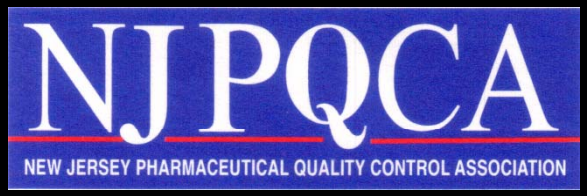


Professor W. J. Latzko, Ph.D.

Quality Issues in the United States Today

Wanted Willing Workers

4 WILLING WORKERS.	must be willing to put forth best effort. Continuation of job depends on performance.
2 INSPECTORS	Experience not necessary. Inspectors must be able to distinguish RED from WHITE. Must be able to count to 20.
1 CHIEF INSPECTOR	Same requirements as Inspector.
1 RECORDER	Must be able to enter data

Observations

Name	Day				Total	Best Two	
	1	2	3	4			
Total							
Cumulative Average							

Inspector1:		Date:	
Inspector2:			
Recorder:			
Chief Inspector:			

Type of Question

- ***True or False***

  The current population of the United States of America is over 306 million people.

  True [x] or False [ ]

- ***Multiple Choice***

  The population of the United States of America is

  [ ] Under 200 million people
  [ ] Over 400 million people
  [ ] All of the above
  [x] None of the above

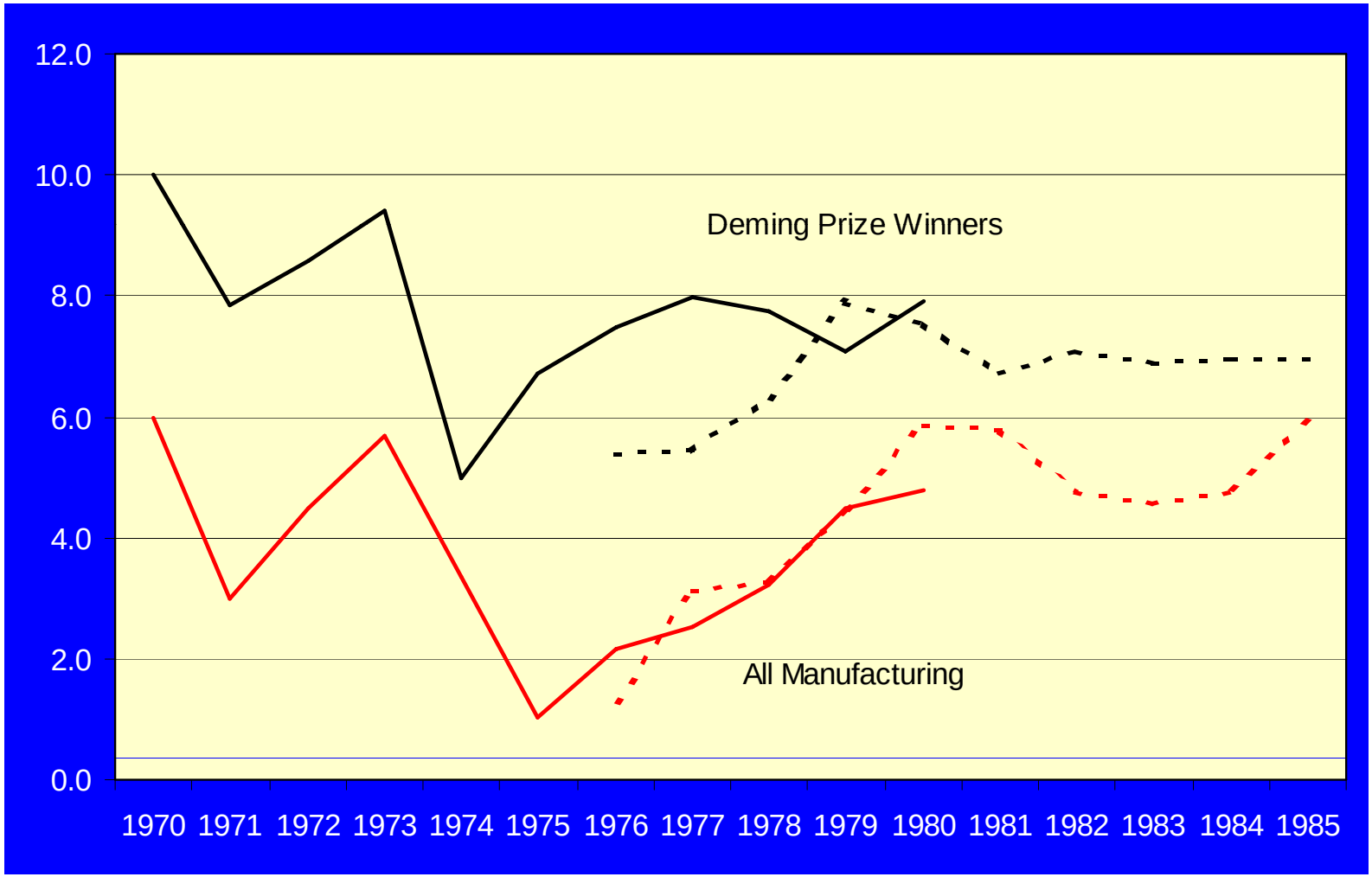
Introduction

- Why Quality?
- Is it Profitable?
- Comment on Methods of Quality Used in the U.S.A. Today

Why are US Firms Interested in Quality?

- Everyone else is involved
- Buyers require it
- Marketing Tool
- Increased Profits
- Improve Operations
- Better Customer Service

Dr. Kano's Comparison



Quality Pays

- Study of Deming Prize Winners
- Baldy (Malcolm Baldrige) Winner Fund

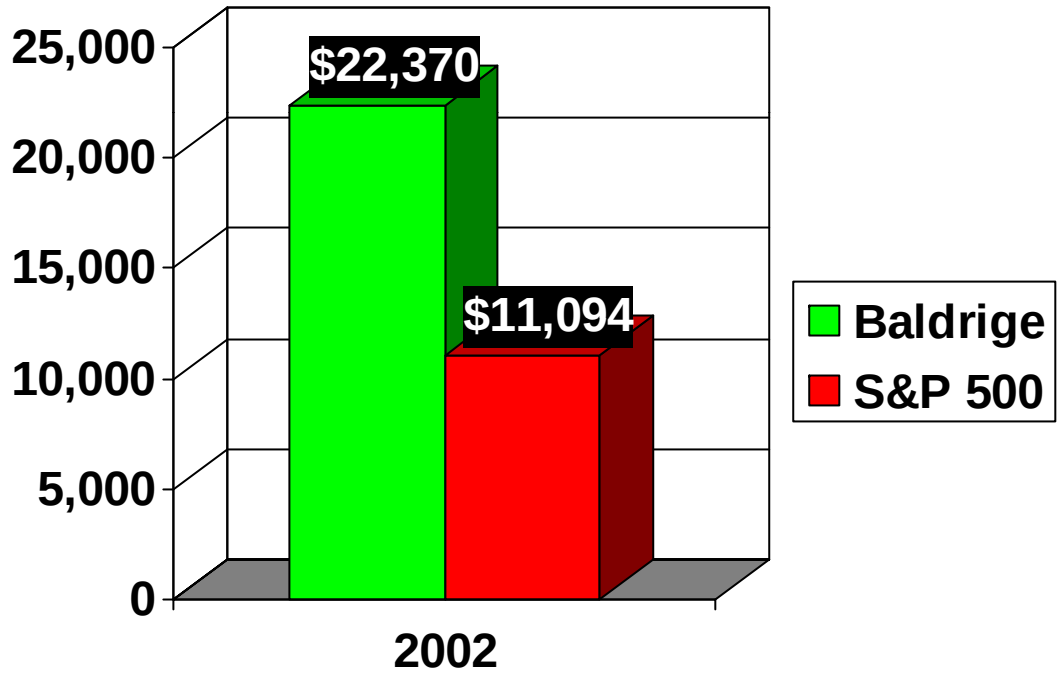
Baldrige Index

Stock Prices of former Winners

Invested $5,291 in

- ADAC Laboratories
- Eastman Chemical
- Federal Express
- Motorola
- Solectron
- Zytec

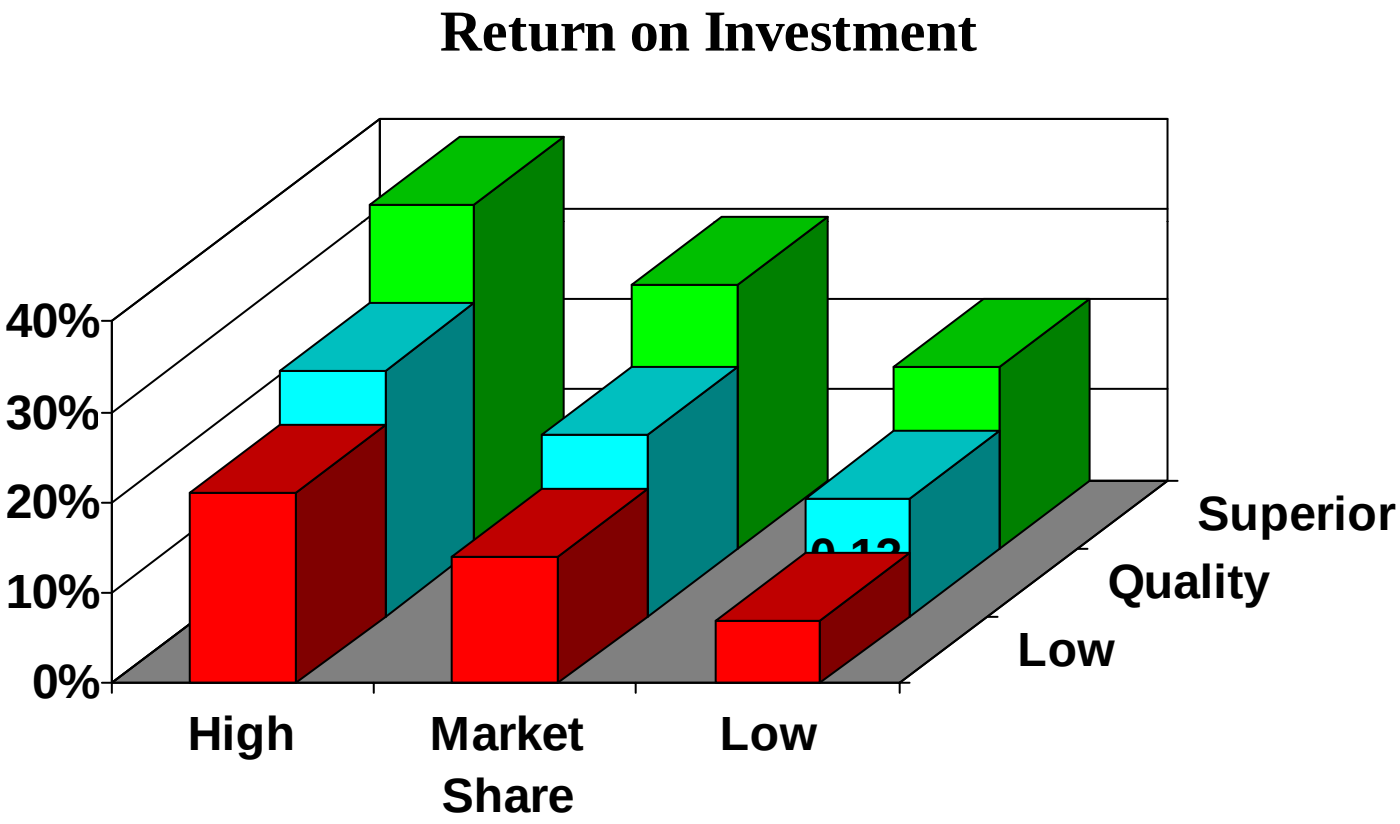
Baldrige Index



Quality Pays

- Study of Deming Prize Winners
- Baldy (Malcolm Baldrige) winner Fund
- The Profit Impact on Market Study (PIMS)

Quality, Market Share, & ROI



Quality Models Used today

- Partially Related to Quality
- Static Methods
- Dynamic Methods

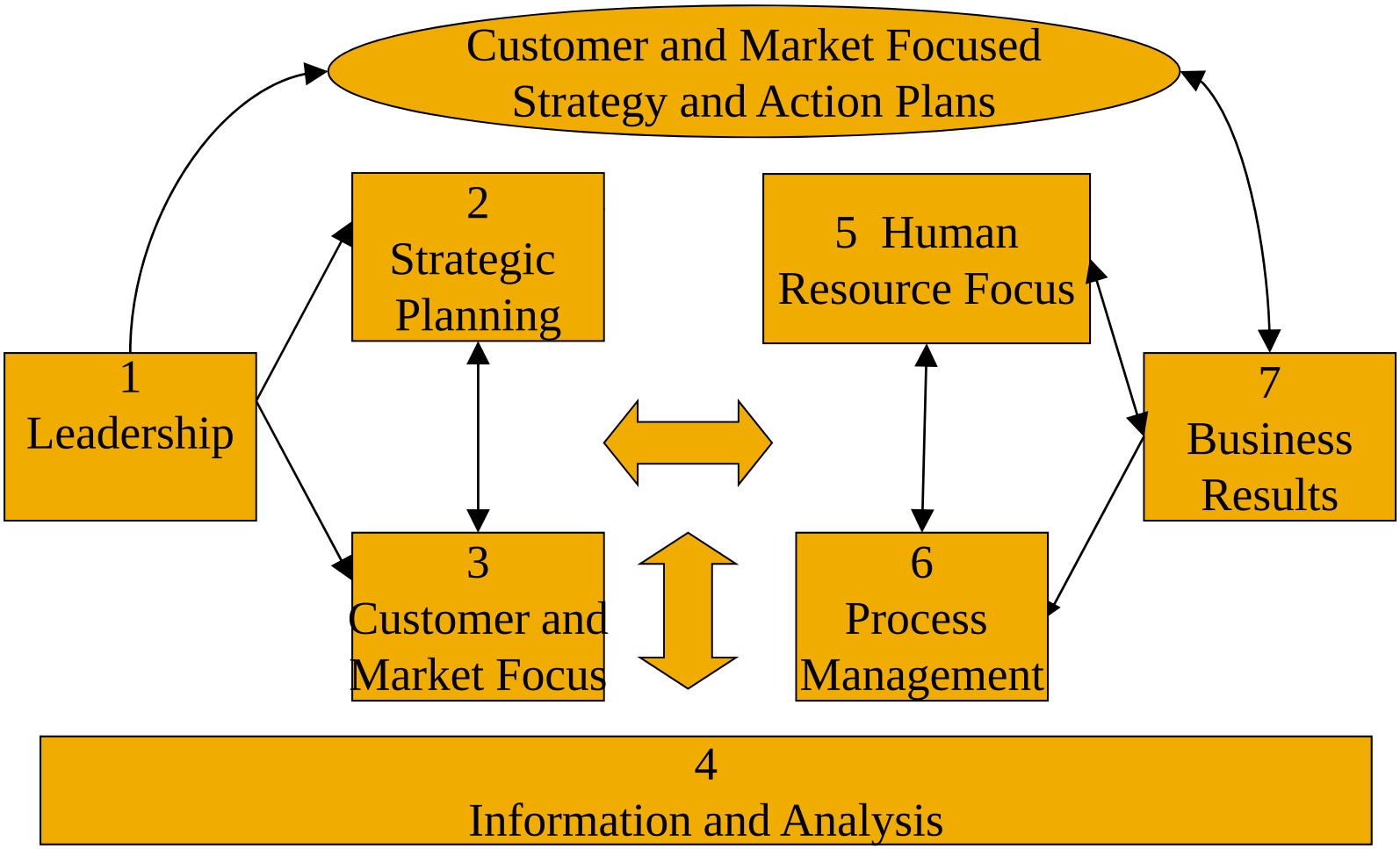
Partially Related to Quality

- Balanced Scorecard
- Benchmarking
- Re-engineering

Static Quality Models

- Malcolm Baldrige

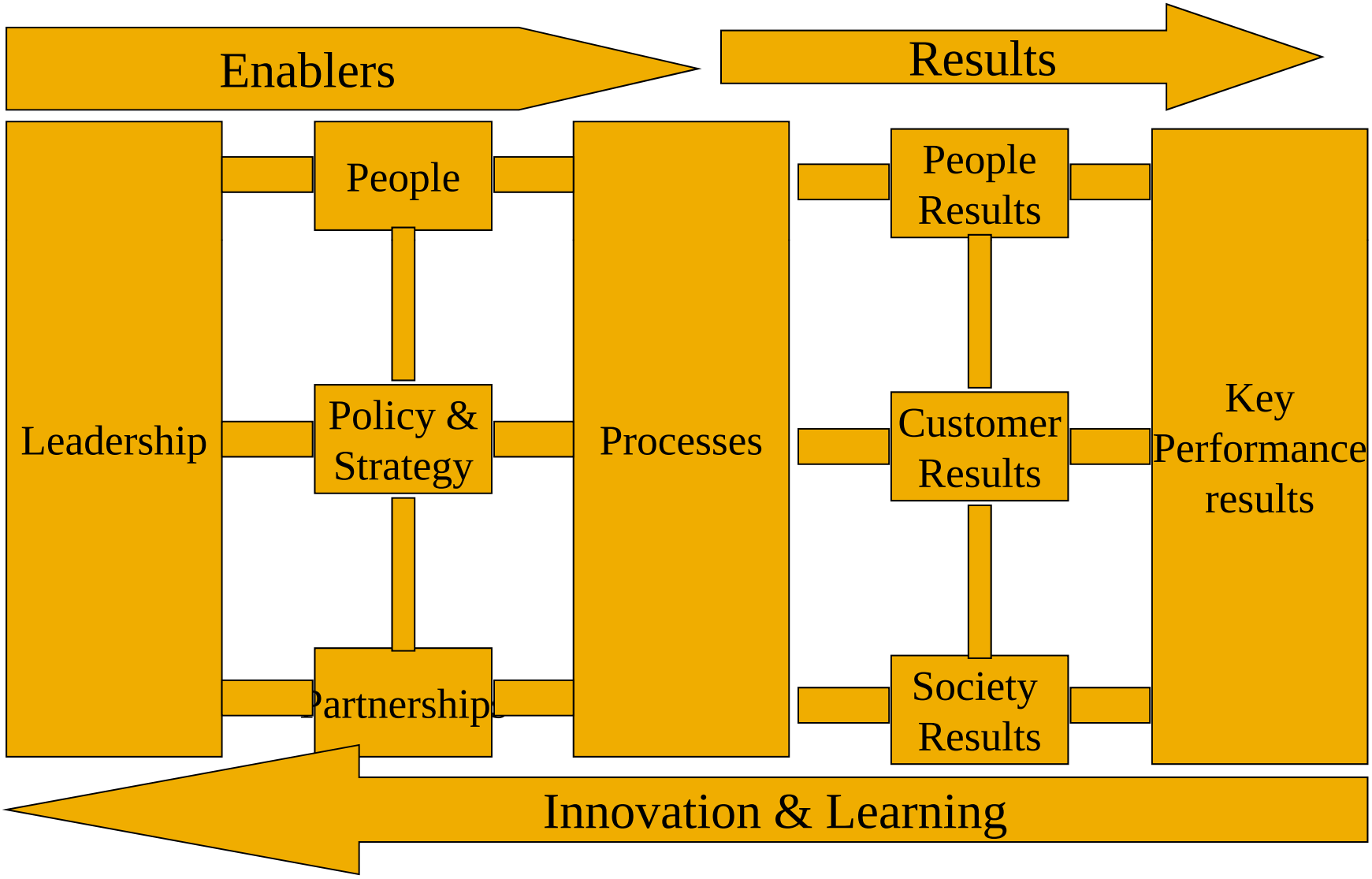
Malcolm Baldrige Model



Static Quality Models

- Malcolm Baldrige
- European Quality Award (EFQM)

European Quality Model



Static Quality Models

- Malcolm Baldrige
- European Quality Award (EFQM)
- ISO 9000
- QS 9000
- TS 9000

ISO 9000:
Some New Use of Old Words

- Supplier – Us
- Purchaser – Our Customer
- Sub-Contractor – Our Suppliers

ISO 9000: Benefits

- Improved Efficiency of Operations
- Optimized Company Structure & Operational Integrity
- Clearly Defined Responsibilities & Authorities
- Improved Records in Case of Litigation

ISO 9000: Benefits (continued)

- Formalized System
  - Consistent Quality
  - Punctual Delivery
- Documented System with Useful Reference & Training Tools
- Ability to Tender for ISO 9000 Contracts at Home and Abroad

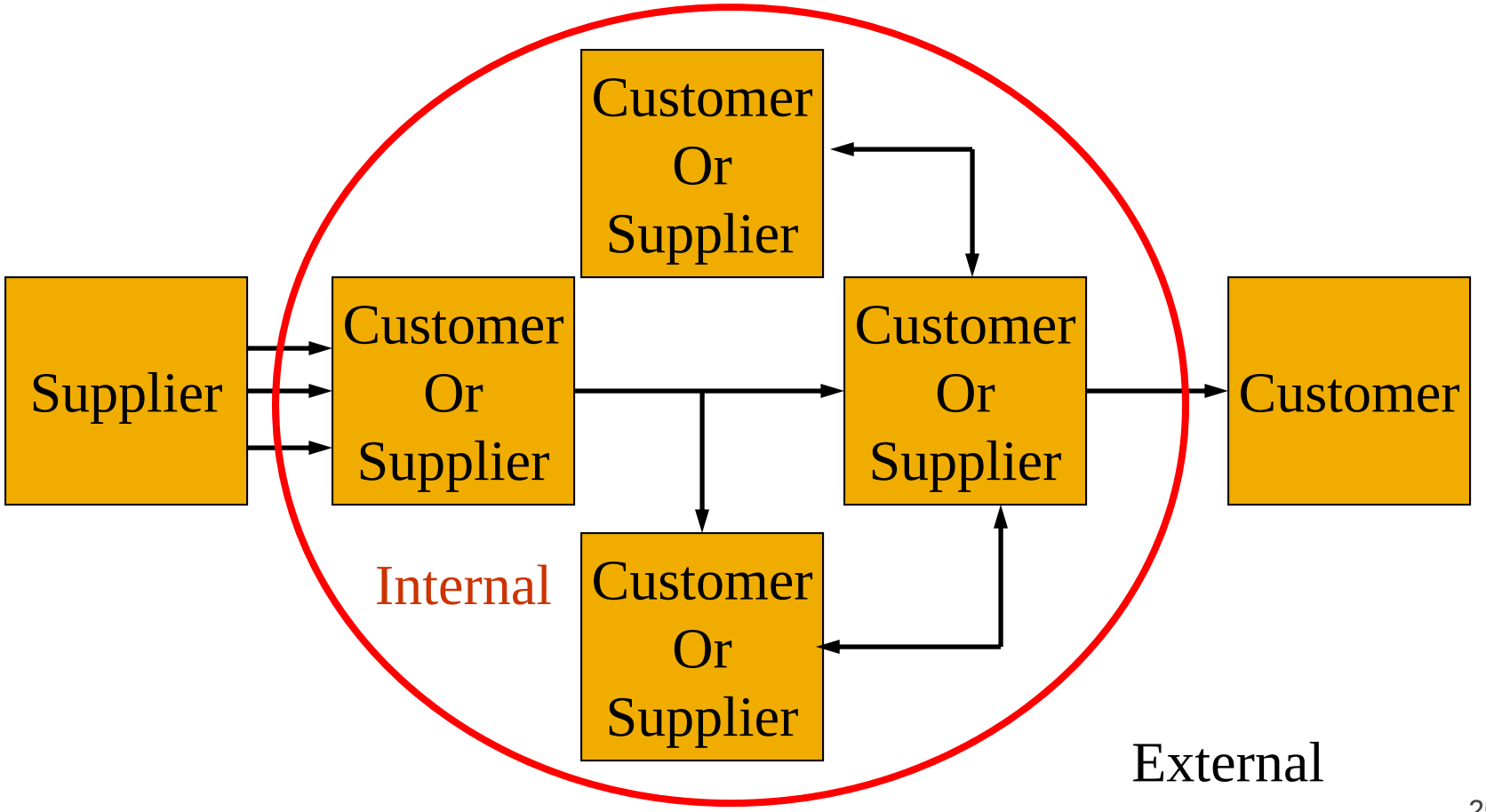
ISO 9000: What is Needed?

- Management Commitment and Support
- Staff Support
- A Quality Manual
- Procedures for
  - Writing a Standard Operating Procedure
  - Writing Work Instructions

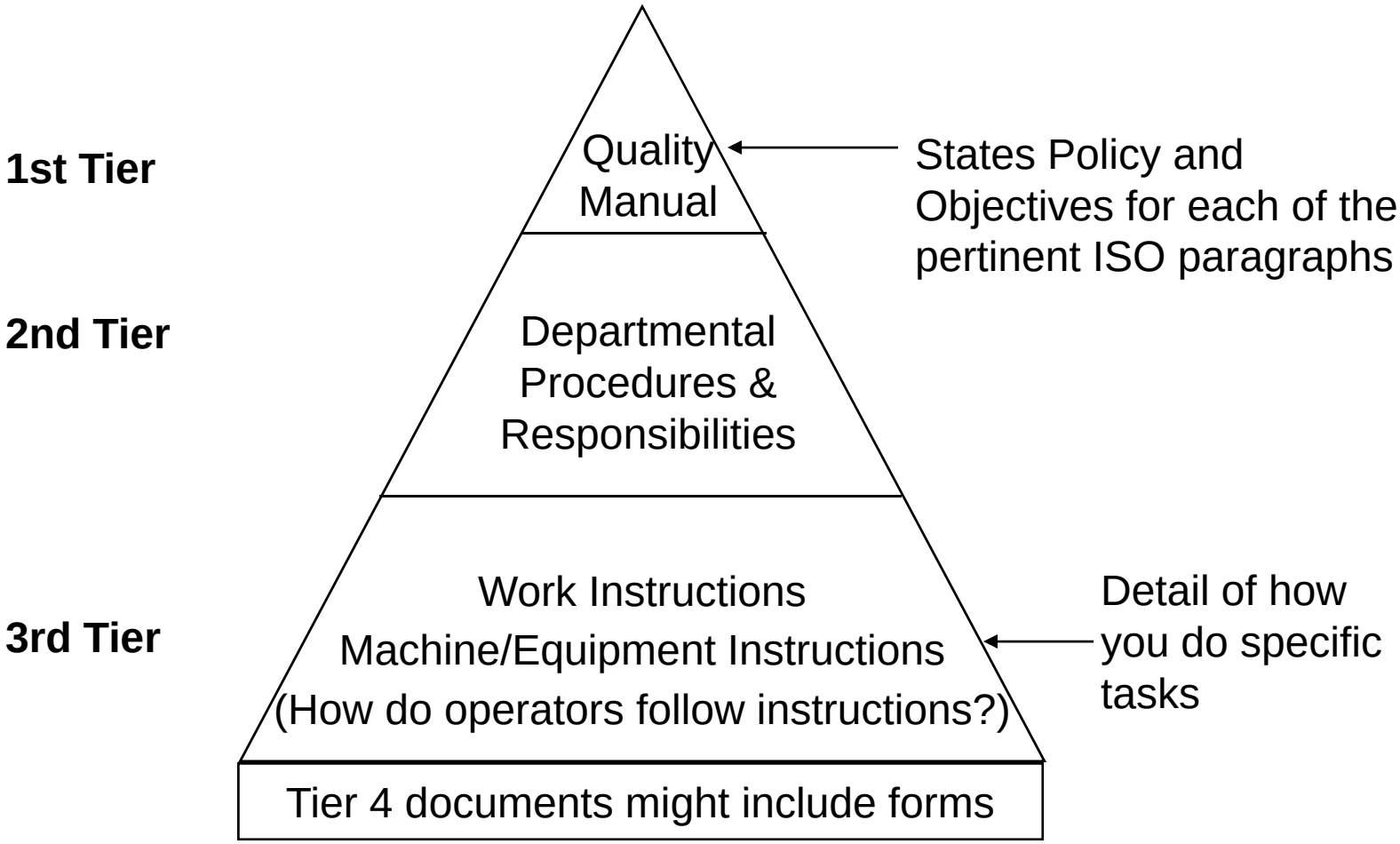
ISO 9000: What is Needed (continued)

- Develop SOP's and Work Instructions
- Implement SOP's and Work Instructions
- Staff to Track and Audit
- Conduct Internal Audit
- Certification

Customer Interaction



The Quality Pyramid



ISO 9001-2008

Static Models such as ISO 9000

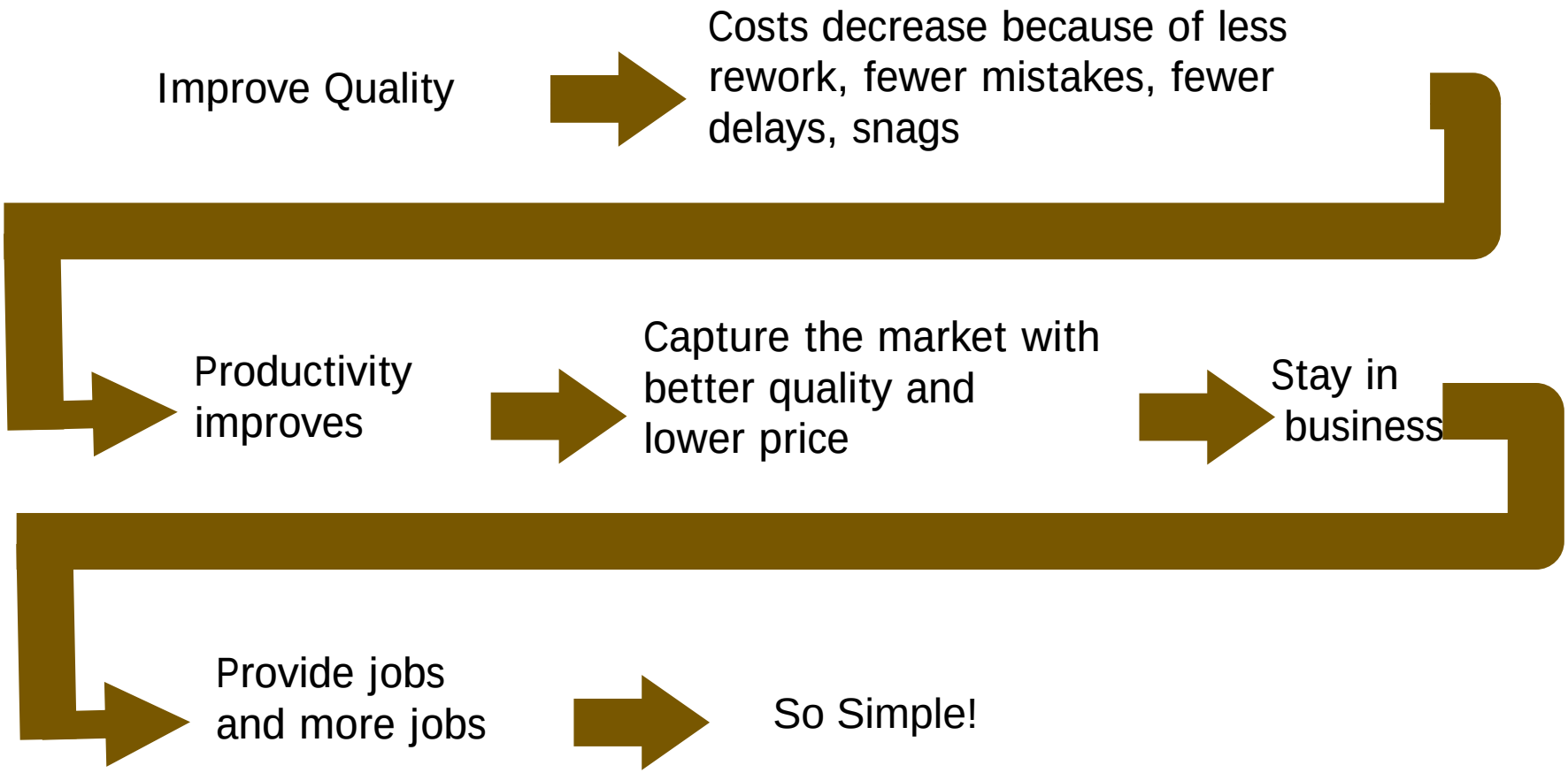
- Depend on inspection mentality
- It's ok if output is bad as long as one follows procedure no matter how bad the procedure
- Does not improve quality

Dynamic Quality

- Continual Improvement

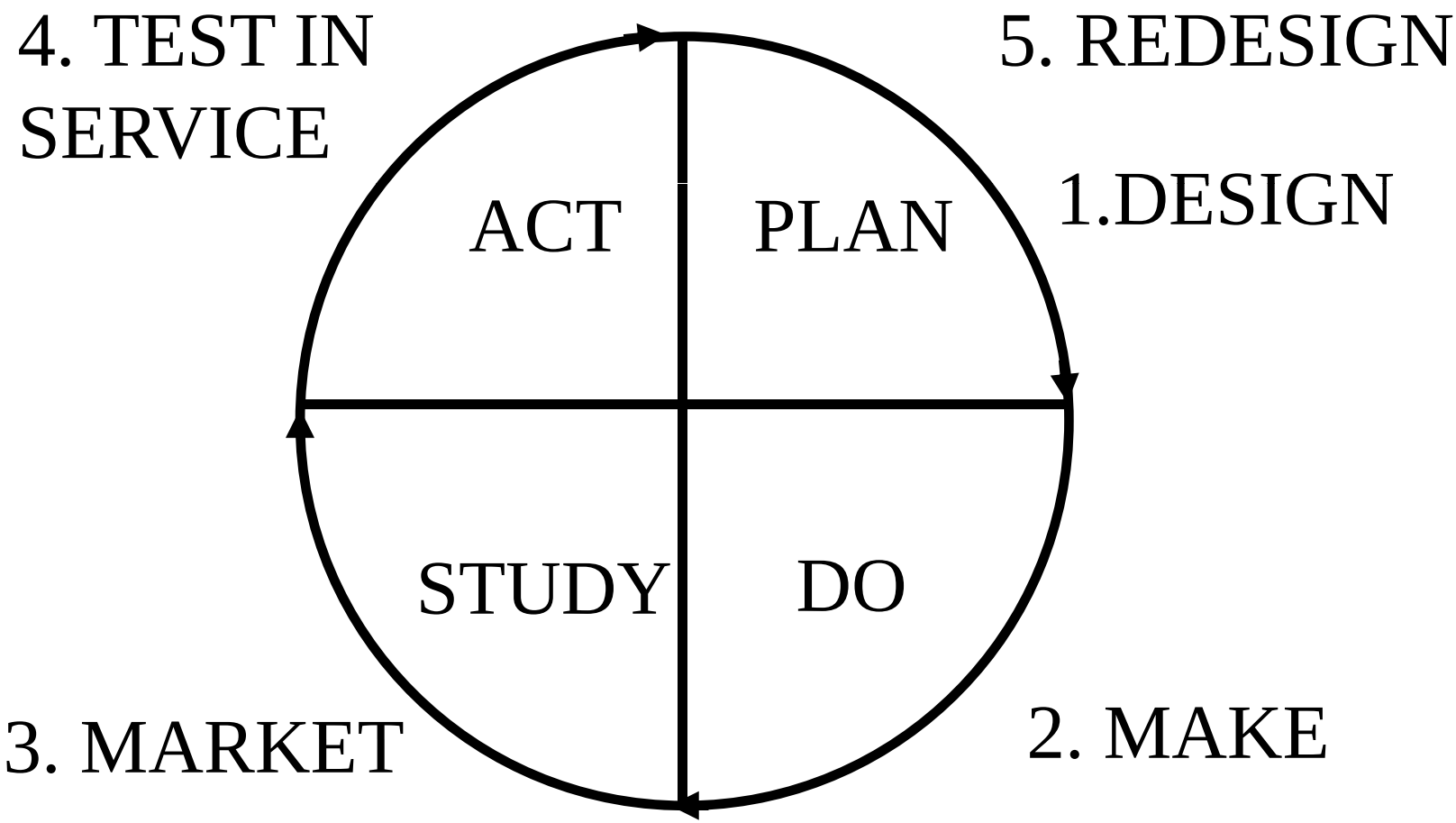
The New Philosophy

Deming Chain Reaction



The Shewhart Cycle

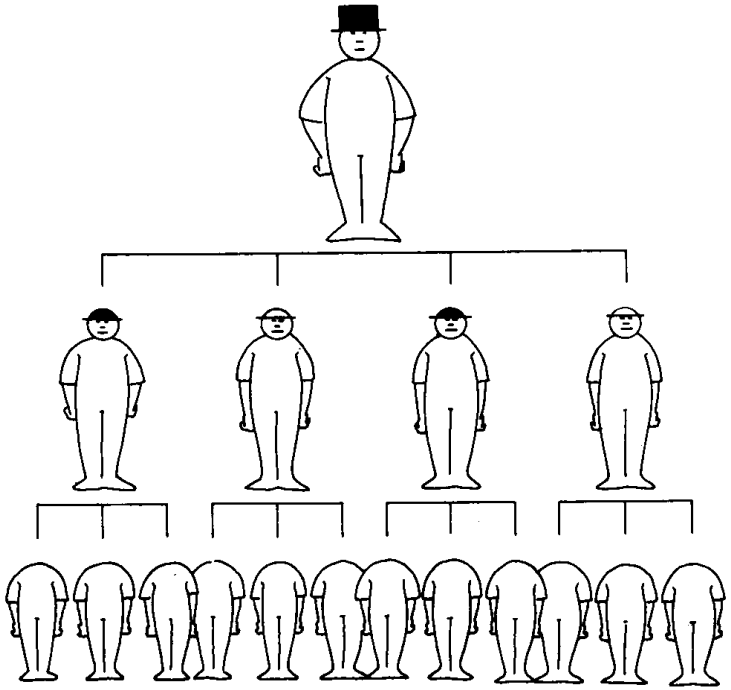
Consumer Cycle



Cycle of Learning

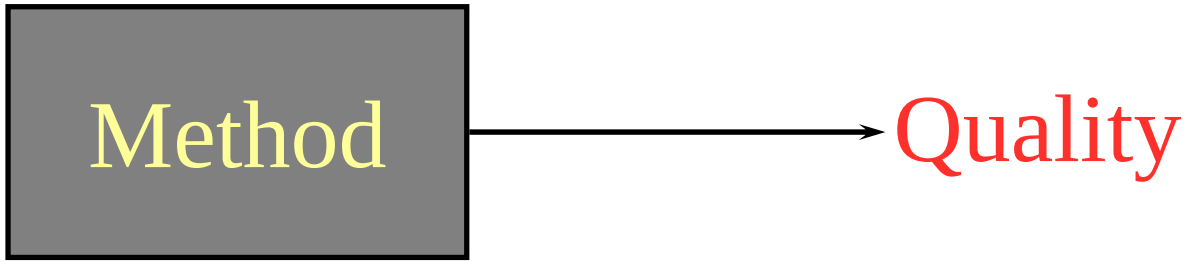
Where Does Quality Start?

- Quality Starts at the Top



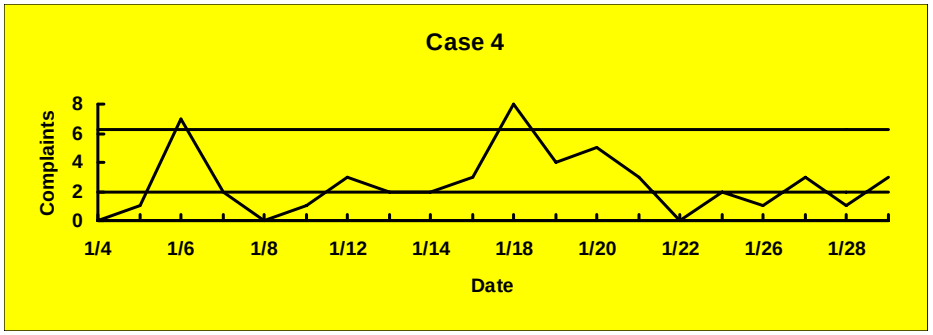
What is Quality?

- Quality is an outcome —not a method



What is the Method?

- The Method is Modern Management (Managing for Quality)

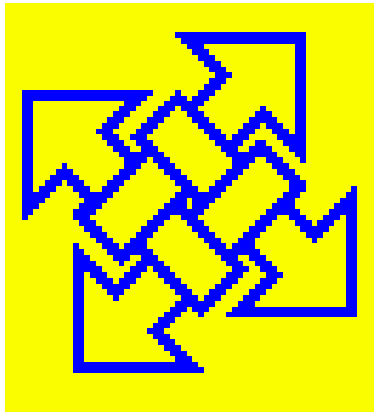


How Does Modern Management Differ From Traditional Western Style of Management?

- Modern Style of Management Applies the System of Profound Knowledge Compiled by Dr. Deming

Elements of the System of Profound Knowledge

- There are four elements of the System of Profound Knowledge. They are all interrelated:
  - Theory of a System
  - Theory of Variation
  - Theory of Knowledge
  - Theory of Psychology



The System of Profound Knowledge

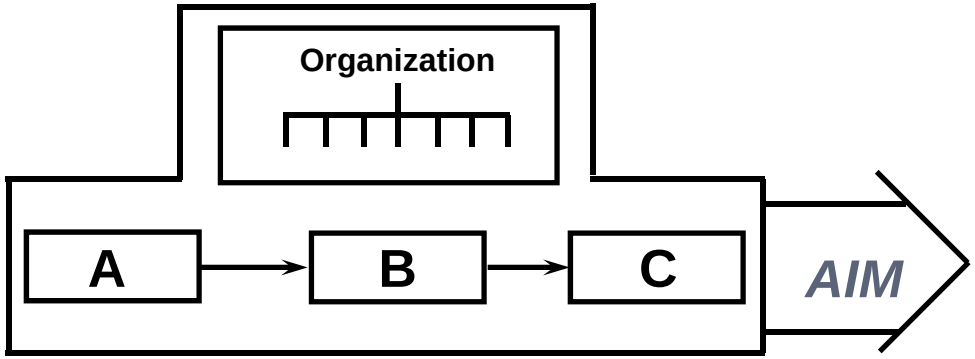
One need not be eminent in any part of Profound Knowledge in order to understand it as a system and to apply it.

W. Edwards Deming

Theory of Systems

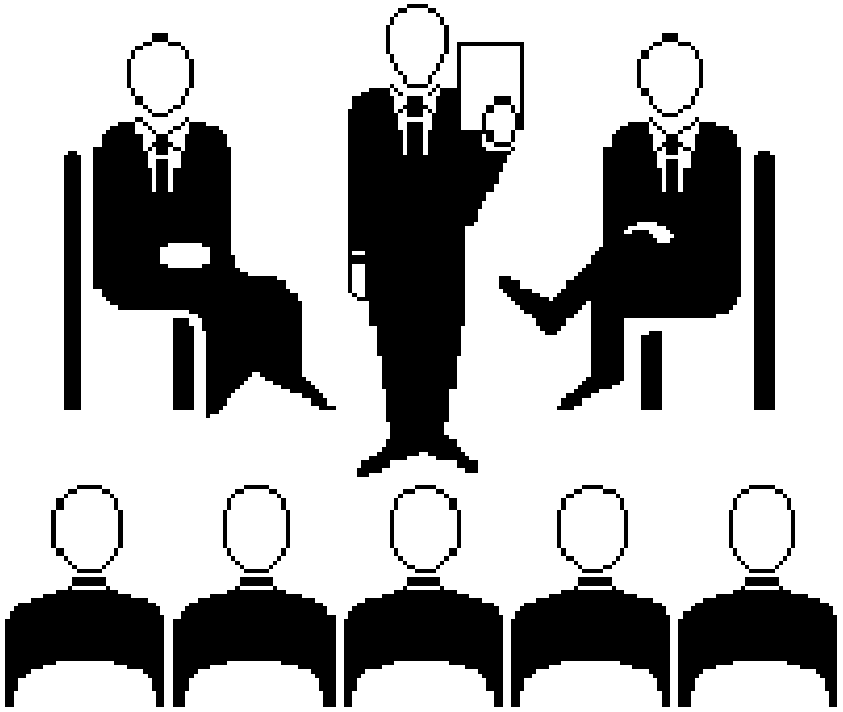
- A system is a series of functions or activities (sub processes, stages—hereafter components) within an organization that work together for the aim of the organization.

System Boundary



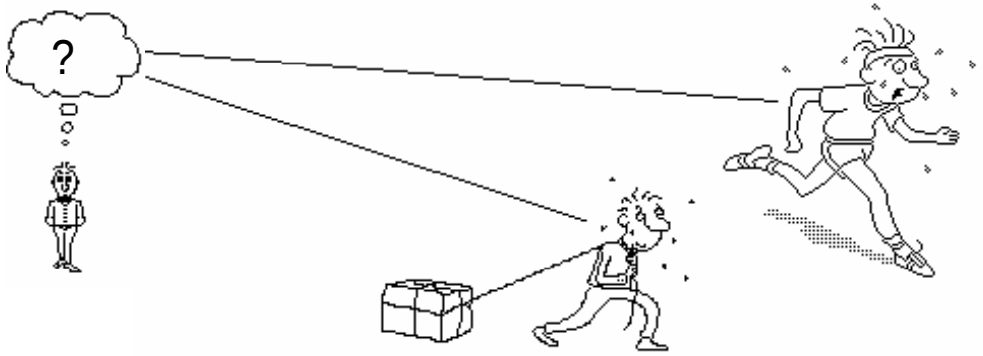
What is an Aim

- The aim is a value-judgment.



The Aim of a System

- The aim of the system must be clear to everyone in the system. Without an aim, there is no system.



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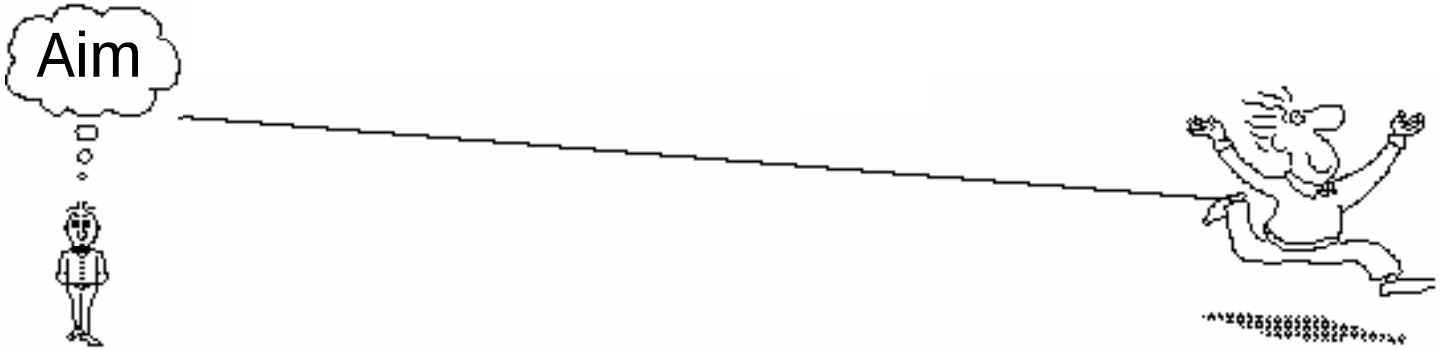


Optimizatian Example: Powertrain Div.

Status	Engine	Transmission	Both
As is	$100	$80	$180

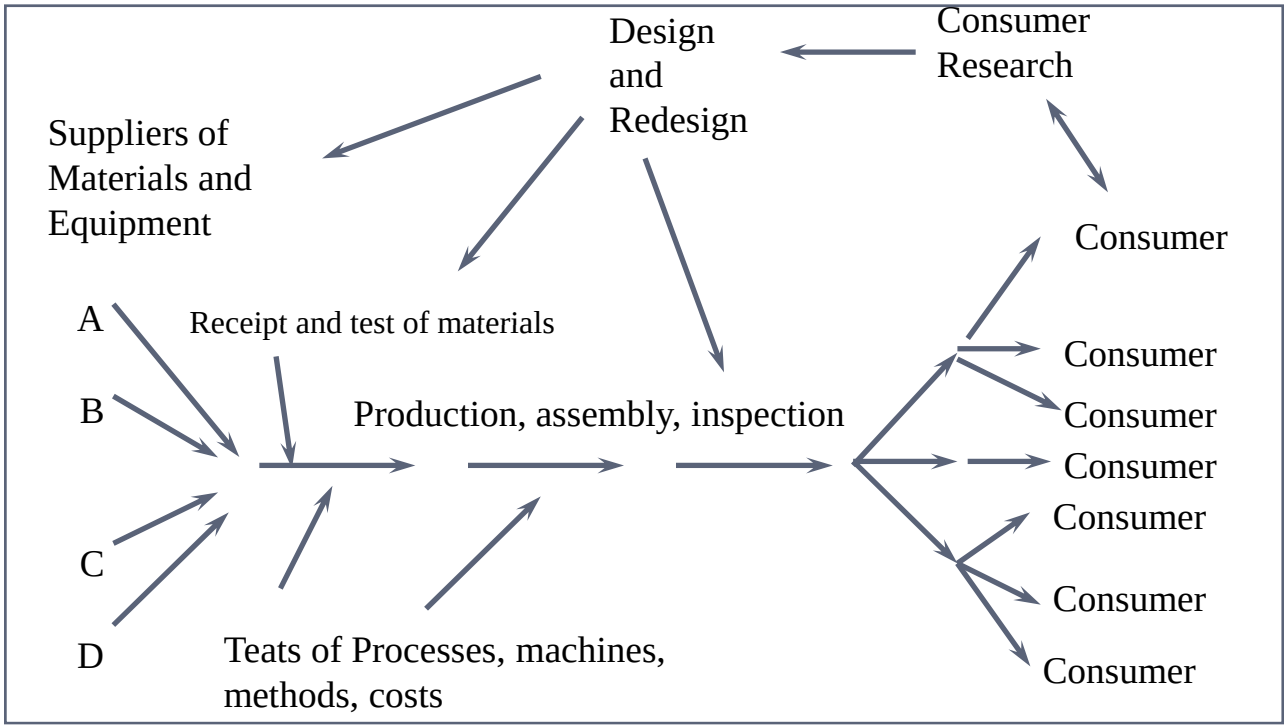
Optimizatian Example: Powertrain Div.

Status	Engine	Transmission	Both
As is	$100	$80	$180
Proposed	$130	$0	$130
Gain from Proposal			$50

Rejected

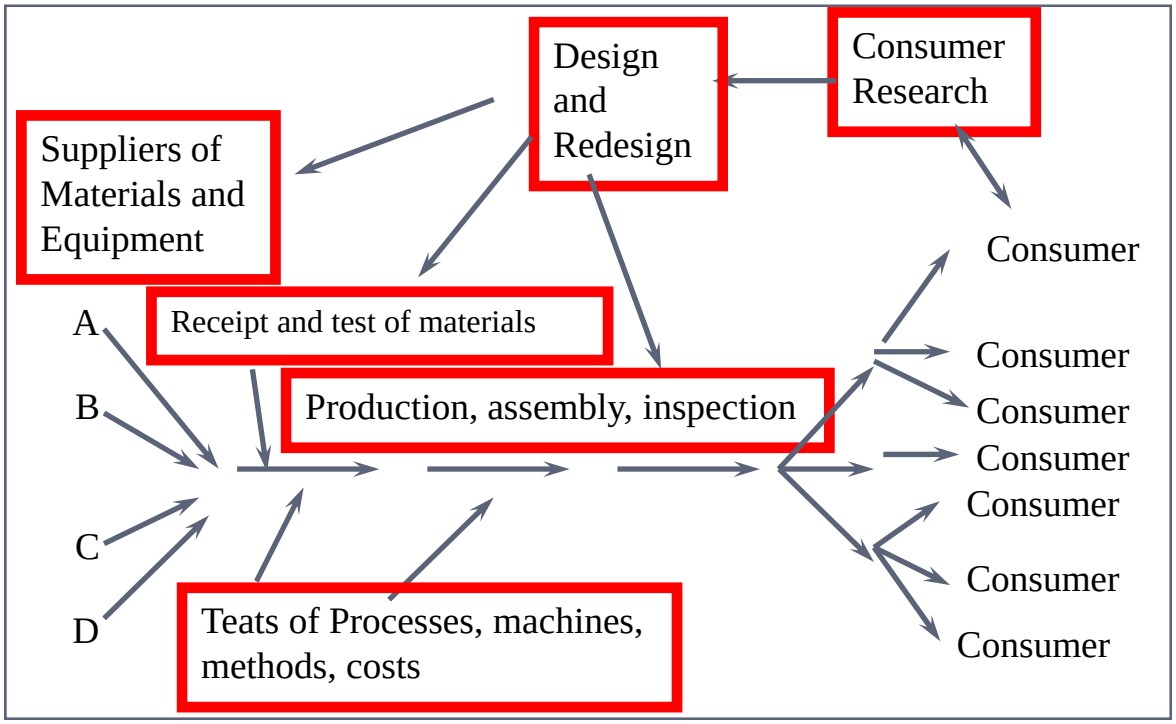
The Flow Diagram

- A flow diagram is helpful toward understanding a system. By understanding a system, one may be able to trace the consequences of a proposed change.



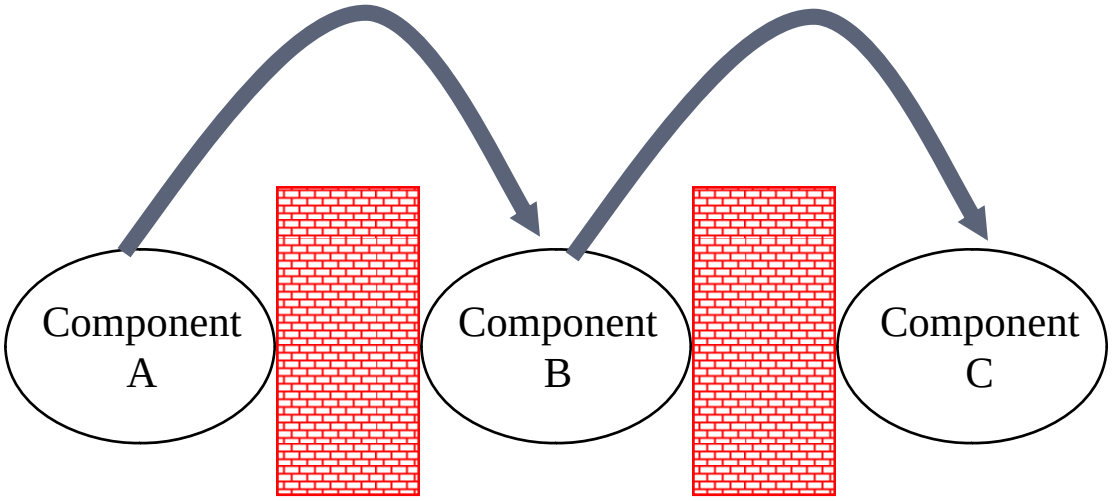
Organization Chart

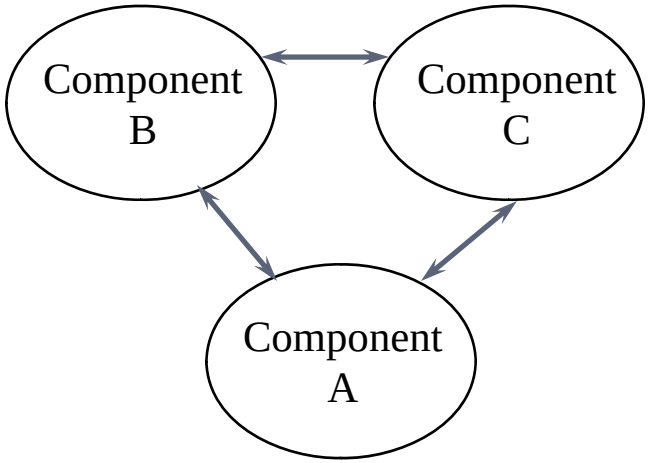
A business is not merely an organization chart, all departments striving for individual goals. It is a network of people, materials, methods, equipment, all working in support of each other for the common aim.



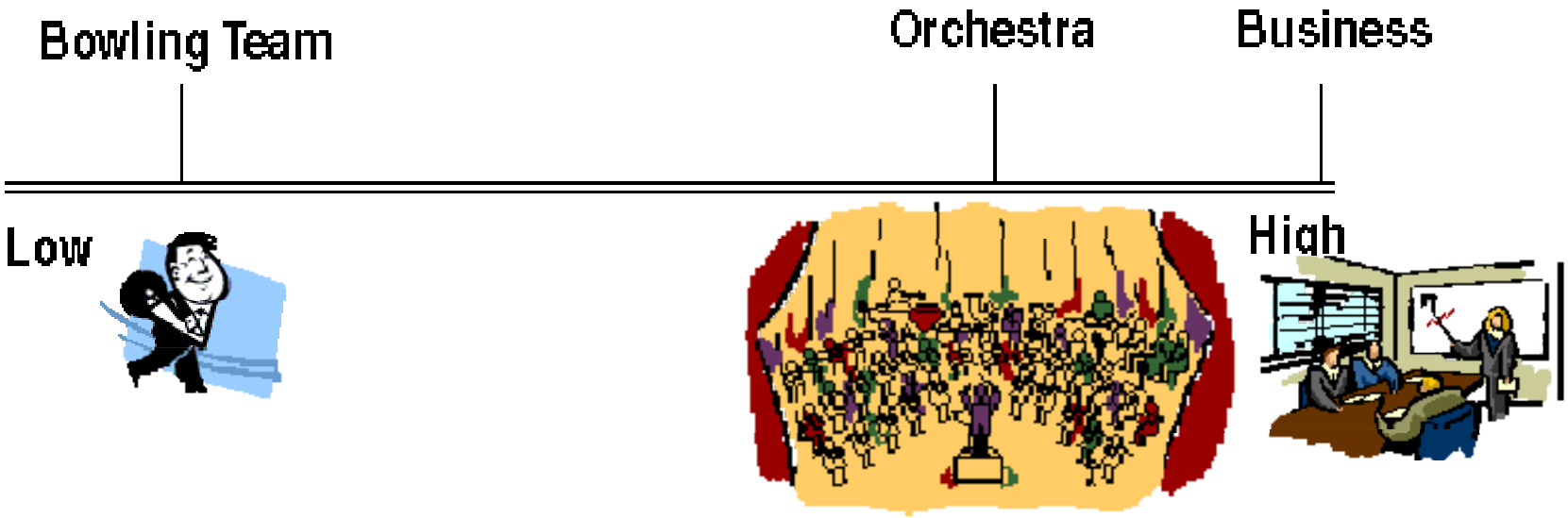
System Interdependence

- There is in almost any system interdependence between the components thereof.





Degree of Inter-dependence



Competition Sub-Optimizes the System

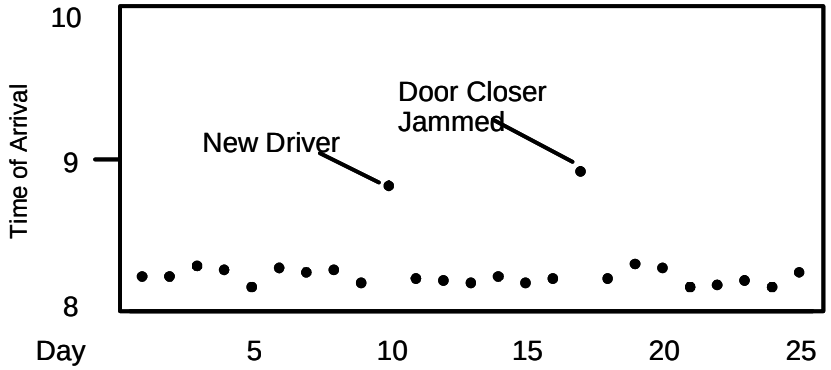
- Any system that results in a win, lose structure is sub-optimized. Optimization of a system should be the basis for negotiation between any two people, between divisions, between union and management, between competitors, between countries. Everybody would gain.

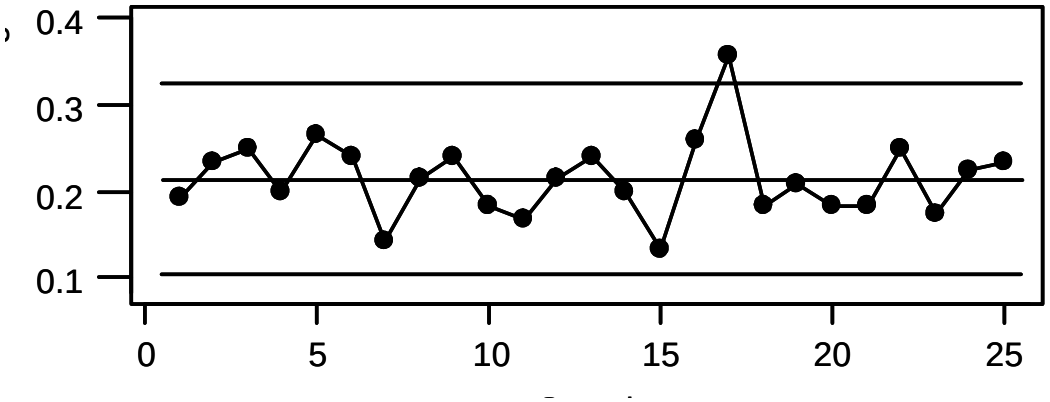
Loser

Winner

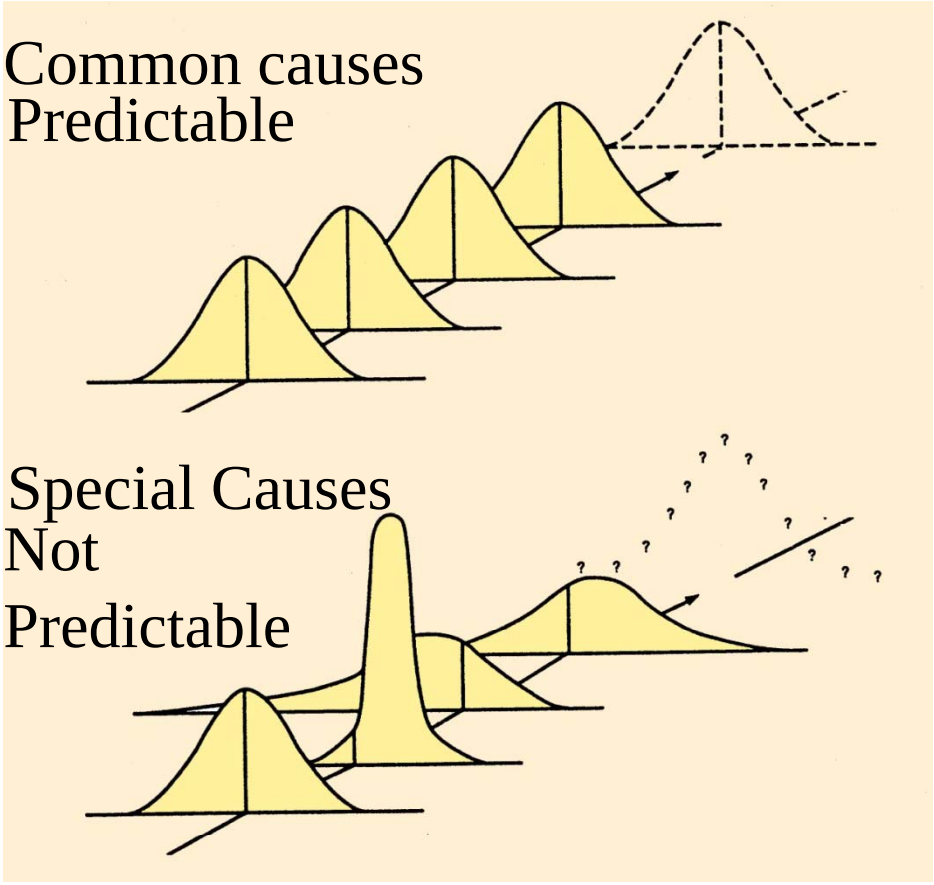
Theory of Variation

- Some understanding of variation, including appreciation of a stable system, and some understanding of special causes and common causes of variation, is essential for management of a system, including leadership of people.



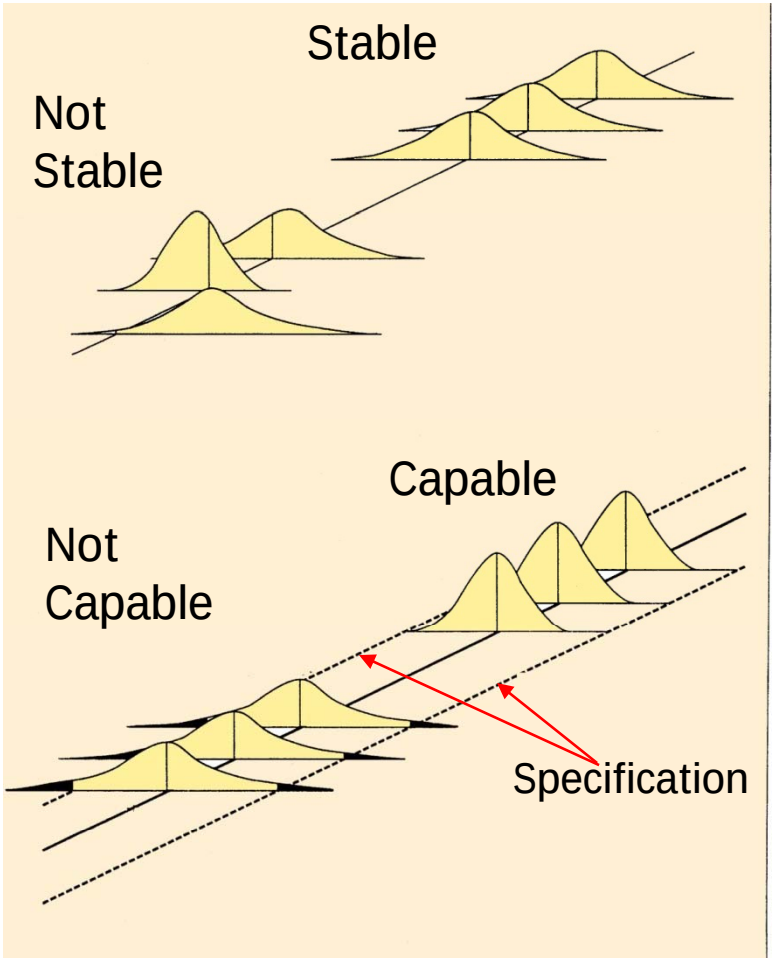


Common & Special Causes of Variation



Source: AIAG *SPC Manual*, p.8

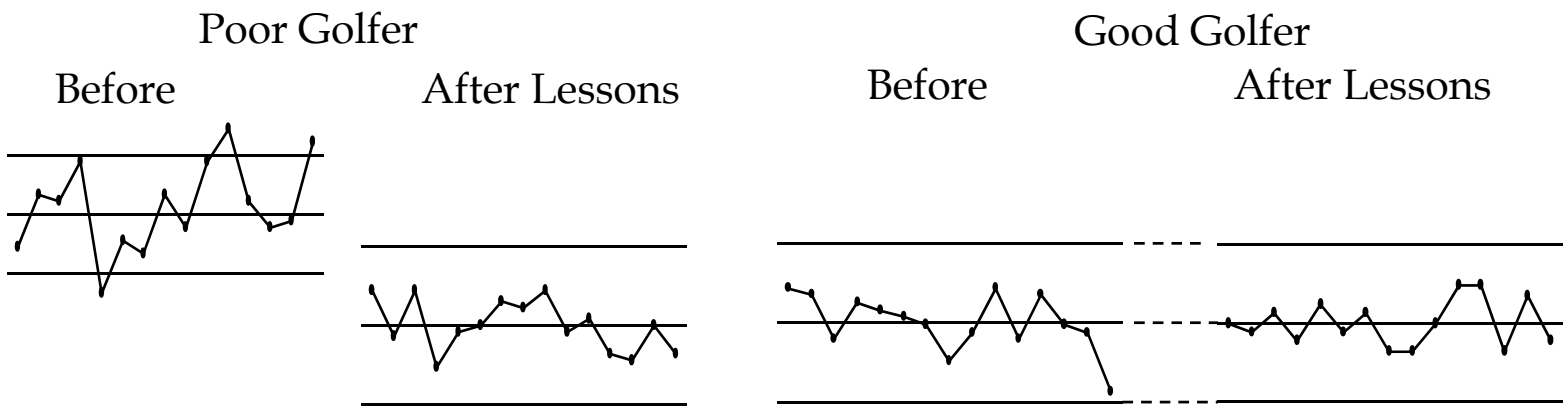
Stability vs. Capability



Source:
AIAG *SPC Manual*, p.12

Leadership

- The leadership of people (manager, leader, supervisor, teacher) is entirely different in the two states, stable and unstable. Confusion between the two states leads to calamity.



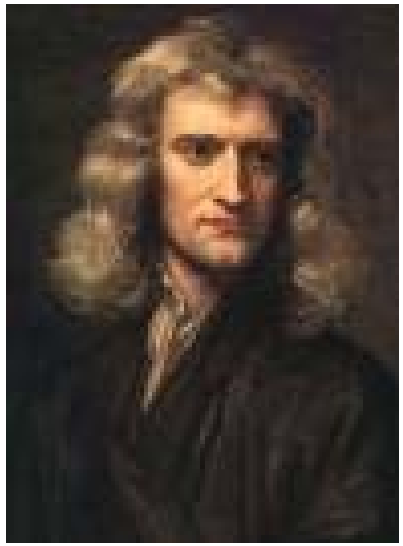
Theory of Knowledge

- Any rational plan, however simple, requires prediction concerning conditions, behavior, comparison of performance of each of two procedures or materials.

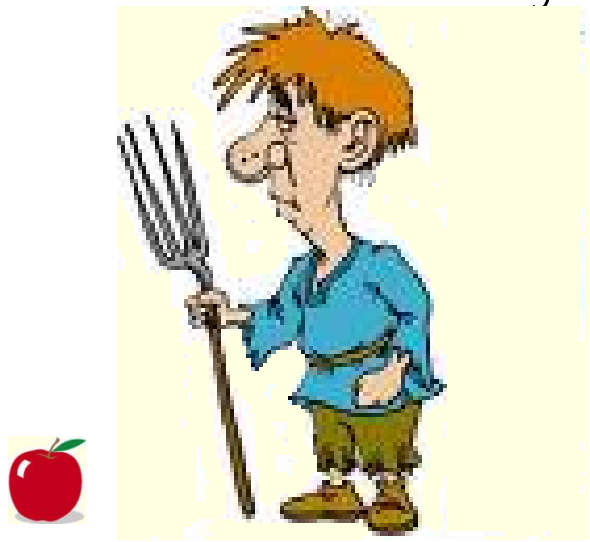
What does Experience Teach by Itself?

Without theory, there is nothing to modify or to learn by comparison with experience.

With theory

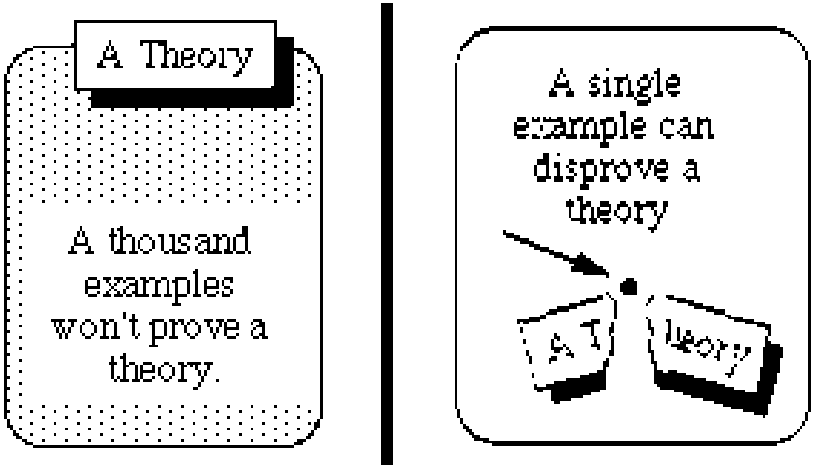


Without theory



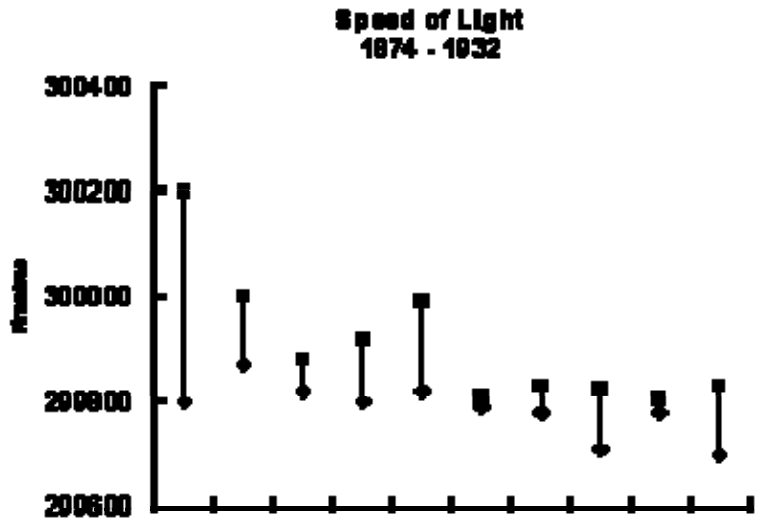
How Many Examples Make a Theory?

- An example is no help in management unless studied with the aid of theory. To copy an example of success, without understanding it with the aid of theory, may lead to disaster.



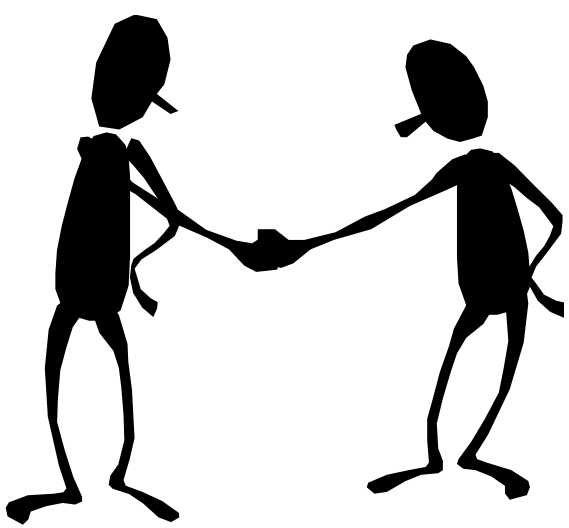
What Is a True Value?

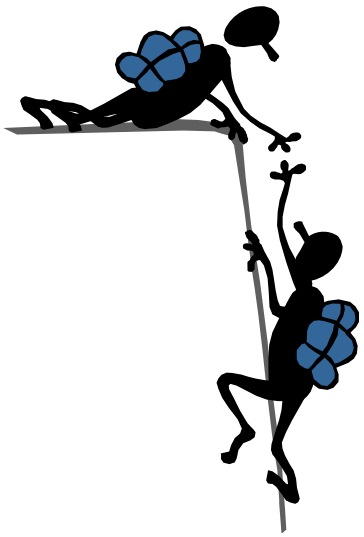
- There is no true value of any characteristic, state, or condition that is defined in terms of measurement or observation. Change of procedure for measurement or observation produces a new number.

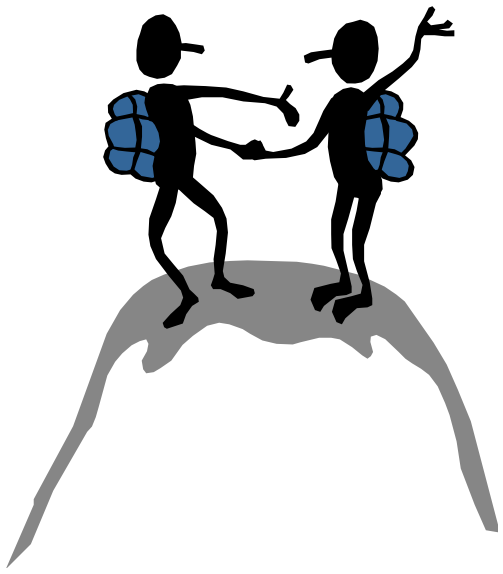


Theory of Psychology

- Psychology helps us to understand people, interactions between people and circumstances, interaction between teacher and pupil, interactions between a leader and his people and any system of management.







People Are Different From One Another.

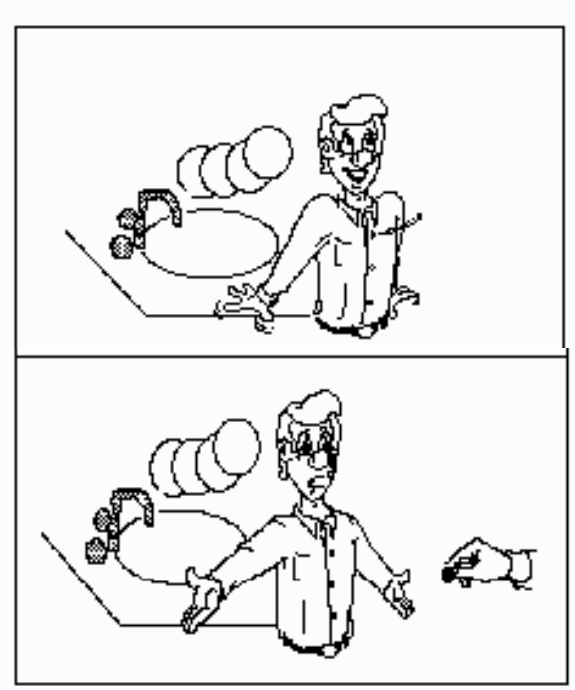
A leader must be aware of these differences, and use them for optimization of everybody's abilities and inclinations. Management of industry, education, and government operate today under the supposition that all people are alike.

Learning

- People learn in different ways, and at different speeds. Some learn best by reading, some by listening, some by watching pictures, still or moving, some by watching someone

Motivation

- There is intrinsic motivation, extrinsic motivation, over-justification.



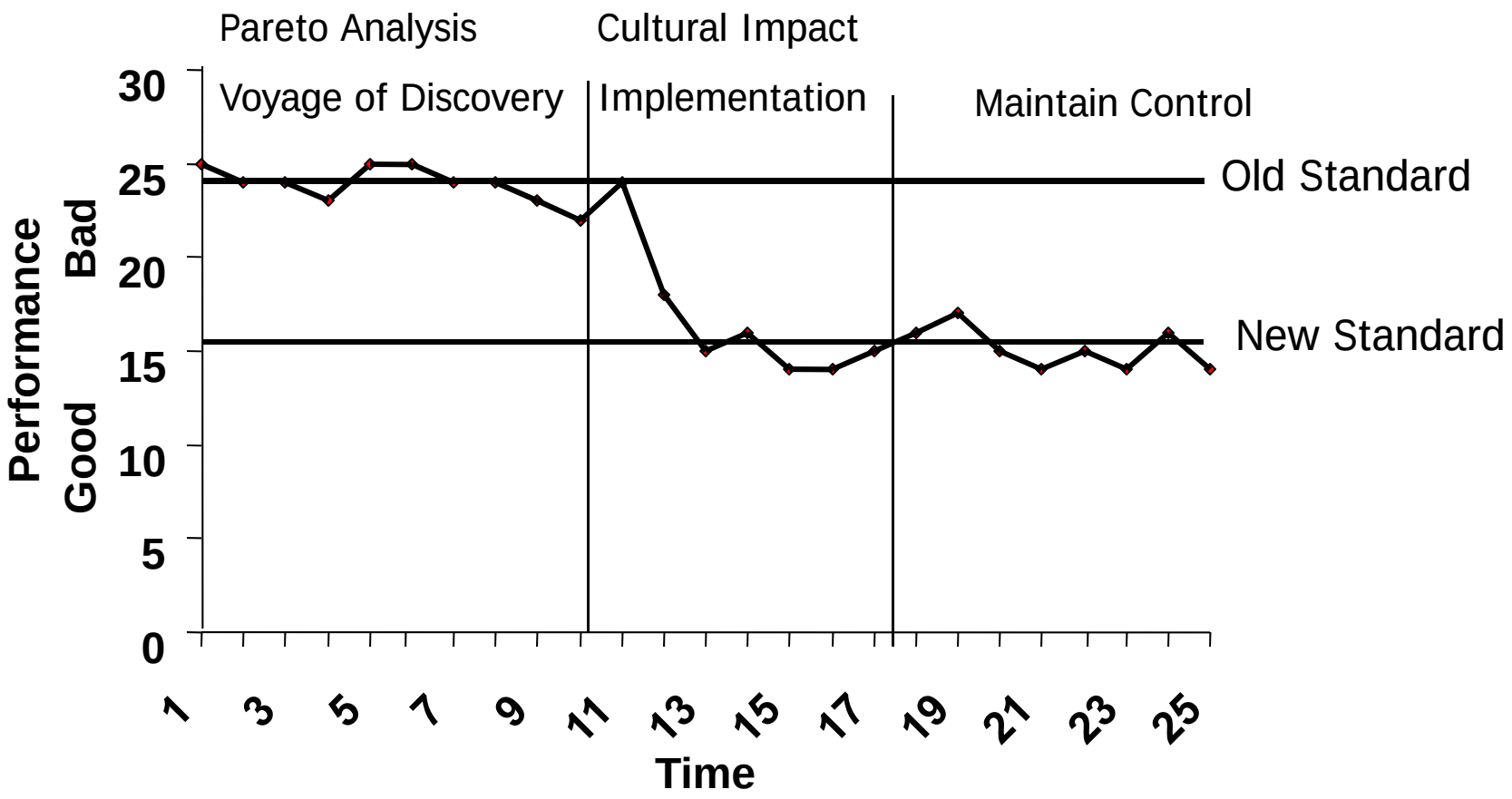
Dynamic Quality

- Continual Improvement
- Managerial Breakthrough Technique (Juran)

  &

  Quality Control Circles (Ishikawa)

MBT & QCC


Pareto Analysis
Voyage of Discovery
Cultural Impact
Implementation
Maintain Control
Old Standard
New Standard
Performance
Bad
Good
30
25
20
15
10
5
0
1
3
5
7
9
11
13
15
17
19
21
23
25
Time

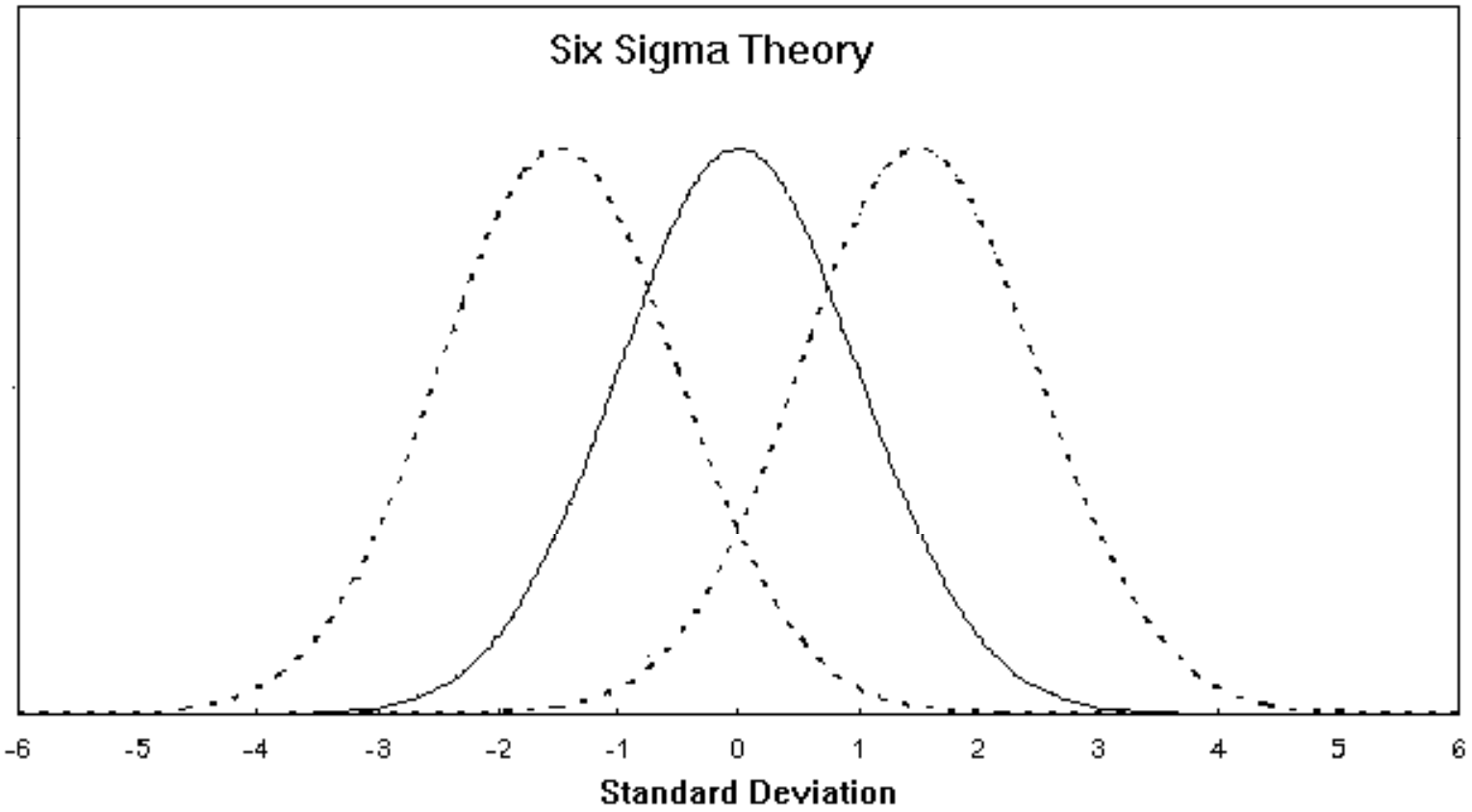
Dynamic Quality

- Continual Improvement
- MBT & QCC
- Six Sigma

6σ Technical Aspects

- Theory of six sigma
- Discussion of the loss function
- Problems with the technical aspects

Theory



Area Under Normal Curve

Shift Value	% Within Curve	Parts per million
-6.0	99.9999999%	0.0
-5.5	99.9999981%	0.0
-5.0	99.9999713%	0.3
-4.5	99.9996599%	3.4
-4.0	99.9968314%	31.7
-3.5	99.9767327%	232.7
-3.0	99.8650033%	1350.0
-2.5	99.3790320%	6209.7

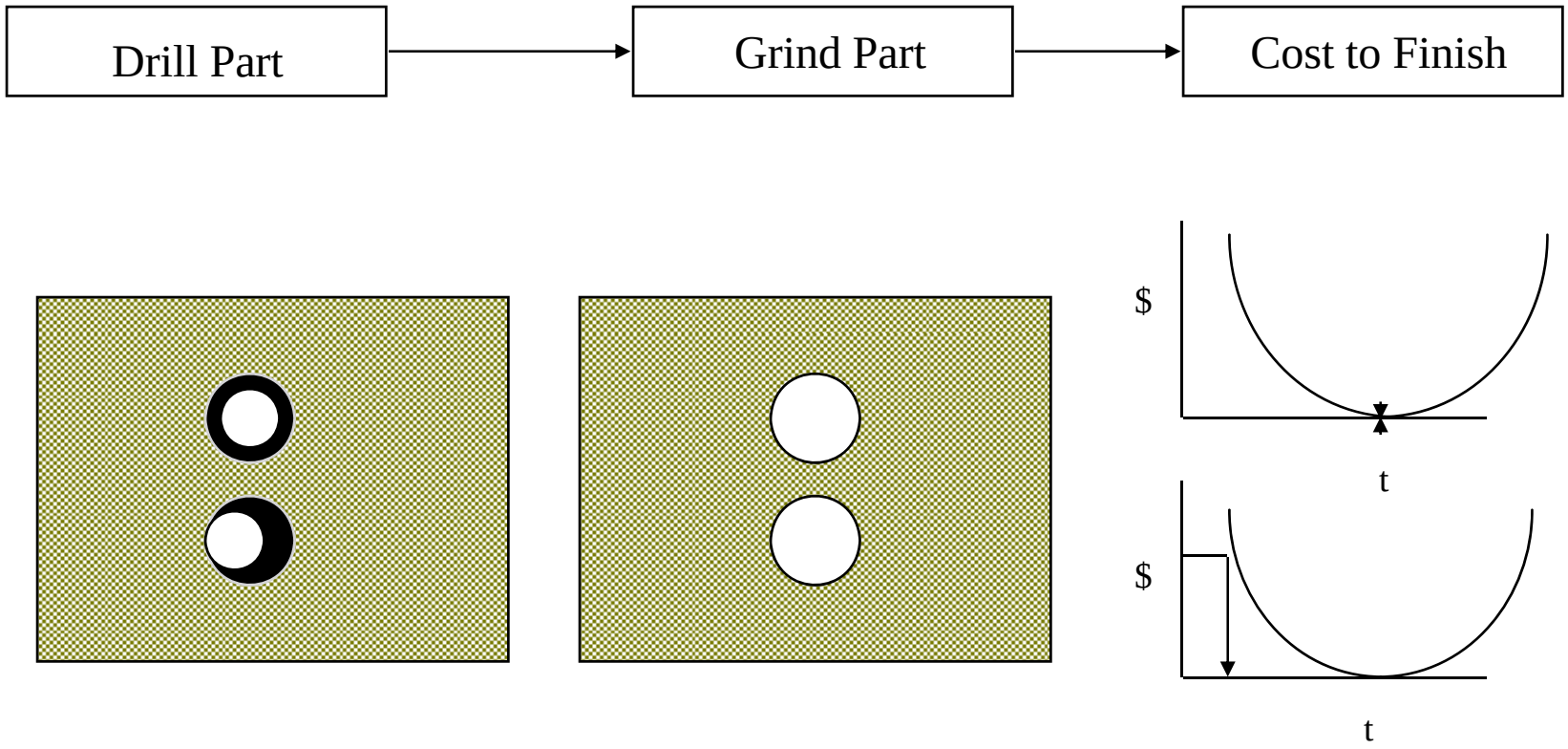
The Loss Function Formula

The loss function for a two sided example is

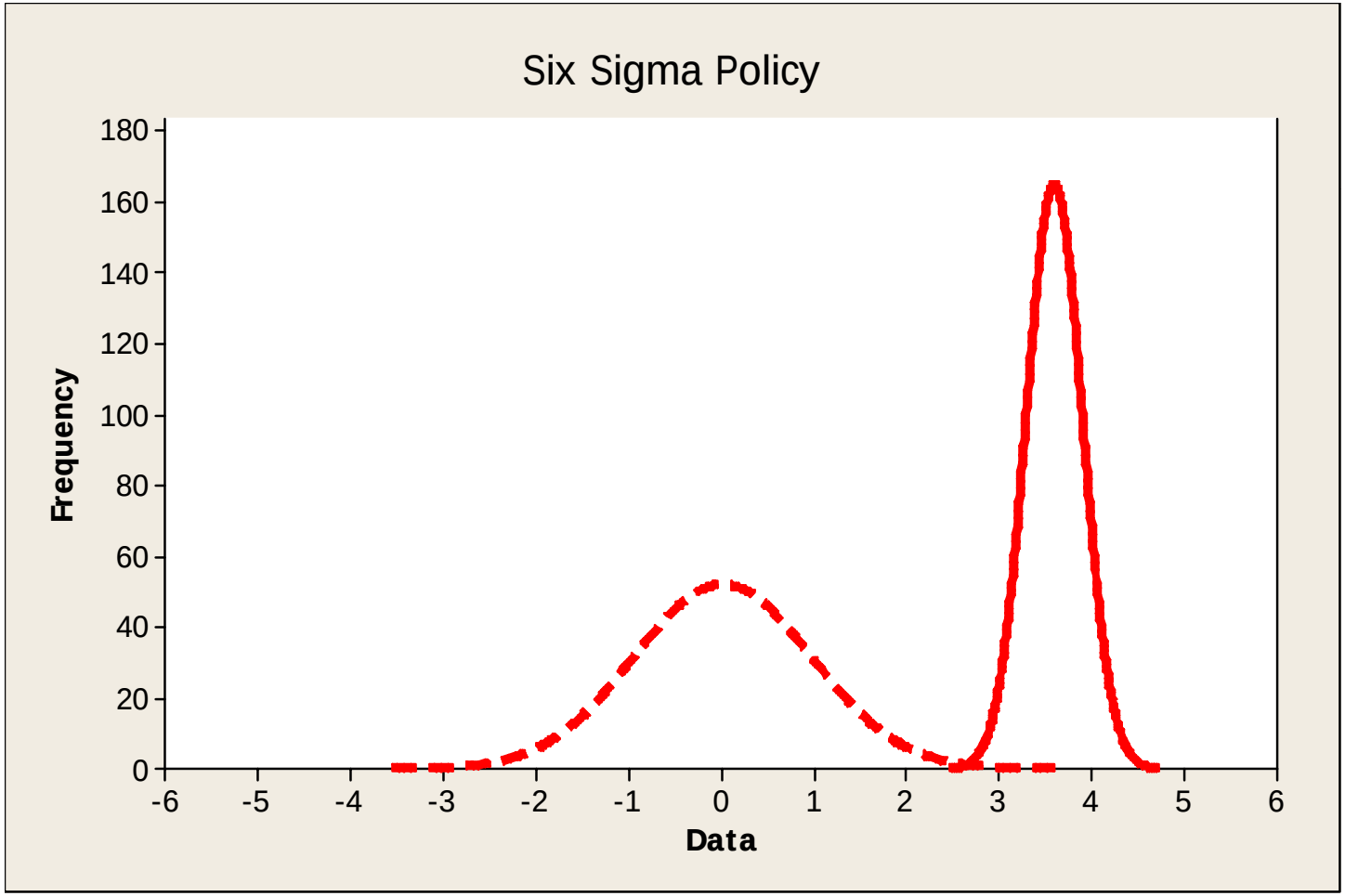
$$L = C \{ \sigma^2 + [x - \mu]^2 \}$$

Where C is a constant

Example



Two 6σ Curves



A Relative Cost Comparison

	Case I	Case II
Mean (m)	0	3.6
Standard Deviation (s)	1	0.3
Loss Function = C { s2 + [x - m]2 }	1C	13.05C

Result

- Six Sigma is based on theory that misuses the Shewhart Control Chart Concept
- Meeting Six Sigma standards is not necessarily the least cost solution
- There are alternative methods that accomplish the same ends, perhaps even better

Practical Purpose

- To improve quality
- To decrease costs
- To delight customers

Practical Impact

- Got senior management attention
- Helps to improve quality
- Probably delights customers

Practical Execution

- Uses tools of quality
- Requires statistical thinking
- Develops use of more sophisticated methods than do other nostrums
- Frees Quality Engineers to do their job with top management support.

Good Points

- Achieves better quality
- Delights customers
- Can save money
- Removes inspection mentality

Bad Points

- Doing the right things for the wrong reason
- Recent emphasis on project cost savings can prevent otherwise good ideas from implementation
- The process gives a false sense of security to management
- Management going back to business as usual –no lasting transformation

My Conclusion

- Theory is flawed, but . . .
- Improvement of quality is possible, but . . .
- As a program the process will probably be displaced by another program
- Doing things by rote leads to the law of frustration
- The profession that looks after quality will get a black eye eventually

Questions