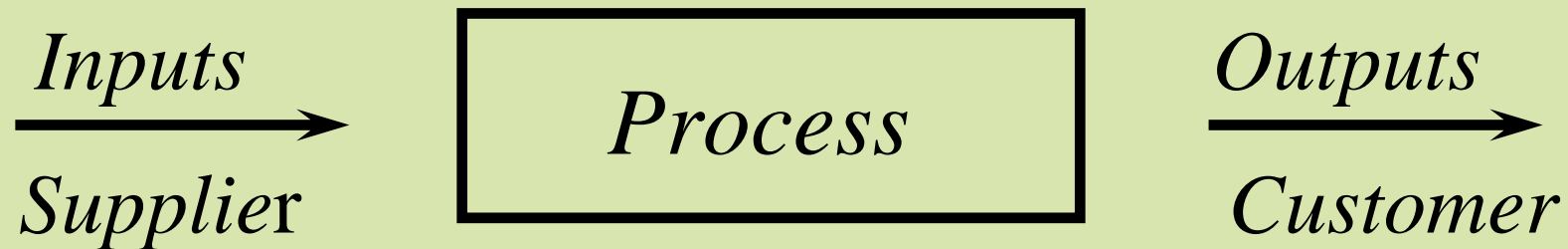
Quality Management Principles

- 1. Customer focus**
- 2. Leadership**
- 3. Involvement of People**
- 4. Process Approach**
- 5. System Approach to Management**
- 6. Continual Improvement**
- 7. Factual Approach to Decision Making**
- 8. Mutually Beneficial Supplier Relationships**



Processes

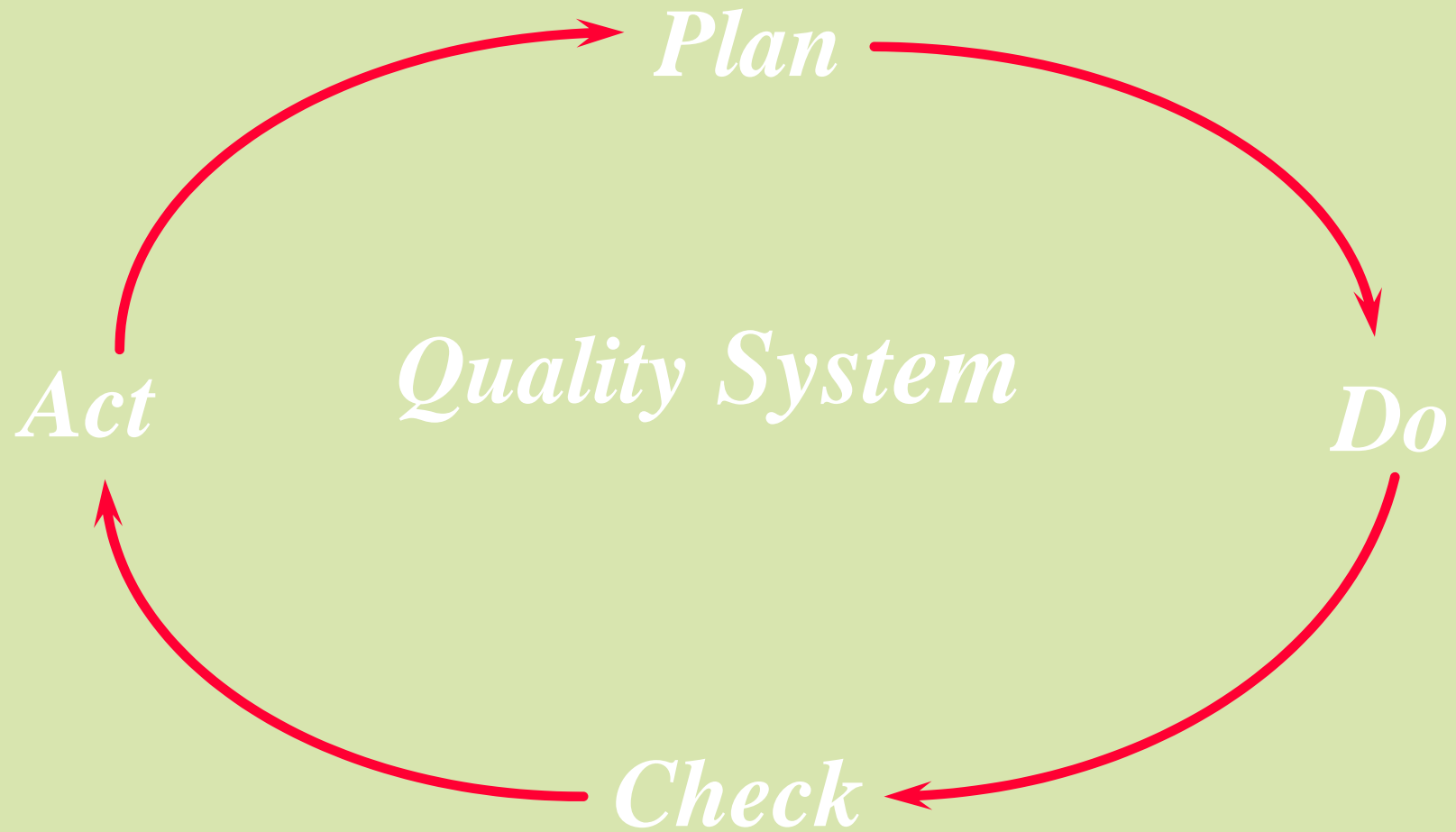
System of activities which uses resources to transform inputs into outputs. *ISO/DIS 9000 (E)*



Product: result of a process (hardware, software, services, processed materials) *ISO/DIS 9000 (E)*



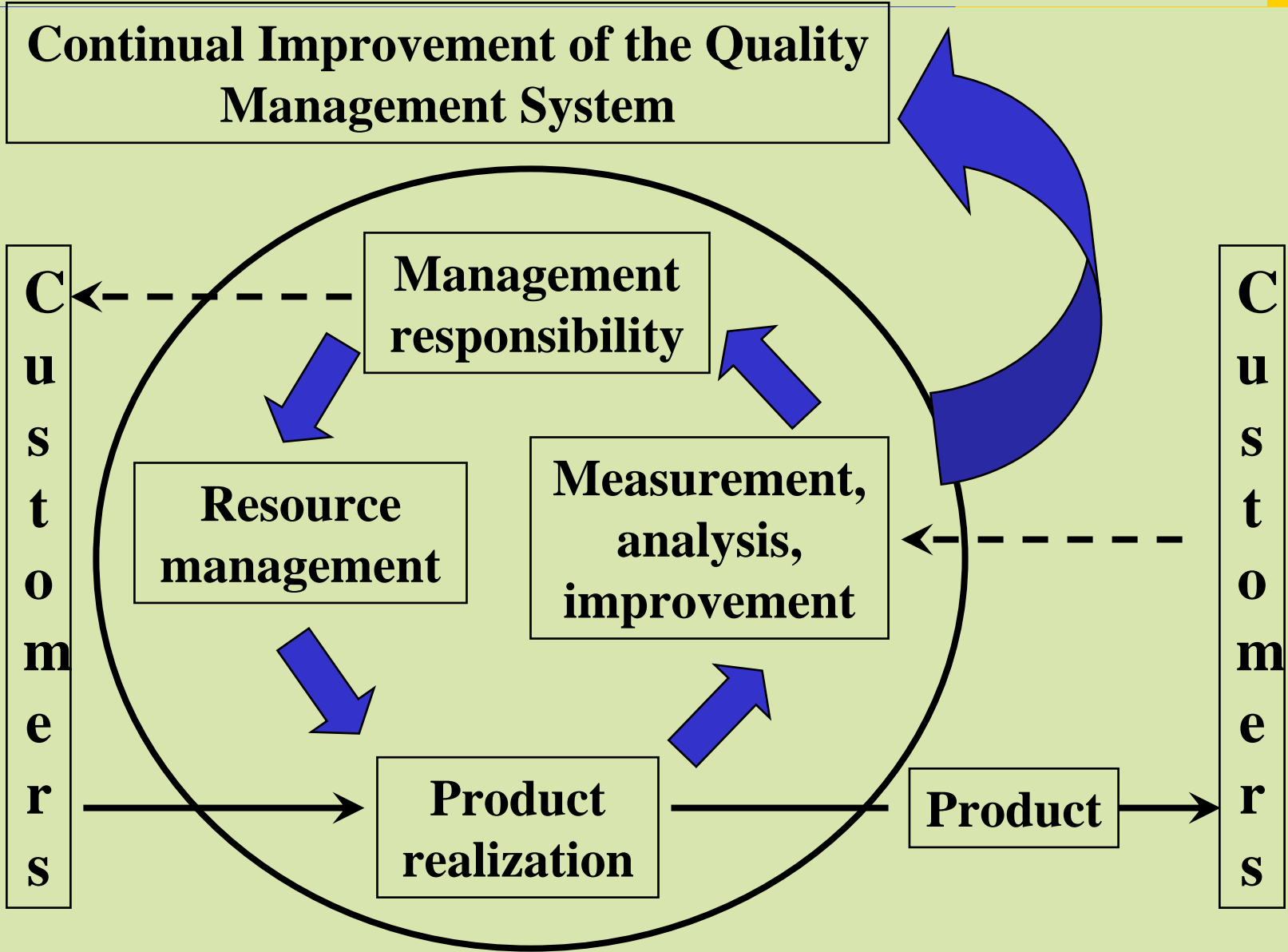
Continual Improvement





ISO 9001 - Main Clauses

- **4 Quality Management System**
- **5 Management Responsibility**
- **6 Resource Management**
- **7 Product Realization**
- **8 Measurement, Analysis, Improvement**





QMS Documentation Requirements





A Successful QMS Implementation

- **Focused on prevention rather than reaction**
- **Promotes employee involvement and commitment**
- **Management and customer confidence**
- **Formal process for continuous process improvement**
- **Ensures “best practice” and consistency**



The Benefits of Implemented QMS

- **Market advantage**
- **Improved customer satisfaction**
- **Improved internal operations**
- **Direct cost savings**
- **Improved documentation**
- **Improved quality awareness**



ISO Registration

- **Select an accredited registrar**
- **Submit the Quality Manual and an application**
- **Pre-assessment audit (optional)**
- **Registration audit (also called Certification audit)**
 - **desktop and physical**
- **Surveillance audits (once per year)**
- **Every 3 years the registrar will do a complete “re-certification audit”**



The Measure of Success

"When it is obvious that the goals cannot be reached, don't adjust the goals, adjust the action steps."

Confucius quotes (China's most famous teacher, philosopher, and political theorist, 551-479 BC)





Questions?