IDENTIFYING SOME MANAGEMENT APPROACHES TO TOTAL QUALITY MANAGEMENT (TQM) WITHN INDUSTERIAL
ORGANZIATIONS

BY
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Abstract

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**Identify some Management A approaches to Total Quality Management
Within Industrial Originations**
(Title)

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American Psychological Association Manual
(Name of the Manual Used in the study)

The purpose of the research was to identify some management approaches to total
quality management (TQM) within industrial organizations. Total quality management
has been a popular managerial topic since the 1980s. And has grown to become an
established field of research. The need for an improved understanding of the critical
factors for successful implementation is becoming increasingly important.

There is an increasing focus on quality throughout the world. With increased competition, companies have recognized the importance of quality system implementation in remaining effective in a volatile bossiness environment. Specifically meeting the needs and desires of the customer is critical and must be done much better and efficiently than it has been in the past.

Acknowledgment

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Chapter I

Research problem and objectives

<u>Introduction</u>

Quality has become one of the most important competitive strategic tools, and many organizations have realized that it is key to developing products and services that support continuing success. Quality systems are designed to set a clear direction for organizations to follow enabling understanding and involvement of employees proceeding towards a common goal.

The aim of business is long-term profitability. Over a considerable length of time, earnings are achieved by pleasing customers with good products/services while keeping production cost at a minimum. The use of quality tools and techniques provides long-term dividends through lower costs and productivity improvement.

As competition increases and changes occur in the business world, we need to have a better understanding of quality. Quality concerns affect the entire organization in every competitive environment. Therefore, top managers need to understand and apply quality philosophies to achieve high performance levels in products and processes and to face the challenges of new global competition. Consumers demand high quality levels of products/services at reasonable prices to achieve value and customers satisfaction.

There is an increasing focus on quality throughout the world. With increased competition, companies have recognized the importance of quality system

implementation in maintaining effectiveness in a volatile business environment. Specifically   meeting the needs and desires of the customer is critical and must be done much better and efficiently than it has been done in the past.

 All types of industries, both public and private provides, have reduced costs increased process efficiency and improved the quality of their products and services by working to meet the needs of the people they serve through the application of total quality management (TQM) principles.

Problem statement

 The purpose of this study is to identify some management approaches to total quality management (TQM) within industrial organizations.

Research Objectives

This research project will attain the following objectives:

1- Describe the need for top mangers to understand total quality management.

2-Understand the important of leadership-support and commitment in TQM efforts

3-Develop an awareness of the importance of change management tools and techniques in the creation of total management environment.

4-promote the importance of established quality management philosophies.

5- Understand how to determine, and evaluate customer requirements

6- Explore the integration of organizational interactions throughout total quality management philosophies to achieve improved fficiency and customer satisfaction.

7-Determine the need for continuous improvement efforts and competitive advantage in the future.

8- Understand how organizations can successfully achieve business excellence through the implementation of TQM practices.

9-How the adaptation of TQM approach can help overcome some of the difficulties of changing environment.

Need Statement

Total quality management will help to:

- Define customer and market requirements.

- Improve customer-focused decision making and planning

- Understand organizational capabilities

- Evaluate competitor performance

  - Leaders must create the vision, establish objectives, develop a plan, and provide the tools support the team, create an environment that foster quality .be obsessed with customer's needs

  - Determine what management must do to achieve total quality

  - Justify the need to develop skills and abilities of the workforce

  - Understand the important of quality in management

  - Instill the need for an explicit vision statement and support improvement towards the vision

  - Encourage the use of quality tools and techniques to resolve issues, monitor performance and identifies improvement opportunities techniques.

  - Recognize quality as strategic planning consideration.

  - Strengthen the organizational compete by focusing on operational efficiency and customer satisfaction.

<u>Definitions</u>

Total Quality Management: is a structured system for satisfying internal and external customers and suppliers by integrating the business environment, continuous improvement, and breakthroughs with development, improvement, and maintenance cycles while changing organizational culture ("TQM", 2000).

Quality, as applied to the products turned out by industry, means the characteristic or group or combination of characteristics, which distinguishes one article from another, or the good of one manufacturer from those of his competitors, or one grade for product from a certain factory from another grade turned out by the same factory (Kolarik, 1995).

Quality is the totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied need (Kolarik, 1995).

Quality control is the operational techniques and the activities which sustain a quality of product or service that will satisfy given needs; also the use of such techniques and activities (Kolarik, 1995).

Quality assurance

 quality assurance is defined as a set of activities whose purpose is to demonstrate that an entity meets all quality requirements. Q.A. activities are carried out in order to inspire the confidence of both customers and managers, confidence that all quality requirements are being met (Kolarik, 1995).

A customer is anyone who receives or is affected by the product or process.

 (Kolarik, 1995).

ISO 9000

Series of quality standards where effectively applied and demonstrated itself as a foundation for quality management program. These standards apply to generic product categories such as hardware, software, processed material, and service, but are not related to any product's technical specifications (Peach, 1997).

Limitations

There were several constants, which limited this study:

1. The semester time frame was limited.

2. The limitation of the resource and the body of knowledge on the topic of total quality management.

Assumptions.

The total quality management is applicable to all company environments.

Chapter II

Review of literature

For this chapter, review of literature related to the quality discipline was conducted are discussed. Topics include the for history of quality, quality management philosophies (Deming, juran, Crosby) concept of quality, quality function deployment, total quality management, ISO9000, Cost of quality, Quality tools and employee involvement.

History of Quality

The introduction of total quality management concepts can be traced to the first management consultant, an engineer named Frederick W. Taylor. His application of science to complex human endeavors was further developed by Walter A. Shewhart, a statistician who developed work sampling and control charts, which attracted the interest of another statistician, Edwards Deming. Joseph M. Juran, an investigator at the Hawthorne Works experiments, also, drew from Shewhart's work and recognized that system problems could be addressed through three fundamental managerial processes - planning, control and improvement. Philip B. Crosby advocated the "zero-defects" program adopted by the US federal government defining quality as "conformance to requirements". Work regarding the quality discipline is continuing, and adoption of these concepts by service industries is resulting in broaden application and interpretation of quality principles based on Philip Kotler's. Marketing approach and strong customer focus. Deming, Juran, and Crosby, initiated the TQM principles and, share a common

theme of participatory management. Management participation and attitude, professional quality management, employee participation, and recognition reflect a philosophy making internal and external customer satisfaction as the organization's primary goal ("History of Quality", 2001).

In 1960, the first quality control circles were formed for the purpose of quality improvement within work groups. Simple statistical techniques were learned and applied by Japanese workers.

By the late 1970s and early 1980s. U.S. managers were making frequent trips to Japan to learn about the Japanese miracle of quality. Such trip could have been avoided of us industries would have continued the usage of these principles after wwII, during which time TQM activities were effectively used in many manufacture. Nevertheless, a quality renaissance began to occur in U.S. products and services, and by the middle of 1980's the concepts of TOM were being publicized.

In the late 1980s the automotive industry began to emphasize statistical process control (SPC). Suppliers and their suppliers were required to use these techniques. Other industries and the Department of Defense also implemented SPC. The Malcolm Baldrige National Quality Award was established and became the means to measure TQM. Genechi Taguchi introduced his concepts of parameter and tolerance design and brought about a resurgence of design of experiments (DOE) as a valuable quality improvement tool.

Emphasis on quality continued in the auto industry in the 1990s when the Saturn automobile ranked third in customer satisfaction behind the two most expensive Japanese automobiles. In addition, ISO 9000 quality standard was developed and quickly became

the worldwide model for a quality system. The automotive industry adopted ISO 9000 to place greater emphasis on customer satisfaction and also added elements on production and Aufmented it to planning and organizing so 14000 was approved as the worldwide model for environmental management systems (Besterfild, 1997).

Quality Management Philosophies

Introduction

More managers than ever before are focusing on quality as a way of increasing productivity, reducing costs, and meeting customer needs. These managers are beginning to understand the importance of continuously improving the quality of their services and products as a means of achieving these goals. Those who begin to learn about quality quickly become familiar with the names of Philip B. Crosby, W.Edwards Deming, and Joseph M. Juran--renowned quality experts--who have been carrying forth the message of quality for more than 30 years. At an age when most people have retired, Philip B. Crosby and Joseph M. Juran continue an untiring pace of work conducting seminars, consulting with clients, and writing new texts. They have devoted their lives to helping organizations improve the quality of their products and services. Their influence is now worldwide and their accomplishments are legendary in the discipline.

The Deming Philosophy

W. Edwards Deming was originally trained as a statistician, and much of his philosophy can be traced to these roots. He worked for Western Electric during its pioneering era of statistical quality control development in the 1920s and 1930s. During World War II, he taught quality control courses as part of the national defense effort. Deming began teaching statistical quality control in Japan shortly after Word War II and

is credited with having been an important contributor to the Japanese quality improvement programs. In fact, the highest award for quality improvement in Japan is called the Deming Prize. While Japan embraced his methods for 30 years, he was virtually unknown in the United States until 1980.

Deming focuses on the improvement of product and service conformance to specifications by reducing uncertainty and variability in the design and manufacturing process. In Deming's view, variation is the chief culprit of poor quality. In mechanical assemblies, for example, variations from specifications for part dimensions lead to inconsistent performance and premature wear and failure. Likewise, inconsistencies in service frustrate customers and hurt the reputation of the company. To achieve reduction of variation, refines a never-ending cycle of product design, manufacture, test, and sales, followed by market surveys, then redesign, and so forth. Deming claims that higher quality leads to higher productivity, which in turn leads to long-term competitive advantage. The Deming "chain reaction" theory summarizes this view; the theory states that process improvements lead to lower costs due to less rework, fewer mistakes, delays and snags, and more efficient use of materials. Lower costs, in turn, lead to productivity improvements. With better quality and lower prices, the firm can achieve a greater or larger market share and remain competitive and provide more meaningful and rewarding jobs. Upper management needs to recognize the benefits of quality as a strategic factor and strive to create a culture that supports empowerment, continuous improvement and customer satisfactions. Deming stresses that top management has the overriding responsibility for quality improvement (Evans & Lindsay, 1993).

Deming's 14 Points for Management

1-Create and publish to all employees a statement of the aims and purposes of the

company or other organization. Management must demonstrate constantly their

commitment to this statement

2- Learn the new philosophy throughout all areas everybody.

3-Understand the purpose of inspection. it should evaluate process improvements and

cost reductions.

4- End the practice of awarding business on the basis of price alone

5- Improve constantly and forever the system of production and service

6- Institute training

7- Teach and institute leadership

8- Drive out fear. Create trust. Create a climate for innovation

9- Optimize all efforts toward the aims and purposes of the company.

10- Eliminate exhortations for the work force

11- (a) Eliminate numerical quotas for production Instead learn and institute methods for

        improvement

    (b) Eliminate management by objectives (MBO). Instead, learn the capabilities of

        processes, and how to improve them.

12- Remove barriers that rob people of pride of workmanship.

13- Encourage education and self-improvement for everyone.

14- Take action to accomplish the transformation

 (Evans & Lindsay, 1993).

JURAN'S QUALITY TRILOGY

Dr. J. M. Juran, whose impact on the quality movement in Japan, was second only to Deming's, developed a useful framework to what referred to as "a universal thought process-a universal way of thinking about quality, which fits all functions all levels, all product lines." He called it the "quality trilogy":

The underlying concept of the quality trilogy is that managing for quality consists of three basic quality oriented processes:

• Quality planning

• Quality control

• Quality improvement

The starting point is quality planning which involves creating a process that will be able to established goals. Once the process is turned over to the operating forces.thier responsibility is to run the process at optimal effectiveness and take corrective action when the process or product does not conform to established specifications.

Finally, quality improvement is "the process for breaking through to unprecedented levels of performance. "But quality improvement does not happen of its own accord. It results from purposeful action taken by upper management to introduce a new managerial approach throughout the organization of quality improvement process. This quality improvement process is super-imposed on the quality control process. It is implemented in addition to quality control, not instead of it. Juran's approach is essentially the same as Deming's. Quality is a management responsibility that needs to be performed systematically to achieve continuous improvement over time.

This is the same basic idea behind the so-called PDCA cycle, known in Japan as the

Deming wheel, which is considered to be the essence of the Japanese approach to total

quality control:

Plan: The basic planning process described by Juran.

Do: The implementation of the plan.

Check: Evaluation of performance according to critical measures appropriate methods

Act: Quality improvement efforts based on the lessons learned from experiences. These

experiences feed into the new plan, since PDCA is a cyclical process (Costin, 1994).

The Crosby philosophy

Philip B. Crosby was corporate vice president for quality at International Telephone and Telegraph (ITT) for 14 years after working his way up from line inspector. After that he e established Philip Crosby Associates in 1979 to develop and offer training programs related to quality. He is also the author of several popular books. His first book, Quality is Free published in 1979, sold about one million copies.

The essence of Crosby's quality philosophy is embodied in what he calls the "Absolutes of' Quality Management and the Basic Elements of Improvement." Crosby's Absolutes of Quality Management areas follow:

Quality means conformance to requirement, not elegance

- ❖ There is no such thing as a quality problem only opportunities to improve .

- ❖ There is no such thing as the economics of quality; it always cheaper to do the job right the first time.

- ❖ The only performance measurement is the cost of quality approach.

- ❖ The only performance standard is "Zero Defect"

Crosby's "Basic Elements of Improvement" include determination, education, and implementation. By determination, Crosby means that top management must be serious about quality improvement. The "Absolutes" should be understood by everyone; this can be accomplished only through education. Finally, every member of the management team must understand the implementation process. (Evans & Lindsay, 1993).

Crosby's 14-point program

- *Management commitment* .Top management must become convinced of the need for quality improvement, and must make its commitment clear to the entire company.

- *Quality Improvement Team*. Management must form a team of department heads to oversee quality improvement.

- *Quality Measurement.* Quality measurement appropriate to every activity must be established to identify areas needing improvement.

- *Cost of Quality Evaluation*. The controller's office should make an estimate of the cost of quality to identify areas where quality improvement would be profitable.

- *Quality Awareness*. Quality awareness must be raised among employees. They must understand the important of product conformance and the cost of nonconformance.

- *Corrective Action*. Opportunities for correction are generated by steps 3 and 4,as well as discussions among employee.

- *Zero Defects planning*. An ad hoc zero defects committee should be formed from member of the quality improvement team.

- *Supervisor Training.* Early in the process. All levels of management must be trained to implement their part of the quality improvement program.

- *Zero Defects Day*. A zero Defect day should be scheduled to signal to employees that the company has a new performance standard.

- *Goal Setting*. TO turn commitment into action. Individuals must establish improvement goals for them selves and their group.

- *Error Cause Removal*. Employees should be encouraged to inform management of any problems that prevent them from performing error-free work.

- *Recognition. Public*, nonfinancial appreciation must be given to their quality goals or perform outstandingly.

- *Do All again*. To emphasize the never-ending process of quality improvement.

(Costin, 1994)

The key to successful implementation of quality principles and methods is tied directly to leadership. In fact, lack of management and leadership commitment is considered by Crosby to be the number one cause of quality system failure. According to Juran, every successful quality revolution has included the active participation of upper management- there are no exceptions and Deming agrees. He says the transformation is top management job and it cannot be delegated.

Quality is not a quick fix to address management problems. It is not a program, but a transformation. As part of this effort, top managers must recognize the need for assessment, strategic planning, and the development of a long-term, integrated organizational-wide approach. Leadership is needed to establish policies defining the positions the organization will take in regard to quality. Leadership is also necessary to cultivate a customer orientation and provide all employees with ongoing education and training. These arguments notwithstanding, success or failure will rest upon the correct assessment of how to achieve customer-defined quality criteria and the kind of leadership

required to get the organization mobilized in the most cost-acceptable way. (Costin, 1994).

Quality Concept

Introduction

Top management of a company, of course, bears overall responsibility for that company's products and services, but managers, supervisors and foremen are all responsible for the quality of the products and services produced by their respective factories, departments, sections, groups, and /or teams. Meanwhile, the duty of engineers and technical specialists is to systematically and methodically prepare, revise, and improve standards that will enable their companies to supply society with quality products as economically as possible.

Controlling quality does not simply mean studying statistics or preparing control charts. I believe the aims of quality control should be first, to strengthen a country's economic base by enabling it to export large volumes of high-quality, reasonably priced products, and finally to secure a firms economic foundation for the future by establishing and actively exporting industrial technology. The ultimate aims of quality system should be to enable companies to share the benefits sensibly and fairly among consumers, employees, and shareholders, to raise the country's standard of living, and to make life better for the world as a whole.

Since modern quality control uses statistical methods, it is sometimes referred to as statistical quality control (SQC). The effective implementation of quality control requires the participation and cooperation of all the employees at every stage of the company's activities, from market research through research and development, product planning, design, production preparation, purchasing and subcontracting, production,

inspection, marketing, sales and after-sales service, as well as in financial and human resources functions. Quality control carried out in this way is known as company wide quality control (CWQC) or total quality control (TQC).

"Quality requires developing, designing, producing, marketing, and servicing products and/ or services with optimum cost-effectiveness and usefulness, which customers will purchase with satisfaction. To achieve these goals, all the separate parts of a company (top management, head office, factories, and individual departments such as production, design, technical, research, planning, market research, administration, accounting, materials, warehousing, sales, servicing, personnel, labor relations, and general affairs) must work together. All the company's functional areas must strive to cooperate in facilitating systems and preparing standards and implementing procedures faithfully. This can only be achieved through full utilization of a variety of techniques such as statistical and technical methods, standards and regulations, computer integration, automation control, facility control, measurement control, operations research, industrial engineering, and market research.

Introducing total quality enables the realization of benefits for everyone. Management, consumers, employees and shareholders all profit.

QUALITY IN MANUFACTURING

Well-developed quality assurance systems have existed in manufacturing for some Time, however, these systems focused primarily on technical issues such as equipment reliability, defect measurement, and statistical quality control (SQC). The transition to a customer-driven organization has caused fundamental changes in manufacturing practices, changes that are particularly evident in areas such as product design, human resource management, and supplier relations. Product design activities, for example, now closely integrate marketing, engineering, and manufacturing operations. Human resource practices concentrate on empowering workers to collect and analyze data, make critical operations decisions and take responsibility for continuous improvements, thereby moving the responsibility for quality from the quality control department onto the factory floor. Suppliers have even become partners in product design and manufacturing efforts. Many of these efforts were stimulated by the automotive industry as Ford, GM, and Chrysler forced their network of suppliers to develop quality assurance systems and improve quality of products and/or services.

Exemplary quality leaders in the manufacturing sector include large companies as AT&T, Motorola, Armstrong World Industries, Cadillac Motor Car Company, Corning Telecommunications Products Division, Eastman Chemical Company, and small companies such as Granite Rock Company, Trident Precision Manufacturing, Inc., and Wainwright Industries (Evans & Lindsay, 1993).

QUALITY IN SERVICES

Service has been defined as "a social act which takes place in direct contact between the customer and representatives of the service company"(Evans & Lindsay, 1993). A service might be as simple as handling a complaint or as complex as securing a home mortgage. Many organizations are pure service businesses providing intangible products. Examples could include a law firm whose product is legal advice, or a health care facility whose product is comfort and improved health. Service organizations include all non-manufacturing organizations except such industries as agriculture, mining, and construction. The U.S. government's Standard Industrial Classification system describes service organizations as those primarily engaged in providing a wide variety of services for individuals, business and government establishments, and other organizations. Examples:

Hotels and other lodging places, establishments providing personal, business, repair, and amusement services; health, legal, engineering, and other professional services; educational institutions, membership organizations.

The service sector has grown rapidly in the last few decades. In 1945, approximately 23 million people were employed by service-producing industries, and 18.5 million were employed by goods-producing industries. By the middle of 1997, about 98 million people were employed by service-producing industries, while the number of people employed by goods producing industries had only grown to 24 million. Thus, 79.8 percent of the non-farm employees in the United States are working in services.

The service sector began to recognize the importance of quality several years after the manufacturing sector. This can be attributed to the fact that service industries had not

confronted the same aggressive foreign competition that faced manufacturing. Another factor is the high turnover rate in service industry jobs that typically pay less than manufacturing jobs. Constantly changing personnel makes establishing a culture for continuous improvement more difficult. Also, the very nature of quality changed from a focus on product defects to achieving customer satisfaction
(Evans & Lindsay, 1993).

Total Quality Management (TQM)

Total Quality Management refers to a management process and set of disciplines that are coordinated to ensure that the organization consistently meets and exceeds customer requirements. TQM engages all divisions, departments and levels of the organization. Top management organizes all of its strategy and operations around customer needs and develops a culture with high levels employee participation. TQM companies are focused on the systematic management of data in all processes and practices to eliminate waste and pursue continuous improvement.

The goal is to deliver the highest value for the customer at the lowest cost while achieving sustained profit and economic stability for the company. Top management must commit to a vision, often expressed in a mission statement, and align and train its employees toward that common goal. To do this, cross-functional teams work on improvements that promote efficiency and respond to customer requirements. Long-term relationships with customers, suppliers and employees focus on quality beyond short-term profit.

TQM alters the way a company thinks about work and all of its relationships as it impacts every function, system and person connected with the company. TQM is a continuous journey toward excellence.

As managers and supervisors, you are on the front lines of innovation in business and industry today. Top management and the people you direct look to you for guidance in how to make necessary improvements. Small business owners are in the same position in directing their employees. The world of work has changed dramatically from an era when all orders came down from the "top" with a due date. Global competition and advances in technology have created market conditions that make all projects and programs "past due" before they are even out of the gate.

Your job working in or creating a TQM environment is to accept the challenge of delivering innovation and improvements in how your company accomplishes its work. I-low you understand the needs of your customers - both those inside and outside the company - and how you align and develop resources - both human and technical - to meet customer requirements will make all the difference in your company's success.

It is essential for companies to differentiate between their internal and external customers in making process improvements and achieving quality gains. Internal customers are those people within the company who receive the results of your work. When you need a service, a function performed or a part from another department in your company, you are the internal customer. The efficiency and quality of the responses to internal customers throughout the customer chain influence how well satisfied the external or "ultimate" customer will be. Meeting customer requirements means there is diligence and quality at every step. (Capezio&Morehouse, 1993)

Core Principles of Total Quality Management

 While every organization should implement its own specialized form of quality

management, there are some basic core principles that guide every quality effort. The

single most important element of quality management is the focus on the customer. In

fact, the term "Quality" in TQM means "what the customer defines as instrumental to the

service." During this quality process, we will strive frequently to hear from our

customers. From this basic concept, that the customer is the ultimate determiner of

quality, come the other principles of Quality management. Briefly they are**:**

1) The customer is the ultimate determiner of quality. Services and programs

should be designed, with the needs of the customer in mind. Therefore, it is important to

determine who the customers are and define their specific needs.

2) Quality should be built into the process from the beginning. and not simply

derive from customer complaints. It is important that all levels of an organization be

involved in producing a Quality product and not just try to modify it before delivery.

3) Achieving Quality requires continuous improvements. Customer's

expectations are always changing and typically rising as quality management begins to

yield results. It is important to remember that when customers are assessing quality, they

are not simply comparing us to our performance last year, but to every other organization

that is serving their needs; from the Department of Motor Vehicles to the supermarket.

4) Quality management requires the involvement of all staff and partners.

"Since improved Quality comes from improvements during the processes leading up to

the delivery of the product or service, all levels and divisions of an organization must be

involved in developing Quality. Therefore, key components to lasting Quality

management is significant team building, partnership creation, and trust".

("Core Principle", 2000).

Learning the principles and practices of Total Quality Management will help achieve outstanding results and enlist the support of top management in advancing this concept within the organization enabling area managers or supervisors to create a work environment that gets the best from its workers. The proof will be reflected in the results deliver to the customer.

With growing global competition, quality management is becoming increasingly important to the leadership and management of all organizations. Quality management principles provide understanding of and guidance on the application of quality management. By applying following quality management principles, organizations will produce benefits for customers, owners, employees, suppliers and society as a whole.

Benefits form applying TQM Principles

When organizations embark on a systematic approach to quality improvement based on TQM principles, they gain both measurable and intangible benefits. Some of these include:

Ability to be more competitive.

Increased market share.

Cost reductions.

Increased flexibility and responsiveness.

Simplified processes.

Improved communications.

Less frustration and more satisfaction among the workforce.

CUSTOMER FOCUS

In organizations it must be understood that the main purpose of work is to serve customers better. Therefore it must be known how well products/services are performing, from the customer's perspective, through measurements and feedback. The process for acquiring this information should be continuously improved to broaden markets and to keep up with changing customers' requirements.

Customer Focus is the first basic attribute. The customer is the judge of quality. Therefore, all product and service attributes should provide value to the customer and lead to customer satisfaction and loyalty. It is critical that a company remain close to the customers, knowing what work the customer does and how the customer uses the product. Coca-cola strives for customer loyalty. They receive over 500,000 contacts yearly from customers. And guarantee that each contact will have a reply within two weeks. Along with each contact a survey of quality is included. Coke sends these surveys because they want to achieve a high-level customer satisfaction. The customer focus that Coca-Cola employs has allowed them to be one of the leading organizations in the area of customer service and loyalty.

Quality Function Deployment

Introduction

Quality Function Deployment was first introduced in the United States in an article by Dr.Yoji Akao in the October 1983 issue of Quality progress, a monthly publication of the American Society for Quality. In November 1983 the Cambridge Corporation of Tokyo, under the leadership of Masaaki Imai, conducted a Total Quality Control (TQC) and Quality Function Deployment (QFD) workshop in Chicago.

Quality Function Deployment is a structured process that provides a means to identify and carry the customer's voice through each stage of product and service development and implementation. QFD is achieved by cross-functional teams, that collect, interpret, document, and prioritize customer requirements. Through the use of charts and matrices, quality responsibilities are effectively deployed for any needed activity within the company to ensure that appropriate quality is achieved.

QFD relies on easy to understand techniques supported by analytical tools. QFD, though structured, is a flexible planning tool that allows organizations to react quickly in developing, or improving products and services for creative and innovative thinking. The application of QFD is growing rapidly as product and service industries realize the need for customer-driven management and systems to continuously improve their competitive position.

QFD IMPLEMENTATION

Implementation of QFD should be considered in terms of four phases:

1. Organization Phase: Management selects the product or service to be improved, the appropriate cross- functional team, and defines the scope of the QFD study. Initial QFD projects should address improvement on products or services that already exist and are well understood. This makes it possible to concentrate on the QFD techniques. Later projects can focus on new product or service introduction.

2. Descriptive Phase: The selected team defines the products/ services from several viewpoints: Customer demands, quality characteristics, functionality, new technology,

reliability, and cost. QFD uses a matrix system to array the various viewpoints, to assess current and competitive positions, and to establish and plan for target values.

3- Breakthrough Phase: The team selects areas for improvement and competitive advantage through investigation of technology, new concepts, better reliability, and cost reduction and monitors the bottleneck engineering process.

4. Implementation Phase: The team defines the product or service and how it will be produced. Using QFD, the team carries the development of the product or service through preparation for production, production, delivery, and conformation of customer satisfaction.

USERS OF QFD

In 1986 Dr. Yoji Akao, past chairman of the QFD research committee of the Japan Society for Quality Control (JSQC), conducted a survey of QFD usage among the larger member companies of the Union of Japanese Scientists and Engineers (UJSE). The study showed that, although, QFD was not being used in some Japanese companies, it had grown significantly and was used with great success at many Japanese companies. Currently, many U.S. companies are using QFD. In the automotive industry, Ford, Chrysler, and General Motors, users of QFD themselves, are involving their supplier bases in QFD studies. In the electronics field, Digital Equipment Corporation and Texas Instruments have been QFD pioneers. Numerous other companies use QFD including: Procter& Gamble, Deere & company The Kendall company Polaroid, Rockwell International, Hughes Aircraft and Hewlett -Packard.

Because use of QFD in the United States is so recent, there are few documented success stories for a wide variety of industries. A further difficulty in obtaining detailed case studies, describing successes, lies in the reluctance of companies that have had major successes to broadcast those activities to their competition. Refer to Appendix D for partial list of U.S. QFD applications.

THE BENEFITS OF QFD

"The results of the 1986 JSQC Survey, conducted by Dr. Yoji Akao and others, were published with details on the status of QFD in Japanese companies that used QFD and reported the following benefits:

➢ Decreased start-up problem

➢ Competitive analysis became possible

➢ Control points clarified effective communications between divisions

➢ Design intent carried through to manufacturing

Additional information gathered from translations of Japanese reports, as well as U.S. company presentations and publications, highlight other benefits:

➢ Better communication

➢ Fewer product /service changes

➢ Better reliability of key elements

➢ Improved market research

➢ Quality is built in "upstream"

➢ Reduced product/service development time

➢ Lower start-up costs

➢ Increased understanding of complex relationships

➢ Greater clarity of organizational and program priorities

➢ Better designs

➢ Identification and resolution of conflicting requirements

Quality Function Deployment provides a tracking system for development efforts

and preserves knowledge for future reference. QFD helps companies determine where to

invest time and money, ensure that cost-oriented quality is achieved, and differentiate

products/services from those of the competition. QFD ensures that each phase of the

development cycle is rooted in customer needs and, within the development process,

serves to facilitate the use of other tools, techniques, and in-house expertise at the

appropriate time" (Costin, 1994).

The Cost of Quality

In most firms cost accounting has been an important function. All organizations measure and report costs as a basis for control and improvement. The concept of the quality costs emerged in the 1950s. Traditionally, the reporting of quality-related costs has been limited to inspection and testing; other costs were accumulated in overhead accounts. As managers began to define and isolate the full range of quality-related costs, a number of surprising facts emerged." First, quality-related costs were much larger than previously reported, generally in the range of 20 to 40 percent of sales. Second, quality-related costs were not only related to manufacturing operations, but to ancillary services such as purchasing and customer service departments, as well. Third, most of the costs resulted from poor quality and were avoidable. Finally, while of poor quality was avoidable; no clear responsibility for action to reduce them was assigned, nor was any structured approach formulated to do so. As a result, many companies began to develop cost of quality (COQ) programs. The "costs of quality"-or more specifically, the costs of poor quality, were associated with avoiding poor quality or incurred as a result of poor quality.

Quality Cost Classification

Quality cost can be organized into four major categories: prevention cost, appraisal cost, internal failure cost, and external failure cost**. Prevention costs** are investments made to keep nonconforming product from occurring and reaching the customer, including the following specific costs:

- *Quality planning cost*, such as salaries of individuals associated with quality, planning and problem-solving teams, the development of new procedures, new equipment design, and reliability studies.

- *Process control cost*, which include costs of analyzing production processes and implementing process control plans.

- *Information systems cost* expended to develop data requirements and measurement methods.

- *Training and general management cost*, include internal and external training programs, clerical staff expenses, and miscellaneous supplies.

Appraisal costs are those associated with effort to ensure conformance to requirements, generally through measurement and analysis of data to detect nonconformances. Categories of appraisal costs include

- Test and inspection cost associated with incoming materials, work-in-process, and finished goods, including equipment costs and salaries.

- Instrument maintenance cost due to calibration and repair of measuring instruments.

- Process measurement and control cost, which involve the time, spent gathering and analyzing quality measurements.

Internal failure costs are incurred as a result of unsatisfactory quality found before the delivery of a product to the customer; some examples include:

- Scrap and rework cost, including material, labor, and overhead.

- Cost of corrective actions, arising from time spent determining the causes of
  failure and correcting production problems.

External failure costs occur after poor-quality products reach the customer, specifically these are:

- Costs due to customer complaints and returns; including rework on returned
  items, cancelled orders and freight premiums.

- Product recalls costs and warranty claims including the cost of repair or
  replacement, as well as associated administrative costs.

- Product liability costs, resulting from legal actions and settlements. (Evans &
  Lindsay, 1993).

ISO 9000 standards

The International Organization for Standardization (ISO) recognized the need for harmonization of various quality standards used worldwide, and issued the ISO 9000 series of standards in 1987. The embodies comprehensive quality management concepts and guidance together with models for external assurance requirements. The ISO 9000 series was revised in 1994 and again in 2000.

It is not the purpose of these international standards to enforce uniformity of quality systems among various businesses. The requirements are generic and independent of any specific industry or economic sector. These standards are intended to be used in their present form. However, some tailoring may be required to suit individual needs, and organizations should adopt the selected system to suit needs, but not change the organization working methods to suit the standard.

Many countries have endorsed the ISO standards and accepted them as the national

quality model.

The ISO 9000 is a series of international standards were developed by

quality experts from around the world to be used by companies that either want to

implement in-house quality systems or ensure that suppliers have appropriate quality

systems in place. The standards were developed under the auspices of the

International Organization for Standardization (ISO). International standards

promote international trade by providing one consistent set of requirements

recognized around the world ("quality systems", 1995)

Overview of ISO Content

1- Management responsibility

2- Quality system

3- Contract review

4- Design control

5-Document control

6- Purchasing

7- Purchaser supplied product

8- Product identification and tractability

9- Process control

10- Inspection and testing

11- Inspection, measuring, and test equipment

12- Inspection and test status

13- Control of nonconforming product

14- Corrective action

15- Handling storage, packaging, and delivery

16- Quality records

17- Internal quality audits

18- Training

19- Servicing

20- Statistical techniques

(Capezio & Morehouse, 1993)

Quality System –9000

The QS-9000 standard was developed by the so-called "Big 3" automakers, Chrysler, Ford, General Motors, as a common supplier quality standard. Previously each company had its own quality requirements (e.g., Ford's Q-101 standard, Chrysler's Suppliers Quality Assurance Manual and General Motors' targets for Excellence. QS-9000 replaces these individual documents.

Over the years, suppliers had to meet the various and sometimes conflicting requirements of the Original Equipment Manufacturers (OEM). In recognizing the need to resolve the problems created by the different quality systems, the "big 3" established a Quality Systems Requirements Tasks Force whose responsibility is to develop and maintain a common quality standard, which led to the development of QS-9000.

The first edition of QS-9000 was initially released in August 1994. Since then, it has been revised twice and the current (third) edition was released in March 1998. ("Quality systems", 1995).

The Seven Basic Quality Control Tools (7QC)

In the 1950's the Japanese began to learn and apply the statistical quality control tools and philosophies that Walter Shewhart and W. Edward Deming developed in the 1930's and 1940's. Their progress in continuous improvement led to the expansion of the use of these tools. Kaoru Ishikawa, head of the Japanese Union of Scientists and Engineers (J.U.S.E.) expanded the use of these approaches in manufacturing in the 1960's with the introduction of the 7 Quality Control Tools. (7QC) They are as following:

Cause and Effect (CE) Diagram

The cause and effect diagram is also called the fishbone chart because of its appearance and the Ishakowa chart after the man who popularized it in Japan. Its most frequent use is to list the potential cause of particular problems. The lines coming off the core horizontal line are the main causes and the lines coming off those are sub causes.

Run Chart

The run chart shows the history and pattern of variation.. This tool is used at the beginning of the change process to see what the problems are. And at the end of the change process to see whether the change has resulted in a permanent improvement.

Scatter Diagram

A scatter diagram shows the relationship between to variables that are thought to be related. For example, is there a relationship between out side temperature and cases of the common cold? As temperatures drop, do colds increase. The closer the points hug a diagonal line the more closely the correlation

Flowchart

A flowchart lists the order or sequences of activities. A beneficial technique is to map the ideal process and the actual process and identify the differences as targets for improvement.

Pareto Chart

A Pareto chart shows the distribution of items and arranges them from the most frequent to the least frequent. The tool is named after Wilfredo Pareto, an Italian economist who determined that wealth is not evenly distributed among the population. Some of the people have most of the money. This tool is a graphical picture of the most frequent causes of a particular problem. It shows where to put your initial effort to get the most gain.

Histogram

A histogram is a bar chart showing a distribution of variables. An example would be to line up by height a group of people in a course. Normally one would be the tallest and one would be the shortest and there would be a cluster of people around an average height. Hence the phrase "normal distribution". This

tool helps identify the cause of problems in a process by the shape of the

distribution as well as the width of the distribution.

Control Chart

A control chart is a line chart with control limits. It is based on the work of

Shewhart and Deming. By mathematically constructing control limits at 3

standard deviations above and below the average, one can determine what

variation is due to normal ongoing causes (common causes) and what variation is

produced by unique events (special causes). Eliminating the special causes first

and then reducing common causes can improve quality. ("7QC", 1996)

Continuous Improvement

Continuous improvement is a commitment, continuous quality improvement, and a

process, continuous process improvement. The Japanese word for this is "kaizen", and it

is, according to "Imai", the single most important concept in Japanese management. The

commitment to quality is initiated with a statement of dedication to a shared mission and

vision and the empowerment of all participants to incrementally move toward the vision.

The process of improvement is accomplished through the initiation of small, short-term

projects and tasks throughout the organization, which collectively are driven by the

achievement of the long-term vision and mission. Both are necessary, and one cannot be

done without the other.

Continuous improvement is dependent on two elements: 1) learning the appropriate

processes, tools, and skills and 2) practicing these newfound skills on small achievable

projects. The process for continuous improvement. First advanced many years ago by

Deming, is Plan-Do-Check-Act (PDCA), a never-ending cycle of improvement that

occurs in all phases of the organization. While no rigid rules are required to carry out the

process, the general framework of each step can be described.

Plan: This step asks such key questions as what changes are needed, what results are

needed, what obstacles need to be overcome, is data available, and what new information

is needed. Do: The implementation of a small-scale change or pilot tests to provide data

for answers. Check: The assessment and measurement of the effects of the change or test.

Act: Asks whether the data confirm the intended plan, whether other variables are

influencing the plan, and whether the risks in proceeding are necessary and worthwhile.

Then, based on these answers, the project or task is modified and moves into the plan

stage again, where the iteration continues, expanding knowledge and implementing

further improvement. Ideally, this process would continue indefinitely.

Two of Deming's principles and two Baldrige categories address this important

aspect of total quality:

Deming Principle 3-Cease dependence on inspection and testing to achieve quality.

Reduce the need for inspection by building quality into the programs and services in the

first place. Within Inspection and test (IT), cease dependence on testing to achieve

quality. Provide learning experiences that create quality performance.

Deming Principle 5-Improve constantly and forever the system of program quality and

service in order to improve quality performance.

Baldrige Category 5--Management of process quality is the key element of how the

organization develops and realizes the full potential of the work force to pursue its quality

and performance objectives. Also examined, are the efforts required to build and maintain

an environment for quality excellence that is conducive to full participation and personal organizational growth.

Baldrige Category 6--Quality and operational results examines quality levels and improvement trends in operational performance of inspection and test (IT) and supplier quality, as well as the current quality and performance levels of competitors.

In the development of systems, the concepts of continuous improvement come into play in two significant processes. The first is in the development of systems and the second is in the support of systems.

The first part of the of PDCA"Plan" portion of is the requirements phase. This phase, tied to the concepts of customer satisfaction, builds the plan for the product based on customers' valid needs. Focus groups, customer councils, user groups, and partnerships help define the needs of the chain of customers that most systems must serve.

The second part of the "plan" portion involves the analysis and design phase, where technologies and customer needs are married up. This portion of the plan phase also requires interface with customers to assure compliance and understanding.

The "do" stage is the development cycle in the system. A clear definition of the quality measurements of the system is required before the development begins. Items include considerations such as:

How to measure customer satisfaction:

- Capability
- Performance
- Availability

- Training
- Reliability
- Changeability
- System documentation
- Flexibility
- Ease of use
- Understanding

Quality of product delivered:

- Timeliness
- Cost
- Ease of installation
- Backlog of errors
- Fit to specification

These are some of the major items that should be understood at the beginning of the

development cycle. Measurement processes should be considered and designed prior to

beginning the project.

The check functions may include:

- A quality system plan
- Performance design points
- Prototyping
- Nine cycle change control systems
- Development of change control systems
- Publications change control systems
- Training
- Documentation
- Quality assurance review
- Unit testing plan
- Integrated testing plan

• Field test

The "act" phase is the driver for change. It is easy to forget the fact that PDCA is

a cycle and that within the individual parts we must PDCA each of the activities with

which we

are dealing. The metrics of performance must be continually monitored and these items

must be acted upon as opportunities for continuous improvement.

The life cycle system an organization develops with its customers should be its road map

to appropriate change and control.

The second significant use of PDCA is the support activity, also known as the

maintenance phase of the system. The kaizen approach to customer satisfaction means

continuing improvement in all aspects of the life of a product or service ("TQM for

Information System", 2001).

Employee Involvement

Employee involvement is "a process for empowering members of organization to

make decisions and solve problems appropriate to their levels in the organization". This

process may involve realigning power, knowledge.and information to lower levels in the

organzation.but it may not. Providing superior customer value is the criterion that

determines the nature of employee involvement, rather than a philosophy of employee

involvement for its own sake. A critical link for translating strategic intention into action,

employee involvement takes various forms. Work teams, job enrichment, quality circles,

and task forces. And labor-management action teams are among the more common

organization manifestations.

Involvement is most effective when organization members are organized into teams. Teams are trained to use problem-solving and decision-making tools that are appropriate for the task. Employee people to take control of their jobs in this manner is based on the simple premise that, by working in and being part of a system orprocess, they have the information needed to describe it and identify how it can be improved. In addition to the direct benefits of improvement by participation, people tend to become more loyal and satisfied when their ideas are used. In addition. People are more motivated to continue the improvement process. This concept has been described in the literature of the behavioral sciences for many years but rarely practiced on a large scale until the advent of TQM.

Chapter III
Methodology

Introduction

This chapter contains definitions and descriptions of the methodology for this paper and data collection procedures that will be used to review and analyze the existing body of knowledge in quality management.

Research design

The purpose of research design varies according to the research paradigm, methods and assumptions. Generally speaking, there are two major methods in research design: quantitative and qualitative approach.

Quantitative approach requires the use of standardized measures to fit into a limited number of predetermined response categories to which numbers are assigned. The advantage of quantitative approach is that it is possible to measure the reactions of many people to a limited set of questions facilitating comparison and statistical aggregation of the data. This gives a broad generalizable set of findings that can be presented briefly and clearly (Patton, 1990).

This method uses either random assignment or other sampling techniques to minimize intervening variables that could impact the results of the research (Cook, & Reichardt, 1997)

"Qualitative research is multi-method in focus, involving an interpretive, naturalistic approach to its subject matter. This means that qualitative researchers study things in their natural settings, attempting to make sense of or interpreter phenomena in terms of the meaning people bring to them. Qualitative research involves the studied use and collection of a variety of empirical materials-case study, personal experience,

introspective, life story, interview, observational, historical, international, and visual texts

that describe routine and problematic moments and meaning in individuals' lives"

(Creswell, 1997).

"Qualitative methods are a traditional evaluation in which the researchers translate

the results of findings to describe research categories. The methodology of qualitative

provides depth and detail rather than breadth through direct quotation and detailed

descriptions of people's activities, behaviors, actions, and the full range of interpersonal

interactions and organizational processes that are part of human experience" (Patton,

1990).

For the purpose of this study, the qualitative methodology was selected for the following

reasons:

➢ The topic of total quality management is complex, and qualitative research will

   continue to play an important role in investigation and analysis.

➢ Total quality management in one of those topics where there is no foreseeable

   endpoint where researchers will be able to state that there is a complete shared

   understanding.

➢ Total quality management is also a topic that poses serious problems for

   quantitative methods. There is not sufficient information available to use the

   quantitative measures and experimental design

This research was conducted through comprehensive review of management and

quality literature. To identify quality objectives and management approaches the

researcher has identified and selected Deming, Juran, Crosby and Ishinkawa and others who have focused their concern on quality management philosophies and techniques. For the purpose of this study, the researcher will study, analyze, and evaluate, in depth the philosophies that are represented in these approaches.

Chapter IV
Findings of the study

In chapter two, some management approaches to total quality management (TQM) were introduced. Chapter four will talk about the most important concepts mentioned in chapter two such as the quality management philosophies continuous improvement, quality function deployment, so and the important elements of total quality management.

Deming provides a philosophy of management, a theory of management and specific, powerful rules capable of transforming any company culture into a true TQM culture. On the other hand, the innovative techniques advocated by Taguchi and the use SPC provide the means for technically improving any process in a total sense; that is, throughout every stage, from design, production and maintenance to control of improved processes.

The successful implementation of his approach has greatly contributed to Japan's high reputation for quality and reliability, and therefore to its industrial success. Japan's highest industrial award is named after him: the Deming Prize is awarded annually to the one company or individual who has contributed most to the enhancement of statistical techniques, and to their improved application and design, research and development, manufacturing or service ("TQM", 1997)**.**

"The Deming 14 points for management in industry, education and government follow naturally as application of this outside knowledge for transformation from the present Western style of management to one of optimization.

The 14 points are the basis for transformation of American industry. It will not suffice merely to solve problems, big or little. Adoption and action on the 14 points are a signal that the management intends to stay in business and aim to protect investors and employees. Such a system formed the basis for lessons for top management in Japan in 1950 and in subsequent years. The 14 points apply anywhere, to small organizations as well as to large ones, to the service industry as well as to manufacturing and apply to every division within a company.

These philosophies represent the bulk of what Deming tried to communicate to managers and companies around the world.

The basic idea that Deming had is this If management is to be responsible for improving something as complicated as a modern assembly of machines and people (whether in the factory, the hospital, the office, or anywhere else), managers must have a way of learning which parts of the problems are due to the workers and which parts are due to the system. Deming understood that this could happen only if the two circumstances are fulfilled.1) the worker and the management can speak the same language.

2) The management uses the workers as essential "instruments" in understanding what is happening at the place where the work gets done.

 If managers adopt Deming's way, they will understand that they need the workers - not just as arms and legs to do what they are bid, but as intelligent human beings who can provide insights into how to improve the output and efficiency of the process. And we know that the improvement in management/ labor relations can come from such an attitude, honestly felt and experienced.

Probably the biggest success of all is at the Ford Motor Company, where Don Peterson, Ford's president, has declared, "the Ford Motor Company is committed to the adoption of the methods of W.Edwards Deming." The recent contract settlement with the UAW indicates how serious Ford is. In videotape prepared to convince Ford's employees, especially its middle management, case examples of the success of Deming's methods are given.

From the experiences at Ford, Nashua Corporation, and several Japanese-managed companies in the United States, we now have substantial evidence that Deming's methods work wherever they have been seriously tried.

 Deming's way is more than just attention to quality control. It is a philosophy of management that may be applied in any type of organization. It may be used in hospitals. It has been. It has raised Japanese productivity to record-breaking levels" (Deming, 2000).

There are four major benefits of TQM according to Deming Prize winners as reported by Keno:

1)   TQM produces growth in market share;

2)   TQM improves customer satisfaction by reducing problems and defects

3)   TQM reduces cost, which helps grow market share (Deming progression)

4)   TQM reduces superior design of new products and in companies that use QFD this happens in one third to one-half less time

Juran prescriptions on quality management focus on three major quality processes, called the Quality Trilogy. This trilogy consists of:

(1) Quality planning, which is the process of preparing to meet quality goals

(2) Quality control, which is the process of meeting quality goals during operations

(3) Quality improvement, which is the process of breaking through to unprecedented levels of performance.

Quality planning begins with identifying customers, both external and internal, determining their needs, and developing product features that respond to those needs. Thus, Juran wanted employees to know who uses their products, whether in the next department or in another organization. Quality goals based on meeting the needs of customers and suppliers alike at a minimum combined cost are then established. Next, the process that can produce the product to satisfy customers' needs and meet quality goals under operating conditions must be designed. Strategic planning for quality determines short-term and long-term goals, sets priorities, compares results with previous plans, and combines the plans with other corporate strategic objectives.

As a parallel to Deming's emphasis on identifying and reducing sources of variation, Juran stated that quality control involves determining what to control, establishing units of measurement to evaluate data objectively, establishing standards of

performance, measuring actual performance, interpreting the difference between actual performance and the standard, and taking action on the difference.

Unlike Deming, Juran specified a detailed program for quality improvement. Such a program involves proving the need for improvement, identifying specific projects for improvement, organizing support for the projects, diagnosing the causes, providing remedies for the causes, proving that the remedies are effective under operating conditions, and providing control to maintain improvements. At any given point in time, hundreds or even thousands of quality improvement projects should be under way in all areas of the company.

Juran's assessment of most companies revealed that quality control receives top priority among the trilogy; most companies feel strong in this category. Quality planning and quality improvements, however, do not receive priority attention and are significantly weaker in most organizations. Juran felt that more effort should go into quality planning and, especially, quality improvement.

As we can see, many aspects of the Juran and Deming philosophies are similar. The focus on top management commitment, the need for improvement, the use of quality control techniques, and the importance of training are fundamental to both philosophies.

The essence of Crosby's quality philosophy is embodied in what is termed the "Absolutes of Quality Management." It includes the following five points:

1. Quality means conformance to requirements, not elegance. Crosby quickly dispels the myth that quality follows the transcendent definition discussed earlier. Requirements must be clearly stated sot that they cannot be misunderstood. Requirements ast as communication devices and are ironclad. Once requirements are established, then one can take measurements to determine conformance to those requirements. The nonconformance detected is the absence of quality. Quality problems become nonconformance problems, that is, variation in output. Setting requirements is the responsibility of management.

2. There is no such thing as a quality problem. Problems must be identified by those individuals or departments that cause them. Thus, a firm may experience accounting problems, manufacturing problems, design problems, front-desk problems, and so on. In other words, quality originates in functional departments, not in the quality department. Therefore, the burden of responsibility for such problems falls on these functional departments. The quality department should measure conformance, report results, and lead the drive to develop a positive attitude toward quality improvement. This Absolute is similar to Deming's third point.

3. There is no such thing as the economics of quality; doing the job right the first time is always cheaper. Crosby supports the premise that "economics of quality" has no meaning. Quality is free. What costs money are all actions that involve not doing the jobs right the first time.

4. The only performance measurement is the cost of quality, which is the expense of nonconformance. Crosby notes that most companies spend 15 to 20 percent of their sales dollars on quality costs. A company with a well-run quality management program can achieve a cost of quality that is less than 2.5 percent of sales, primarily in the prevention and appraisal categories. Crosby's program calls for measuring and publicizing the cost of poor quality. Quality cost data is useful in calling problems to management's attention, to select opportunities for corrective action, and to track quality improvement over time. Such data provides visible proof of improvement and recognition of achievement.

5. The only performance standard is "Zero Defects (ZD)." Crosby feels that the Zero Defects concept is widely misunderstood and resisted. Zero Defects is not a motivational program, it is a performance standard.

"Crosby's approach provides relatively few details about how companies should address the finer points of quality management. It focuses on managerial thinking rather than on organizational systems. By allowing managers to determine the best methods to apply in their own company's situations, his approach tends to avoid some of the implementation problems experienced by companies that have adopted the Deming philosophy. Hundreds of thousands of companies have taken his course in-house or at his Quality College" (Deming, 2000)

While a clear understanding of quality is necessary toward the achievement of TQM, it is only a small step in the process. Making the system work requires not only the commitment of the entire organization, but also an understanding of quality management,

and the willingness toward change. Individuals working on their own, even with a solid

plan, will never generate optimum results. The individual effort is important in the

improvement process, but it must be coordinated with others in the organization to

become truly effective. Education and training will be continuous and bring together all

the steps into one cohesive program toward TQM. An effective coordination of these

steps will result in quality improvement through increased efficiency and capability. This

in turn, should lead the organization to have satisfied customers and an increase in market

share.

   "Continuous improvements are the backbone of the TQM process. The notion of

continuous improvement requires a systematic approach to quality management that

follows Deming's cycle of the Plan-Do-Check-Act. This system must be deeply

embedded within the organization, and should involve a continuous assessment of

customer's needs and wants. The continuous improvement cycle ensures that the

organization learns from results and improves its operations and outputs accordingly.

This must be accomplished in a planned, systematic, and conscientious way to create a

way of life that penetrates the entire organization" (TQM, 2001)

   The concept of total quality management is very simple in nature. The central focus

is on identifying the customer, the customer's needs and requirements, and then to set out

a plan toward meeting those requirements. In order to do this effectively, the organization

must have a good quality management system, statistical process control, and teamwork.

This process must start with top management and flow downward throughout the

organization. A good quality control system involves cooperation between all the major

departments throughout the organization including marketing, engineering, operations, purchasing customers service finance etc." A well-run and fully documented quality management system provides the necessary groundwork for the successful application of SPC and teamwork to the organization's goal". ("TQM", 1995)

Continuous improvement of all operations and activities is at the heart of TQM. Once it is recognized that customer satisfaction can only be obtained by providing a high-quality product, continuous improvement of the quality of the product is seen as the only way to maintain a high level of customer satisfaction. As well as recognizing the link between product quality and customer satisfaction. TQM also recognizes that product quality is the result of process quality. As a result, there is a focus on continuous improvement of the company's processes and will lead to an improvements. In turn, this will lead to an improvement in product quality, and to an increase in customer satisfaction. Improvement cycles are encouraged for all the company's activities such as product development and the way customer relationships are managed. This implies that all activities include measurement and monitoring of cycle time and responsiveness as a basis for seeking opportunities for improvement.

Elimination of waste is a major component of the continuous improvement approach. There is also a strong emphasis on prevention rather than detection, and an emphasis on quality at the design stage. The customer-driven approach helps to prevent errors and achieve defect-free production. When problems do occur within the product development process, they are generally discovered and resolved before they can get to the next internal customer.

To achieve customer satisfaction, the company has to respond rapidly to customer needs. This implies short product and service introduction cycles. These can be achieved with customer-driven and process-oriented product development because the resulting simplicity and efficiency greatly reduce the time involved. Simplicity is gained through concurrent product and process development. Efficiencies are realized from the elimination of non-value-added effort, such as re-design. The result is a dramatic improvement in the elapsed time from product concept to first shipment. (TQM, 2001)

TQM environment requires a committed and well-trained work force that participates fully in quality improvement activities. Such participation is reinforced by reward and recognition systems, which emphasize the achievement of quality objectives. On-going education and training of all employees supports the drive for quality. Employees are encouraged to take more responsibility, communicate more effectively, act creatively, and think innovatively. As people behave the way they are measured and recommended, TQM links relationship to customer satisfaction the basic objective of the TQM activities of a company is increasing its value, as understood on the basis of the needs of its owners. In other words, TQM and business excellence refer to the same thing. Business excellence emphasizes results, whereas, TQM underscores means.

A prerequisite for TQM in all companies is a comprehensive business model. In an international context, features of such activities have been outlined with ISO 9000 standards and quality award criteria. Leading TQM principles common to these include:

- Leadership
- Customer focus

- Continual improvement and learning
- Respect for personnel and partners
- Agility and flexibility
- Long term future orientation
- Innovative business
- Fact-based leadership
- Public responsibility and corporate citizenship
- Result orientation and emphasis on creating value
- Processes-based business and systems thinking

International research has indicated that core factors that increase the value of a company have a clear linkage to effects of the aforementioned principles. A solution does not, however, refer to creating rigid structures or systems but, rather – in current uncertain times – to generating effective modes of thinking and realizing these in accordance with the business.

Total Quality Management is the culture that allows an organization to accomplish its overall mission of satisfying the customer and increase market share. The groundwork of TQM has been laid out by pioneers, such as Dr. Deming; it is now up to the managers of organizations to continue the evolution of TQM to reach its full potential (TQM integration, 2001)

In addition to continuous improvement, other elements are equally important factors in achieving the best TQM structure. Competitive benchmarking is a process that views other companies who have become experts in a function that another company would like to study and initiate for themselves in order to improve their quality. The benchmarking procedure may be from any firm that has an excellent process that another company would like to perfect.

The next element is employee empowerment. The process gives more responsibility to employees who make or serve products. The process allows less management time to supervise the lines, allowing management to do other important tasks. Employee empowerment is a horizontal loading practice to encourage employee moral and gives employees much more discretion over their own assigned positions.

The team approach is another idea that joins employees and encourages group solving of important issues. The process is to encourage all group participants to be involved, cooperate, and develop a team spirit that will improve employee development, motivation, product quality, and company moral.

The last element is the need to stress decision based on fact rather then opinion. To base decisions on fact develops more accurate decisions and helps operate an organization more efficiently and effectively. Employees and management should also have the knowledge of tools at their disposal. From those tools comes a better product and expansion in new ways to perform activities.

When companies have finally developed an efficient system, it is necessary to develop relationships with suppliers who have similar goals in quality (TQM history and continues processes, 2000)

 As a result of the ISO 9000 implementation, company operations will become better defined and integrated. Employees are more aware of quality objectives, communications are improved and better information is available for making decisions.

Another benefit is that quality documents can be used for training purposes. Everyone understands their responsibilities and consistently performs their tasks and defects and rework are reduced.

Supplier partnerships are formed and customer satisfaction is improved. Access to world markets is opened, along with the capability to bid on contracts calling for ISO 9000 certification.

ISO 9000 quality systems bring various benefits to their users. The primary purpose of an effective quality system is to inspire confidence among customers in a contractual situation. It is also of immense value to the suppliers themselves, because it enables them to achieve customer's satisfaction cost effectively. If all tasks were carried out correctly the first time, there would be no waste, costs would be minimized and profit maximized. An effective quality system confers the following benefits on the supplier:

- It enables them to identify and plan tasks and their method of performance in order to yield the right results.

- It provides the means for identifying and resolving problems and preventing their recurrence, thereby improving conformance.

- It enables staff to control their own operations, thereby reducing fire-fighting and freeing manager from constant intervention in business
 operations. This will help to create quality awareness and job satisfaction among employees.

- It provides a means for documenting the company's experience. This can serve as the basis for training staff and thus for improving their
 performance.

- It provides data that can be used to determine the performance level of operating process and products, and to effect improvements

- It generates objective evidence to demonstrate the quality of products and the effectiveness of systems and thus to build confidence among customers.

Implementing a quality system based on ISO 9000 can help transform an ad hoc method of quality control into an organized and cost-effective quality-management system. Combining high quality with low cost gives the company a tremendous competitive advantage.

An ever-increasing number of companies all over the world are implementing quality-system standard internally. In addition, the bigger companies are insisting that their suppliers implement certified quality systems based on ISO 9000. This would greatly help in the improvement of their image, their credibility and their acceptability in international markets, factors essential for success in the export trade (Quality management systems, 2001)

The revisions that create ISO 9000:2000 are based on eight-quality management principles that reflect best management practices:

- A focus on identifying and meeting customer needs and expectations.
- Leadership and an expanded role for executive management.
- Involving and leveraging the abilities of people at all levels of the organization.

- Managing resources and activities as a process.
- Identifying, understanding and managing a system of interrelated processes for a systematic approach to management.
- Continual improvement.
- Factual decision-making and the establishment of measurable objectives for the quality system.
- Mutually beneficial supplier relationships.

These principles create the opportunity for companies to become a total performance managed company, enhancing performance and profitability while obtaining the internationally recognized ISO registration. These new principles are ingrained in four major processes, which constitute an overall process of continual improvement as illustrated in the following flow chart. As you will note, identifying customer requirements and measuring customer satisfaction are crucial elements of this process (ISO900: 2000, 2001).

The ISO 9000 series of standards has a significant role in the quality systems employed by many businesses and offers great benefits to certain industries such as manufacturing and software development, which due to the nature of their operations can more easily comply with ISO requirements. In addition, the pursuit of ISO certification is for many companies their first attempt at adopting a quality improvement process—which adds value in itself. However, ISO 9000 certification should be viewed as merely a portion of larger, overall quality approach. It's failure to focus on constant, systemic improvement, and to not seek movement beyond customer satisfaction causes it to fall short as the ultimate quality solution in any industry. Many QA experts and consultants

are actively combining QA certification schemes (namely ISO 9000) with a TQM

strategy and businesses are gaining real benefits rather than just certificates. Management

must review the quality options available and determine how their company can best

achieve quality and constant improvement in order to secure their share of the

marketplace (ISO 9000,2001)**.**

QFD has been used in the manufacturing world for more than twenty years. It has

accomplished outstanding achievements. QFD has also exhibited greater advantages in its

application in software industry.

QFD is a kind of preventive quality tool. QFD places development efforts at the front of a

program rather than at the end. With development up-front, we can focus on planning and

reduce requirement changes. It also puts quality in design process, so defects can be

prevented early, and design changes can be reduced. Preventing problems at an early

stage can shorten the development cycle, reduce cost, and improve productivity. The

following benefits stem from these characteristics:

- "Preventive" quality tool (Reduces design changes)
- Shorter development cycles
- Lower costs, greater productivity
- Improved product quality and reliability
- Increases market share
- Fosters better attention to customers' perspectives
- Reduces product definition interval

QFD is a structured step-by-step methodology, and it uses a structured ''House of

Quality" model as a tool to collect the data. This tool helps to collect the information

thoroughly and document the identified requirements effectively and completely. Thus, it can:

- Aid in avoiding the loss of information

- Provide a structured process for project documentation

The well-defined mechanism in the "House of Quality" model also helps to prioritize and analyze the requirements and identifies their correlations, which lead to the following benefits:

- Provides decision justification
- Quantifies qualitative customer requirements
- Represents data to facilitate the use of metrics
- Facilitates cross-checking

With a clear mission of concentrating on customers' requirements, and with a well-structured process and common tool to work on, QFD can effectively:

- Support team involvement

- Create better communication among departments

QFD is an approach, which can help improve quality, satisfy customer needs, shorten development times, and at the same time reduce costs. However any technique has its own limitations when implemented.

QFD process is costly, difficult and it requires a much longer view into the future to achieve payback. Without top management support, all attempts at QFD implementation could go for naught. Top management commitment is key when implementing QFD broadly because of the implications involved with organization, budgets, and timing of project deliverables.

QFD is a group work approach designed to ensure that everyone works together to give customers what they want. It was first adopted in Japan, and has brought significant benefits to the manufacturing industry. QFD helps improve quality of products, satisfy customer needs, shorten development times, and at the same time reduce costs. QFD changes the way people think and brings quality into products and manufacturing processes. It helps to achieve high quality products by improving process quality (Quality function deployment, 2001).

The cost of quality approach is a method for understanding work activities, identifying process improvement opportunities, estimating the financial impact of improvement activities, and monitoring the financial benefits improvement implementation. Cost-of-quality information can also be beneficial in monitoring the workforce and prioritizing resources commitments for improvement activities.

The Cost-of-Quality Identification Process identifies and measures cost-of-quality work. By analyzing this cost-of-quality information, managers and quality improvement teams can identify areas of the organization or the process that need improvement. Ongoing application of cost-of-quality methodology in process management helps to reduce the need for activities that are directed at discovering and correcting failures and defects.

By using the Cost-of-Quality Identification Process as a basis for their quality improvements, organizations, groups, process management teams, and individuals can realize important benefits, including:

- Estimating the potential for quality improvement and cost reduction.

      Some organizations report a cost of quality that exceeds 30 percent of

      total expenses.

- Motivating management to commit full support to reducing cost of quality.
- Identifying and prioritizing processes and activities for improvement.
- Monitoring and tracking the financial benefits realized from
- Implementing quality improvements.
- Improving AT&T's competitive edge by increasing product and service
- value to the customer.

It should be recognized that initially efforts to reduce cost of quality, such as

planning and prevention, may increase the total cost of quality during early

stages of process improvement. This results in part from the additional time and resources

needed to collect analyze data and conduct training.

Business organizations at AT&T have applied the Cost-of-Quality

Identification Process as a step in improving their process quality with the

following results:

- The cost of quality in several factories was reduced from more than 12
  percent of production costs in l985 to less than 8 percent in 1988.

- The quality improvement team in a customer services group reduced
  "no credit for returned equipment" complaint calls from customers by
  50 percent in one year. The financial impact of this improvement was more than
  $1M.

- A sales channel used a sales incentive program and the installation of 3B systems
  to reduce its cost of quality by 7 percent of its total work.

- A typist group in a staff organization replaced two different word processing
  programs and incompatible hardware with a single local area network system that
  reduced cost of quality by more than 12 percent of its total work (cost of quality,
  2001).

Finally, Total Quality Management is a management philosophy the whole

organization, follows to provide a continuous improvement effort. The effort the units

contribute is to establish a high rate of quality products and services.

 TQM is a philosophy taught by W. Edwards Deming, in that the Japanese perfected after

the end of WWII. Its principles propelled the Japanese economy and business sector to

great levels that almost over took American supremacy business. Once America saw

how TQM was applied and how it achieved inspiring results, businesses scrambled to

initiate their own TQM programs. Some businesses succeeded in applying TQM and

rose to new great heights, and others failed to follow all-important aspects in hastening implementation and creating a culture to foster integration of the philosophies.

TQM stresses continued improvement and provides elements to achieve its goal. TQM has initiated new thoughts and programs like quality functional deployment, the Malcolm Baldrige Award and the Deming Prize. In all, TQM is a practice that will continue as it proposes all businesses to do. To be successful in today's global economy all businesses must continuously improve to remain successful and one step ahead of competition. As long as customers require and demand better quality, TQM will be the foundation of corporate success.

In light of its brief history, total quality management and the father of TQM W. Edwards Deming have revolutionized the business world. The successful business of today utilizes some aspect of TQM if not the full implementation. As history has proved, the most successful enterprise, be it a small business, multinational corporation, a country, or the world, TQM can improve and continue success through continued improvement out of despair and chaos into the world's best economic expansion.

Chapter V
Summary and conclusion

Overview

- TQM works when: there is a clear understanding of what fundamental change the organization is going to make and a clear understanding of how TQM will help.

- It is directed and led by the personal involvement of all top management.

- Each employee understands the seven QC Tools and uses the PDCA cycle to continuously improve and hold the gains

- Each employee contributes in an integrated way to the fundamental improvement of the organization

- The whole organization is structured to produce significant results in quality, cost, and delivery and quality of work live with the leadership of key executives (cross-functional management).

- The organization has a customer-driven master plan of how it will accomplish its fundamental improvement and carries out that plan during four to six years.

Top management must get involved. Superior customer service must start with the top management of the organization being committed to the process of satisfying and meeting the customer's expectations. Top management must drive all change initiatives within the organization. Changing direction is never a simple process and changing it from the bottom up is an even bigger task that is bound to fail. If and when

top management shows total commitment and is seen to be "walking the talk", then the employees will soon follow their example.

Finally, top mangers needs to ensure that quality initiatives are understood at all key levels of the organization. These levels are the organization level, the operational/process level, and the individual level. This means that from the board of directors to the line worker, everyone needs to understand why these changes are being made and which strategic goals these changes will affect, and what the benefits with result.

Recommendations for Quality Managers

- Lead and guide and support employees in learning and practicing TQM.

- Act as a team leader in directing subordinates. Practice delegation through participation and involvement, but avoid abdication.

- Accept mistakes as one of the prices of improvement. Avoids censure. Help analyze mistakes for learning purposes.

- Identify customers and learn what customers' need are. Leads his/her people in identifying how to better serve customers.

- Train people and help them in recognizing suggestion opportunities, and making suggestions.

- Develop ways to enhance the relationships with current and potential customers and provide a means to measure and evaluate satisfaction.

- Recognize the need for assessment, strategic planning, and the development of a long-term, integrated organization-wide approach.

- Identify and overcome any resistance to the change in standards.

- Understand quality standards and concepts, be able to implement organizational assessments, and maintain customer satisfaction and focus.

- Seek to ensure that the organization provides products and services of a predictable and reliable standard that meet the needs of the clients or customers.

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