EIN 5226

# Quality Management Initiatives

## Chapter 55

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# Outline

- History of the quality movement
- Notable contributors to current quality approaches
- Deming Philosophies
- Evolution of Management structures
- International Standards
- Malcom Baldrige Assessment

# History of Quality
## Colonial Times

Craftsmen

- Responsible for design and production
- Items made one at a time
- Pieces hand crafted and fit together

# History of Quality
## 19th Century - Early Industrialization

Interchangeable Parts

- Eli Whitney and the cotton gin
- Uniform parts produced
- Assemble at random
- Typically small factory run by owner

# History of Quality
## Early 1900's - Large factories

Assembly line production

- Complex operations broken into small tasks (Frederick Taylor)
- Henry Ford
- Three components
  - Specification - Production - Inspection

# History of Quality
## 1920-WWII - Quality Control Function

Statistical Quality Control

- Focus to processes
- 1920's AT&T Bell Labs
  - Control Charts
  - Acceptance Sampling
- WWII
  - Scarcity of material and safety concerns
  - Military Standards

# History of Quality
## Post WWII - Shifting times

- US prosperity
  - Abundance of materials
  - Emphasis on quantity
- Japan rebuilds
  - Statistical Quality Concepts embraced
  - Total Quality Concepts
- Japanese Competitive Advantage

# History of Quality
## 1970-present US Quality Emphasis

USA reacts

- Shift in emphasis from cost to quality
- Quality Philosophies adopted
- Growth in use of Statistical Methods

# Quality Gurus

- Walter Shewhart
- Armand V. Feigenbaum
- Philip B. Crosby
- Joseph Juran
- W. Edwards Deming
- Kaoru Ishakawa
- Genichi Taguchi

# Quality Gurus

## Walter Shewhart (1891-1967)

- Known for development of statistical process control charts at Bell Telephone Laboratories
- Plan-Do-Check-Act cycle attributed to him

## Armand V. Feigenbaum (1920-2014 )

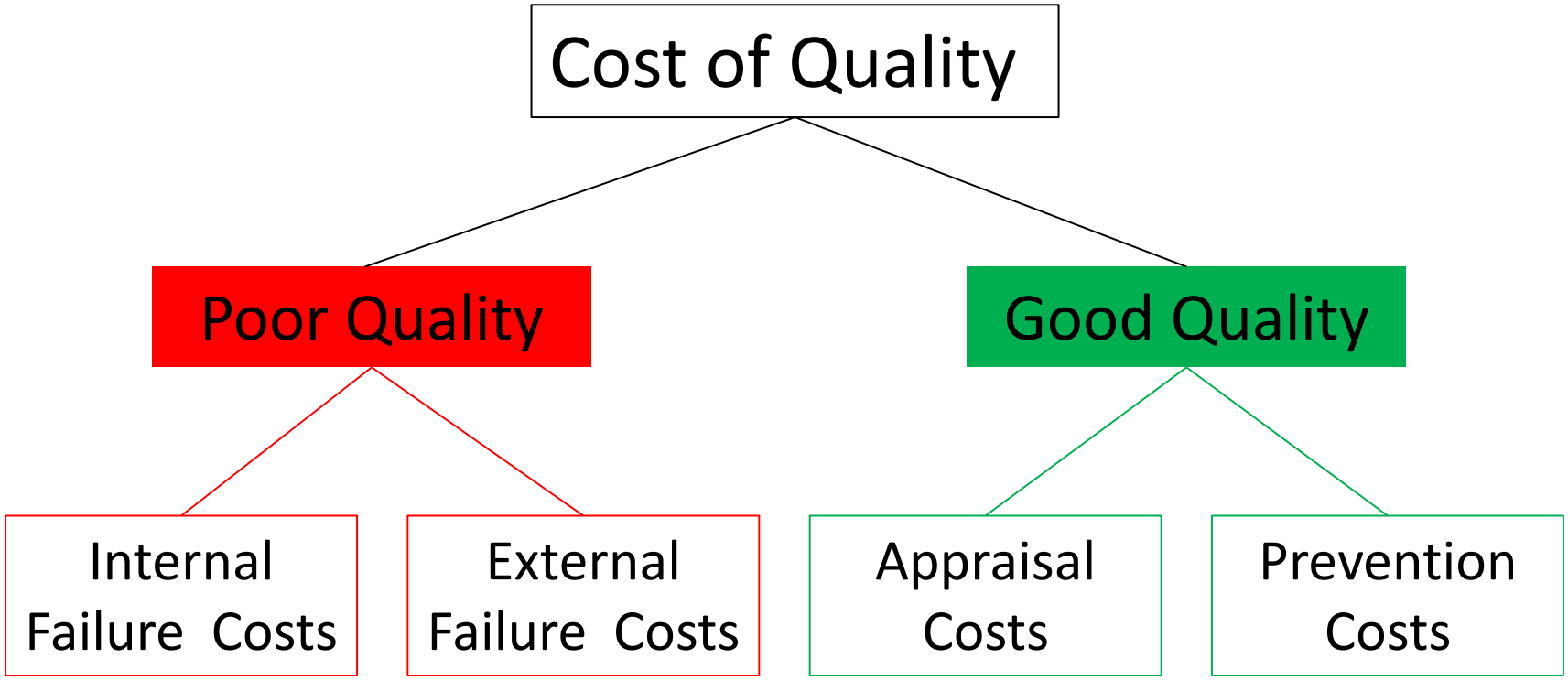
- Wrote Total Quality Control in 1961
- Given credit for establishing Total Quality Control concepts

# Philip B. Crosby (1928-2001)

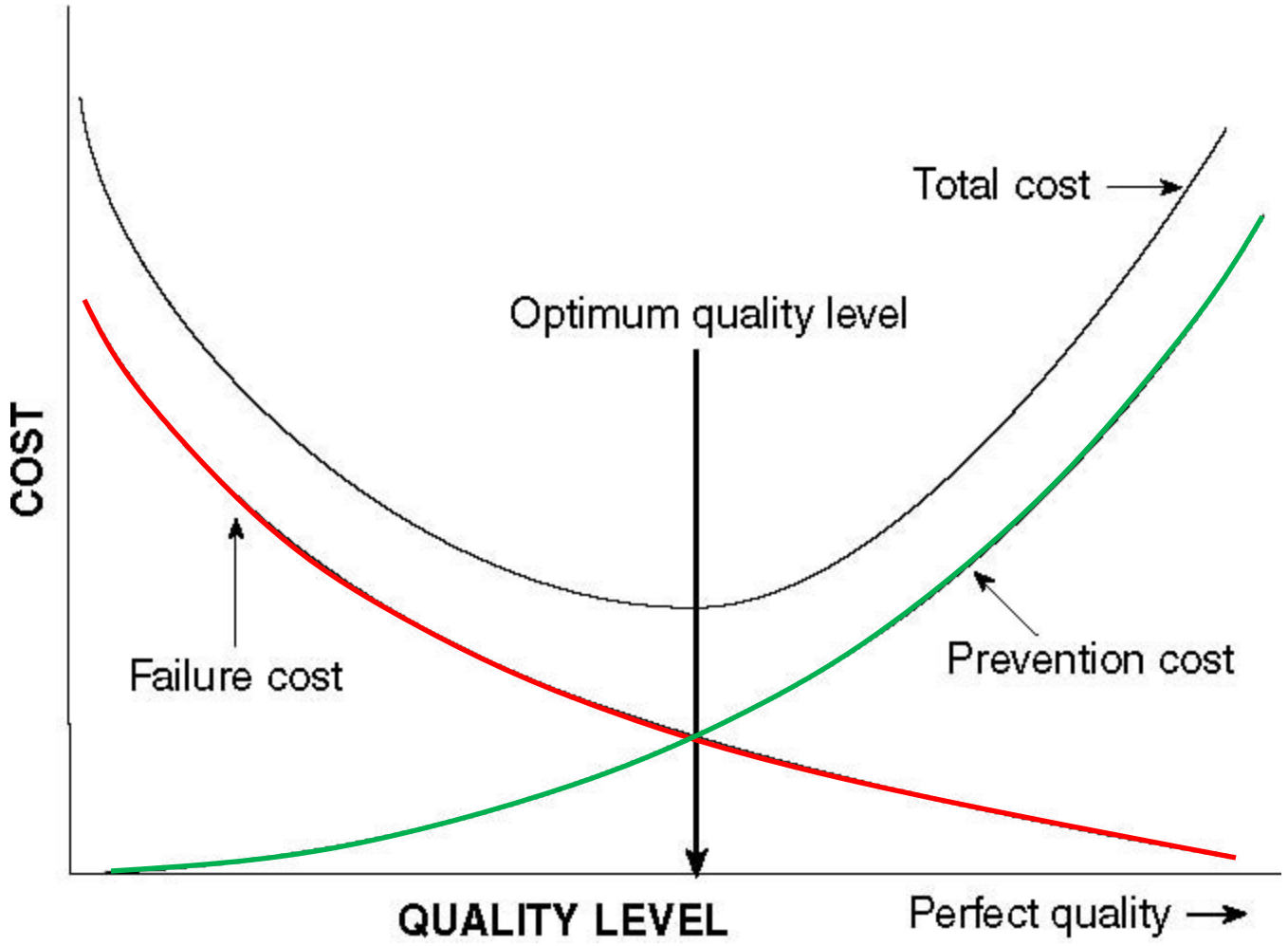
- Wrote ***Quality is Free*** *(1980)*

- Absolutes of quality management
  1. Quality means conformance to requirements.
  2. Quality comes from prevention.
  3. The quality performance standard is zero defects.
  4. Quality is measured by the price of nonconformance

# Defining cost of quality

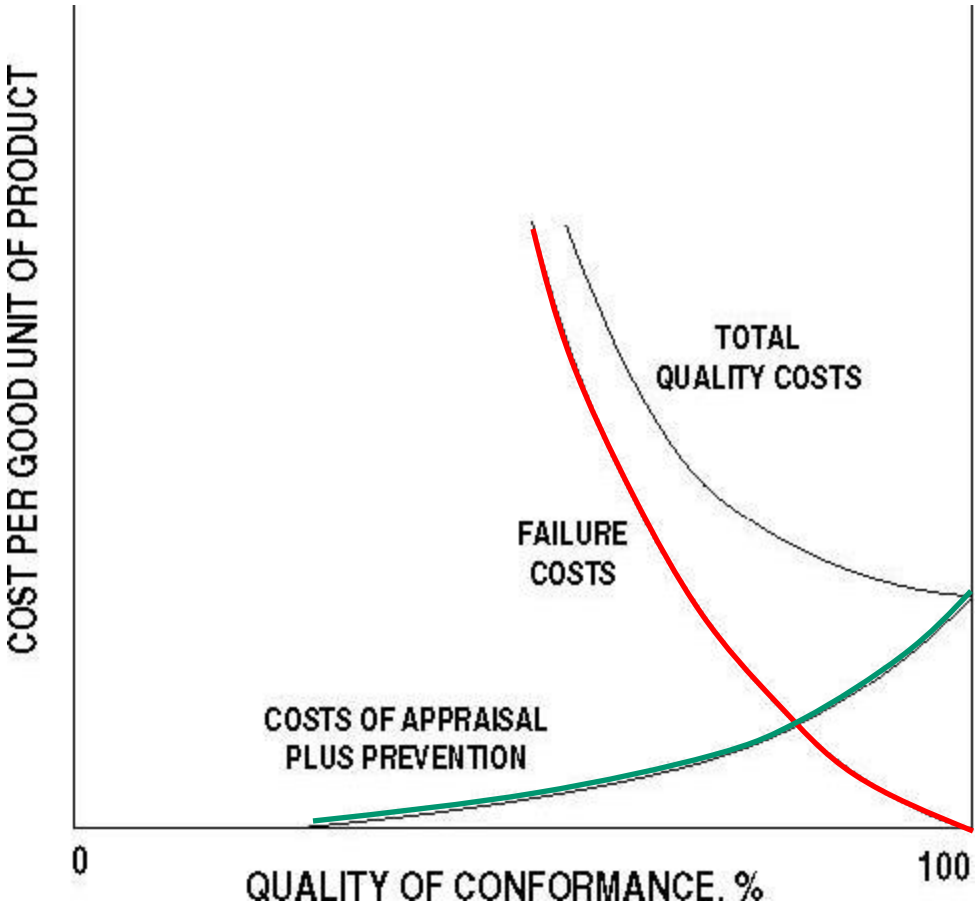


# Traditional model of quality costs




From *Jurans Quality Control Handbook, 4th edition*. J.M. Juran, editor. Copyright Â© 1988, McGraw-Hill.

# New model of optimum quality costs.




From *Jurans Quality Control Handbook, 4th edition*.
J.M. Juran, editor. Copyright Â© 1988, McGraw-Hill.

# Joseph Juran (1904-2008)

Basics for success

- Top management must commit time and resources
- Specific improvement goals must be in the business plan
- Responsibility for improvement must be assigned
- People must be trained for quality management and improvement
- The workforce must be empowered to participate in the improvement process

# Joseph Juran (1904-2008)

Wrote ***Quality Control Handbook***

1st Edition in 1951,

Now in 6th Edition 2010

"Vital few, trivial many"

– The Pareto Principle

or Juran's Principle?

# W. Edwards Deming (1900-1993)

Wrote ***Out of the Crisis*** (1982)

- 7 Deadly Diseases
- 14 Points for Management
- Advocate for application of statistical theory

# Deming's 14 Points for Management

1. Create constancy of purpose toward improvement of product and service, with the aim to become competitive and to stay in business, and to provide jobs.
2. Adopt the new philosophy. We are in a new economic age. Western management must awaken to the challenge, must learn their responsibilities, and take on leadership for change.
3. **Cease dependence on inspection to achieve quality**. Eliminate the need for inspection on a mass basis by building quality into the product in the first place.

# Deming's 14 Points for Management

4. **End the practice of awarding business on the basis of price tag. Instead, minimize total cost. Move toward a single supplier for any one item, on a long-term relationship of loyalty and trust.**
5. Improve constantly and forever the system of production and service, to improve quality and productivity, and thus constantly decrease costs.
6. Institute training on the job.
7. Institute leadership . The aim of supervision should be to help people and machines and gadgets to do a better job. Supervision of management is in need of overhaul, as well as supervision of production workers.

# Deming's 14 Points for Management

8. Drive out fear, so that everyone may work effectively for the company .
9. Break down barriers between departments. People in research, design, sales, and production must work as a team, to foresee problems of production and in use that may be encountered with the product or service.
10. **Eliminate slogans, exhortations, and targets for the work force asking for zero defects and new levels of productivity.** Such exhortations only create adversarial relationships, as the bulk of the causes of low quality and low productivity belong to the system and thus lie beyond the power of the work force.

# Deming's 14 Points for Management

11. **A) Eliminate work standards (quotas) on the factory floor. Substitute leadership. B) Eliminate management by objective. Eliminate management by numbers, numerical goals. Substitute leadership.**
12. A) Remove barriers that rob the hourly worker of his right to pride of workmanship. The responsibility of supervisors must be changed from sheer numbers to quality. B) Remove barriers that rob people in management and in engineering of their right to pride of workmanship.
13. Institute a vigorous program of education and self-improvement.
14. Put everybody in the company to work to accomplish the transformation. The transformation is everybody's job.

# Out of the Crisis - Chapter 11
# Common Causes and Special Causes

"The central problem in management and in leadership, in the words of my colleague Lloyd S. Nelson, is a failure to understand the information in variation."

"The first question in examination of data is accordingly to question the state of statistical control that produced the data."

- Common causes of variation versus special causes
- Run charts, histograms
- Statistical control of processes, control limits versus specifications, Process capability
- Statistical control of instruments and gages

# The Deming Funnel Experiment

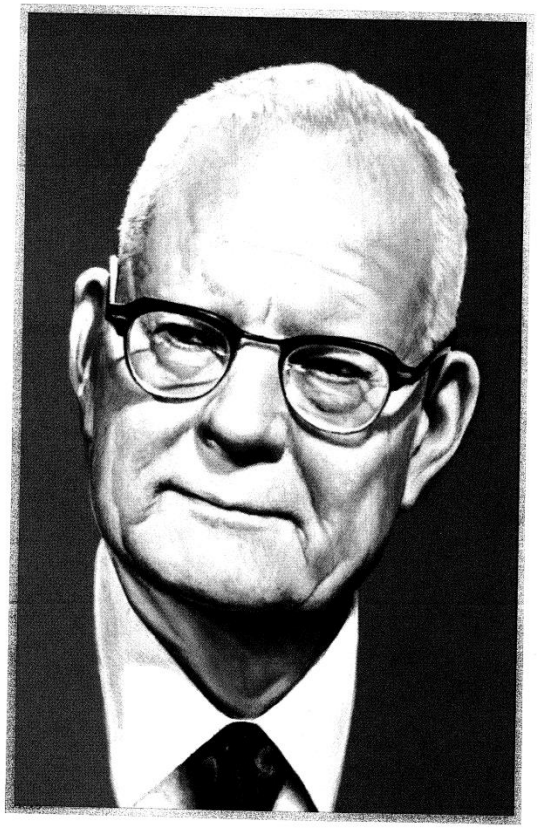
Tampering – adjusting a process based on a sample measurement

Examples

- Adjusting machine setting after each part is run to “get back to target”
- Increasing advertising because sales are down in a month

**If a process is stable, tampering will lead to greater variation, NOT improvement!**

# W. Edwards Deming (1900-1993)



## OUT OF THE CRISIS

W. Edwards Deming

Best wishes to Karen
W. Edwards Deming
6 June 1990

Massachusetts Institute of Technology
Center for Advanced Engineering Study

# Kaoru Ishakawa (1915-1989)

- Popularized Total Quality Control in Japan
- Developed Ishakawa diagram (also called fishbone diagram or cause and effect diagram)
- Popularized “Quality Control Circles” to involve workers in solving problems in their own work

# Genichi Taguchi (1924-2012)

- Wrote *Design of Experiments* in 1962
- Promoted principles of robust design

  Instead of trying to eliminate or reduce causes of product performance variability, adjust design of product so that the product is insensitive to the effects of uncontrolled variation.

- Taguchi Loss Function –

  The further from target a characteristic is, the greater the quality losses are.

# International Standards

**International Organization for Standardization (ISO)**

- Independent, non-governmental organization
- Worlds largest developer of voluntary international standards
  - Published over 19,500 standards
  - Covers almost every industry

- 163 Member Countries – network of national standards bodies

  USA: American National Standards Institute (ANSI)

# International Standards

Standard: Document that provides requirements, specifications, guidelines or characteristics

that can be used consistently

to ensure that materials, products, processes and services are fit for their purpose. (ISO.org)

# ISO Management System Standards

- ISO 9000 family - quality*
- ISO 14000 family - environmental
- ISO 50001 - energy
- ISO 22000 family - food safety.
- ISO 27000 family – information security
- ISO 20121 – sustainable events

* First management standard, issued in 1987.

# ISO 9001:2015
## Quality Management Systems - Requirements

- Sets out the requirements of a quality management system
- Requirements are generic and intended to be applicable to all organizations.
- Organizations can be certified as having met the requirements of ISO 9001:2015.

# ISO 9000 Family of standards

Most important characteristics in the series are:

- Customer focus
- Emphasis on business processes
- Integrated management
- Continual Improvement
- Measurement of customer satisfaction.

# Malcolm Baldrige National Quality Award

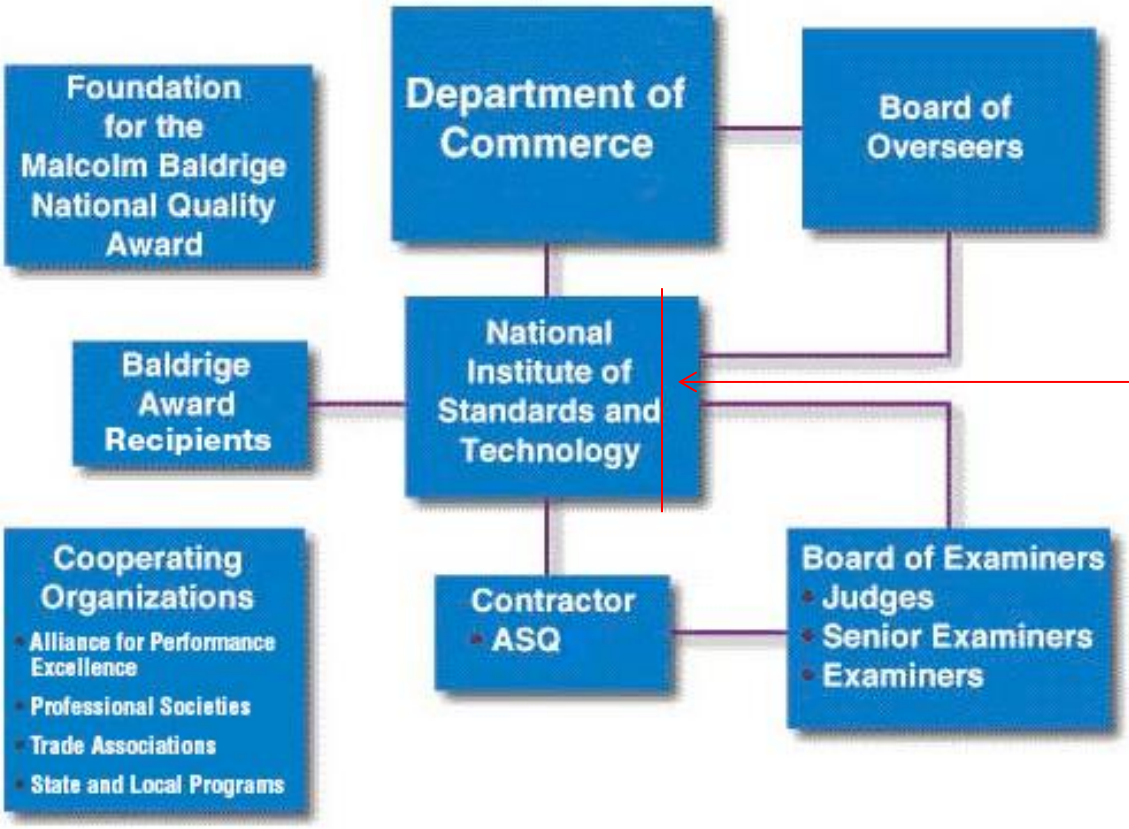
Award established by the U.S. Congress in 1987 to recognize US organizations for achievements in quality and business performance

The Baldrige Program also

- *Raises awareness about the importance of performance excellence in driving the U.S. and global economy*
- *Provides organizational assessment tools and criteria*
- *Educates leaders in businesses, schools, health care organizations, and government and nonprofit agencies about the practices of best-in-class organizations*

*(Source: http://www.nist.gov/baldrige/about/index.cfm)*

# Malcolm Baldrige National Quality Award Organization Chart




Baldrige Performance Excellence Program

- Develops criteria
- Manages award program
- Promotes performance excellence

http://www.nist.gov/baldrige/about/organization_chart.cfm

# Baldrige Criteria

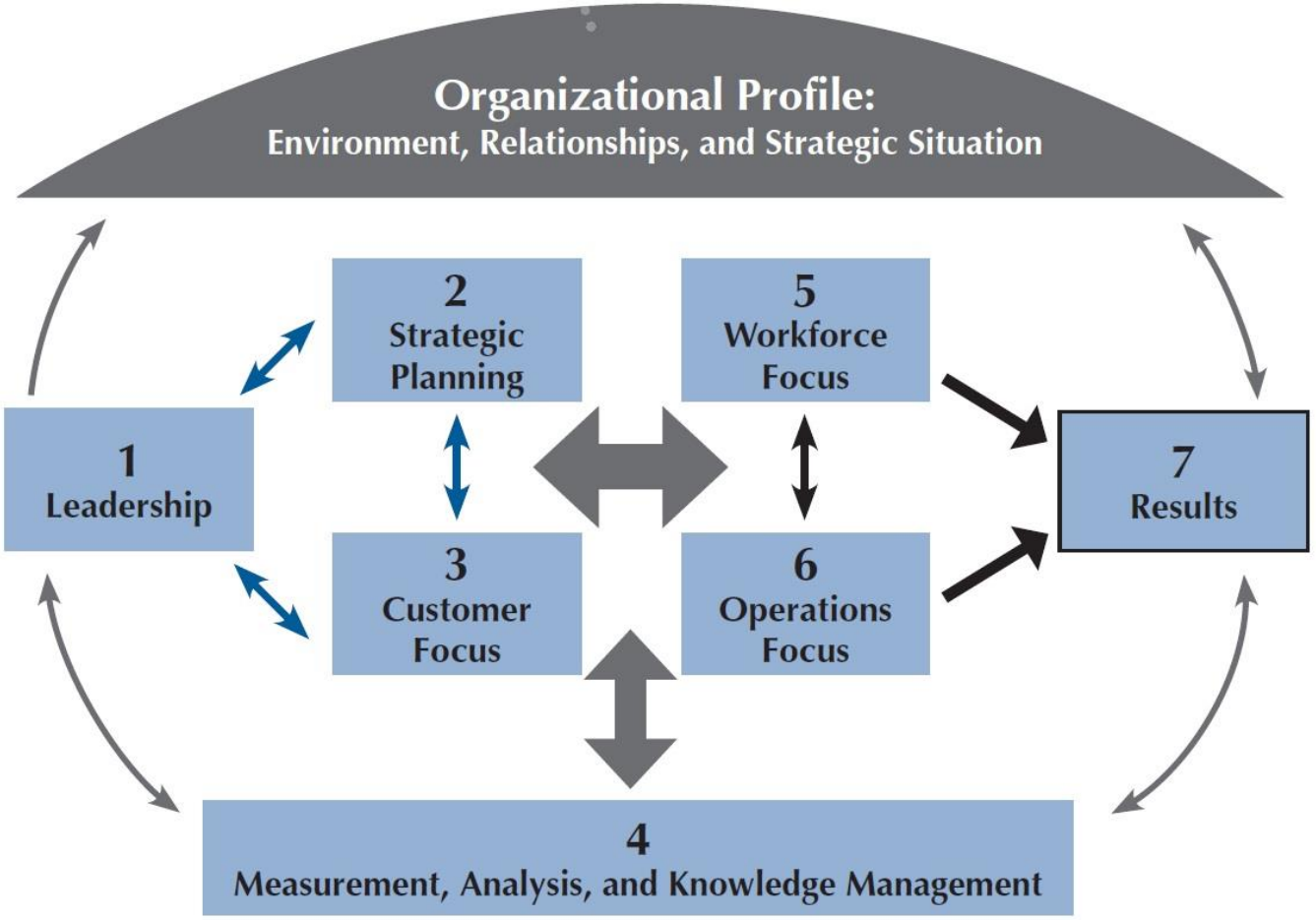
## What are the criteria?

- “Integrated management framework”— providing a systems view for managing performance
- Set of questions that set the expectations or requirements.

## Versions of the criteria

- Business/Non-profit
- Education
- Healthcare .

# Baldrige Criteria Framework: A Systems Perspective



# The Leadership Triad

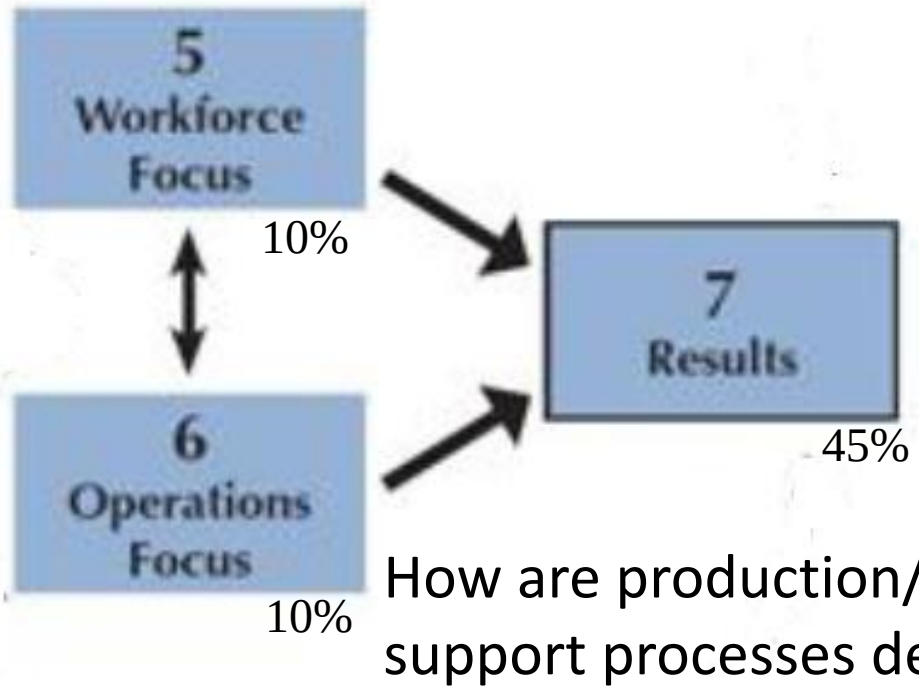

How does the company set strategic directions? How does it determines key action plans.

How do senior executives guide the company? How does the company addresses its responsibilities to the public and practices good citizenship

How does the company determine requirements and expectations of customers and markets?

# The Results Triad

How has the company developed its workforce full potential. How is the workforce aligned with objectives.




How is the company's performance/improvement in

- customer satisfaction,
- financial and marketplace performance,
- human resources,
- supplier and partner performance,
- and operational performance.

How are production/delivery and support processes designed, managed, and improved?

# Sample from the Criteria

source: http://www.nist.gov/baldrige/publications/upload/2013_2014_Baldrige_Criteria_Brochure.pdf

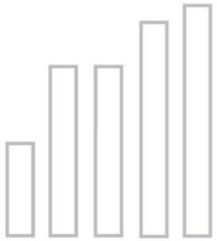
## 3.2 Customer Engagement: How do you serve customers' needs to engage them and build relationships? (45 pts.)

**Describe HOW you determine product offerings and communication mechanisms to support your CUSTOMERS. Describe HOW you build CUSTOMER relationships.**

In your response, include answers to the following questions:

### a. Product Offerings and CUSTOMER Support

**(1) Product Offerings** HOW do you determine CUSTOMER and market requirements for product offerings and services? HOW do you identify and adapt product offerings to meet the requirements and exceed the expectations of your CUSTOMER groups and market SEGMENTS (identified in the Organizational Profile)? HOW do you identify and adapt product offerings to enter new markets, to attract new CUSTOMERS, and to create opportunities to expand relationships with current CUSTOMERS, as appropriate?



The ratio of the Baldrige Program's benefits for the U.S. economy to its costs is estimated at **820 to 1**.

**99 Baldrige Award winners** serve as national role models.

2010–2014 award applicants represent **537,871 jobs**, 2,520 work sites, over $80 billion in revenue/budgets, and about 436 million customers served.

364 Baldrige examiners volunteered roughly **$5.5 million** in services in 2014.

State Baldrige-based examiners volunteered around **$30 million** in services in 2014.

BALDRIGE
Performance Excellence Program



NIST
National Institute of Standards and Technology
U.S. Department of Commerce

# ISO9000 vs Baldrige Criteria

| | |
|---|---|
| Both | Customer focused,<br>Process oriented,<br>Emphasize continuous improvement |
| Baldrige | Business results focus.<br>Includes financial/profitability results.<br>Award criteria. USA only. |
| ISO | Process effectiveness focus<br>Detailed and technically oriented.<br>Certification criteria. International. |

# EIN 5226

Please see Blackboard for related assignments.

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