QFD – Contd.

- *Customer requirements*
  - *Survey customers to find out what they specifically need in our product*
    - *Focus groups, telephonic interviews, directly talk to customers*
- *Competitive Evaluation*
  - *How our product compares to those of competitors*
  - *Evaluation scale is from 1 to 5*

Quality costs

- ***Quality costs*** *can be broken down into four broad groups. These four groups are also termed as four (4) types of quality costs. Two of these groups are known as prevention costs and appraisal costs. These are incurred in an effort to keep defective products from falling into the hands of customers. The other two groups of costs are known as internal failure costs and external failure costs.*

Examples of four types of quality cost are given below:

Prevention Costs	Appraisal Costs
Systems development	Test and inspection of incoming materials
Quality engineering	Test and inspection of in-process goods
Quality training	Final product testing and inspection
Quality circles	Supplies used in testing and inspection
statistical process control	Supervision of testing and inspection activities
Supervision of prevention activities	Depreciation of test equipment
Quality data gathering, analysis, and reporting	Maintenance of test equipment
Quality improvement projects	Plant utilities in the inspection area
Technical support provided to suppliers	Field testing and appraisal at customer site
Audits of the effectiveness of the quality system	

Examples of four types of quality cost are given below:

External Failure Costs	Internal Failure Costs
Cost of field servicing and handling complaints	Net cost of scrap
Warranty repairs and replacements	Net cost of spoilage
Repairs and replacements beyond the warranty period	Rework labor and overhead
Product recalls	Re-inspection of reworked products
Liability arising from defective products	Retesting of reworked products
Returns and allowances arising from quality problems	Downtime caused by quality problems
Lost sales arising from a reputation for poor quality	Disposal of defective products
	Analysis of the cause of defects in production
	Re-entering data because of keying errors
	Debugging software errors

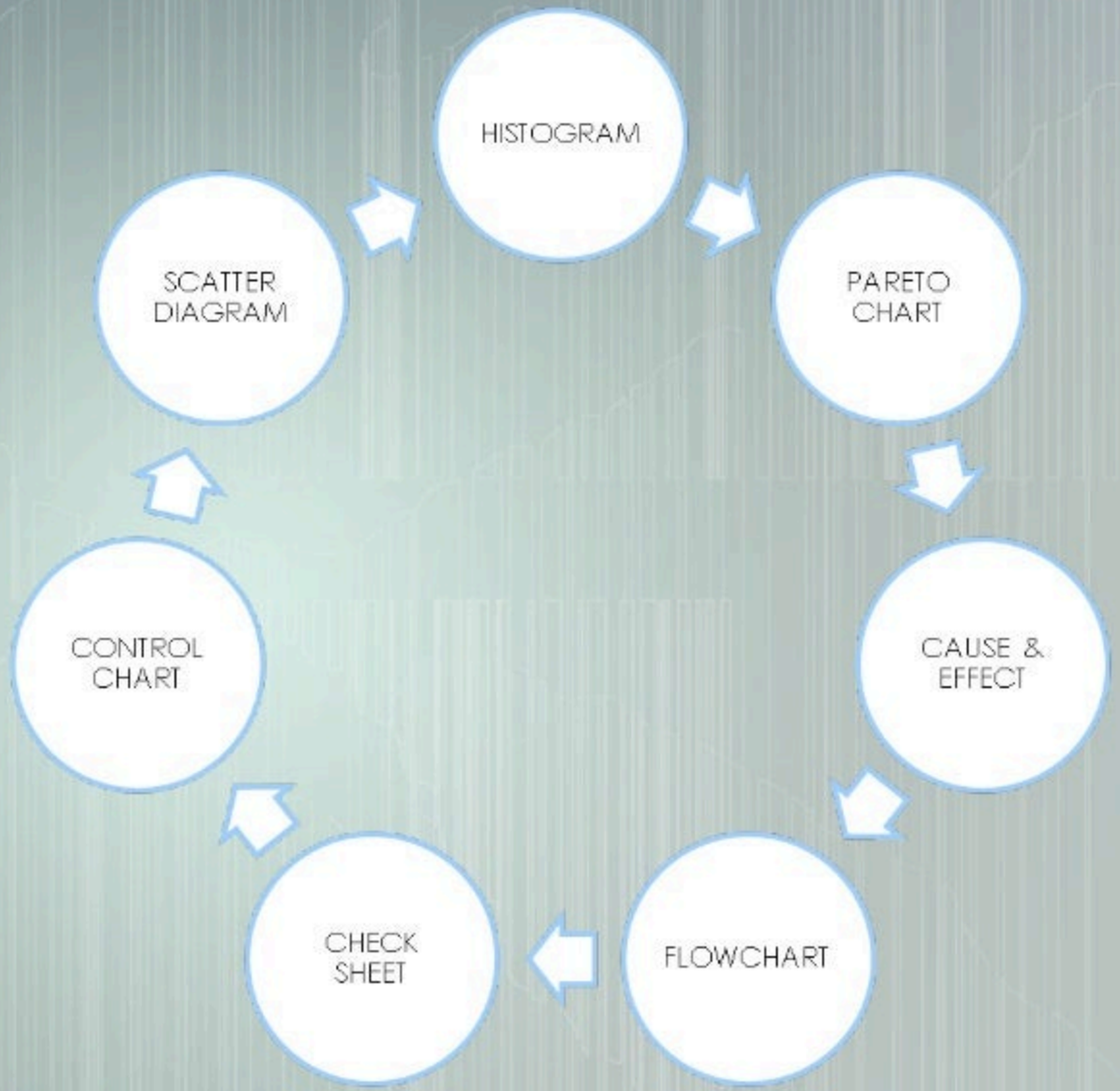
TOTAL QUALITY MANAGEMENT

SEVEN BASIC QUALITY TOOLS

INTRODUCTION

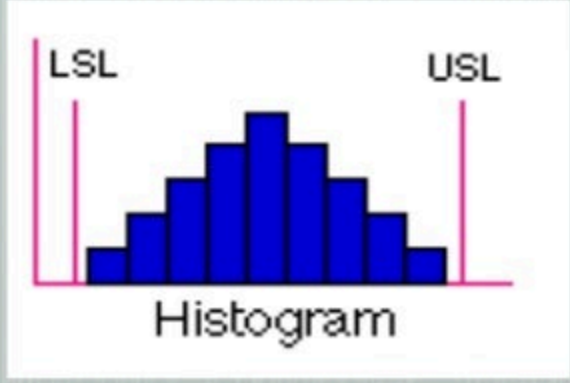
- *Quality tools are more specific - tools which can be applied to solving problems in improving quality in organizations, manufacturing, or even in individual processes.*
- *They were first emphasized by Kaoru Ishikawa, professor of engineering at Tokyo University and the father of "quality circles".*

Seven Basic Quality Tools



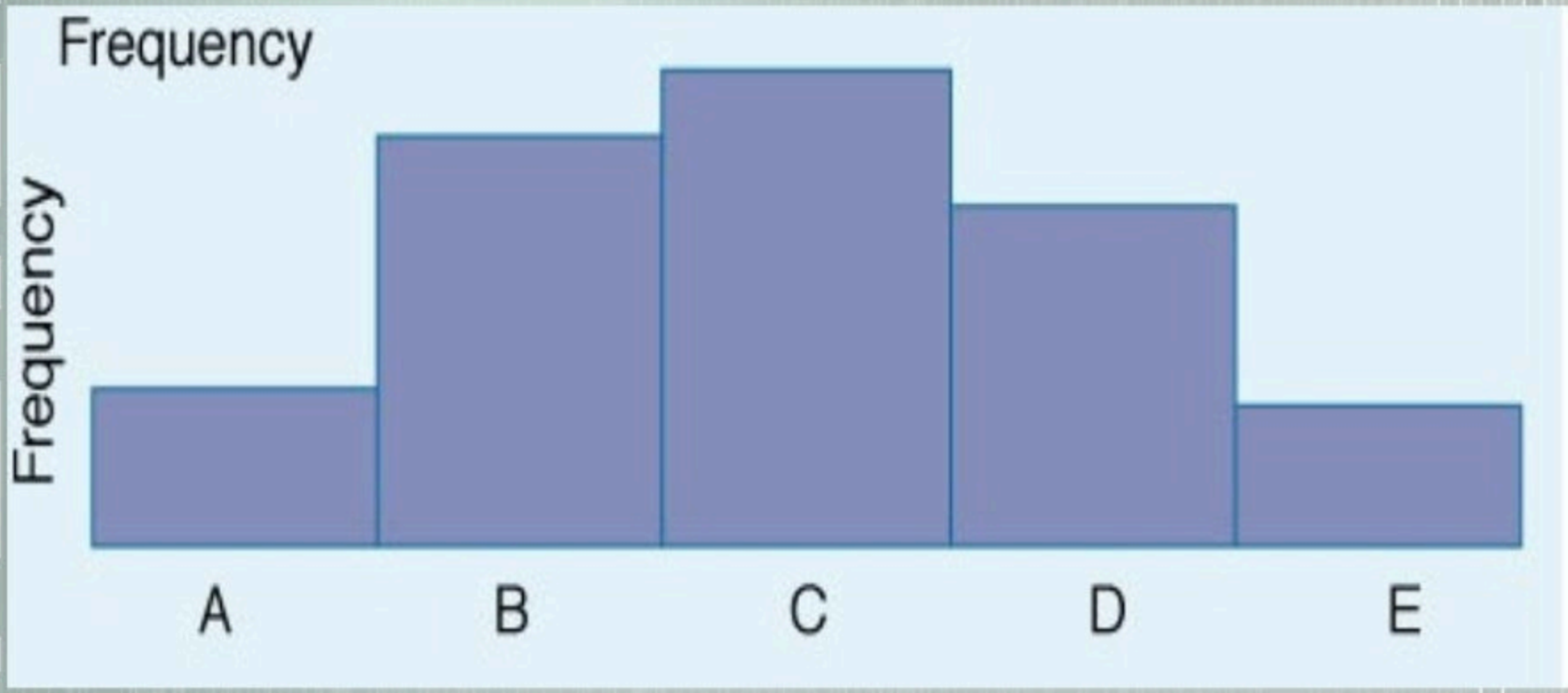
Histograms

- *A histogram is a bar graph that shows frequency data.*
- *Histograms provide the easiest way to evaluate the distribution of data.*



Histograms

- *A chart that shows the frequency distribution of observed values of a variable like* **service time** *at a bank drive-up window*
- *Displays whether the distribution is symmetrical (normal) or skewed*



Pareto Analysis

- Technique that displays the degree of importance for each element
- Named after the 19th century Italian economist
- Often called the 80-20 Rule
- Principle is that quality problems are the result of only a few problems e.g. 80% of the problems caused by 20% of causes