

## 4.3: Productivity and Total Quality Management

### The Cost of Quality: A Self-Check Exercise

By  
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In many ways, quality is very expensive. There are multiple categories of costs associated with quality management. Understanding these costs is the first step in designing an argument of why the investment is an important one. Complete this assessment of your understanding of Cost of Quality concepts. The activity is self-graded.

In this interactive object, learners check their knowledge of concepts related to the cost of ensuring quality in manufacturing as they relate to the categories of appraisal, prevention, internal failures, and external failures.

Activity Link: <https://www.wisc-online.com/learn/career-clusters/business-management-and-administration/qlt1904/the-cost-of-quality-a-self-check-exercise>

### Quality Management Services: “What is Quality Management System?”

This video describes the integrated system necessary to create a quality management system within an organization. Just using the word quality can be confusing for managers. Understanding what quality is and how it should be approached is challenging. Designing a systematic way to approach management of quality is fundamentally important to successfully controlling quality.



Clarify



meovly



A YouTube element has been excluded from this version of the text. You can view it online here: <http://pb.libretexts.org/b/?p=80>

### Boundless: *Business*, “Chapter 10, Section 2, Part 2: TQM”

Read this page. This page explores the nature of total quality management (TQM) and the necessity of use in the operations environment. TQM is one of the bedrock approaches to quality management. You will see many of the components of TQM in other quality management approaches. This approach is important because of the focus on a continuous cycle of improving the quality of a product, service, or process.

#### TQM

Total quality management (TQM) is an integrative philosophy of management for continuously improving the quality of products and processes.

#### LEARNING OBJECTIVE

- Explain the principles of Total Quality Management (TQM)

#### KEY POINTS

- TQM functions on the premise that the quality of products and processes is the responsibility of everyone who is involved with the creation or consumption of the goods or services offered by an organization.
- Satisfying the customer involves making sure both internal and external customers are happy.
- The internal suppliers are the subordinates who answer to a particular supervisor. Satisfying them involves giving them the tools and motivation they need to do their jobs.
- It is important to go beyond satisfaction, making the customer – and supplier – feel important and valued, and part of the process.
- “Lean” focuses on eliminating the wasteful use of time, energy or resources, and instead focusing activities completely on the creation of value.
- The focus of the Six Sigma management strategy is to reduce defect by minimizing variation in processes.

#### TERMS

- **poka-yoke**: A methodology of using low-cost techniques to error-proof production processes.
- **Total Quality Management (TQM)**: A strategic approach to management aimed at embedding awareness of quality in all organizational processes.

#### EXAMPLE

- ‘Lean’ is based on the Toyota Production System, which aimed to minimize overburden, inconsistency and waste. It was developed between 1948-1975, and was a precursor to lean manufacturing.

#### FULL TEXT

Total Quality Management (TQM) is an integrative philosophy of management for continuously improving the quality of products and processes.

#### Overview

TQM functions on the premise that the quality of products and processes is the responsibility of everyone involved in the creation or consumption of the goods or services the organization offers. TQM capitalizes on the involvement of management, the workforce, suppliers, and even customers in order to meet or exceed customer expectations.

Considering the practices of TQM as discussed in six empirical studies, Cua, McKone, and Schroeder (2001) identified nine common TQM practices:

1. Cross-functional product design;
2. Process management;
3. Supplier quality management;
4. Customer involvement;
5. Information and feedback;

6. Committed leadership;
7. Strategic planning;
8. Cross-functional training; and
9. Employee involvement.

### Basic Principles of Total Quality Management

The basic principles for the Total Quality Management philosophy of doing business are to satisfy the customer, satisfy the supplier, and continuously improve the business processes.

#### Satisfy the Customer

The first, and major, TQM principle is to satisfy the customer—the person who pays for the product or service. Customers want to get their money's worth from a product or service they purchase.

**Satisfy the Users:** If the user of the product is different than the purchaser, then both the user and customer must be satisfied, although the person who pays gets priority.

**Company Philosophy:** A company that seeks to satisfy the customer by providing them value for what they buy and the quality they expect will get more repeat business, referral business, and reduced complaints and service expenses. Some top companies not only provide quality products but also give extra service to make their customers feel important and valued.

**Internal Customers:** Within a company, a worker provides a product or service to his or her supervisors. If the person has any influence on the wages the worker receives, that person can be thought of as an internal customer. A worker should have the mindset of satisfying internal customers in order to keep his or her job and to get a raise or promotion.

**Chain of Customers:** Often in a company, there is a chain of customers—each improving a product and passing it along until it is finally sold to the external customer. Each worker must not only seek to satisfy the immediate internal customer, but must also look up the chain to try to satisfy the ultimate customer.

#### Satisfy the Supplier

A second TQM principle is to satisfy the supplier, which is the person or organization from whom you are purchasing goods or services.

**External Suppliers:** A company must look to satisfy their external suppliers by providing them with clear instructions and requirements and then paying them fairly and on time. It is in the company's best interest that its suppliers provide quality goods or services if the company hopes to provide quality goods or services to its external customers.

**Internal Suppliers:** A supervisor must try to keep workers happy and productive by providing good task instructions, the tools they need to do their job, and good working conditions. The supervisor must also reward the workers with praise and good pay.

**Get Better Work:** The reason to do this is to get more productivity out of the workers, as well as to keep the good workers. An effective supervisor with a good team of workers will certainly satisfy his or her internal customers.

**Empower Workers:** One area of satisfying the internal supplier is by empowering the workers. This means allowing them to make decisions on things that they can control. This not only takes the burden off the supervisor, but it also motivates these internal suppliers to do better work.

#### Continuous Improvement

The third principle of TQM is continuous improvement. You can never be satisfied with the method used, because there always can be improvements. The competition is always improving, so it is necessary to strive to keep ahead of the game.

**Work Smarter, Not Harder:** Some companies have tried to improve by making employees work harder. This may be counterproductive, especially if the process itself is flawed. For example, trying to increase worker output on a defective machine may result in more defective parts. Examining the source of problems and delays and then solving those problems is what works best. Often, the process has bottlenecks that are the real cause of the problem. Those are what should be removed.

**Worker Suggestions:** Workers are often a source of continuous improvements. They can provide suggestions on how to improve a process and eliminate waste or unnecessary work.

**Quality Methods:** There are also many quality methods, such as just-in-time production, variability reduction, and poka-yoke, that can improve processes and reduce waste.

## Boundless: Business, "Chapter 10, Section 2, Part 1: Philosophies"

Read this description of the quality principles. These principles are important to the focus on and ability to lead an organization toward a culture that embraces continual quality improvement.

### Philosophies

Quality management adopts a number of management principles that can be used to guide organizations towards improved performance.

#### LEARNING OBJECTIVE

- Recognize how top management can improve quality performance

#### KEY POINTS

- There are eight primary quality management principles.
- The principles are the basis of the ISO 9001:2008 quality management system standard.
- One of the permanent quality objectives of an organization should be the continual improvement of its overall performance.

#### TERMS

- **value:** The degree of importance you give to something.
- **ISO 9001:2008:** The ISO 9000 family of standards are related to quality management systems and designed to help organizations ensure that they meet the needs of customers and other stakeholders while meeting statutory and regulatory requirements related to the product.
- **Quality Management:** Process of ensuring that an organization or product is consistent. It can be considered to have four main components: quality planning, quality control, quality assurance, and quality improvement. Quality management is focused not only on product/service quality, but also the means to achieve it.

#### EXAMPLE

- In the 1950s and 1960s, Japanese goods were synonymous with cheapness and low quality but over time, their quality initiatives began to be successful, with Japan achieving very high levels of quality in products from the 1970s onward. For example, Japanese cars regularly top the J.D. Power customer satisfaction ratings. In the 1980s, Deming was asked by Ford Motor Company to start a quality initiative after they realized that they were falling behind Japanese manufacturers. A number of highly successful quality initiatives have been invented by the Japanese (see for example, on this page: Genichi Taguchi, QFD, Toyota Production System). Many of the methods not only provide techniques but also have associated quality culture (i.e., people factors). These methods are now adopted by the same western countries that decades earlier derided Japanese methods.

## FULL TEXT

### The Principles of Quality Management

Quality management adopts a number of management principles that can be used by top management to guide their organizations towards improved performance. The principles include:

- **Customer focus:** Since the organizations depend on their customers, they should understand current and future customer needs, should meet customer requirements, and try to exceed the expectations of customers. An organization attains customer focus when all people in the organization know both the internal and external customers and also what customer requirements must be met to ensure that both the internal and external customers are satisfied.
- **Leadership:** Leaders of an organization establish unity of purpose and direction of it. They should go for creation and maintenance of such an internal environment, in which people can become fully involved in achieving the organization's quality objective.
- **Involvement of people:** People at all levels of an organization are the essence of it. Their complete involvement enables their abilities to be used for the benefit of the organization.
- **Process approach:** The desired result can be achieved when activities and related resources are managed in an organization as process.
- **System approach to management:** An organization's effectiveness and efficiency in achieving its quality objectives are contributed by identifying, understanding, and managing all interrelated processes as a system.
- **Continual improvement:** One of the permanent quality objectives of an organization should be the continual improvement of its overall performance.
- **Factual approach to decision making:** Effective decisions are always based on the data analysis and information.
- **Mutually beneficial supplier relationships:** Since an organization and its suppliers are interdependent, therefore, a mutually beneficial relationship between them increases the ability of both to add value.

These eight principles form the basis for the quality management system standard ISO 9001:2008.

### Boundless: Business, "Chapter 10, Section 2, Part 3: Quality Inspections and Standards"

Read this section to better understand the usefulness of quality audits in managing to quality standards. Quality audits are an important part of the quality process. Companies ensure that they are producing a quality product or service by integrating the ISO standards into processes. To ensure that all parts of operations is compliant audits are conducted.

#### Quality Inspections and Standards

Companies ensure the quality of products and services by adhering to ISO standards and performing quality audits to ensure compliance.

#### LEARNING OBJECTIVE

- Recognize the ISO's role in ensuring quality standards

#### KEY POINTS

- The Quality Management System (QMS) standards were created by the International Organization for Standardization (ISO) in 1987, and are reviewed and updated every few years. These standards are used to certify the processes and systems of an organization, but not the product or service itself.
- In 1994 three major standards were released as part of the ISO 9000:1994 series. Major revisions were made in 2008.
- A quality audit is the systematic examination of a quality system, and is carried out by internal or external auditors. It is a key element in ISO 9001 standards.
- Since 2008, the focus of quality audits has shifted from simply procedural adherence to measuring the effectiveness of actual QMS's.

#### TERMS

- **ISO 14000:** a set of standards related to environmental management designed to help organizations reduce the negative environmental effect of their operations, meet legal requirements, and continually improve
- **ISO 9000:** a set of standards related to quality management systems and designed to help organizations ensure that they meet the needs of customers and other stakeholders while meeting statutory and regulatory requirements related to the product
- **Quality Management System (QMS):** The organizational structure, procedures, processes, and resources needed to implement quality management.
- **Quality Audit:** The process of systematic examination of a quality system carried out by an internal or external quality auditor or audit team. It is an important part of an organization's quality management system and is a key element in the ISO quality system standard, ISO 9001.
- **International Organization for Standardization (ISO):** An international standard-setting body composed of representatives from various national standards organizations. Founded on February 23, 1947, the organization promulgates worldwide proprietary, industrial, and commercial standards.

#### EXAMPLE

- Quality audits and adherence to ISO standards are not just for private corporations; the US Food and Drug Administration requires that medical devices undergo quality auditing, and several countries require quality audits of their educational systems.

## FULL TEXT

### Quality Standards

The International Organization for Standardization (ISO) created the Quality Management System (QMS) standards in 1987. They were the ISO 9000:1987 series of standards, comprising ISO 9001:1987, ISO 9002:1987, and ISO 9003:1987; which were applicable in different types of industries, based on the type of activity or process (designing, production, or service delivery).

The standards are reviewed every few years by the ISO. The version in 1994 was called the ISO 9000:1994 series; consisting of the ISO 9001:1994, 9002:1994 and 9003:1994 versions.

A major revision occurred in 2008, and the series was called ISO 9000:2000 series. The ISO 9002 and 9003 standards were integrated into one single certifiable standard: ISO 9001:2008. After December 2003, organizations holding ISO 9002 or 9003 standards had to complete a transition to the new standard.

The ISO 9004:2009 document gives guidelines for performance improvement over and above the basic standard (ISO 9001:2000). This standard provides a measurement framework for improved quality management, similar to and based upon the measurement framework for process assessment.

The Quality Management System standards created by ISO are meant to certify the processes and the system of an organization, not the product or service itself. ISO 9000 standards do not certify the quality of the product or service.

In 2005 the International Organization for Standardization released a standard, ISO 22000, meant for the food industry. This standard covers the values and principles of ISO 9000 and the HACCP standards. It gives one single integrated standard for the food industry and is expected to become more popular in the coming years in the industry.

ISO has also released standards for other industries. For example, Technical Standard TS 16949 defines requirements in addition to those in ISO 9001:2008 specifically for the automotive industry.

ISO has a number of standards that support quality management. One group describes processes (including ISO/IEC 12207 & ISO/IEC 15288), and another describes process assessment and improvement (ISO 15504).

### Quality Audits

A quality audit is the process of systematic examination of a quality system carried out by an internal or external quality auditor or audit team. It is an important part of organization's quality management system and is a key element in the ISO quality system standard, ISO 9001.

Quality audits are typically performed at predefined time intervals and ensure that the institution has clearly defined internal system monitoring procedures linked to effective action. This can help determine if the organization complies with the defined quality system processes and can involve procedural or results-based assessment criteria.

With the upgrade of the ISO 9000 series of standards from the 1994 to 2008 series, the focus of the audits has shifted from purely procedural adherence towards measurement of the actual effectiveness of the Quality Management System (QMS) and the results that have been achieved through the implementation of a QMS.

Audits are an essential management tool to be used for verifying objective evidence of processes, to assess how successfully processes have been implemented, for judging the effectiveness of achieving any defined target levels, to provide evidence concerning reduction and elimination of problem areas.

For the benefit of the organisation, quality auditing should not only report non-conformance and corrective actions, but also highlight areas of good practice. In this way, other departments may share information and amend their working practices, which contributes to continual improvement.

Quality audits can be an integral part of compliance or regulatory requirements. One example is the US Food and Drug Administration, which requires quality auditing to be performed as part of its Quality System Regulation (QSR) for medical devices (Title 21 of the US Code of Federal Regulations part 820).

Several countries have adopted quality audits in their higher education system (including New Zealand, Australia, Sweden, Finland, Norway, and the USA). Initiated in the UK, the process is focused primarily on procedural issues rather than on the results or the efficiency of a quality system implementation.

Audits can also be used for safety purposes. Evans and Parker (2008) describe auditing as one of the most powerful safety monitoring techniques and "an effective way to avoid complacency and highlight slowly deteriorating conditions," especially when the auditing focuses not just on compliance but effectiveness.

The processes and tasks that a quality audit involves can be managed using a wide variety of software and self-assessment tools. Some of these relate specifically to quality in terms of fitness for purpose and conformance to standards, while others relate to quality costs or (more accurately) to the cost of poor quality. In analyzing quality costs, a cost of quality audit can be applied across any organization rather than just to conventional production or assembly processes.

## Boundless: Business, " Chapter 10, Section 2, Part 4: Quality Control"

Read this section on the quality control process. Quality control is focused on identifying issues with quality and initiating corrective action. Quality control processes are vital to a healthy quality control function.

### Quality Control

Quality control is a process that evaluates output against a standard and takes corrective action when output doesn't meet that standard.

#### LEARNING OBJECTIVE

- Discuss the role of quality control in business

#### KEY POINTS

- The purpose of quality control is to make sure that certain processes perform to a company's set standards.
- Quality control in relation to customers involves the continuous act of making sure products, designed and manufactured, are produced to meet and exceed customer needs.
- Quality should be measured differently for products and services and judged by their own set of dimensions.
- Controls include product inspection, where every product is visually examined, often with a stereo microscope to perceive fine detail before the product is sold into the external market.
- Responsibility for overall quality lies with top management. Top management must establish strategies, institute programs for quality, and motivate managers and workers.

#### TERMS

- total quality managementA strategic approach to management aimed at embedding awareness of quality in all organizational processes.
- quality controlA control, such as inspection or testing, introduced into an industrial or business process to ensure quality.
- organizational cultureOrganizational culture is the collective behavior of humans who are part of an organization and the meanings that the people attach to their actions.

#### EXAMPLE

- Controls include product inspection, where every product is examined visually. Inspectors will be provided with lists and descriptions of unacceptable product defects such as cracks or surface blemishes.

#### FULL TEXT

Quality can be thought of as the degree to which performance of a product or service meets or exceeds expectations. Quality control is a process that evaluates output against a standard and takes corrective action when output doesn't meet these predetermined standards. Therefore, quality control in relation to customers would be the continuous act of making sure products, designed and manufactured, are produced to meet and exceed the needs of customers. For contract work, particularly work awarded by government agencies, quality control issues are among the top reasons for not renewing a contract.

This approach places an emphasis on three aspects:

- Elements such as controls, job management, defined and well-managed processes, performance and integrity criteria, and identification of records
- Competence, such as knowledge, skills, experience, and qualifications
- Soft elements, such as personnel integrity, confidence, organizational culture, motivation, team spirit, and quality relationships

Controls include product inspection, where every product is examined visually, often using a stereo microscope for fine detail before the product is sold on the external market. Inspectors will be provided with lists and descriptions of unacceptable product defects such as cracks or surface blemishes.

An emphasis on quality control heightened during World War II. At that time quality control evolved to quality assurance and is now better known as a Strategic Approach, a tool for improving not only products but also processes and services. Quality should be measured differently for products and services, and judged by their own set of dimensions. Responsibility for overall quality lies with top management. Top management must establish strategies, institute programs for quality, and motivate managers and workers. Most of the time, managers aim to improve or maintain the quality of an organization as a whole; this is referred to as Total Quality Management (TQM). TQM involves a continual effort for quality improvement by everyone in an organization. The entire supply chain must be involved for an organization to meet and exceed goals of quality control.

## ids355: Operations Management Wikispace: "Chapter 9: Management of Quality"

Read this chapter summary. Successful management of quality requires an understanding of the dimensions of product or service quality that add utility for your customers. Pay particular attention to the three awards that are given to recognize outstanding quality.

### Chapter 9: Management of Quality

Chapter 9 focuses on the importance of quality. It discusses various concepts and tools that can be used to achieve high quality and continuous improvement. Broadly defined, **quality** refers to the ability of a product or service to consistently meet or exceed customer requirements or expectations. Different customers will have different expectations, so a working definition of quality is customer-dependent. When discussing quality one must consider design, production, and service. In a culmination of efforts, it begins with careful assessment of what the customers want, then translating this information into technical specifications to which goods or services must conform. The specifications guide product and service design, process design, production of goods and delivery of services, and service after the sale or delivery.

Some of these consequences of poor quality include loss of business, liability, decreased productivity, and increased costs. However, good quality has its own costs, including prevention, appraisal, and failure. A recent and more effective approach is discovering ways to prevent problems, instead of trying to fix them once they occur. This will ultimately decrease the cost of good quality in the long run.

There are several costs associated with quality:

**Appraisal costs** – costs of activities designed to ensure quality or uncover defects

**Prevention costs** – costs of prevention defects from occurring

**Failure costs** – Costs caused by defective parts or products or by faulty services

**Internal failures** – failures discovered during production

**External failures** – failures discovered after delivery to the customer

**Return on quality (ROQ)** – an approach that evaluates the financial return of investments in quality

Chapter 9 discusses key contributors of quality management and several awards for companies who possess traits of excellent quality management. This chapter defines total quality management (TQM) as a philosophy that involves everyone in the organization in a continual effort to improve quality and achieve customer satisfaction. This philosophy concentrates on continuous improvement and quality at the source. Six sigma is a concept that stresses improving quality, reducing costs, and increasing customer satisfaction. Lastly, this chapter gives several examples of quality tools, which include flowcharts, check sheets, histograms, pareto analysis, scatter diagrams, controls charts, and cause-and-effect diagrams.

Successful management of quality requires that managers have insights on various aspects of quality. These include defining quality in operational terms, understanding the costs and benefits of quality, recognizing the consequences of poor quality and recognizing the need for ethical behavior.

Understanding dimensions that customers use to judge the quality of a product or service helps organizations meet customer expectations.

#### Dimensions of Product Quality

• **Performance**– *main characteristics of the product*

• **Aesthetics**– *appearance, feel, smell, taste*

• **Special features**– *extra characteristics*

• **Conformance**– *how well the product conforms to design specifications*

• **Reliability**– *consistency of performance*

• **Durability**– *the useful life of the product*

• **Perceived quality**– *indirect evaluation of quality*

• **Service-ability**– *handling of complaints or repairs*

#### Dimensions of Service Quality

• **Convenience**– *the availability and accessibility of the service*

• **Reliability**– *ability to perform a service dependably, consistently, and accurately*

• **Responsiveness**– *willingness to help customers in unusual situations and to deal with problems*

• **Time**– *the speed with which the service is delivered*

• **Assurance**– *knowledge exhibited by personnel and their ability to convey trust and confidence*

• **Courtesy**– *the way customers are treated by employees*

• **Tangibles**– *the physical appearance of facilities, equipment, personnel, and communication materials*

• **Consistency**– *the ability to provide the same level of good quality repeatedly*

#### The Determinants of Quality

**Quality of Design** – **intention of designers to include or exclude features in a product or service.** The starting point of producing quality in products begins in the “design phase”. Designing decisions may involve product or service size, shape and location. When making designs, designers must keep in mind customer wants, production or service capabilities, safety and liability, costs, and other similar considerations.

**Quality of conformance**– **refers to the degree to which goods and services conform to the intent of the designer.** Quality of conformance can easily be affected by factors like: capability of equipment used, skills, training, and motivation of workers, extent to which the design lends itself to production, the monitoring process to assess conformance, and the taking of corrective action.

**Ease of use** – **refers to the ease of usage of the product or services for the customers.** The term “ease of use” refers to user instructions. Designing a product with “ease of use” increases the chances that the product will be used in its intended design and it will continue to function properly and safely. Without ease of use, companies may lose customers, face sales returns, or legal problems from product injuries. Ease of use also applies to services. Manufacturers must make sure that directions for unpacking, assembling, using, maintaining, and adjusting the product are included. Directions for “What to do when something goes wrong” should also be included. Ease of use makes a consumer very happy and can help retain customers.

**Services offered to the customer after delivery.** There will be times when products may fail or problems with usage may occur. This is when “Service after delivery” is important through recall and repairs of the product, adjustment, replacement or buys back, or reevaluation of a service.

Having good quality is a **competitive advantage** against others who offer similar products or services in the marketplace.

In addition, good quality can:

- **Raise Company's Reputation**
- **Rationalize Premium Prices**
- **Decrease Liability Costs**
- **Increase Productivity**
- **Increase Customer Loyalty**
- **Increase Customer Satisfaction**

**Consequence's include:**

- **loss of business and existing market share**

- legal liability
- lack of productivity
- increased costs

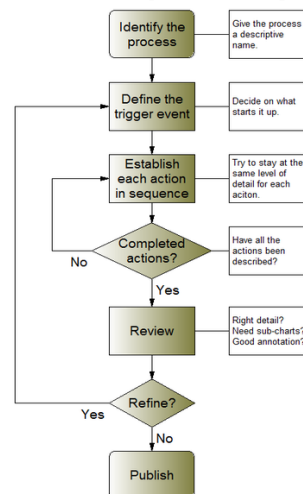
Failure to meet quality standards can damage a company's image, reputation or lead to external criticism. In the manufacturing field, the quality of raw materials or equipment can affect the whole manufacturing process. If defects or poor quality are not detected on time, companies may face various costs to solve problems. Discovering and fixing problems on time reduces costs. Quality costs include prevention (prevent defects from occurring by planning system, training and control procedures), appraisal (ensure quality or uncover defects by inspections, testings and audits), and failure (caused by defective parts, products or by faulty services discovered during the production process – internal or after delivery to the customer – external).

Three well-known awards given annually to recognize quality are:

1. Baldrige Award (given by the U.S. government)
2. European Quality Award
3. Deming Prize (established by the Japanese).

There are also worldwide known quality certifications like ISO 9000 (which is a set of international standards on quality management and quality assurance, critical to international business) and ISO 14000 (a set of international standards for assessing a company's environmental performance).

Total quality management (TQM) is a constant pursuit of quality that involves everyone in an organization. The driving force is customer satisfaction; a key philosophy is continuous improvement. The Japanese use the term *kaizen* to refer to continuous improvement. Training of managers and workers in quality concepts, tools, and procedures is an important aspect of TQM. Teams are an integral part of TQM. Two major aspects of the TQM approach are problem solving and process improvement. Six-sigma programs are a form of TQM. A six-sigma improvement project typically has one or more objectives such as: reducing delivery time, increasing productivity, or improving customer satisfaction. They emphasize the use of statistical and management science tools on selected projects to achieve business results. There are *seven basic quality tools* that an organization can use for problem solving and process improvements. A flowchart is a visual representation of a process. As a problem-solving tool, a flowchart can help investigators in identifying possible points in a process where problems occur. The diamond shapes in the flowchart represent decision points in the process, and the rectangular



shapes represent procedures. They show the direction of “flow” of the steps in the process. arrows

A check sheet is a simple tool frequently used for problem identification. Check sheets provide a format that enables users to record and organize data in a way that facilitates

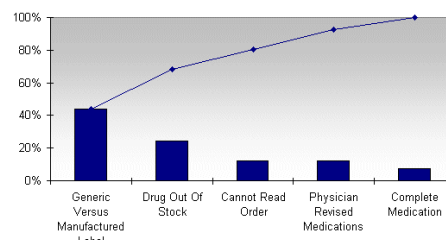
Day	Time	Type of defect					Total
		Smeared print/other	Out of registration	Paper jam	Uneven inking	Blank print	
M	7-8	III	IIII				7
	8-9	I	II	III	IIII		10
	9-10		III	I			3
	10-11		I				2
	11-12						0
	1-2		I	III			4
Total	2-3				I		1
		4	11	7	5	0	27

collection and analysis.

A histogram can be useful in getting a sense of the distribution of observed values. It is a chart of an empirical frequency distribution.

Pareto analysis is a technique for focusing attention on the most important problem areas. The idea is to classify the cases according to degree of importance, and focus on

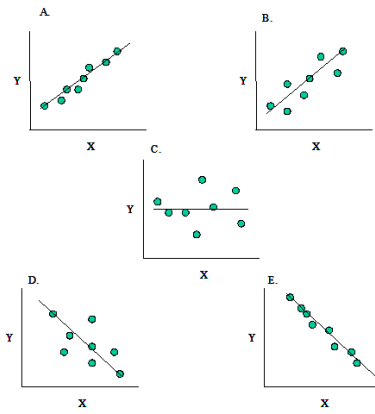
Causes For Medications Not Being Delivered On-Time



resolving the most important, leaving the less important.

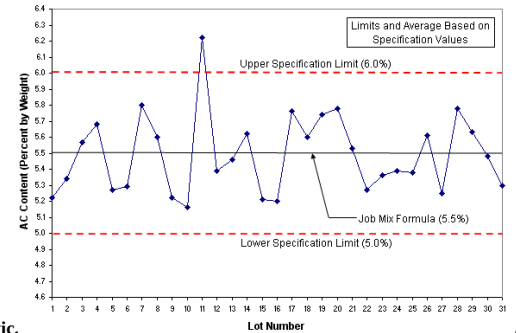
It is a graph that shows the degree and direction of relationship between two variables. A correlation may point to a cause of

A scatter diagram can be useful in deciding if there is a correlation between the values of two variables. A correlation may point to a cause of



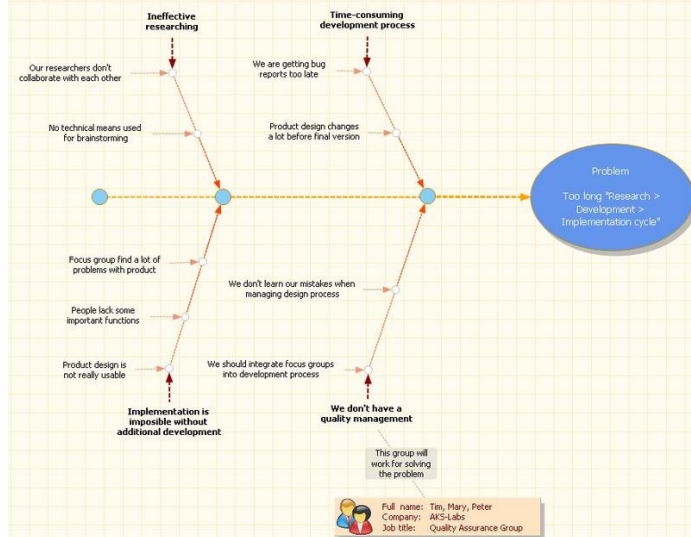
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A control chart can be used to monitor a process to see if the process output is random. It can help detect the

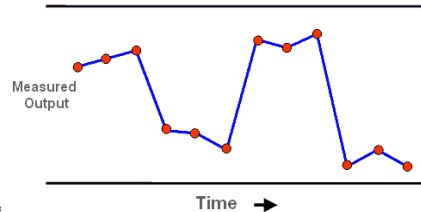


presence of correctable causes of variation. It is a statistical chart of time-ordered values of sample statistic.

cause-and-effect diagram offers a structured approach to the search for the possible cause(s) of a problem. It is also known as a *fishbone diagram* because of its shape, or an Ishikawa diagram, after the Japanese professor who developed the approach to aid workers overwhelmed by the number of possible sources of problems when problem solving. This helps to organize problem-solving efforts by identifying categories of factors that might be causing problems.



A run chart can be used to track the values of a variable over time. This can aid in



identifying trends or other patterns that may be occurring.

#### Important People in Quality

- **Walter Shewart**
  - “father of statistical quality control”
  - Control charts
  - Variance reduction
- **W. Edwards Deming**
  - Special vs. common cause variation



- The 14 points
- **Deming Prize**– Prize established by the Japanese and awarded annually to firms that distinguish themselves with quality management programs.
- **Joseph Juran**
  - *Quality Control Handbook*, 1951
  - Viewed quality as fitness-for-use
  - Quality trilogy– quality planning, quality control, quality improvement
- **Armand Feigenbaum**
  - Quality is a “total field”
  - The customer defines quality
- **Philip B. Crosby**
  - Zero defects
  - *Quality is Free*, 1979
- **Kaoru Ishikawa**
  - Cause-and-effect diagram
  - Quality circles
  - Recognized the internal customer
- **Genichi Taguchi**
  - Taguchi loss function
- **Taiichi Ohno and Shigeo Shingo**
  - Developed philosophy and methods of *kaizen*

Contributor	Key Contributions
Shewhart	Control Charts; variance reduction
Deming	14 points; special versus common causes of variation
Juran	Quality is fitness-for-use; quality trilogy
Feigenbaum	Quality is a total field; the customer defines quality
Crosby	Quality is free; zero defects
Ishikawa	Cause-and-effect diagrams; quality circles
Taguchi	Taguchi loss function
Ohno and Shingo	Continuous improvement

## DIMENSIONS OF QUALITY

Dimension	Example
Performance	Everything works: fit and finish, ride, handling, acceleration
Aesthetics	Exterior and interior design
Features	Convenience: placement of gauges High tech: GPS system Safety: anti-skid, airbags
Conformance	Car Matches manufacturer’s specifications
Reliability	Infrequent need for repairs
Durability	Useful life in miles, resistance to rust
Perceived quality	Top-rated
Serviceability	Ease of repair

An emphasis on quality control heightened during WWII. Quality control then evolved to quality assurance and is now better known as a Strategic Approach, a tool for improving not only products but also processes and services. Quality can be thought of as the degree to which performance of a product or service meets or exceeds expectations. Quality should be measured differently for products and services, and therefore product and service quality are judged on their own set of dimensions. Responsibility for overall quality lies with top management. Top management must establish strategies, institute programs for quality, and motivate managers and workers. Most times managers are on a quest for the quality of an organization as a whole; this is referred to as Total Quality Management (TQM). TQM involves a continual effort for quality improvement by everyone in an organization. So in essence, for an organization to meet and exceed goals of quality control the entire supply chain needs to be involved.

### Consequences of poor quality

There are numerous consequences with poor quality products which can affect a business and a customer in many different ways. Whether it is a small or large problem, the magnitude of the problem always affects someone at some point. When a product is designed poorly or lacks in quality, customers recognize that very quickly, and it can quickly lead to a problem for the business. It does not matter whether the company is a product or a service oriented company because poor quality will always, most likely, create negative affects for the firm. Eventually, the low cost input in the R&D department and the using cheaper materials will lead to loss of business . Therefore, due to the cost associated with satisfying the customer, it is best to fix problems in the design phase rather than dealing with it after it’s in the hands of a customer. The sooner the problem with a product or service is identified and remedied, the better!

### Methods for Generating Ideas

Additional tools that are useful for problem solving and process control include:

- *Brainstorming*
- *Affinity diagram*
- *Quality circles*
- *Interviewing*
- *Benchmarking*



- 5W2H approach
  - Who
  - What
  - When
  - Where
  - Why
  - How
  - How much

Brainstorming is used to communicate thoughts and ideas without any criticism. Everyone has equal input and ideas are shared in order to facilitate problem solving.

Affinity Diagram is used to arrange data into categories that may be analyzed. One of its uses is to group many responses to similar ideas. It uses the right side of the brain (generates ideas) and the left side of brain (analyze and organize).

Quality Circles are usually informal meetings between employees to exchange ideas and concerns about processes.

Interviewing is a tool used by managers to find information from employees through Q & A sessions.

Benchmarking is tool for companies to set standards. It attempts to compare itself to the best in the industry in order to meet or exceed the standard set. Usually uses these steps: 1. Identify process for improvement. 2. Identify organization that is the best at that process. 3. Study that organization. 4. Analyze data. 5. Improve process at your organization.

5W2H approach asks the questions what, why, where, when, who, how, and how much (5 W words and 2 H words). Its purpose is to ask the questions that will lead to improving processes.

### Responsibility for Quality

**Top Management**– has the ultimate responsibility for quality. While they establish strategies for quality, they also institute programs to improve quality; guide, direct, and motivate managers and workers; and set an example by being involved in quality initiatives.

**Design**– Quality products and services begin with design.

Sales can be lost when the products are not designed well and do not function correctly. Customers get turned off when that happens and may not want to risk buying the same brand again. Liability is an important area because there is the potential for damages or injuries that could reflect badly on the company and then damage control will need to be done to repair the company image and reputation. Productivity can be slowed when there are defects and poor quality because time must be spent to redo and fix these issues. Costs can be reduced by up to five times if problems are caught early on in the process, compared to later in the production stages.

### Questions to the chapter

**1.Which quality certification pertains to set of international standard on quality management and quality assurance?**

- a) ISO 14000
- b) ISO 24700
- c) ISO 9000
- d). ISO 27000
- e) None of the above

[reveal-answer q="491213"]Show Answer[/reveal-answer]

[hidden-answer a="491213"]

Answer: C (pg.424)[/hidden-answer]

**2.Whose key contribution included the cause-and-effect diagram (fishbone diagram)?**

- a) Joseph M. Juran
- b) Kaoru Ishikawa
- c) Armand Feigenbaum
- d) Walter Shewhart
- e) Genichi Taguchi

[reveal-answer q="34151"]Show Answer[/reveal-answer]

[hidden-answer a="34151"]

Answer: B (pg.411)[/hidden-answer]

**3.Which cost of quality involves the cost of preventing a defect from occurring?**

- a) Appraisal Costs
- b) Failure Costs
- c) Fixing Costs
- d) Prevention Costs
- e) Internal Costs

[reveal-answer q="376263"]Show Answer[/reveal-answer]

[hidden-answer a="376263"]

Answer: D (pg.420)[/hidden-answer]

**4.Which failures are discovered after delivery to customer?**

- a) External
- b) Internal
- c) Prevention
- d) Quality
- e) None of the above

[reveal-answer q="242012"]Show Answer[/reveal-answer]

[hidden-answer a="242012"]

Answer: A (pg.420-421)[/hidden-answer]

**5.Which method for generating ideas is a tool used to organize data into logical categories?**

- a)Brainstorming

- b) Affinity Diagram
- c) Quality Circles
- d) Interviewing
- e) Benchmarking

[reveal-answer q="424945"]Show Answer[/reveal-answer]

[hidden-answer a="424945"]

Answer: B (pg.444)/[hidden-answer]

**6. Which of the following is a consequence of poor quality?**

- a) loss of business
- b) liability
- c) productivity
- d) costs
- e) all of the above are correct

[reveal-answer q="896229"]Show Answer[/reveal-answer]

[hidden-answer a="896229"]

Answer: e) all of the above are correct PG. 418/[hidden-answer]

**7. Which of the following is true of the benefits of good quality?**

- a) enhanced reputation for quality
- b) reduced productivity
- c) lower liability cost
- d) higher liability costs
- e) both a & c are correct

[reveal-answer q="675392"]Show Answer[/reveal-answer]

[hidden-answer a="675392"]

Answer: e) both a & c are correct pg. 418/[hidden-answer]

**8. The cost to fix a problem at the design or production stage, compared to at an earlier stage costs how many times more?**

- a) one time
- b) two times
- c) three times
- d) four times
- e) five times

[reveal-answer q="446997"]Show Answer[/reveal-answer]

[hidden-answer a="446997"]

Answer e) five times PG 419/[hidden-answer]

**10. Productivity is closely related to which of the following?:**

- a) liability
- b) costs
- c) quality
- d) express written warranties
- e) defective products

[reveal-answer q="269636"]Show Answer[/reveal-answer]

[hidden-answer a="269636"]

Answer c) quality PG 418/[hidden-answer]

**11. What are the three costs that are associated with quality?**

- a) Appraisal costs, Prevention costs, Labor costs.
- b) Appraisal costs, Prevention costs, Failure costs.
- c) Appraisal costs, Prevention costs, Internal Failures costs.
- d) Appraisal costs, Prevention costs, Total Costs.
- e) Appraisal costs, Prevention costs, Overhead cost.

[reveal-answer q="966566"]Show Answer[/reveal-answer]

[hidden-answer a="966566"]

Answer is B found on page 420./[hidden-answer]

**12. Which of the following are two major aspects of the TQM approach?**

- a) Continuous improvement and process improvement.
- b) Six-sigma and continuous improvement.
- c) Problem solving and process improvement.
- d) Problem solving and continuous improvement.
- e) All of the above.

[reveal-answer q="159215"]Show Answer[/reveal-answer]

[hidden-answer a="159215"]

Answer is C found on pages 432-434./[hidden-answer]

**13. What is the Japanese term for continuous improvement?**

- a) kaizen

- b) Ishikawa
- c) fishbone
- d) a. and c. are correct answers,
- e) None of the above.

[reveal-answer q="56880"]Show Answer[/reveal-answer]  
[hidden-answer a="56880"]

Answer is A found on page 428.[/hidden-answer]

**14. What are the four basic steps in the PDCA cycle?**

- a) Problem, Decision, Solution, Award.
- b) Design, Study, Plan, Do, Act.
- c) Plan, Design, Check, Act.
- d) Plan, Do, Study, Act.
- e) None of the above.

[reveal-answer q="185432"]Show Answer[/reveal-answer]  
[hidden-answer a="185432"]

Answer is D found on page 433.[/hidden-answer]

**15. Which basic quality tool is focused on resolving the most important problem?**

- a) Scatter diagram
- b) Control chart
- c) Pareto analysis
- d) Cause-and-effect diagram
- e) Fishbone diagram

[reveal-answer q="771414"]Show Answer[/reveal-answer]  
[hidden-answer a="771414"]

Answer is C found on page 438.[/hidden-answer]

**16. Which of the following is a Determinant of Product Quality?**

- a) Design
- b) Product/Service conformity to design
- c) Ease of Use
- d) Service after delivery
- e) All of the Above

[reveal-answer q="908035"]Show Answer[/reveal-answer]  
[hidden-answer a="908035"]

Answer: E page 416[/hidden-answer]

**17. Which of the following doesn't refer to the term "Ease of Use"?**

- a) Increases the chances that product will be used for intended design
- b) Product conforms to the intended designs
- c) Instructions are included in the product
- d) Product continues to function safely and properly
- e) All of the above refers to "Ease of Use"

[reveal-answer q="240319"]Show Answer[/reveal-answer]  
[hidden-answer a="240319"]

Answer: B page 417[/hidden-answer]

**18. Which is NOT a Consequence of Poor Quality**

- a) Productivity
- b) Loss of Business
- c) Costs
- d) Legal Liability
- e) None of the Above

[reveal-answer q="419651"]Show Answer[/reveal-answer]  
[hidden-answer a="419651"]

Answer: E page 406[/hidden-answer]

**19. The consequences of poor quality products or services may result in:**

- a) Less Liability
- b) Baldrige
- c) Injuries and defective output
- d) Lower costs
- e) Faster Productivity

[reveal-answer q="689204"]Show Answer[/reveal-answer]  
[hidden-answer a="689204"]

Answer: C page 419[/hidden-answer]

**20. One of the things Designers should consider when making a product is...**

- a) Customer preference
- b) Company Costs
- c) Production capabilities
- d) A and C
- e) All of the Above

[reveal-answer q="740578"]Show Answer[/reveal-answer]

[hidden-answer a="740578"]

Answer E page 419[/hidden-answer]

**21. Although closely associated with quality, this name is not on the list of quality gurus:**

- a) W. Edwards Deming
- b) Philip Crosby
- c) Malcolm Baldrige
- d) J. M. Juran
- e) Kaoru Ishikawa

[reveal-answer q="922240"]Show Answer[/reveal-answer]

[hidden-answer a="922240"]

Answer: Malcolm Baldrige (pg 409)/[hidden-answer]

**22. Which name is associated with management responsibility?**

- a) Deming
- b) Crosby
- c) Juran
- d) Feigenbaum
- e) Ishikawa

[reveal-answer q="397276"]Show Answer[/reveal-answer]

[hidden-answer a="397276"]

Answer: D. Feigenbaum (pg 411)/[hidden-answer]

**23. Which quality pioneer compiled a list of 14 points that he believed were imperative to achieve quality in an organization?**

- a) Deming
- b) Crosby
- c) Baldrige
- d) Juran
- e) Ishikawa

[reveal-answer q="764070"]Show Answer[/reveal-answer]

[hidden-answer a="764070"]

Answer: A. Deming (pg 409)/[hidden-answer]

**24. Which one of these is a tool for gathering data?**

- a) Control chart
- b) Fishbone diagram
- c) Scatter diagram
- d) Flowchart
- e) Checksheet

[reveal-answer q="648589"]Show Answer[/reveal-answer]

[hidden-answer a="648589"]

Answer: E. Checksheet (pg 435)/[hidden-answer]

**25. Which one of these is a tool for problem solving?**

- a) Benchmarking
- b) Cause-and-effect diagram
- c) Histograms
- d) Scatter diagrams
- e) Control charts

[reveal-answer q="152733"]Show Answer[/reveal-answer]

[hidden-answer a="152733"]

Answer: Cause & Effect Diagram (pg 439)/[hidden-answer]

**26. Which of these people are not considered one of the "gurus" who mapped out some of the foundations of modern quality management?**

- a) Walter Shewhart
- b) W. Edwards Deming
- c) Joseph M Juran
- d) Philip B. Crosby
- e) Charles P. Bonini

[reveal-answer q="681874"]Show Answer[/reveal-answer]

[hidden-answer a="681874"]

Answer is E (pg 409)/[hidden-answer]

**27. What is Six Sigma best defined as:**

- a) A Japanese term for continuous improvement

- b) A business process for improving quality, reducing costs and increasing customer satisfaction
- c) Framework for problem solving and improvement activities
- d) A diagram of the steps in a process
- e) None of the Above

[reveal-answer q="256416"]Show Answer[/reveal-answer]

[hidden-answer a="256416"]

Answer is: B, pg.429[/hidden-answer]

**28. Which of the following is not a dimension of product quality?**

- a) Performance
- b) Special features
- c) Consistency
- d) Conformance
- e) Reliability

[reveal-answer q="403335"]Show Answer[/reveal-answer]

[hidden-answer a="403335"]

Answer: C, pg. 414- Consistency deals with the dimensions of service quality[/hidden-answer]

**29. Philip B. Crosby identified key points in his concept of zero defects, which of the below is one of his key points?**

- a) Management must be persistent in efforts to achieve good quality
- b) Institute modern methods of training on the job
- c) Quality products and services begin with design
- d) Cost to remedy a problem is a major concern in quality management
- e) All the above.

[reveal-answer q="196254"]Show Answer[/reveal-answer]

[hidden-answer a="196254"]

Answer: A, pg.411[/hidden-answer]

**30. Reducing one or more steps in a supply chain by cutting out one or more intermediaries is known as:**

- a) Delayed differentiation
- b) Cross-docking
- c) Avoidance
- d) Disintermediation
- e) Reverse logistics

[reveal-answer q="748630"]Show Answer[/reveal-answer]

[hidden-answer a="748630"]

Answer: D, pg. 541[/hidden-answer]

**31. What are the key elements of Deming's 14 points?**

- a) Constancy of purpose
- b) Continual improvement
- c) Profound knowledge
- d) Decreasing labor costs
- e) Only a, b, and c

[reveal-answer q="490425"]Show Answer[/reveal-answer]

[hidden-answer a="490425"]

Answer: E (pg 409)[/hidden-answer]

**32. By how many times is it more costly to fix a problem at the customer end compared to the design stage?**

- a) 1x
- b) 5x
- c) 3x
- d) 2x
- e) 4x

[reveal-answer q="846586"]Show Answer[/reveal-answer]

[hidden-answer a="846586"]

Answer: B (pg.407)[/hidden-answer]

**33.Costs of activities designed to ensure quality or uncover defects are costs associated with?**

- a) external failures
- b) failure costs
- c) appraisal costs
- d) prevention costs
- e) internal failures

[reveal-answer q="791932"]Show Answer[/reveal-answer]

[hidden-answer a="791932"]

Answer: C (pg. 409)[/hidden-answer]

**35. What is known as performance, aesthetics, special features, conformance, reliability, durability, perceived quality, and serviceability?**

- a) quality of design
- b) quality of conformance
- c) return on quality
- d) dimensions of quality
- e) Deming prize

[reveal-answer q="74761"]Show Answer[/reveal-answer]

[hidden-answer a="74761"]

Answer: D (pg. 403)/[hidden-answer]

**36. Which technique uses groups of people to share thoughts and ideas without any criticism?**

- a) Process Improvement
- b) Benchmarking
- c) Brainstorming
- d) Interviewing
- e) 5WH2

[reveal-answer q="944059"]Show Answer[/reveal-answer]

[hidden-answer a="944059"]

Answer: C (pg. 444)/[hidden-answer]

**37. Benchmarking uses which of the following to improve standards?**

- a) Larger companies
- b) Smaller companies
- c) Competitors
- d) Suppliers
- e) Industry Leaders

[reveal-answer q="447918"]Show Answer[/reveal-answer]

[hidden-answer a="447918"]

Answer: E (pg. 445)/[hidden-answer]

**38. Which methods asks 7 questions to improve processes?**

- a) 5W2H
- b) Affinity Diagram
- c) Quality circles
- d) Benchmarking
- e) Brainstorming

[reveal-answer q="489626"]Show Answer[/reveal-answer]

[hidden-answer a="489626"]

Answer: A (pg. 446)/[hidden-answer]

**39. Control charts have which of the following features?**

- a) Tabulated categories
- b) Diagrams
- c) Lower control limits
- d) Upper control limits
- e) Both C and D

[reveal-answer q="923435"]Show Answer[/reveal-answer]

[hidden-answer a="923435"]

Answer: E (pg. 436)/[hidden-answer]

**40. A Scatter diagram is useful when there is**

- a) One variable
- b) Correlation between variables
- c) Multiple variables
- d) NO Correlation between variables
- e) Variation

[reveal-answer q="319835"]Show Answer[/reveal-answer]

[hidden-answer a="319835"]

Answer: B (pg. 438)/[hidden-answer]

**41. What is NOT the primary determinants of quality, which a product or a service successfully satisfies its intended purpose?**

- a) Ease of use
- b) Cost
- c) Design
- d) Service after delivery
- e) Design Conformity

[reveal-answer q="141987"]Show Answer[/reveal-answer]

[hidden-answer a="141987"]

Answer: b) Cost (Pg 416)/[hidden-answer]

**42. What is the correct definition of an appraisal cost?**

- a) cost of preventing defects from occurring

- b) cost caused by defective parts or products or by faulty services
- c) An approach that evaluates the financial return of investments in quality
- d) cost of activities designed to ensure quality or uncover defects
- e) all of the above

[reveal-answer q="169148"]Show Answer[/reveal-answer]

[hidden-answer a="169148"]

Answer: d) cost of activities designed to ensure quality or uncover defects. (Pg 420)/[hidden-answer]

**43. Which quality tool can be useful in getting a sense of the distribution of observed values?**

- a) histogram
- b) check sheet
- c) scatter diagram
- d) control chart
- e) flow chart

[reveal-answer q="330434"]Show Answer[/reveal-answer]

[hidden-answer a="330434"]

Answer: a) Histogram (Pg 435)/[hidden-answer]

**44. What step comes after “develop performance measures and collect data” and before “generate potential solutions” in the TQM problem-solving process?**

- a) define the problem and establish an improvement goal
- b) analyze the problem
- c) choose a solution
- d) implement the solution
- e) monitor the solution to see if it accomplishes the goal

[reveal-answer q="349590"]Show Answer[/reveal-answer]

[hidden-answer a="349590"]

Answer: b) analyze the problem. (Pg433)/[hidden-answer]

**46. Who is known as the “father of statistical quality control?”**

- a) W. Edwards Deming
- b) Walter Shewhart
- c) Philip B. Crosby
- d) Joseph M. Juran
- e) Genichi Taguchi

[reveal-answer q="492798"]Show Answer[/reveal-answer]

[hidden-answer a="492798"]

Answer is B. (Pg 409)/[hidden-answer]

**47. Which of the following is NOT a dimension of quality?**

- a) Performance
- b) Durability
- c) Aesthetics
- d) Investment
- e) Conformance

[reveal-answer q="892693"]Show Answer[/reveal-answer]

[hidden-answer a="892693"]

Answer is D. (Pages:412-413)/[hidden-answer]

**49. A statistical chart of time-ordered values of a sample statistic is a:**

- a) Flowchart
- b) Check sheet
- c) Scatter Diagram
- d) Cause-and-effect diagram
- e) Control chart

[reveal-answer q="343927"]Show Answer[/reveal-answer]

[hidden-answer a="343927"]

Answer is E (Page:439)/[hidden-answer]

**50. What question is not included in the 5W2H approach?**

- a) Which
- b) What
- c) Why
- d) Where
- e) When

[reveal-answer q="428062"]Show Answer[/reveal-answer]

[hidden-answer a="428062"]

Answer is A (Page:446)/[hidden-answer]

**51. Which are included in the product quality?**

- a) Reliability
- b) Durability
- c) Convenience



- d) a and b
- e) All of the above

[reveal-answer q="50981"]Show Answer[/reveal-answer]  
[hidden-answer a="50981"]

Answer is D, pg.415[/hidden-answer]

**52. What are the determinants of quality?**

- a) Design
- b) Ease of use
- c) Service after delivery
- d) The wellness of product to design
- e) All of the above

[reveal-answer q="916486"]Show Answer[/reveal-answer]  
[hidden-answer a="916486"]

Answer is E, pg.416[/hidden-answer]

**53. Which of the following is not a consequence of poor quality?**

- a) productivity
- b) liability
- c) costs
- d) speed
- e) All of the above

[reveal-answer q="652745"]Show Answer[/reveal-answer]  
[hidden-answer a="652745"]

Answer is D, pg.419[/hidden-answer]

**54. The appraisal costs means:**

- a) costs of preventing defects from occurring
- b) costs caused by defective parts or products or by faulty services
- c) costs of activities designed to ensure quality or uncover defects
- d) costs related to defective products
- e) neither one is correct.

[reveal-answer q="575780"]Show Answer[/reveal-answer]  
[hidden-answer a="575780"]

Answer is C, pg.420[/hidden-answer]

**55. A set of international standards for assessing a company's environmental performance is**

- a) ISO 14000
- b) ISO 24700
- c) IEC 24700
- d) ISO 9000
- e) None of the above

[reveal-answer q="116916"]Show Answer[/reveal-answer]  
[hidden-answer a="116916"]

Answer is A, pg.424[/hidden-answer]

**56. Which tool uses a diagram of the steps as a visual representation of a process?**

- a) PDCA Cycle
- b) Flow Chart
- c) Check Sheet
- d) Histogram
- e) Scatter diagram

[reveal-answer q="481805"]Show Answer[/reveal-answer]  
[hidden-answer a="481805"]

Answer is B, pg.435[/hidden-answer]

**57. A run chart shows performance over**

- a) speed
- b) quantity
- c) productivity
- d) time
- e) quality

59. All of the following are affected by poor quality EXCEPT — One more choice needed.

- a. Loss of Business
- b. Increased Liability
- c. Decreased Costs

- d. Increased Productivity
- e. Customer loyalty

[reveal-answer q="489912"]Show Answer[/reveal-answer]  
[hidden-answer a="489912"]

Answer C (P418)/[hidden-answer]

60. The Baldrige Award is an award given out for doing what?

- a. Stimulate Efforts to improve quality
- b. Recognize quality achievements
- c. Publicize successful programs
- d. All of the above (ABC)
- e. None of the above

[reveal-answer q="293240"]Show Answer[/reveal-answer]  
[hidden-answer a="293240"]

Answer D (Page 422)/[hidden-answer]

61. Dimensions of quality include: Performance, Special Features, Reliability, Durability, Perceived quality, and \_\_\_\_.

- a. Tested Quality, Usefulness
- b. Ease of use, Aesthetics,
- c. Conformance, Price
- d. Aesthetics, Conformance
- e. None of the above

[reveal-answer q="406392"]Show Answer[/reveal-answer]  
[hidden-answer a="406392"]

Answer D (p412 definition)/[hidden-answer]

62. Which quality tool uses a technique for classifying problem areas according to degree of importance, and focusing on the most important.

- a. Pareto Analysis
- b. Scatter Diagram
- c. Control Chart
- d. Histogram
- e. None of the above

[reveal-answer q="605932"]Show Answer[/reveal-answer]  
[hidden-answer a="605932"]

Answer is D, pg.442/[hidden-answer]

63.) Which quality management principle(s) form the basis of the latest version of ISO 9000:

- A.) A customer focus
- B.) Leadership
- C.) A process approach
- D.) Continual improvement
- E.) All of the above

[reveal-answer q="125638"]Show Answer[/reveal-answer]  
[hidden-answer a="125638"]

Answer is E (p.425)/[hidden-answer]

64.) Which is the annual award given by the US government to recognize quality achievements of US companies?

- A.) European Quality Award
- B.) Deming Prize
- C.) Baldrige Award
- D.) Carlton Award
- E.) Cadillac Award

[reveal-answer q="495574"]Show Answer[/reveal-answer]  
[hidden-answer a="495574"]

Answer is C (p.422)/[hidden-answer]

65) Problem solving, material and product losses, scrap, and downtime are examples of:

- A) Appraisal costs
- B) Prevention costs
- C) Internal failure costs
- D) External failure costs
- E) None of the above

[reveal-answer q="598391"]Show Answer[/reveal-answer]  
[hidden-answer a="598391"]

Answer is C (p. 421)/[hidden-answer]

66. One of the quality dimensions is this same for product and service. Which one?

- a) special features
- b) serviceability
- c) reliability
- d) courtesy
- e) convenience

[reveal-answer q="744585"]Show Answer[/reveal-answer]

[hidden-answer a="744585"]

answer c (p.403)/[hidden-answer]

67. Six sigma is a process to :

- a) improve quality
- b) increase customer satisfaction
- c) reduce costs
- d) all of the above
- e) none of the above

[reveal-answer q="137660"]Show Answer[/reveal-answer]

[hidden-answer a="137660"]

answer d (p.418)/[hidden-answer]

68.

Who contributed the *continuous improvement* aspect of quality?

- a) Juran
- b) Crosby
- c) Ohno and Shingo
- d) Ishikawa
- e) Feigenbaum

[reveal-answer q="972948"]Show Answer[/reveal-answer]

[hidden-answer a="972948"]

answer c (p. 412)/[hidden-answer]

69.

All of the following are consequences of Poor Quality EXCEPT

- a) Liability
- b) Loss of business
- c) Cost
- d) Direct feedback
- e) a and d

[reveal-answer q="944901"]Show Answer[/reveal-answer]

[hidden-answer a="944901"]

answer d (p. 418)/[hidden-answer]

70.

PDSA stands for

- a) Plan Direct Study Act
- b) Plan Direct Simplify Act
- c) Plan Do Study Act
- d) Participate Do Satisfy Act
- e) None of the above

[reveal-answer q="122801"]Show Answer[/reveal-answer]

[hidden-answer a="122801"]

answer c (p. 433)/[hidden-answer]

71.

Which annual award is given by the U.S. government to recognize quality achievements of U.S. companies?

- a) Deming Prize
- b) Baldrige Award
- c) Juran Award
- d) Taguchi Award
- e) None of the above

[reveal-answer q="199592"]Show Answer[/reveal-answer]

[hidden-answer a="199592"]

answer b (p.422)/[hidden-answer]

72.

Which type of cost relates to attempts to prevent defects from occurring?

- a) Prevention Costs
- b) Foreseeable Costs
- c) Appraisal Costs
- d) Failure Costs
- e) None of the above

[reveal-answer q="283684"]Show Answer[/reveal-answer]

[hidden-answer a="283684"]

answer a (p. 420)/[hidden-answer]

## Unit 4 Discussion

#1

Research the three well-known awards (Baldrige Award, European Quality Award, Deming Prize) given annually to recognize quality. Pick one of the awards and one of the main evaluation criteria. Compare and Contrast this evaluation criterion for Apple and Microsoft. How would these two organizations score on this quality dimension? How would you suggest improving the quality related to this criterion based on the material that is covered in this section?

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