

## TOTAL QUALITY MANAGEMENT AND QUALITY COSTS

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Abstract: In today's tough competition, TQM is “minimum requirement staying in the game”. Comparing total quality to the current managerial idea – reengineering, both aim to increase productivity by rethinking processes. In the long run, quality can be achieved only by involving the total organization in continuous improvement. TQM requires changes in how managers lead, in how managers communicate, what is rewarded, and how decision is made, as well as how accurately quality costs are accounted for and reported.

In order to be globally competitive in today's world-class manufacturing environment, firms place an increased emphasis on quality and productivity. Total quality management (TQM) is an effort in this direction. Simply put, it is a system for creating a competitive advantage by focusing the organization on what is important to the customer.

Total quality management can be broken down into:

- Total—the whole organization is involved and understands that customer satisfaction is everyone's job.
- Quality—the extent to which products and services satisfy the requirements of internal and external customers.
- Management—the leadership, infrastructure, and resources that support employees as they meet the needs of those customers.

A quality product is a product that conforms to customer expectations. Generally, there are two types of product quality:

1. Quality of design refers to quality differences of products that serve the same function but have different design specifications, such as the type and quality of materials used in the product.
2. Quality of conformance is a measure of how a product meets its design specifications. Is the product manufactured as the design specifies? When quality experts refer to improving quality, they are referring to reducing the incidence of nonconformance. Quality refers to doing it right the first time.

TQM is supported by two key beliefs that quality is what the customer says it is, and that it must be thoroughly integrated into the very fabric of the organization, including its basic strategies, culture, and management systems. It is essentially an endless quest for perfect quality. It is a zero-defects approach. It views the optimal level of quality costs as the level where zero defects are produced. This approach to quality is opposed to the traditional belief, called acceptable quality level (AQL), which allows a predetermined level of defective units to be produced and sold. AQL is the level at which the number of defects allowed minimizes total quality costs. The rationale behind the traditional view is that there is a tradeoff between prevention and appraisal costs and failure costs. As you increase prevention and appraisal costs, you expect to see failure costs decrease.

Studies indicate that the total cost of poor quality, or the cost of not doing the right things right the first time, is 20% of gross sales for manufacturing companies and 30% for service industries.

## 1. Principles of TQM

Making a product right the first time is one of the principal objectives of TQM. Implementing a successful TQM program will in fact reduce costs rather than increase them. There is no question that better quality will result in better productivity. This is based on the principle that when less time is spent on rework or repair, more time is available for manufacturing, which will increase productivity.

When an organization maintains accurate records of its cost of quality, TQM will demonstrate that effective quality assurance geared toward prevention versus correction will pay for itself. A good example of this is the situation in which it is possible to eliminate 100% inspection with a good statistical process control (SPC) program. Elimination of high reject rates results in fewer products being repaired, reworked, or scrapped with the obvious reductions in cost.

Tying the cost of quality to TQM is necessary in order to motivate management, which is cost, motivated in both industry and government. In a TQM environment, management will start utilizing the cost data to measure the success of the program. The corporate financial planner can determine that the TQM program is reducing overall product costs. Given this success in the prevention of defects, the following failure costs will be reduced or eliminated:

- Rework or repair.
- Inspection of rework.
- Testing of rework.
- Warranty costs.
- Returned material.
- Discounts, adjustments, and allowances.

It is obvious that the cost of prevention in TQM is minor when taken against the above-listed failure costs.

## 2. Elements of TQM

The major elements of TQM are straightforward and embrace a commonsense approach to management. However, each of the individual elements must be integrated into a structured whole to succeed. The elements are as follows:

**Focus on the Customer.** Every functional unit has a customer, whether it is an external consumer or an internal unit. TQM advocates that managers and employees become so customer-focused that they continually find new ways to meet or exceed customers' expectations. We must accept that the customer defines quality. Meeting the customer's needs and expectations is the strategic goal of TQM.

**Long-term Commitment.** Experience shows that substantial gains come only after management makes a long-term commitment, usually five years or more, in improving quality. Customer focus must be constantly renewed to keep that goal foremost.

**Top Management Support and Direction.** Top management must be the driving force behind TQM. Senior managers must exhibit personal support by using quality-improvement concepts in their management style, incorporating quality in their strategic-planning process, and providing financial and staff support.

**Employee Involvement.** Full employee participation is also an integral part of the process. Each employee must be a partner in achieving quality goals. Teamwork involves managers, supervisors, and employees in improving service delivery, solving systemic problems, and correcting errors in all parts of work processes.

**Effective and Renewed Communications.** The power of internal communication, both vertical and horizontal, is central to employee involvement. Regular and meaningful

communication from all levels must occur. This will allow an agency to adjust its ways of operating and reinforce the commitment of TQM at the same time.

**Reliance on Standards and Measures.** Measurement is the springboard to involvement, allowing the organization to initiate corrective action, set priorities, and evaluate progress. Standards and measures should reflect customer requirements and changes that need to be introduced in the internal business of providing those requirements. The emphasis is on "doing the right thing right the first time."

**Commitment to Training.** Training is absolutely vital to the success of TQM. The process usually begins with awareness training for teams of top-level managers. This is followed by courses for teams of mid-level managers, and finally by courses for nonmanagers. Awareness training is followed by an identification of areas of concentration, or of functional areas where TQM will first be introduced. Implementing TQM requires additional skills training, which is also conducted in teams.

**Importance of Rewards and Recognition.** Most companies practicing TQM have given wide latitude to managers in issuing rewards and recognition. Here, a common theme is that individual financial rewards are not as appropriate as awards to groups or team members, since most successes are group achievements.

### 3. Costs of Quality

Costs of quality are costs that occur because poor quality may exist or actually does exist. More specifically, quality costs are the total of the costs incurred by (1) investing in the prevention of nonconformances to requirements; (2) appraising a product or service for conformance to requirements; and (3) failure to meet requirements.

Quality costs are classified into three broad categories: prevention, appraisal, and failure costs.

**Prevention Costs.** These are costs that are incurred to prevent defects. Amounts spent on quality training programs, researching customer needs, quality circles, and improved production equipment are considered in prevention costs. Expenditures made for prevention will minimize the costs that will be incurred for appraisal and failure.

**Appraisal Costs.** These are costs incurred for monitoring or inspection; these costs compensate for mistakes not eliminated through prevention.

**Failure Costs.** These may be internal, such as scrap and rework costs and reinspection, or external, such as product returns due to quality problems, warranty costs, lost sales due to poor product performance, and complaint department costs.

There are two views concerning optimal quality costs:

1. Traditional view that uses an acceptable quality level.
2. World-class view that uses total quality control.

**Optimal Distribution of Quality Costs: Traditional View.** The traditional approach uses an acceptable quality level (AQL) that permits a predetermined level of defective units to be produced and sold. AQL is the level where the number of defects allowed minimizes total quality costs. The reasoning of the traditional approach is that there is a tradeoff between failure costs and prevention and appraisal costs. As prevention and appraisal costs increase, internal and external failure costs are expected to decrease. As long as the decrease in failure costs is greater than the corresponding increase in prevention and failure costs, a company should continue increasing its efforts to prevent or detect defective units.

**Optimal Distribution of Quality Costs: World-Class View.** The world-class view uses total quality control and views the optimal level of quality costs as the level where zero defects are produced. The zero-defects approach uses a quality performance standard that requires:

1. Products to be produced according to specifications.
2. Services to be provided according to requirements.

Zero defects reflect a total quality control philosophy used in JIT manufacturing.

#### 4. Quality Cost and Performance Reports

The first step in a quality cost reporting system is to prepare a detailed listing of actual quality costs by category. Furthermore, each category of quality costs is expressed as a percentage of sales. This serves two purposes:

- It permits managers to assess the financial impact of quality costs.
- It reveals the relative emphasis placed on each category.

How to Use Quality Cost Reports?

**Prevention Costs.** These are the costs of all activities specifically designed to prevent poor quality in products or services. Examples are the costs of new product review, quality planning, supplier capability surveys, process capability evaluations, quality improvement team meetings, quality improvement projects, and quality education and training.

**Appraisal Costs.** The costs associated with measuring, evaluating, or auditing products or services to assure conformance to quality standards and performance requirements. These include the costs of incoming and source inspection/test of purchased material, in-process and final inspection/test, product, process, or service audits, calibration of measuring and test equipment, and the costs of associated supplies and materials.

**Failure Costs.** The costs resulting from products or services not conforming to requirements or customer/user needs. Failure costs are divided into internal and external failure cost categories.

**Internal Failure Costs.** Failure costs occurring prior to delivery or shipment of the product, or the furnishing of a service, to the customer. Examples are the costs of scrap, rework, reinspection, retesting, material review, and downgrading.

**External Failure Costs.** Failure costs occurring after delivery or shipment of the product, and during or after furnishing of a service, to the customer. Examples are the costs of processing customer complaints, customer returns, warranty claims, and product recalls.

**Total Quality Costs.** The sum of the above costs. It represents the difference between the actual cost of a product or service, and what the reduced cost would be if there were no possibility of substandard service, failure of products, or defects in their manufacture.

Quality cost reports can be used to point out the strengths and weaknesses of a quality system. Improvement teams can use them to describe the monetary benefits and ramifications of proposed changes. Return-on-investment (ROI) models and other financial analyses can be constructed directly from quality cost data to justify proposals to management. In practice, quality costs can define activities of quality program and quality improvement efforts in a language that management can understand and act on—dollars.

The negative effect on profits, resulting from a product or service of less than acceptable quality or from ineffective quality management, is almost always dynamic. Once started, it continues to mushroom until ultimately the company finds itself in serious financial difficulty due to the two-pronged impact of an unheeded increase in quality costs coupled with a declining performance image. Management that clearly understands this understands the economics of quality.

In the quality cost report, quality costs are grouped into one of four categories:

1. Prevention costs.
2. Appraisal costs.
3. Internal failure costs.
4. External failure costs.

In addition, each category of quality costs is expressed as a percentage of sales. There are four types of performance reports to measure a company's quality improvement. They are:

- **Interim Duality Performance Report.** It measures the progress achieved within the period relative to the planned level of progress for the period.
- **One-Year Quality Trend Report.** It compares the current year's quality cost ratio with the previous year's ratio. More specifically, it compares (1) the current year's variable quality cost ratio with the previous year's variable quality cost ratio, and the current year's actual fixed quality costs with the previous year's actual fixed quality costs.
- **Multiple-Period Quality Report.** It shows the overall trend of quality costs by category since the inception of the quality enhancement program.

Once the quality-related activities are identified for each category, resource drivers can be used to improve cost assignments to individual activities. Root or process drivers can also be identified and used to help managers understand what is causing the cost of the activities.

The principal objective of reporting quality costs is to improve and facilitate managerial planning, control, and decision-making. Potential uses of quality cost information include:

- Quality program implementation decisions.
- Evaluation of the effectiveness of quality programs.
- Strategic pricing decisions; for example, improved reporting of quality costs might be used by managers to target specific quality costs for reductions. A reduction in quality costs might enable a firm to reduce its selling price, improve its competitive position, and increase market share.
- Inclusion of quality costs in cost-volume-profit analysis; for example, overlooking quality cost savings results in a higher break-even and possible rejection of a profitable project.

The control process involves comparing actual performance with quality standards. This comparison provides feedback that can be used to take corrective action, if necessary.

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