

9 February 2003

Measuring the Aspects of Quality

Many companies in countries throughout the world have introduced and implemented formal quality systems like Total Quality Management and the ISO 9000 series of standards. Many of these companies have been adapting and evolving their quality systems for years in an attempt to improve their quality and productivity. With the increased focus on using quality systems to achieve customer satisfaction, companies are forced to ask themselves this question: *Are quality improvements efforts worth the cost?*

Although quality is difficult to measure, it can be determined by measuring some of the aspects of quality and then determining how those aspects relate to cost.

How Do You Measure Quality?

Many companies try to measure quality, but they do not always put these measurements into simple financial terms. This makes evaluating quality-related performance difficult. By applying fundamental business management concepts, including financial principles, companies can effectively measure quality.

The table below presents a matrix of measurable parameters that enable a company to measure quality. The table is based on Kaoru Ishikawa's cause-and-effect diagram (also known as the Ishikawa or Fishbone diagram), which quality managers frequently use to analyze problems. Each field contains a measure of quality that is present in most companies. Some of these are more applicable in production environments, while others relate more closely to service environments. Most of these factors can be measured in monetary terms.

	People	Machines	Materials	Methods
Cost Metrics	<ul style="list-style-type: none"> • Training costs • Recruiting Cost • Overtime costs • Employee turnover 	<ul style="list-style-type: none"> • Equipment cost • Operating cost • Repair costs • Added value per hour 	<ul style="list-style-type: none"> • Material costs • Inventory costs • Rework cost • Cost of material waste • Cost to dispose of waste 	<ul style="list-style-type: none"> • Activity cased cost • Engineering costs • Inspection costs • Job set-up costs
Time Metrics	<ul style="list-style-type: none"> • Time to resolve complaints 	<ul style="list-style-type: none"> • Process cycle time • Machine lifetime • Maintenance time • Set-up time 	<ul style="list-style-type: none"> • Return orders • Material shortages • Rework time • Cost of urgent shipments 	<ul style="list-style-type: none"> • Response time to requests • Time to close complaints • Inspection



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		<ul style="list-style-type: none"> • Unscheduled downtime • Repair time 		time
Product Metrics	<ul style="list-style-type: none"> • Employee output • Number of requests handled 	<ul style="list-style-type: none"> • Number of rejected parts 	<ul style="list-style-type: none"> • Reject rate • Number of non-conformities • Customer returns 	<ul style="list-style-type: none"> • Engineering changes • Undesirable side products

Once you get some metrics in place that represent certain aspects of quality, you can start to measure costs and benefits. For instance, you might increase the costs associated with training employees and see a corresponding decrease in customer returns. You might invest in upgraded equipment and see a decrease in the number of rejected parts and a decrease in maintenance time.

You may be able to also tie quality improvement directly to increased sales and revenue. This could be accomplished through customer surveys asking what factors were important in their buying process.

Quality and Profits

Does an increase in quality lead to an increase in profit? A company's quality policy definitely has an impact on its bottom line. Since there is a cost and a benefit associated with quality activities, they can impact both revenue and expense. There is also an impact to revenue and expenses for poor quality. Poor quality will result in reduced revenue and will typically require increased expense to improve. Examples of how quality impacts company profit are shown below.

	Income	Expense
'Good' Quality	<ul style="list-style-type: none"> • More customers • Repeat business • Competitive advantages 	<ul style="list-style-type: none"> • Lower inspection costs • Lower production costs • Lower working capital due to reduced inventory
'Poor' Quality	<ul style="list-style-type: none"> • Loss of business • Penalties for late deliveries/service • Partial or late payments due to customer dissatisfaction 	<ul style="list-style-type: none"> • Rework and material waste costs • Repeat shipping costs • Sorting costs • Warranty costs

Summary

In most industries, satisfied customers will tell others about their positive experiences and can help your business grow simply by word-of-mouth. The opposite is true as well, as



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the bad experiences of one customer can impact others. Poor quality can have other affects as well. For example, it might be necessary for a company to ship products overnight when internal problems have led to delays, causing extra shipping costs for the company. If quality levels are unacceptable, the company can face extra expenses in the form of warranty and rework costs.

By identifying and managing key processes, organizations can determine where quality improvements should be made. Improvements involve some investment in time and costs. The value gained from these quality investments need to exceed the costs, over time.

Quality no longer refers to just products and services, but also processes and systems. Processes and systems are the way that products are produced and services delivered. Therefore, processes and systems must be improved to increase the quality of your products and services.