16. UNDERSTANDING COSTS OF QUALITY

R. P. Mohanty M.K. Tiwari***

Abstract

In this paper, the authors have carried out an extensive study to review the literatures documented so far by numerous researchers in the area of quality cost. The various approaches used to categorize the quality cost and some of the models of quality costs are discussed. The total quality cost as a percentage of some bases, directly sensitive to fluctuations in business, will give more exact picture of the situation. Various bases used by different authors in priority are found out. The paper aims at spreading the simple message that we need to think about investing in quality in terms of costs (societal resources) to enhance incomes. If any enterprise has a poor quality level, an initial investment in quality will surely lower the operational cost in the long run and will transform the poor quality producer into a high quality provider eventually building the image and multiplying revenue generation.

Keywords: *Quality cost, quality loss, process cost etc.*

1. Introduction

Total Quality Management (TQM) has been accepted as the long-term systems approach by many organizations across the world. The primary purpose of such an approach is to link every element/activity of the organization and align all the elements/activities towards a unifying goal of maximizing return. In the dynamics of competition, return maximization is strategic and requires the prudent management of all costs incurred in undertaking all activities. Quality related costs are such costs which when managed properly give both competitive and comparative advantages to organization.

In recent years, the importance of the quality-related costs has been realized. Quality-related costs represent a considerable proportion of a company's total costs and sales. Wheelwright and Hayes (1985) brought out that IBM's quality costs in the early 1980s were 30% of its manufacturing costs. Burns (1976) measured the quality costs in a machine-tool company and these costs were equivalent to 5% of the sales turnover. In a study of a steel foundry, Moyers and Gilmore (1979) reported the quality costs at 38% of sales. However, in the literature, quality costs are reported to be between 5 and 30% of sales. In the year 1983, MacGregor estimated quality related costs at £10 000 million a year in the UK. It is estimated that the quality costs are bigger in Europe than in Japan and the USA. Referring to the case of Japan, we must note that although there had been rather less concern about the quality cost in Japan, this came from the fact that many companies have striven for an effort to improve quality continuously, under the belief that

**Chair Professor, Dean & Advisor, Institute for Technology and Management Group of Institutions, Navi Mumbai, India.*

***Professor, Department of Forge Technology, National Institute of Foundry and Forge Technology, Ranchi, India.*

improving quality leads to the reduction of product cost. This belief is one of the important maxims advocated in Total Quality Control (TQC) implemented in Japan. However, concern for quality costing has been increasing even in Japan. In addition to the influence of the increased number of ISO 9000-certified companies and the recent institution of a new product liability law, this tendency comes from an unprecedented cost down pressure in order to cope with fierce competition that is caused by slow economic growth. It is clear from the above database that quality costs represent an amount of money too high to ignore. Juran (1952, 1989) described the cost of poor quality as "the sum of all costs that would disappear if there were no quality problems" and presented the analogy that poor quality and its related costs are "gold in mine". Quality costs could be used for the assessment of the quality control system and progress made by the improvement process. Juran made the first attempt, describing the importance of the quality costs, but it was not clear how to manage them.

2. Quality Cost

According to Crosby (1983), quality costs are, first a tool for focusing management attention on quality, and second a measure of the success of a quality improvement programme. The cost of quality is the cost of producing, finding, correcting and preventing defects. Quality costs are the total of the cost incurred by investing in the prevention of non-conformances to requirements, appraising a product or service for conformance to requirements and failing to meet requirements.

3. Quality Cost Categories

Feigenbaum (1956) categorized quality costs into Prevention-Appraisal-Failure costs (PAF). The failure costs can be further classified into subcategories: internal and external failure costs. This classification is widely used and these categories are defined in BS 6143 Part 2 (British Standards Institute, 1990) as:

- ***Prevention cost:*** The cost of any action taken to investigate, prevent and reduce the risk of nonconformity or defect. Typical examples of prevention costs are quality training, quality assurance and quality planning.
- ***Appraisal cost:*** The cost of evaluating the achievement of quality requirements including, for example, cost of verification and control performed at any stage of the quality loop. Examples of appraisal costs are inspection, quality audits and acceptance tests.
- ***Internal failure cost:*** The cost arising within an organization due to nonconformities or defects at any stage of the quality loop, such as costs of scrap, rework, retest, re-inspection and redesign. Scrap, replacement, rework and repair can be mentioned as typical examples of internal failure.
- ***External failure cost:*** The cost arising after delivery to a customer/user due to nonconformities or defects, which may include the cost of claims against warranty.

Crosby (1984) divides quality costs into two categories:

- ***The price of conformance (POC):*** including the explicitly quality-related costs incurred in making certain things are done right the first time, and
- ***The price of non-conformance (PNOC):*** including all the costs incurred because quality is not right the first time.

Crosby's POC includes prevention and inspection (appraisal) costs and his PNOC include internal and external failure costs.

Juran et al (1975), advocates a categorization of quality costs including :

- ***Tangible factory costs***, which are measurable, costs such as scrap, rework and additional inspection.
- ***Tangible sales costs,*** which are measurable costs such as handling customer complaints

and warranty costs.

- ***Intangible costs,*** which can only be estimated, such as loss of customer good will, delays caused by stoppages and rework, and loss of morale among staff.

In Xerox, quality costs are classified into three categories:

- ***The cost of conformance*** (prevention and appraisal)
- ***The cost of non-conformance*** (failure to meet customer requirements before and after delivery),
- ***The cost of lost opportunities.***

Table 1 clarifies the Xerox cost of quality in a tabular form.

Table 1: Xerox cost of quality: Definitions

Term	Definition	Example
Costs of Conformance	Expenses associated with meeting customer requirements	
1) *Prevention*	The cost to avoid failure	Training, communications
2) *Inspection/Appraisal*	The costs to check work	Incoming inspection, preinstall, auditing
Cost of Nonconformance		
3) *Failure to meet customer requirements*	Unnecessary expenses associated with failure to meet customer requirement The cost of redoing work, waste, remakes	Aborted installs, machine replacement, incomplete surveys. Response time in excess of customer requirements, overly elaborate presentati
4) *Exceeding customer requirements.*	The costs of unnecessary "extras"	
Lost Opportunities	Profit not earned owing to lost customers and reduction in revenue because of nonconformance	Cancellation owing to poor service

Wasserman and Lindland (1997) have given taxonomy of quality cost and are represented in Figure 1. (Please refer page no. 144)

So far, prevention, appraisal and failure have been treated equally as quality costs instead of considering the total quality costs, it would be better for a company first to make a distinction between quality costs and quality losses and then try to manage quality losses. The informative difference between quality costs and quality losses is that the former adds value, while the later does not add value and sometimes reduces value. According to these distinctions, prevention and appraisal costs are categorized into quality cost and failure cost is categorized into quality loss in principle. However, there is quality loss even in prevention and appraisal costs because they are not always so successful. In general, they are generated in order to compensate the occurrence of potential failure loss. In Table 2, we have delineated the quality cost and quality loss.

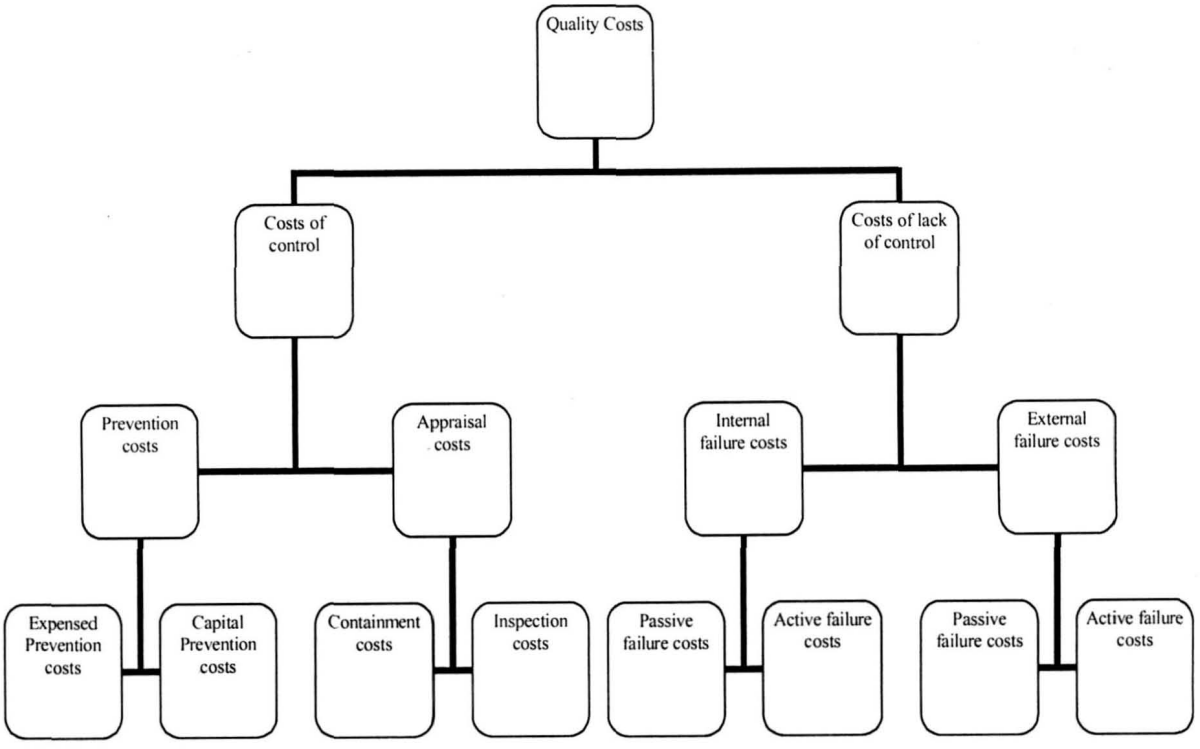

Figure 1: *Taxonomy of Quality Cost*

Table 2: Definitions of quality costs and quality losses

	Quality Cost	**Quality Loss**
Prevention	Money spent on a successful prevention activity	Money spent on an unsuccessful prevention activity plus the sequential losses.
Appraisal	Money spent on successful appraisal activity	Money spent on unsuccessful appraisal activity plus the sequential losses.
Failure	-	All failures
Manufacturing	-	The decrease of the production equipment in order to decrease failures
Design	-	The money spent to achieve more than required product quality

In order to explain these extended quality-related costs further, let us consider the following situation:

A product X is produced in 1000-piece batches from 10 equal machines. The company performs inspection of the incoming materials and found out 9% defect ratio. The company also performs after-production inspection and the defect rate is 8%, of which 7% is due to inappropriate processing and 1% is due to defective incoming materials that passed undetected. In this situation, the money spent on producing the defected products plus the money spent on the purchase of the defective incoming materials is the internal failure loss (IFL). Also, the customers report an additional 0.5% of defective products.

The money spent on the production and delivery of these products along with any warranties and the lost customer goodwill is the *external failure loss* (EFL). It is generally acceptable that external failure is more important than internal failure. The money spent on successfully checking the incoming materials and the products is the appraisal cost (AC); while the money spent on unsuccessfully checking the incoming materials and the products is the appraisal loss (AL). The appraisal cost and loss occur because of lack of prevention in a preceding stage. If all the necessary preventive measures are considered, appraisal would be unnecessary. From that point of view, appraisal could be considered as a loss. But because, it is not possible for such a situation to be achieved, appraisal activities will always exist and of course a distinction between appraisal costs and losses should be made. The incoming material inspection is at most 90% effective, as the company inspectors detect nine out of 10 defective incoming pieces. The management, in order to improve the quality of the product, implemented a calibration and maintenance programme of the production equipment used to evaluate quality. Thereafter, production was resumed and the defect rate fell to 4%, of which 1% was due to defective incoming materials that passed undetected. Then the company checked the production from every machine individually and found that all machines had an average of 2% per machine (0.2% in the total production) of defects, apart from machine No. 1 which had 12% (1.2% of the total production). This happened because of unsuccessful calibration of machine No. 1. The money spent for successful calibration of the machines is prevention cost (PC), while the money spent for the unsuccessful calibration of machine No. 1 is prevention loss (PL). Machine No. 1 was fixed, and defect product ratio decreased to 3% (2% because of process problems and 1% because of defective incoming materials that passed undetected). The production manager desired to improve further the situation by decreasing the machine speed to 80% of the designed level, the defect ratio fell to 2% (1% process related, 1% incoming material related), and if the machine speed is reduced to 60% of the designed level, the defects pertaining to the process were almost zero. According to the PAF model, the decrease of defects is a quality cost reduction. This approach fails to address the fact that the quality cost reduction happened not because of an improvement but due to inefficient use of resources.

Respective brief definitions of the above-mentioned quality costs and losses are summarized in Table 2 - (please refer page no. 144). Loss is defined as the gap between the current situation ('as-is') and the ideal situation ('to-be'). Table 3 - (please refer page no. 146) describes some of the examples of quality cost associated with software products.

Table 3: Examples of quality costs associated with software products.

Prevention	Appraisal
Staff training	Design review
Requirements analysis	Code Inspection
Early prototyping	Glass box testing
Fault-tolerant design	Black box testing
Defensive programming	Training testers
Usability analysis	Beta testing
Clear specification	Test automation
Accurate internal documentation	Usability testing
Evaluation of the reliability of development tools (before buying them) or of other potential components of the product	Pre-release out-of-box testing by customer service staff

Internal Failure	External Failure
Bug fixes	Technical support calls
Regression testing	Preparation of support answer books
Wasted in-house user time	Investigation of customer complaints
Wasted tester time	Refunds and recalls, Warranty costs Liability costs
Wasted marketer time	Coding/testing of interim bug fix releases
Wasted advertisements	Shipping of updated product
Direct cost or late shipment	Added expense of supporting multiple versions of the
Opportunity cost of late shipment	product in the PR work to soften drafts of harsh reviews
	Lost sales and Lost customer goodwill
	Discounts to resellers to encourage them to keep selling the product

4. Quality Cost Models

Traditionally, there exist two schools of thought that normally explain the behavior of quality costs: "quality is free", zero defects, or continuous improvement and the economic school. "Quality is free" establishes that the quality does not have economic effects because it is not an asset capable of buying or selling. The classic economic model establishes that there exists an economic relationship between the two categories of quality cost: to invest in conformity activities will reduce the costs of nonconformity that is to say the model obtains an optimum total cost. These two schools of thought generate important consequences on relevance and the use of quality costs. Researches carried out by the different researchers are presented in Table 4.

5. Quality Cost Bases

Total quality cost compared to an applicable base results in an index which may be plotted and periodically analyzed in relation to past indices. The base used should be representative of, and sensitive to, fluctuations in business activity.

- Total Quality Cost as an average percent of net sales.
- Internal failure costs as a percent of total production/service costs.
- External failure costs as an average percent of net sales.
- Procurement appraisal costs as a percent of total purchased material costs.
- Operations appraisal costs as a percent of total production/service costs.

Table 4: Contributions made by various researchers

Author/ Researcher	Key Focus	Limitations
Feigenbaum (1956)	1. Prevention-Appraisal-Failure (PAF) model. 2. Universal acceptance of PAF scheme for quality costing. 3. Classification of failure costs into internal and 4. External failure costs. 5. Focuses attention on cost reduction.	1. It does not include intangible quality costs such as "Loss of customer goodwill" and "Loss of sales". 2. Ignores the positive contribution to price & sales volume by improved quality. 3. It does not consider process costs.
Crosby (1984)	1. Process cost approach. 2. It categorizes quality costs into the Price of conformance (POC) and Price of non-conformance (PONC).	1. It does not clearly indicate the costs incurred when the product fails inside the factory walls and after it is delivered to the customers. 2. Planning activities are difficult to be identified.
Juran (1954)	1. It advocates a categorization of quality costs into tangible factory costs, tangible sales costs and intangible costs.	It does not focus on the importance of prevention activities.
Dale and Plunkett (1991)	1. Consider the activities relating to supplier, company (in-house) and customer under the PAF categorization. 2. It closely relates to the business activities.	1. Focus on process based costing is missing. 2. Difficulty in identifying key process areas costing more.
Son and Hsu (1991)	1. Proposed a quantitative approach for measuring quality costs. 2. It considers both manufacturing processes and statistical quality control.	1. It is restricted to a simplified manufacturing system, which consists of only a machining area and a final inspection area.
Chen and Tang (1992)	1. It categorizes COQ into direct COQ variables (PAF costs & quality related equipment costs) & indirect COQ variables (customer incurred costs, customer dissatisfaction costs & loss of reputation).	1. Here specifying the COOQ variables puts complexity for quality practitioners.

- Total quality costs as a percentage of production/service costs.

  Gilmore (1983) uses the following bases in priority.
- Gross sales are the most popular base against which quality costs are measured.
- Manufacturing cost is the next most popular.
- Unadjusted value added is the last preferred base.
- Prevention, Appraisal and failure cost as a percentage of the above selected bases.
- Chadha (1999) chooses the following bases for performance evaluation.
- Total quality cost as percentage of total sales. TQC/Net Sales.
- Quality cost rupees per unit production. TQC/Units of production.
- Total quality cost /direct labor.

6. Collections and Reporting of Quality Cost

ISO 9004 – 1: 1994 gives three models for approaching quality costs:

6.1. Quality – costing approach

Quality costing is the conventional approach of categorizing quality costs as prevention, appraisal, internal failure and external failure costs. Prevention and appraisal (costs of conformance) are considered investments, while failure costs (costs of non-conformance) are considered as losses. Applying this approach normally involves investing in a relatively modest increase in the cost of prevention to realize a more significant reduction in the cost of failure, and ultimately a reduction in cost of appraisal as well, thereby substantially reducing the total of cost of quality. In this approach, those costs are excluded which are part of the normal operation of the plant or service.

6.2. The Quality loss Approach

The Quality loss approach attempts to capture the intangible as well as the tangible costs, or losses, due to poor quality. The tangible losses are the commonly measured failure costs, such as scrap, rework, and warranty costs. Intangible losses are the hidden failure costs such as lost sales due to customer dissatisfaction.

6.3. The process-cost Approach

The process-cost approach looks at costs for a process rather than for a product or a profit center. In the process-cost approach, the costs of conformance and non-conformance are defined as:

(a) ***Cost of conformance*** :The costs incurred to fulfill all the stated and implied needs of customers in the absence of failure.

(b) ***Cost of non-conformance*** : The costs incurred due to failure of the existing process.

Cost of conformance in the conventional approach includes prevention and appraisal costs to assure that only good product or service reaches the customer but excludes normal production costs of running a process. The process cost approach lumps together all costs incurred when a process is running without failure and calls them cost of conformance.

The different methods for obtaining quality cost data; their problems and remedies are shown in Table 5. (Pl. refer page no. 149).

The activity chart for implementing the quality cost system in an organization is shown in Table 6. (Pl. refer page no. 149).

Table 5: Different methods for obtaining quality cost data and their remedies

S.No	Method for obtaining quality cost data	Problem	Solution/Remedy
1.	Compilations from a. Payroll records. b. Defect reports. c. Field failure reports. d. Scrap costs reports. e. Budgetary control.	Would not provide cost data for warranty, repair or replacement, quality planning, measurement of quality.	Record from clock observations, the amount of time spent on quality tasks.
2.	Recording time estimates from a. Interviews. b. Questionnaires c. Departmental study.	Information acquired may be under suspicion.	Work Sampling technique to be used.
3.	Estimating from diary maintenance of time spend on quality tasks.	a. Extremely expensive. b. Needs regular updating. c. Subject to substantial inaccuracies.	Slip reporting technique to be used.

Table 6: Activity Chart for implementing quality cost system in an organization

S.No	Activity	Estimated Time	Precedence Constraint
01	Educating and gaining top management support.	7 days.	-
02	Study of various approaches of quality cost.	2 days.	1
03	Categorization of quality costs for selected approach.	1 day.	2
04	Identifying quality costs element according to IS/BIS.	2 days.	2
05	Defining and quantifying the cost elements.	5 days.	2
06	Establishing the methodology for collection of data.	5 days.	3,4,5
07	Collecting quality costs data for each element.	21 days.	6
08	Preparing summary of quality costs.	2 days.	7
09	Reporting and analyzing for improvement.	7 days.	8
10	Presentation before the top management.	1 day.	8
11	Establish the quality cost system and review/monitor.	7 days.	9,10

7. Quality Cost Reporting and Analysis

Company, may summarize quality costs by division, by facility, by department, or by shop. They may be summarized by program, by type of program, or by the total of all programs. The decision must be predicated on the individual needs of the company.

Quality Cost is the non-proportionate change that should be of interest. The index [Total Quality Cost/Measurement Base] is the factor to analyze to bring the index to the point of most economical operation – the optimum point. The index may be plotted so that one can analyze how well performing in comparison to past performance and future goals may be analyzed, refer Figure 2. (Pl. refer page no. 150)

Another method of analysis is to study the effect that changes in one category (prevention, for example) have on the other categories and on the total quality cost, refer Table 7. (Pl. refer page no. 150)

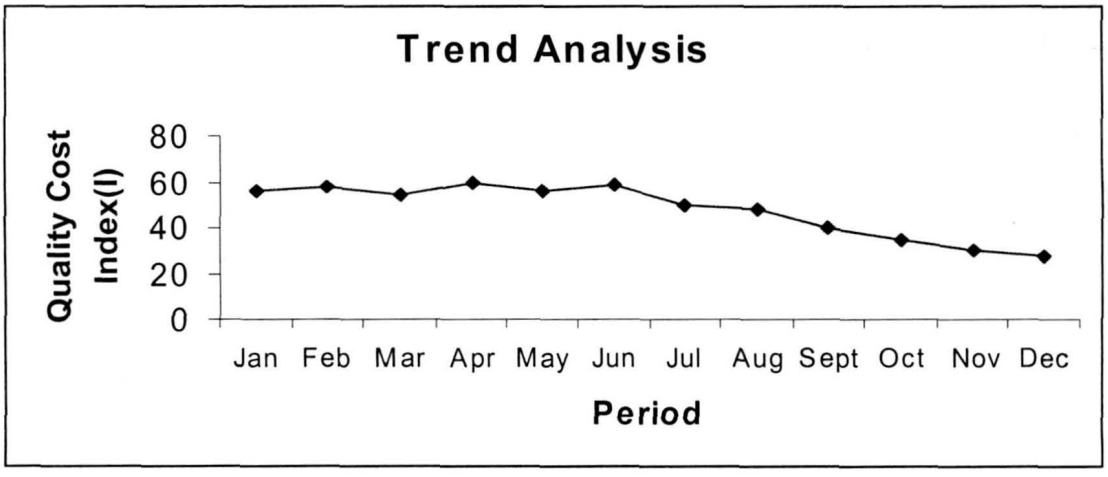

Figure 2: Quality Cost Trend

Table 7: Prevention cost elements and their effects

One must investigate increase in failure costs so that decision can be made on which prevention actions- and prevention costs- can reverse these trends and reduce the total quality cost. One can use other existing quality systems, such as that for defect reporting and analysis, to identify significant problems. While the losses are distributed among numerous causes, these are not uniformly distributed. A small percentage of the causes will account for a high percentage of the losses. This is an adaptation of "Pareto's Principle." These causes are the "vital few," as opposed to the "trivial many." By concentration on prevention of the "vital few" causes, one can achieve maximum improvement at minimum cost. The goal should be to determine and attain an optimum level, where return for the effort expended is greatest.

The amount of detail included in the quality cost report, generally depends upon the level

of management the report is geared to. The report might also identify savings afforded over the report period and point out opportunities for future savings. To middle management, the report might provide quality cost trends by department or shop to enable these managers to identify areas in need of improvement. Reports to line management might provide detailed cost information, perhaps the results of a Pareto analysis, identifying specific areas where corrective action would afford the greatest improvement. Scrap and rework costs by shop are also effective charts, when included in reports to line management. Charts are used to prevent data and trends pictorially. Charts with several ideas usually do not present any of them effectively. Charts can be designed in various ways, depending on their purpose. Line graphs are best for depicting trends, while bar charts are useful for showing proportions and comparisons. Circle or "pie" charts are also used for showing proportions, and are particular effective in illustrating the slice of each silver dollar expended for prevention, appraisal, and internal and external failures. However, circle charts are limited in that they cannot be plotted over time, as can bar charts.

8. Quality Cost Application in Service Industry

Manufacturing organizations for many years to identify opportunities and track improvements had used Cost of quality very effectively. With the service sector's increased interest in quality improvement, quality cost has also been used as a measurement tool for their projects. Quality costs can suggest the improvement areas in educational institutions, banking sector. Within the service industry, there are costs associated with providing and ensuring high quality service and these costs are designated as quality costs. It is difficult to quantify many cost elements in the service sector

9. Identification of Opportunities Areas of Improvement

The uses of quality costs are numerous and diverse. However, these may be grouped into three broad categories. Firstly, quality costs may be used to promote product and service quality as a business parameter, secondly, they give rise to performance measures and facilitate improvement activities and thirdly, they provide the means for planning and controlling future quality costs. It helps companies to decide how, when and where to invest in prevention activities or equipment. It also helps the companies to take the decision on whether to scrap a product or do corrective work. Knowledge of quality costs is of considerable benefit in the education of staff in the concept of TQM as a key business parameter and gaining their commitment to a process of continuous quality improvement. Quality costs are also used to identify products, processes and departments for investigation, to set cost – reduction targets, and to measure progress towards targets. For some of the cost elements which process modifications/ management strategies should be used are shown in Table 8. (Pl. refer page no. 152)

10. Trend Analysis and Predicting Future Quality Costs

Trend analysis is simply comparing present cost levels to past cost levels. The data from this minimum period should be plotted in several ways. Costs associated with each quality cost category (prevention, appraisal, internal failure and external failure) should be plotted periodically and as a fraction of one or more measurement bases thought to be appropriate for future use as indicators of business activity. Elements contributing a high proportion of the costs within a quality cost category should be plotted and analyzed separately. The relationship among the components of quality cost is complex, and it is impossible to develop a functional relationship logically based on the understanding of their behavior.

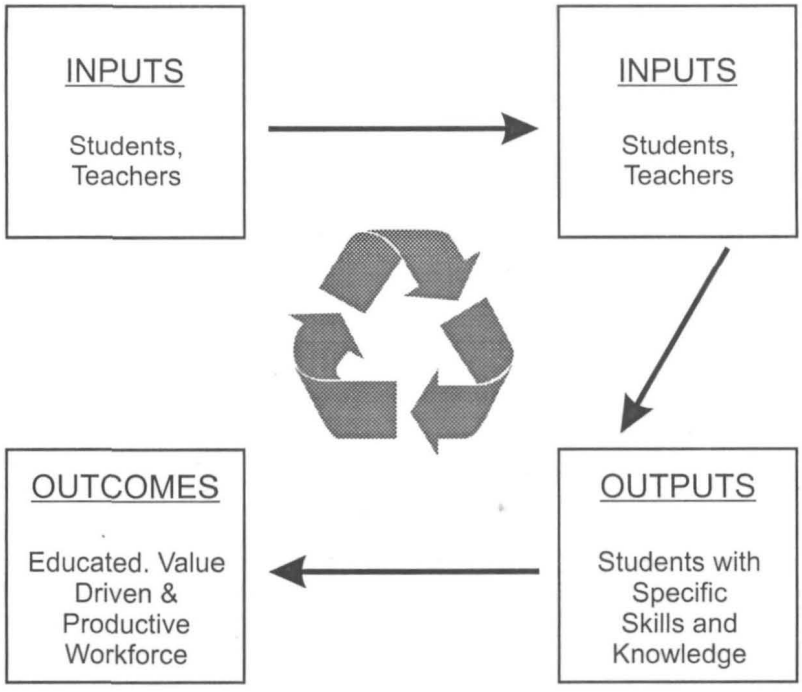

Fig: 1 A Basic Model of Educational Processes

Table 8 : Cost elements with process modifications/management strategies

S.No	Cost Element	Process modifications/Management Strategies
01	Rework	1. Improve Supply Chain 2. Improve supplier's quality system.
02	Excessive In Process Inspection	1. Simplify design.
03	Warranty and Return Costs	1. Not to rush through product through testing. 2. Not to ship defective goods to achieve sales target.
04	Scrap Costs	1. Training to be given.
05	Inspection and Set up costs	1. Investigate the feasibility of changing from 100% inspection to sampling inspection. 2. Develop the methods of reducing set-up time.
06	Incoming Material Inspection	1. Choose the suppliers that provide high quality. 2. Help suppliers establish the quality system.

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11. The Cost of Quality in Education

The basic model of educational process is shown below in Fig.1 (Pl. refer page No. 152)

The ultimate objective of an educational system is to create products (quality students/ citizens), which add value to their work and crate value to the society at large. An educational institution that belives in quality of their products creates constancy of purpose for perpetual improvement and continuously engages in improving every process of the educational system by breaking down barriers between teachers and students, driving out fear, eliminating slogans and artificial advertisements and eliminating so called numerical goals for teachers. World-class universities have instituted vigrous programs of self-improvement for faulty members and engaging them in the work of transformation. The quality education system identifies its critical process: teaching, research and professional service.

Viewed in the above perspective, the cost of quality in education should not be construed as the price of creating quality students/citizens rather it should be formulated as the cost of not creating poor quality students/citizens. As we have seen quality cost are the total of the cost incurred by: investing in prevention, appraising for conformance, failing to meet requirement, failing to meet specifications etc.

We mention below the difference cost categories.

Prevention Cost

The cost of all activities specifically designed to prevent poor quality of teachers and students. Examples may be the cost of admission policy review, selection procedure review, faculty induction and training policy review etc.

Appraisal Cost

The cost associated with measuring, evaluating or auditing students and teachers to assure conformance to quality standards and excellent academic performance requirements.

Failure Cost

The cost may result from students not confirming to the requirements of potential employers. Internal failure cost occuring prior to the students getting out of the institution. Examples may include: examination, testing, reviewing, coaching, counseling etc. External failure cost may be the loss of institutional image due to non-performance of the students in various organizations and blocking future prospects. An institution which would think of vigorous implementation of continuous quality improvement should provide continuing education opportunities for all employees and must use cross-functional teams to improve processes and use democratic decision making at all levels. An excellent educational system should view itself as a learning organization, where all employees are engaged in learning from world-class research and development organizations, universities and corporate management development centers.

Availability of funds plays a crucial role in determining the quality of education that an institution offers. The various costs incurred by

institutions are in the form of wages paid to the faculty and staff, cost of purchasing and maintenance of equipments, recreational facilities, and buildings, purchase of books, software and other state of the art resources like internet, etc. While available funding sources are in the form of tuition fee from students, development grants from government, funds from patents and research, revenue earned as consultancy, testing and validation fee from different organizations, and funds generated by organizing different programs through which the institution sells its expertise. However, institutions with limited availability of funds can also excel if they can judiciously allocate their resources. Sustantial scopes of savings are prsent in costs incurred in maintenance and development activities. In addition, institutions must strive towards increasing their revenues through different curricular and extra-curricular activities (like refresher courses, unit based programs, inter level games and programs), which help in sharpening the skill of the students, and can generate fair amount of revenues. The principles of Total Quality Management (TQM) which advocates the optimization of resources, carries a tremendous potential for cost reduction and enhancement of efficiency of any organization. TQM implementation in education is expected to substantially bring down the cost while ensuring the sustainability of quality and continuous rate of development processes.

Concluding Remarks

Improving the quality of products and services is a common unifying objective of TQM in every organization. While there is a general agreement about quality improvements in all processes and activities, inside an organization, even there is a lack of understanding about quality related costs; because there is no systematic approach to documenting quality cost information. In fact, there exists no strategy to manage quality costs. This paper is an attempt to briefly present some information in order to improve knowledge and understanding the cost of quality such that managers can engage themselves in managing quality.

Summarily, the main purpose of this paper was to present the existing literature and critically analyze such literatures. A cost model is only as good as the inputs it relies on, and how closely these inputs reflect local needs, priorities, and realities. A collaborative process that builds consensus around the model's assumptions and the use of local data to quantify the costs will lend credibility to the estimates the model produces. But the numbers alone will not make the case for increased investments. In the race for quality leadership, it is important for to know which route will get organization to the final destination as fast as possible for the least cost.

Prior research works carried out in academic world and practical implementation undertaken by professionals have concluded that the cost of quality models help in better organizational performance. This study provides broad evidence in support of this proposition. Across a wide range of manufacturing and service sectors companies, Mohanty and Lakhe (1998), Shrivastav, Mohanty and Lakhe (2006) have found considerable evidences that investments in quality management are associated with higher productivity and financial performance. Quality is the degree of excellence at an acceptable price and the control of variability at an acceptable cost.

Quality Cost Analysis looks at the company's costs, not the customer's costs. The manufacturer and seller are definitely not the only people who suffer quality-related costs. The customer suffers quality-related costs too. If a manufacturer sells a bad product, the customer faces significant expenses in dealing with that bad product. The impact of cost of quality management initiatives on financial performance needs to be empirically validated and is an important topic for future research. Companies that fail to understand the relationship between customer value, price and cost of quality are

likely to experience a profit disadvantage in a competitive marketplace. It may be argued here that the adoption of such initiative is equally important than any other strategic initiatives; because of investing in quality permeates the ethics of quality beyond the extended enterprise to survive into perpetuity in sociospheres and biosphere Mohanty R.P. (1997).

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