

---

# TQM and Information Technology: Partners for Profit

*James B. Ayers*

---

*Almost everyone agrees that information technology has not always lived up to its promise. The experts' and vendors' pledges of improvements in productivity and processes as well as increased efficiency and effectiveness have simply not materialized in many cases. What is now becoming clear is that technology cannot stand alone. It must be coupled with an evaluation of and changes in the broader organizational environment. The concepts of total duality management can help an organization address these broader issues and therefore realize the potential gains of information technology.*

In these times of financial stress, organizations of all sizes are reevaluating their investments in information technology. Despite a doubling of technology investment since 1982, white-collar productivity has not improved.<sup>1</sup> This wasteful technology spending leads to lost profits, unhappy customers, and worrisome erosion of competitive position.

For example, in a large health maintenance organization, the information services department developed and installed a new system for making appointments for patients with physicians. The purpose of the new system was to increase doctor productivity by reducing no-shows for appointments. However, the new procedure required the operator to record many information items about the caller, which doubled the time required by the appointment staff to set an appointment.

The resulting logjam of angry patients waiting on the phone not only did nothing to improve physician productivity, but decreased customer service, which previously wasn't even a problem. The systems staff measured their performance by the fact that the new system was installed with no staff additions -- not by the loss of customer satisfaction.

In another example, an aircraft manufacturer designing a new plane made a large investment in engineering workstations to reduce time

and cost and thereby avoid the substantial financial penalties that would result if the design wasn't completed on time. The workstation vendor promised extraordinary productivity gains, but after one year no increase was traceable to the investment in technology. The manufacturer had overlooked the bugs in the overall design process, particularly in areas not touched by the automation.

The lesson learned from these examples is that new technology can't stand alone. In each case, the information technology staff in charge of the project evaluated only the technology environment, neglecting the broader process environment that includes customer service, timeliness of the process, and cost from a total resource point of view. Information technology has a vast potential to generate the improvements these companies were seeking, and many applications of information technology do meet their original intent. However, many more would be more successful if they were approached in a fundamentally different way.

---

*James B. Ayers has consulted to manufacturing and service clients for more than 20 years. He is currently based in Los Angeles and is a partner with Ingersoll Engineers Inc. of Rockford IL. Ayers holds a BS from the United States Naval Academy and MBA and MSIE degrees from Stanford University.*

In this article, we explore total quality management (TQM) as an approach to helping organizations realize the promise of information technology.

### **The TQM environment**

Just as many CEOs embraced systems solutions in the 1980s, many are now hotly pursuing some version of total quality management. In many cases, TQM is living up to its promise. The philosophy and tools of total quality have a great deal to offer those charged with designing and implementing information systems strategies, and the information systems strategist and technologist should be increasingly prepared to work within a TQM environment.

Too few organizations have recognized the link between TQM and systems improvement and the need to integrate information systems and total quality efforts. For example, in the health maintenance organization, a total quality management environment would dictate that implementation of the new system be examined from the customer's viewpoint. This would have been likely to reveal the problems with keeping people on the phone too long. For the manufacturer, the process orientation of a TQM approach would have compelled the company to examine the entire design process to identify potential areas for improvement. The following sections describe five elements present in successful TQM environments and the overlap TQM has with systems improvement.

***Dissatisfaction with the status quo.*** When senior management constantly strives to improve, a continuous improvement mentality takes hold. The CEO has dispensed with the "if it ain't broke, don't fix it" mentality. Change is encouraged; there is no finish line; and any feasible way to better meet customer needs is implemented, and the instigators are rewarded.

Senior management plays a critical leadership role in these organizations. Its primary task is to promulgate a vision of the future for the organization. This vision should describe the organization and its environment in 5 to 10 years. This is enormously important when at-

tempts are made to gauge how an improvement effort will contribute to fulfilling the vision.

My firm, Ingersoll Engineers Inc., surveyed senior managers regarding obstacles to improving competitive position. By a large margin, they cited lack of vision as the single greatest obstacle. Ironically, they also considered the creation of a vision the least expensive tool available for achieving better performance.

***Customer-driven philosophy.*** The total quality management philosophy of continuous change and improvement is customer driven. These customers should definitely include the internal end users to whom the information systems department supplies services. The IS user community in turn serves other internal and external customers.

With this philosophy in place, every proposal is justified in terms of customer needs. This is the essence of total quality because quality is defined by customers. Such techniques as quality function deployment (QFD), which matches the processes and systems to be deployed to specific customer requirements, are used frequently in designing programs for change. The techniques define the two vectors of quality in customer terms: doing the right thing and doing things right. The first refers to the need for the product or service (i.e., making the right product). The second refers to the execution of the process (i.e., making the best possible version of the product).

---

***The workstation vendor promised extraordinary productivity gains, but after one year, no increase was traceable to the investment in technology.***

---

Benchmarking, which brings outside perspective, helps the company determine how other companies perform similar functions and if they perform them better, assess why they do and what can be learned from their experience.

Ford credits benchmarking with awakening its management to the need for improvement. Without real examples of what others have achieved, claims for success may have little credibility in an organization, particularly one set in its ways. Benchmarking can break down resistance to change and the all-too-prevalent resistance to fresh ideas.

**Process orientation.** Organizations with a total quality philosophy view their operations as a network of processes that provides products and services for the benefit of customers. The enterprise is not seen as a group of functional departments, though functional organizations are created to support the network of processes. For example, the process of new product design may be supported by such functional departments as engineering, marketing, and procurement. In traditional environments, organizations are developed first and processes are then designed around them. If necessary, the TQM organization can change structure frequently as old processes are changed or new processes are needed to meet customer needs.

To drive the point home, these companies often appoint process owners. These owners are senior executives accountable for the effectiveness, efficiency, and maintenance of their processes. An effective owner measures process performance, ensures that the process is constantly improved, tracks the needs of internal and external customers, and introduces new technology when it's needed.

Information technology specialists have many skills to offer in such an environment because they are trained in process thinking. They also are accustomed to working with the statistical data necessary to engineer process improvement.

Organizations focusing on processes look at process performance in expanded terms that include not only cost but quality, timeliness, and capital required. In manufacturing, a growing solution is decentralization of production into cells for more responsiveness to customers. This places the total process in a small, autonomous work unit. In service organizations and in overhead functions of manufacturers, the cell concept is advancing to white-collar

areas through such programs as reengineering. Implementers cite closeness to customers, flexibility, elimination of hand-offs, and employee satisfaction as benefits.

**Team-driven change.** To make changes, companies with a TQM philosophy assemble multi-disciplined teams. Teams represent a broad range of perspectives, including those of the customer or user, suppliers, operators, technical specialists (e.g., systems analysts or manufacturing engineers), accountants, consultants, and line managers. Teams join in training to develop the skills needed to design and implement process changes. They work together to dissect processes, to examine the value of each step in terms of customer needs, and to reassemble the process and supporting organization.

Two sets of skills are required to implement these changes. The first is the analytical set: the ability to critically analyze current practice and to build conceptual models of hypothetical alternatives. The second set is the ability to work as members of teams. This is a much more difficult set to train for, but over time, practice improves this ability. In the early phases, most companies must rely on trained facilitators or consultants to make progress. As line managers become more skilled, change becomes a natural part of everyone's job.

The use of teams captures the knowledge of process participants and ensures ownership of the resulting outcome. The information technologist can be a valuable participant for two reasons. First, he or she can show how technology can contribute to process improvement. Second, as an outsider, the technologist can help the team address more delicate issues like current performance, organization charters in a new process environment, and customer requirements.

**New metrics.** US industry is often criticized for its short-sighted approach of measuring only financial health. Despite some good short-term financial numbers, customer quality can be degenerating unseen unless other performance metrics are applied. Companies with a TQM orientation measure their success by key

factors in the marketplace: customer satisfaction, process performance, and competitive comparisons. These new measures are to be used throughout the entire organization, often in combination with such traditional measures as sales and profits.

Because the changes that accompany a TQM program can be quite disruptive and difficult for employees to adapt to or to integrate, successful attainment of improvement goals in these new success factors should be highly publicized throughout the company. This helps keep all employees focused on the new measures of success and encourages them to continue to strive for improvements in these areas.

### **Gaining competitive advantage with IT**

As simple as these concepts sound, they are extremely difficult to implement in most organizations. Two to five years are needed to make a transformation from the traditional to a TQM environment. In organizations that have successfully adopted a TQM philosophy, constant practice was required to change the corporate culture to one in which continued process improvement became a way of life, and TQM can be successful only if it is a way of life for all employees in the organization.

The companies seen as leaders in establishing this culture will say it's a journey rather than a destination. Some leadership examples include Hewlett-Packard Co., IBM Corp., Federal Express Corp., Ford Motor Co., and many other, smaller companies. The Malcolm Baldrige National Quality Award has increased awareness of quality issues. For the uninitiated, the evaluation criteria, available publicly, provide an excellent standard for self-assessment. Other companies (e.g., Boeing Co.) provide solid standards for suppliers seeking to upgrade quality.

For systems strategists struggling to justify investments in technology and seeking to use information technology to its best advantage, total quality management is a natural fit. The systems improvements that IS professionals know can increase productivity and the quality improvements sought by TQM can have a powerful impact when merged into coordi-

nated efforts within progressive organizations. Although this link is not widespread, because TQM is a relatively recent phenomenon, executive and information systems management should realize that information technology departments have much to offer a company undertaking a TQM initiative.

Because most major systems cover multiple departments, IS departments are familiar with the many functional divisions within the company. This familiarity can be useful when such key elements of TQM as process orientation and team-driven change are initiated in the organization. Both require cross-functional perspectives and participation. IS groups will probably understand the practical implications of major change better than others. Their experience with documenting user needs, outlining systems performance parameters, and training users in new technology can be easily applied to such related components of TQM as customer orientation, new metrics for performance measures, and teaching employees how to revise their work habits and attitudes to accommodate or conform to the TQM philosophy.

---

***Without real examples of what others have achieved, claims for success may have little credibility in an organization, particularly one set in its ways.***

---

In addition, information technology itself has evolved beyond just accounting and financial systems. The hand-held computers now used by delivery services and rental car agencies were adopted to fulfill such TQM goals as process improvements and a customer focus. Expert systems and simulation applications also contribute to TQM approaches.

Information technologists face limitations when it comes to taking a leadership role with respect to total quality. They may be seen as too narrow and tech-oriented by users. They may have had trouble in the past communicating in user terms

with others in the organization or in not meeting user expectations. The users may view systems as part of the problem, not the solution.

Unfortunately, it's difficult to participate if you're unwelcome. After all, respect must be earned, not dictated by higher authority. Information services organizations that have become successful partners for profit with line organizations share some common traits.

First, they are easy to deal with. Their customers have ready access to the organization, even if resource constraints make it hard to do everything requested. Second, they start small and don't over-commit in terms of schedule and benefits. Thus, they build credibility with users. Finally, they focus on projects with high strategic value, complete them according to their commitments, and track the benefits of implementation.

In a poorly performing department, this is not done overnight. But once credibility has been achieved, information services managers can become integral to the management team. Among the roles they should play are the following:

- *Helping senior management develop visions.* Any 5- or 10-year vision needs a technology perspective. Hardly any enterprise will be untouched by the fast-changing pace of technology
- *Helping decide which processes should be the focus for improvement teams.* The top processes should be those that are closest to the customer, have higher-than-needed costs, take too long, or represent a strategic advantage in the marketplace.
- *Participating on improvement teams.* Practically all will, or should, involve systems improvements. The IS manager can be a member part-time or full-time on major teams.
- *Reevaluating the IT budget.* Most IS managers are committed to both new development and maintenance efforts. Any efforts that don't fit the vision should be dropped, and development work should be coordinated with process improvement team efforts to gain the benefit of the team's work.
- *Educating teams regarding technology.* The IS manager can become the internal consultant

to teams, showing how their process improvements can be enhanced by software and hardware developments.

Showing how systems can support new metrics. Most data for measuring operating performance exists in some form in the current information system. The IS manager can help financial and operations managers identify the measures, the source of data, and the reporting requirements for the new

### **Building competence**

Many TQM efforts start with the best of intentions but make little real change. In fact, two out of three programs that are more than two years old are bogged down. Reasons for the lack of success vary, but some common pitfalls include:

- *Lack of measurable success.* Savings or improvements in customer satisfaction are elusive. Usually this means the wrong projects have been undertaken, and no one has taken responsibility for the result.
- *Conflicts with the traditional organization.* New process design almost always requires shifts in responsibility and power inside the organization. Most organizations don't recognize this fact at the outset, and mechanisms to deal with the situation aren't in place.
- *Lack of senior management follow-through.* After the initial euphoria, senior management doesn't attend to the myriad of details necessary to make the program stick. The changes don't take root, and the organization reverts to its prior state.
- *Environmental instability.* Today's markets, competitors, and financial constraints change rapidly. Long-term planning is difficult at best. The pace of external change is unlikely to slow and must be accepted as a given in the business environment. But an agile organization that can flex with these changes is best equipped for survival. So in a real sense, there is little choice but to adopt total quality.

Although there are many obstacles, these difficulties make TQM, closely coordinated with new systems development, more necessary than ever. Indeed, a TQM program, by creating a vision for the future, can enlist information

technology to enable the organization to manage its future rather than be left to react to events.

#### **Notes**

1. S.S. Roach, "Services Under Siege – The Restructuring Imperative," *Harvard Business Review* (September-October 1991).