

Lean Six Sigma

A nighttime photograph of the Acropolis in Athens, Greece. The Parthenon and other ancient structures are illuminated with warm yellow lights, standing out against the dark blue night sky. The city lights of Athens are visible in the foreground and background, creating a vibrant contrast with the dark surroundings.

A Methodology for Cultural
Change and Continuous Process
Improvement (CPI)

Lean Six Sigma: A Vision

Empowered People Operating in a Culture and
Climate of Creativity & Innovation



Constantly Eliminating Waste and Variation



Reduced Costs & Increased Productivity

Lean Six Sigma: What is it?



- Lean and Six Sigma are both process improvement methodologies
- Lean is about speed and efficiency
- Six Sigma is about precision and accuracy – leading to data-driven decisions
- Both rooted in the 1980s (and earlier)
 - Lean arose as a method to optimize auto manufacturing
 - Six Sigma evolved as a quality initiative to reduce variance in the semiconductor industry

Why Lean and Six Sigma

- Six Sigma will eliminate defects but it will not address the question of how to optimize process flow
- Lean principles exclude the advanced statistical tools often required to achieve the process capabilities needed to be truly 'lean'
- Each approach can result in dramatic improvement, while utilizing both methods simultaneously holds the promise of being able to address all types of process problems with the most appropriate toolkit.
 - *For example, inventory reduction not only requires reducing batch sizes and linking operations by using Lean, but also minimizing process variation by utilizing Six Sigma tools.*

Lean Six Sigma Goals and Benefits

- Achieve total customer satisfaction and improved operational effectiveness and efficiency
 - Remove wasteful/non-value added activities
 - Decrease defects and cycle time, and increase first pass yields
- Improve communication and teamwork through a common set of tools and techniques
(a disciplined, repeatable methodology)
- Develop leaders in breakthrough technologies to meet stretch goals of producing better products and services delivered faster and at lower cost

Lean Six Sigma Requires Behavioral Change

- Lean Six Sigma Challenges Us to:
 - Think Differently
 - Work Differently
 - Ask Questions and Challenge the Status Quo
 - Make Decisions With Facts and Data
 - Use New Principles, Tools and Methodologies

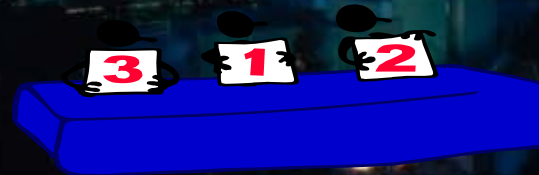
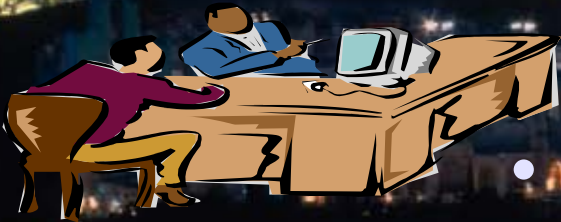
“Early-on, when culture and change compete, culture wins.”
- Tom Quan, GlaxoSmithKline

To Successfully Deploy Lean Six Sigma

- Start with the customer ... listen, listen, listen
- Leadership commitment and alignment ... go beyond the words ... change behavior
 - Create momentum for change
 - Develop need, vision and plan
 - Communicate, communicate, communicate
 - Repeatedly execute and assess
 - Develop necessary skill sets to obtain the desired future state at all levels of the organization
- Involve Everyone: Leadership, Champion, Master Black Belt, Black Belt, Green Belt, Employees

Basic Questions

- What are the customer needs?
- Do our products or services
 - answer the Voice of the Customer
 - at a price he is willing to pay?
- How do we know?

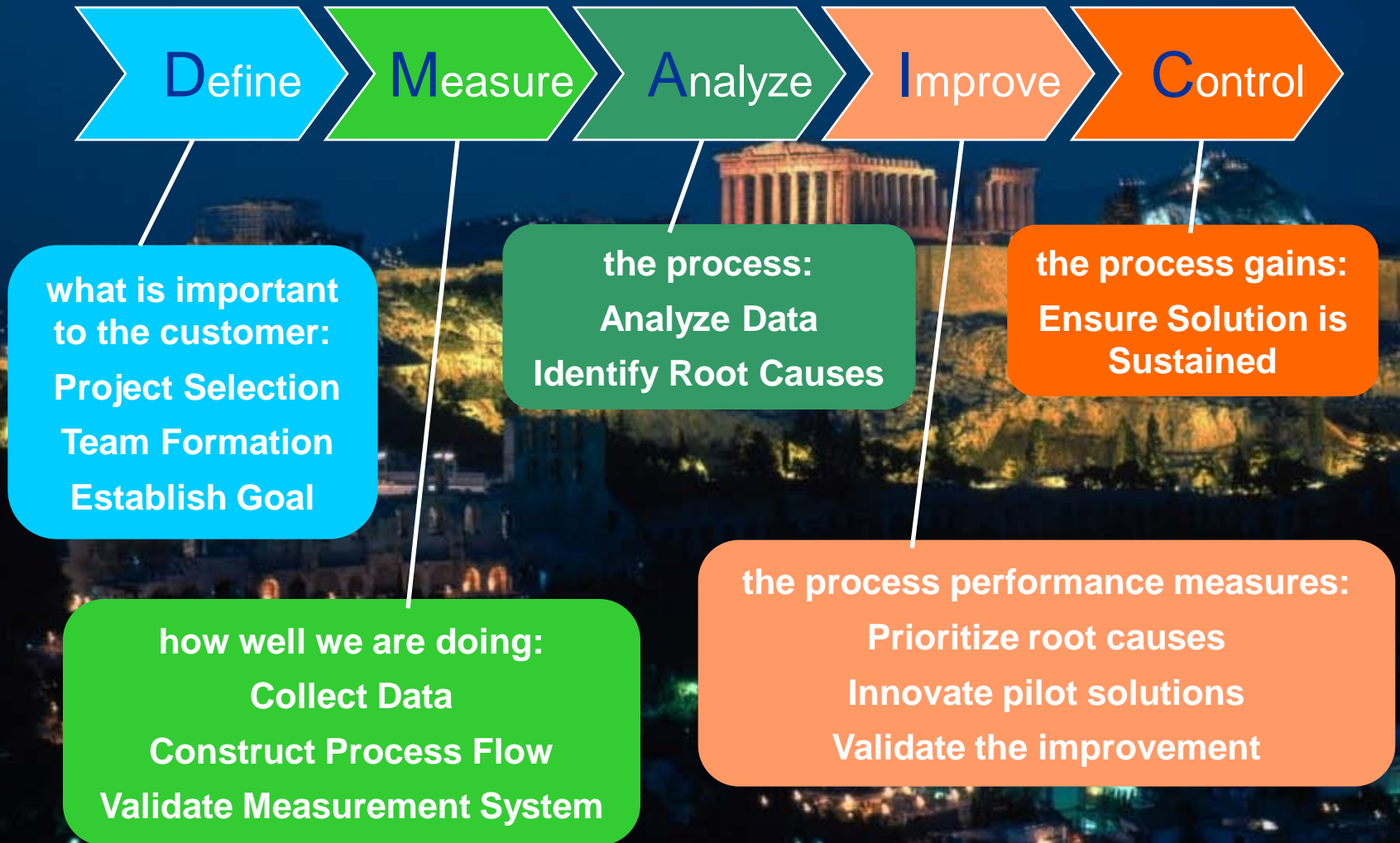


Lean Six Sigma Principles



- Specify value in the eyes of the customer
- Identify the value stream and eliminate waste / variation
- Make value flow smoothly at the pull of the customer
- Involve, align and empower employees
- Continuously improve knowledge in pursuit of perfection

Lean Six Sigma: A Powerful Methodology (DMAIC)



The Tools and Techniques

Define

Measure

Analyze

Improve

Control

Benchmarking
FMEA
IPO Diagram
Kano's Model
Knowledge Based Mgt
Project Charter
SIPOC Model
Quality Function
Deployment
Voice of Customer
Task Appraisal / Task
Summary
Value Stream Mapping

Confidence Intervals
Measurement System
Analysis
Nominal Group
Technique
Pairwise Ranking
Physical Process Flow
Process Capability
Analysis
Process Flow Diagram
Process Observation
Time Value Map
Value Stream Mapping
Waste Analysis

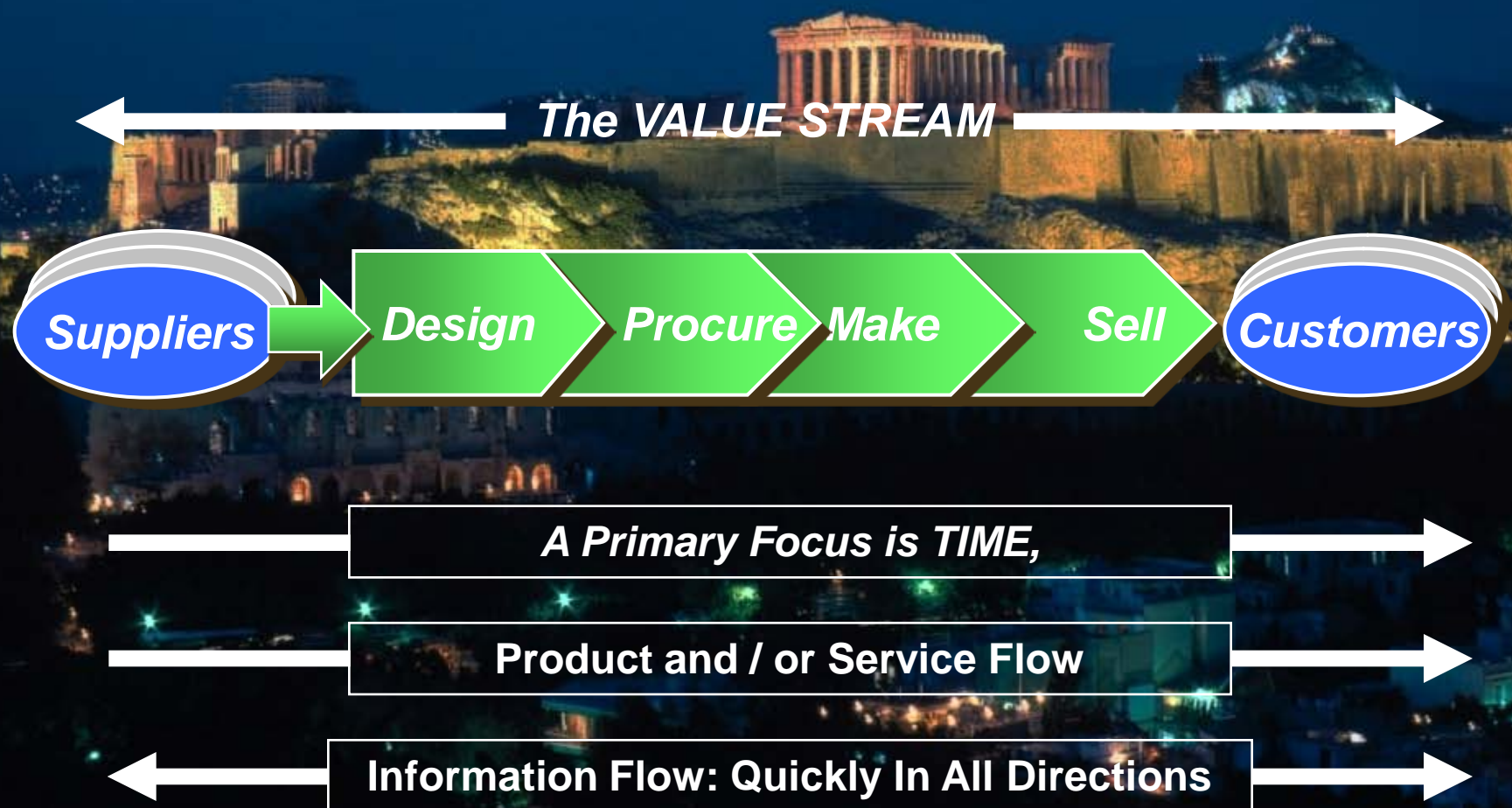
Affinity Diagram
Brainstorming
Cause & Effect Diagram
e-test
F-test
Fault Tree Analysis
FMEA
Histogram
Historical Data Analysis
Pareto Chart
Reality Tree
Regression Analysis
Scatter Diagram
t-test
Thematic Content
Analysis
Tukey End Count Test
5 Whys

DFSS
DOE
Kanban
Mistake Proofing
PF/CE/CNX/SOP
Standard Work
Takt Time
Theory of Constraints
Total Productive
Maintenance
Visual Management
Work Cell Design
5S Workplace
Organization

Control Charts
Control Plan
Reaction Plan
Run Charts
Standard Operating
Procedures

Definition of a Value Stream

The VALUE STREAM is the entire set of processes or activities performed to transform the products and services into what is required by the customer.



Understanding the Value Stream



- We are often part of a value creating stream
- Ultimately, the intent of the stream is to answer the end-user's needs
- Knowing who our customers are is the first step in understanding the stream; our primary customer may not be the end-user
- **Knowing how the stream and our piece works or doesn't work in meeting customer needs is what Lean Six Sigma is about**

Summarizing the Power of Lean Six Sigma

- Provides a *world class* business strategy
- Encourages a *common vision* and *common language* shared by all
- Promotes *teamwork* and REWARDS success
- Combines *aggressive goals* with a *method* and a set of *tools*
- Requires the *application* of *tools* throughout *entire lifecycle* of a product or service
- Produces knowledge for *improved cycle time*, *reduced defects*, and *lower cost*

Better products and services
delivered **faster** and at **lower cost**
=
Improved Customer Value