

# Chapter 1

## *The Chronicle of Quality*

### *The Beginning (1922 to 1938)*

- *Quality control is as old as industry itself*
- *But the statistical approaches were born at AT&T and Western Electric Company (equipment manufacturing arm) in 1924.*
- *Where the engineers was developing a nationwide telephone system at the beginning of the 20th century, sampling inspection was used.*
- *Also, General Electric in 1922 had some formal attempts at scientific acceptance sampling techniques were being made at the G.E. Lamp Works.*



## *During World War II (1939 to 1945)*

- *Manufacturing firms switched from the production of consumer goods to defense equipment*
- *The importance of the quality made the Department of Defense (DoD) directly consider it.*

## *After WWII (1946)*

- *The nightmare of quality started ...*
- *Industries in Europe lay in the ruins of war*
- *Overseas and domestic demand for American manufactured goods exceeded the supply*
- *They could sell everything they produced*
- *Companies didn't care about quality and quality improvement, JUST SELL!!*
- *Many skilled worker in quality position were fired or replaced*
- *The demand for products continued to increase leaving managers to believe they were doing everything right!*

## *After WWII (1950)*

- In 1951, U.S. were trying to help rebuild their shattered economy.
- At the request of General Douglas MacArthur, W. E. Deming was invited to help in planning for Japan industry.
- Deming joined Japanese Union of Scientists and Engineers (JUSE) to help them in statistical quality control methods.
- Deming had a lot of trouble for implementing and using statistical quality control methods, because
  - Unskilled workers (no knowledge and no experience)
  - Resistance of workers to do so!
- At that time, the label **Made in Japan** was synonymous with **cheap junk in worldwide markets**.



## *After WWII (1950)*

- He agreed to do so **only** if he could first talk directly to **top management of companies**
- He explained his thoughts as:
  - (1) Improve Quality  $\Rightarrow$  (2) Less Rework and Waste  $\Rightarrow$  (3) Productivity Improves  $\Rightarrow$  (4) Capture the Market  $\Rightarrow$  (5) Stay in Business  $\Rightarrow$  (6) Provide Jobs
- After that Deming developed his 14 Point philosophy and promised:
  - “... Japanese products will gain respect in worldwide markets.”
- Also, Japanese developed the Deming Prize to acknowledge any idea and work in quality circle

## *Deming's 14 points philosophy*

1. *Create a constancy of purpose focused on the improvement of products and services*
2. *Adopt a new philosophy that recognizes we are in a different economic era*
3. *Do not rely on mass inspection to "control" quality*
4. *Do not award business to suppliers on the basis of price alone, but also consider quality*
5. *Focus on continuous improvement*
6. *Practice modern training methods and invest in on-the-job training for all employees*
7. *Improve leadership, and practice modern supervision methods*
8. *Drive out fear*
9. *Break down the barriers between functional areas of the business*
10. *Eliminate targets, slogans, and numerical goals for the workforce*
11. *Eliminate numerical quotas and work standards*
12. *Remove the barriers that discourage employees from doing their jobs*
13. *Institute an ongoing program of education for all employees*
14. *Create a structure in top management that will vigorously advocate the first 13 points*

## *Deming's Seven Deadly Diseases of Management*

1. *Lack of constancy of purpose*
2. *Emphasis on short-term profits*
3. *Evaluation of performance, merit rating, and annual reviews of performance*
4. *Mobility of top management*
5. *Running a company on visible figures alone*
6. *Excessive medical costs*
7. *Excessive legal damage awards*



## *After WWII (1980)*

- *By 1980, U.S. auto manufactures had lost a major share of their market, and many factories were closed and workers laid off*
- *The NBC Documentary “If Japan Can, Why Can’t We” aired.*



- *Top management of large U.S. Companies began to accept **quality goals** as one of the strategic parameters in business planning along with **production and financial goals***

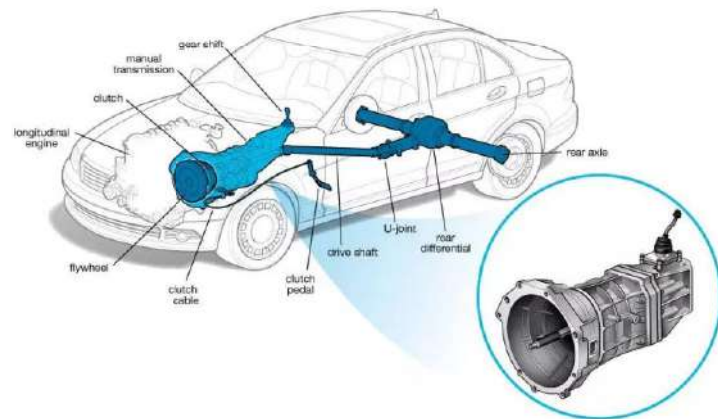
## *Japan vs USA: an Economic War*

- *A salient example is the comparative analysis of the US and Japan car industry*



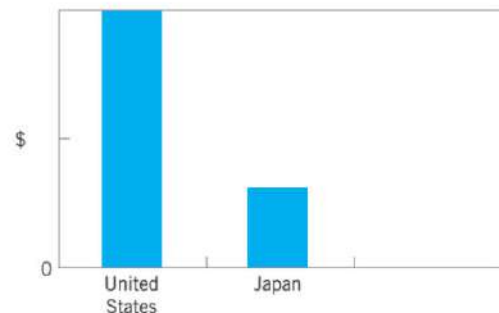
## Japan vs USA: an Economic War

- A few years ago, one of the automobile companies in the United States performed a comparative study of a transmission that was manufactured in a **domestic plant** and by a **Japanese supplier**



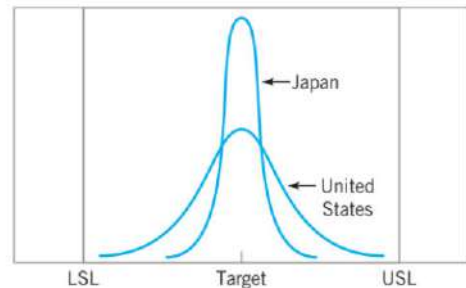
## Japan vs USA: an Economic War

- An analysis of warranty claims and repair costs indicated that there was a striking difference between the two sources of production, with the Japanese-produced transmission having much lower costs, as shown in Figure.
- As part of the study to discover the cause of this difference in cost and performance, the company selected random samples of transmissions from each plant, disassembled them, and measured several critical quality characteristics



## *Japan vs USA: an Economic War*

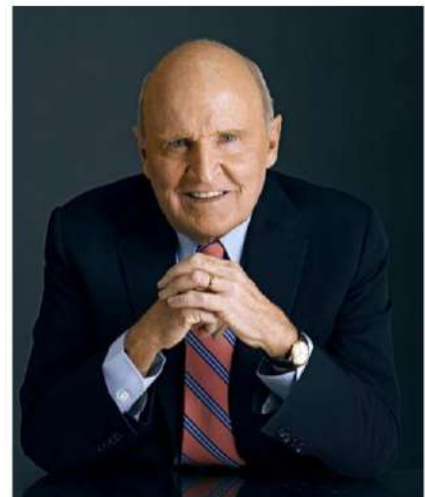
- *The figure is generally representative of the results of this study*
- *Although that both distributions of critical dimensions are centered at the desired or target value, but the distribution of the critical characteristics for the transmissions manufactured in the US takes up about 75% of the width of the specifications, implying that very few nonconforming units would be produced*



## *A (Quality)Management GOAT*

- *Jack Welch (1935 - 2020)*

*Your customers don't see the mean of your process, they only see the variability around that target that you have not removed*



## *Definition of Quality and Quality Improvement*

- *We may define **quality** in many ways*
- *The quality of a product can be described and evaluated in several ways*
- *Garvin (1987) provides an excellent discussion of eight components or **dimensions of quality***
- *These eight dimensions are usually adequate to describe quality in most **industrial** and many **business** situations.*

## *Dimensions of Quality*

- ***Performance** (Will the product do the intended job?)*
- ***Reliability** (How often does the product fail?)*
- ***Durability** (How long does the product last?)*
- ***Serviceability** (How easy is it to repair the product?)*
- ***Aesthetics** (What does the product look like?)*
- ***Features** (What does the product do?)*
- ***Perceived Quality** (What is the reputation of the company or its product?)*
- ***Conformance to Standards** (Is the product made as the designer intended?)*



## *Dimensions of Quality*

- However, in **service** and transactional business organizations (such as banking and finance, health care, and customer service organizations) we can add the following three dimensions:
1. **Responsiveness** (How long they did it take the service provider to reply to your request for service? How willing to be helpful was the service provider?)
  2. **Professionalism** (Is the knowledge and skills of the service provider, relates to provide the required services.)
  3. **Attentiveness** (Customers generally want caring and personalized attention from their service providers)

## *Definition of Quality*

- We see from the foregoing discussion that quality is indeed a multifaceted entity
- Consequently, a simple answer to questions such as “What is quality?” or “What is quality improvement?” is not easy.
- The **traditional** definition of quality is based on the viewpoint that products and services must meet the requirements of those who use them.

### **Definition**

**Quality** means fitness for use.

## *Definition of Quality*

- We prefer a **modern** definition of quality

### **Definition**

**Quality** is inversely proportional to variability.

## *Quality Improvement*

- So, what does it mean?
- How did the Japanese do this?
- How improve the quality?

### **Definition**

**Quality improvement** is the reduction of variability in processes and products.

## *After WWII (1990)*

- *The U.S. Congress established **the Malcolm Baldrige National Quality Award** named after the late secretary of commerce*
- *Based on efforts like this, market shares of U.S. companies rebounded in manufactured goods such as automobiles, electronics, and steel.*