

Quality Cost Reduction

An overlooked key to sustained Total Quality improvement?

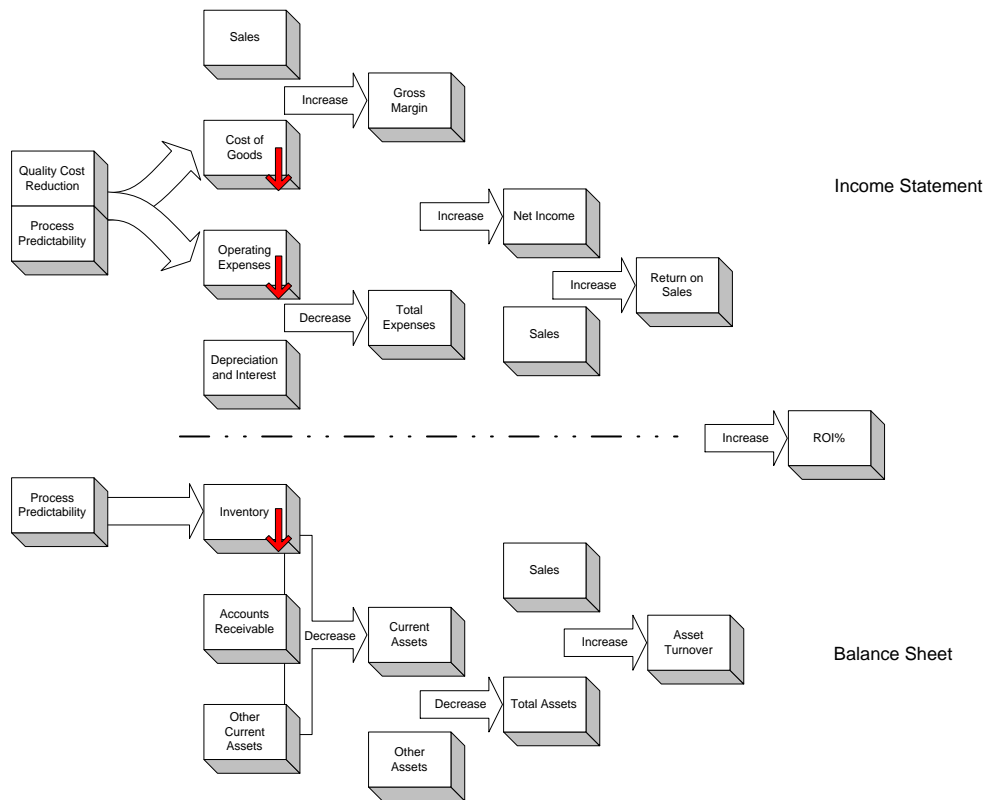
by Charles D. Carpenter

Introduction

Recently, there has been press about the failure of Total Quality improvement initiatives to sustain themselves. Many companies that have gone down the path of continuous improvement are discouraged by the lack of “breakthrough” results and senior management commitment. All of the texts on Total Quality, or TQM, harp on the need for continued commitment from senior management for these initiatives to be successful. What is it that motivates senior management? The answer is straightforward; senior management is motivated and driven to achieve bottom line results and increase value to shareholders.

Quality Cost Reduction (QCR) provides the link between the Total Quality initiative and the bottom line. Quality costs are comprised of elements of the Cost of Goods and Operating Expenses; both are elements of the Income Statement. Reducing quality costs improves Gross Margin and reduces Total Expenses, thus improving Net Income. The Profitability Ratios of Return on Sales and Return on Investment will then reflect the reductions from Cost of Goods and Operating Expenses. As processes are improved and stabilized, Inventory reductions become possible, which are reflected in the Activity and Efficiency Ratios of Asset Turnover, Inventory Turnover, and Inventory on Hand.

How Quality Cost Reduction and Process Predictability Influence the Income Statement and Balance Sheet



QCR is a quality and productivity improvement process that links improvement activities with quantifiable cost reduction. The cornerstone of this process is the establishment of the links

between the general ledger accounts and the costs of making, finding, repairing, and avoiding failures. In other words, quality costs can be defined as the cost of poor performance in both blue collar and white collar processes. QCR places emphasis on breakthrough and continuous improvement resulting in reduced costs, improved quality, and increased productivity in both products and services. QCR supports Total Quality, Cycle Time Reduction, or Just-in-Time initiatives by providing a means to quantify improvements in dollars and, also to provide a systematic approach for solving the problems uncovered by these programs. QCR has three purposes that are related. The first is to provide a tracking system that can be used as an added form of cost control for the company. The second is to identify and quantify opportunities for cost reduction. The third is to provide a systematic approach to solve the problems that have resulted in these adverse quality costs.

To begin an understanding it helps to stratify quality costs into four main categories. These categories comprise effort associated with avoiding failures (prevention), detecting failures (appraisal), and the failures themselves (internal and external). Money and effort expended in prevention will drive down the failures leading to the reduction of appraisal efforts. Another way to look at these costs is to characterize them as:

- the *good* which are Prevention Costs,
- the *bad* which are Appraisal Costs,
- the *ugly* which are Internal Failure Costs, and
- the *ugliest* which are External Failure Costs, (the “defective” products or services that ultimately reach the customer).

Prevention costs are the only quality costs considered as good. These costs are pro-active from the standpoint of how we are trying to improve processes and prevent the occurrence of defectives. Quoting an overused cliché, “an ounce of prevention saves a pound of failure”. If we do a good job of process control through pro-active preventive measures, use the minimum necessary appraisal to collect essential data, and take warranted corrective action, failure costs are minimized. Through preventive activities internal failure costs are driven down. This in turn minimizes the chance that defectives will escape into the customers’ hands, thus minimizing external failure costs. With these two things accomplished, we can then begin to systematically reduce the appraisal activities. It all starts with prevention!

Appraisal costs, also known as inspection costs, are a controllable cost. These are the costs incurred to determine the product’s condition. If the product has been repaired or reworked any subsequent inspections become a cost of internal failure. At first, these costs may appear to be the easiest to reduce, but the production processes must be stabilized and the internal failures must be driven down before the appraisal activities can be reduced or eliminated.

Internal failure relates to a product’s non-conformance to specifications before it leaves the factory. If we generated zero defects, then there would be no internal failure costs. The costs associated with internal failure are generally tracked in some form in most factories. Internal failure costs comprise scrap, rework, re-inspection, re-testing, avoidable process losses, and downgrading of products. This is not an all encompassing list, but it provides the general theme.

External failure costs result from non-conforming products escaping into the marketplace and getting into the hands of the customer, or consumer. We must bear in mind that some external failure costs are unknown, while others cannot possibly be known. Examples would be the loss of a customer or the failure to acquire new customers based upon negative feedback received regarding their company. External failure costs are much greater than the costs of returned goods, warranty, and liability. If we minimize the internal failures, then the chance for non-conforming products to escape into the customers’ hands will be minimized.

Implementing a QCR Initiative

A Quality Cost Reduction initiative consists of three phases. In phase I, which has a typical duration of 2 to 4 months, the opportunities for cost reductions are identified, the cost tracking system is implemented, and priorities are set in accordance with senior management's cost reduction goals. Teams are then formed and trained to tackle the problems associated with the adverse quality costs. Typically during this phase there is only a minor reduction in quality costs, generally associated with the Hawthorne effect (if you monitor it, it tends to get better).

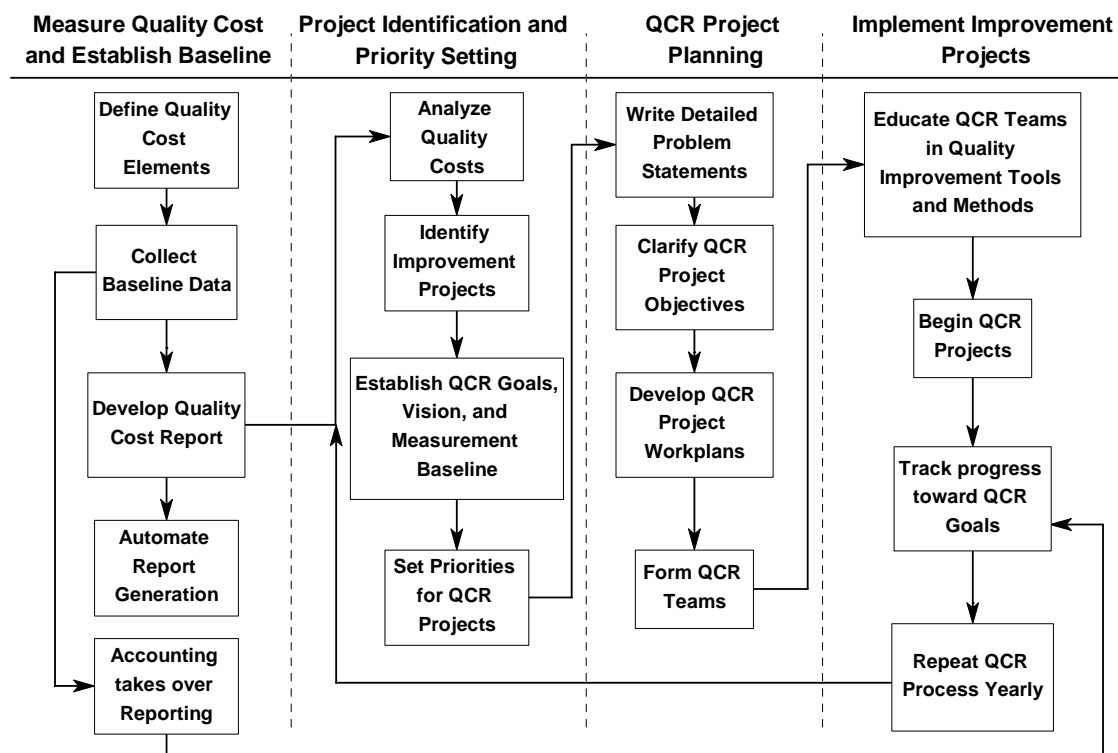
In phase II, which has a typical duration from 1 to 3 years, teams are aggressively attacking the process problems using statistical methods and dramatically reducing the quality costs. Process Controls are implemented as solutions are developed.

In phase III, which has no time limit, the gains are maintained through process control using appropriate statistical methods. The migration from Process Control to Process Predictability is in full motion during this last phase.

The Quality Cost Reduction process has four major steps. The following steps are to be repeated annually and are further illustrated in the QCR Process Flow depicted below:

1. measure quality cost and establish the baseline;
2. identify the opportunities, establish goals, and set priorities;
3. plan the improvement projects; and
4. implement the projects.

Flowchart of QCR Process



A gantt chart follows that illustrates a typical workplan for the implementation of a quality cost reduction initiative. This workplan assumes that there is no quality cost monitoring and tracking in place. If a tracking system was in place, we would start the workplan at the opportunity identification and priority setting tasks. On average, each reduction project takes about 11

weeks to achieve results using a structured, team based process improvement and problem solving approach.

TASKS	MONTH 1				MONTH 2				MONTH 3				MONTH 4			
	w1	w2	w3	w4	w5	w6	w7	w8	w9	w10	w11	w12	w13	w14	w15	w16
Measurement of Quality Costs and Monitoring System Development																
Define the elements of quality costs																
Collect baseline data and develop quality cost report format																
Compile the baseline quality cost report																
Develop system queries and spreadsheets for report automation																
Obtain accounting agreement for reporting responsibility																
Project Identification, Planning, and Priority Setting																
Analyze the quality costs and identify improvement projects																
Establish QCR goals and vision																
Set priorities of the improvement projects																
Write problem statements and clarify objectives of QCR projects																
Develop QCR project workplans																
Implementation of Improvement Projects																
Educate QCR Teams in quality improvement tools and methods																
Begin QCR projects following the workplans (high priority) start wk-10 duration 11 wks																
Begin QCR projects (medium priority) start wk-21 duration 11 wks																
Begin QCR projects (lower priority) start wk-32 duration 11 wks																
Track progress toward the QCR goals (monthly reports)																
Monthly Reports																

The number of improvement projects that are started is dependent upon the resources that can be applied in achieving results and management’s commitment to breakthrough and continuous improvement, which results in reduced costs, improved quality, and increased productivity in both products and services.

An example of a Company with a Base comprising Cost of Goods and Operating Expenses would typically have a Quality Cost value of between 15% and 25% of this base. Generally, the Internal Failure Cost is a least 60% of the Quality Cost. A QCR program can yields savings of 20%, or more, of the Internal Failure Cost in the first 6 to 12 months. Once the internal failures begin to come in line than the Appraisal Costs can be addressed for additional savings. The following table depicts the magnitudes of costs and savings based upon a Company with Cost of Goods and Operating Expenses of \$100,000,000.

Base	Quality Cost as % of Base		Internal Failure Cost of 60%		Savings of 20%	
	Low Range - 15%	High Range - 25%	Low Range	High Range	Low Range	High Range
\$100,000,000	\$15,000,000	\$25,000,000	\$9,000,000	\$15,000,000	\$1,800,000	\$3,000,000

The savings potential and impact to the bottom line are significant. The above is a conservative example of the typical situation found in industry today. This example only looks at the Internal Failure opportunity. There also exists opportunity for savings in the reduction of Appraisal Costs and the External Failure Costs, which depending on the type of goods and services can exhibit a range of diversity.

Contact Charlie Carpenter at EducateVirtually.com for coaching, training, and facilitation of your Quality Cost Reduction efforts.