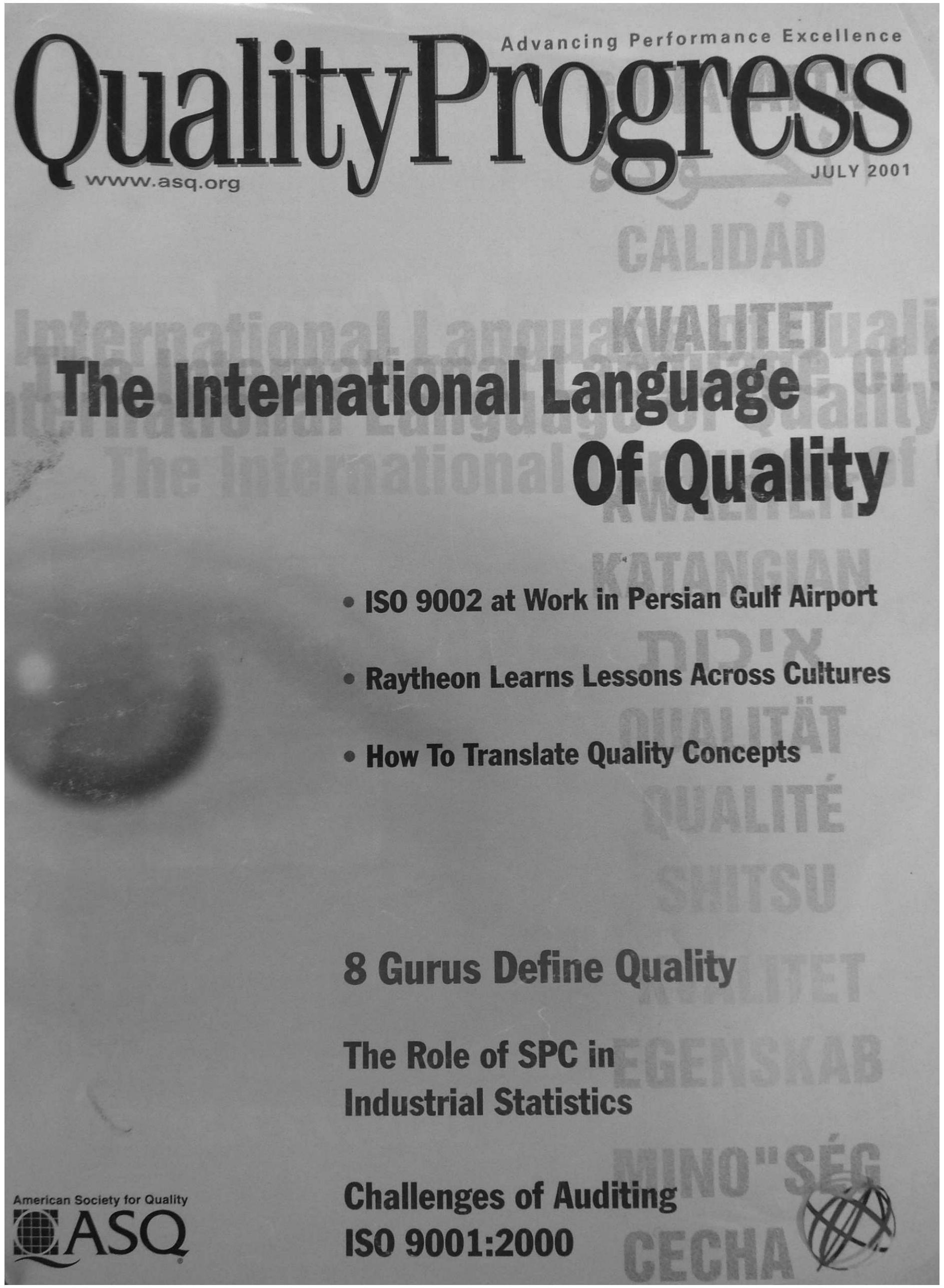


How To Evaluate the Internal Customer-Supplier Relationship

Moving away from a command structure toward the use of quality principles

by

Peter Bialowas and Edith Tabaszewska

ORGANIZATIONS IN EASTERN European countries, such as Poland, are increasingly adopting the principles of quality management as they transition further and further from command to market economies.

The ease with which total quality management (TQM) can be adapted to the specifics of an organization makes it possible to implement its principles in all kinds of companies. TQM's emphasis on the needs of customers, either external or internal, is having a positive influence on Polish organizations because satisfied clients guarantee a large market share and advantageous financial results.

Using TQM, a company develops in two dimensions: an internal one (engaging the work force and improving processes) and an external one (the market). These two aspects of company activity are interrelated. A satisfied work force is more efficient, and its superior results create a positive atmosphere for market development. In turn, external success increases worker satisfaction, particularly when coupled with an increase in earnings.

In today's demanding global market economy, quality management cannot be ignored if a company wants to survive and flourish.

Challenges of TQM implementation

When an organization begins trying to implement TQM principles, it is difficult to compare documented company procedures or processes with their command model counterparts (where workers are accustomed to following instructions without questioning them) in order to find the necessary application changes. The implementation of TQM, instead, works best when it evolves over time, and work force understanding of the principles is the first step in implementation.

It may be difficult for those in the work force to understand and accept principles that are abstract to a majority of them. Furthermore, while the principles are based on management culture, they require acceptance of certain values by the entire work force.

Showing the principles of TQM to those who are on the shop floor in measurable and easy to understand ways is problematic because the

FIGURE 1 Rating System as Given to Internal Suppliers by the Customer

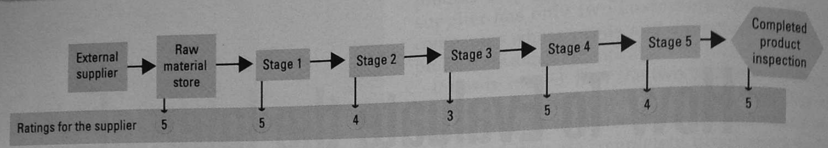
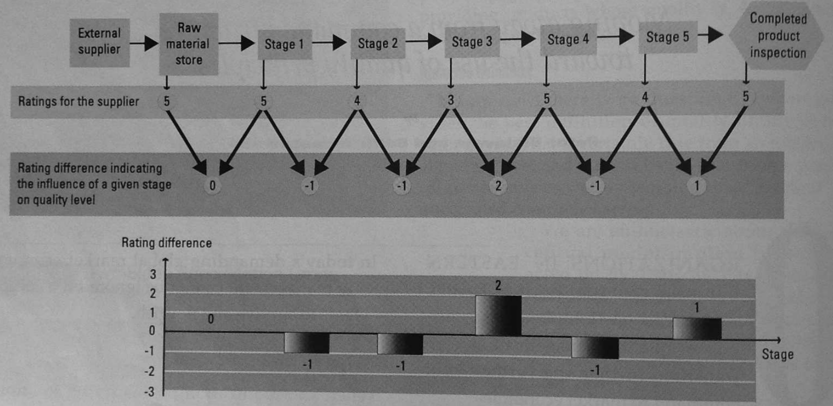


FIGURE 2 The Influence of a Given Stage on the Overall Quality Level



workers are accustomed to clearly stated demands.

The following describes a method developed by the authors that can help organizations transition from commonly used, formal organizational principles to a system in which the full use of quality principles becomes instinctive.

Continuous monitoring of internal suppliers

This method of implementing TQM treats each stage in a manufacturing process as a receiving agent (customer) of the previous stage and as a supplier for the following stage.

Using this system of work organization requires that the person leading the implementation of TQM train the work force, particularly managers of each stage, in quality concepts and tools. The work force has to be assured that this implementation will not have any negative effect on remuneration and is not a subterfuge for qualification testing.

All managers should accept responsibility for TQM implementation within their areas of responsibility, just as if they were the top managers of individual companies. They have the right and duty to demand the highest quality product from their suppliers and the responsibility for the quality of what their departments manufacture for their customers.

The proposed method is based on a system of ratings presented by the customer to the supplier (see Figure 1). The ratings may be monetary, and they go up as the quality of the product or the service improves. This rating given to the supplier not only includes information on the quality of a product but also must indicate the range of problems that need to be solved to improve the present rating and permit delivery of the highest quality product or service.

This rating should be based on certain objective criteria chosen by the supplier, the customer, a technician and a quality assurance (QA) employee. The man-

TABLE 1 Examples of Partially Manufactured Product Feature Rating Of Wool Yarn on a Scale of 1 to 6

Quality rating	Criteria (features)					
	Soiling	Dryness of fiber content	Moisture content of fiber	Evenness of bleaching	Twisting of bundles	Yarn thickness
1	20% and more	3% and more	35% and higher	High—uneven	High	High—uneven
2	20% and more	3% and more	25–30%	High—uneven	High	High—uneven
3	20% and more	1–2%	25–30%	Uneven	Medium	Uneven
4	10–20%	1–2%	20–25%	High—uneven	Medium	Uneven
5	10–20%	1–2%	15–20%	Even	Small—absent	Even
6	Up to 10%	Up to 1%	Up to 15%	Even	Small—absent	Even

Based on wool yarn used in the textile sector

agers' participation in the various stages of the creation of the rating criteria likely helps lead to full understanding of respective requirements and expectations. Both the QA employee and the technician must bring attention to issues that are vital to the process and the final quality of the product.

The rating should focus on the quality of workmanship and product at the stage of importance to the customer. The frequency of ratings may vary, depending on the stage itself and changes in product quality. If, for example, conditions are stable in a given period, the rating will also be applicable for this entire time period. Some ratings will thus change daily while others may last for two weeks, depending on the specific manufacturing procedures.

Different stages of production

The main purpose of the proposed method is to determine how each production stage influences the quality level of a product. The determination of this influence should be achieved by calculating the difference between ratings of a product when it is received from an internal customer at a particular stage of production and those given after that stage (see Figure 2).

A negative difference indicates a decrease in quality, a zero rating indicates no change in quality, and a positive result indicates an increase in quality. To facilitate this calculation, each stage should be rated according to the same scale.

It should be emphasized that the quality level at one stage of the production process cannot be correlated with the quality level at a different stage because it applies to a product at a different stage of completion.

But these levels should be comparable, and every rating should describe the range of product features (see Table 1).

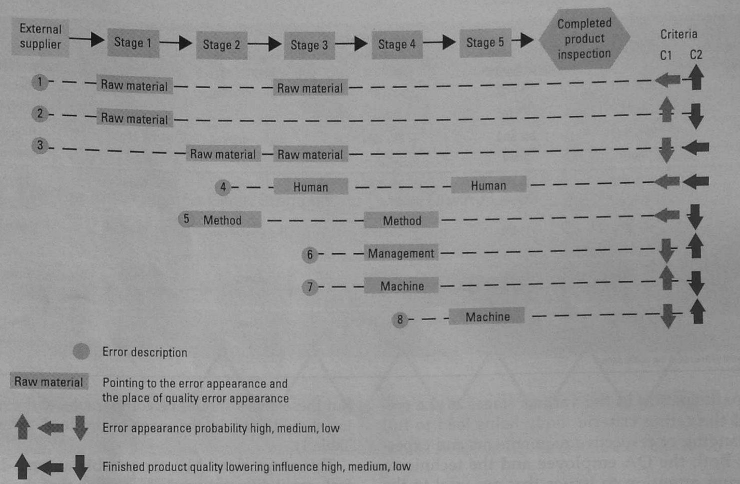
This range should be comparable among different features at different process stages so that the achievement of a quality rating (5, for example) means this same quality level is applicable to a different product stage. Therefore, each quality rating should reflect the degree to which particular features decisive to the quality of a given product are achieved.

If it is impossible to apply such a wide range, the scale should be changed (for example, to every two ratings), while the remaining ratings differ within the full scale (see Table I where only "moisture content of fiber" differs in the first two rows.) Certainly, some features come into play at different stages, and the reasons for problems are not necessarily a result of faulty work by the supplier. Despite this, clearly stated criteria and the knowledge of the process specifics should quite easily pinpoint the precise source of the problem.

It may be helpful to define each rating using criteria that are valid in all stages. In such a way, the lowest rating should mean the level of product quality received from the part supplier that causes problems in the manufacturing process and a high probability of a low quality product (it applies to the stage under the client's supervision). The highest value should mean the level of part quality causing a high probability of the highest quality product with problem-free processing.

It should be stressed that some criterion definitions may be subjective, but the word "high" means "important when taking into account the low quality received from the part supplier" (in the case of Table 1, the yarn

FIGURE 3 An Example of Problems Resulting From Work in Each Production Stage



in bundles). Or it may also mean "creating some problems during the next stage of manufacturing."

Some definitions are understood by workers only after sufficient experience. Nevertheless the phrases defining a level of feature achievement have to be clear to both the supplier and the customer. It should also be remembered that because not every range of detailed criteria will be achieved to this same degree, the final rating should be based on the lowest acceptable feature rating.

The rating received from the internal customer should be used to specify the most important problems in a given process stage. Descriptions of the reasons for certain ratings will surely be used as a tool of quality management. When a company implements this method, a graphic presentation of each stage influencing the process and of the final product should be employed, showing the mean results of a variety of ratings.

The graphs mirroring the whole manufacturing process ought to show all of the problem stages—those where the lowering of quality is present. Therefore, the presentation of the mean values and the differences between ratings given to the supplier by the customer in a certain period of time will help in studying the quality changes at the particular stage.

It is obvious that all these data should be passed on to interested parties. To increase motivation, the graphs could be posted at certain points in production areas. The supplier should also receive information on the most frequent values given in a certain period. This could help in defining main quality problems. In this way, the monitoring of a manufacturing process can be maintained.

If financial capabilities permit, extra remuneration may be given to strengthen the implementation of quality methods and reward improved quality. The amount should be divided among the different production stages reflecting each stage's influence on final product quality. The manager, supervisors and workers should receive the greatest part of this extra payment. Production stages where the rating difference is negative should not receive a bonus unless it can be determined that the situation was not within the control of the people working in that stage.

Defining critical quality problems

It must be stressed that when using this method, it is necessary to possess considerable knowledge of specifics of a given manufacturing process. As previously mentioned, the rating given by the internal customer to the internal supplier doesn't always take into account errors made in the previous stage.

To increase the accuracy of reasoning and fairness of financial sharing, you must define ties between the error, its source and the appearance of connected problems. We suggest a graphic form showing quality problems, taking into account their origin, probability of appearance and importance to the finished product.

Any application of the graphic form will be enhanced by tables that contain all the determinants causing the appearance of quality problems. It appears that line employees' knowledge is most important when determining possible errors. This is in accordance with TQM principles and should positively influence the commitment of these employees to quality.

When coming to conclusions about the influence of itemized errors on the received quality parameters, you may find it helpful to classify the errors using Kaoru Ishikawa graphs. Figure 3 depicts examples of error appearance and their influence on the following production stages.

In practice, the precise analysis of error sources may result in their earlier elimination. It may become evident, for example, that in a certain production stage human factors and not a worn-out machine part have the most influence on error appearance or problems. Such a conclusion should certainly allow attainment of better quality with minimal expenditure, for example by something as simple as developing an employee motivation plan. Additionally, after identifying the probability of an error appearance and its influence on poor quality, you can identify the critical errors (those with a high probability of appearing and having a major effect on the finished product quality).

Training and motivation

The application of this method obviously requires work force training, particularly in companies at the beginning of the long path to quality in a free market. It also is important to adequately motivate the production work force to engage it in moves leading toward the use of TQM principles.

It is assumed that the following may be the basic qualities of the method:

- Speedy information feedback regarding product quality.
- Use of continual ratings to motivate the work force.
- Concentration on the really important issues from process flow and final product quality points of view.
- Enhanced work force engagement at any stage that can be stimulated by bonuses.
- Highlighting of stages that are particularly prone to problems.
- Increased customer quality expectations.
- The possibility of using this method in another process.
- Increased error and problem recognition that otherwise could be ignored, especially when long periods of employment at a company result in loss of objectivity.
- An increase in the initiative taken by line workers. They take more initiative because they can easily obtain information about conditions that influence the quality of their work and because they know their initiative is appreciated.
- Recognition and monitoring of key parts of a manufacturing process.
- Increased bottom to top communication, which is of prime importance when viewing a manufacturing process from the TQM perspective.

The application of the proposed method may be endangered if the work force fears constant evaluation and attempts to boost ratings in ways that make final product quality unrelated to ratings at individual stages.

Used correctly, this method should help determine the most vital variables affecting the quality of a finished product and should indicate those process stages that need special attention.

As quality situations change and problems are eliminated, the criteria used in the evaluation of quality levels may change, and the ratings should increase.

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