Center for Quality of Management Journal

Every enterprise is a service company."

The last decade has seen notable changes in quality approaches in North America. There has been a significant migration from an emphasis on error/cost reduction (i.e., quality in manufacturing) toward corporate-wide, growth-enhancing approaches aimed at providing strategic advantage in the marketplace. This paper discusses the tailoring of TQM to mesh with these new approaches, specifically in businesses that are part of the service sector.



Figure 1: Model for Managing and Sustaining Excellence

The Service Model

The objective of quality management is no longer just reducing defects, but rather increasing the value that customers receive on a sustained basis. Companies that have successfully implemented state-of-the-art quality programs beyond the confines of manufacturing have recognized this difference. They have augmented manufacturing-oriented techniques and made quality a major strategic advantage by applying its tenets to realize their business objectives.

The model for excellence shown in Figure 1 is based on recent CQM research projects.

At the heart of this model are customers and partners. One side of the triangle establishes the vital link between quality system implementation and the company's business planning and management. In the 1996 spring *CQM Journal* (Vol. 5, No. 1) are articles describing the work of CQM companies to integrate Russell Ackoff's powerful strategic planning process, Interactive Planning, with the operational strength of TQM. The articles by Thomas Powell listed in the bibliography are also interesting on this point.

The second side of the triangle recognizes the central role of cultural pathways among employees and customers. Discovering these pathways and taking them into account helps enhance emotional commitment to desirable or necessary systemic changes. You can find discussions of different dimensions of these issues in the 1995 winter *CQM Journal* (Vol. 4, No. 4) and in articles describing the work of Clotaire Rapaille written by Bemowski and the American Quality Foundation.

The base of the triangle confirms the importance of the subject of this paper: tailoring and

optimizing TQM approaches for each individual business. A "one-size-fits-all" formula never fits all.

The Journey

CQM's research project on tailoring TQM to service companies' needs got under way on March 29, 1994. The CQM Service Study Group convened in response to CQM members' wishes for better understanding of the application of TQM in the service sector.

The members of the study group are listed below in Table 1

Victor S. Aramati	DIGITAL
Frederick B. Cunningham	Keane, Incorporated
Joanne Dustin	Keane, Incorporated
Gerald J. Giaccai	Federal Reserve Bank of Boston
Julio Almeda Gomes	Massachusetts Institute of Technology
Sally Green	Federal Reserve Bank of Boston
Christine Maurer	Massachusetts Institute of Technology
William O'Halloran	Synetics
Linda Ridlon	Center for Quality of Management
Ted Walls	Center for Quality of Management
Toby Woll	Center for Quality of Management
Robert Wood	Writer, Boston University
	Table 1: Study Group Members

The Angst

The study group members identified a range of shared concerns:

- They had all found it difficult to implement TQM programs throughout their organizations after the 6-Day Course.
- Most of the examples used in the 6-Day Course reflected experiences from manufacturing companies. These examples did not seem relevant to service organizations' needs.
- Some members had stumbled in trying to apply the 7-Step Problem Solving techniques and metrics to their environment. Their internal business processes were not clear or were hard to describe, and the processes tended to change frequently. Therefore, improvements in service processes were hard to achieve. The study group members found that if you can't map it, you can't measure it; and if you can't measure it, you can't improve it.
- Some members wanted to focus on process mapping but were unable to tie Voice of the Customer (VOC) techniques and business process management together in a scheme for added customer value.
- Study group members recognized a strong link between customer satisfaction and employee satisfaction. They wanted to understand if this link affects the service sector in some unique fashion.

- Members indicated difficulties with gathering data for measuring quality of service. They realized that performance data was lost when calls/contacts passed from hand to hand.
- Members found that their organizations, as service providers, had to understand the customers' processes in order to succeed.
- Members indicated that their service organizations (or for that matter, any unit within an organization that lay outside of manufacturing) had difficulty using the TQM tools to benefit their customers.
- They felt a general need to understand better the application of TQM in a service environment.

The Process

Following the approach used successfully by other CQM study groups, we agreed to the activities shown in Figure 2. During the initial meetings over several months, the study group researched and reviewed the work of thought leaders in the area of managing for service excellence. Christine Maurer did a literature search and summarized key articles. Christine's summary is available in the CQM library; a more complete bibliography is included at the end of this article.



Figure 2: Research Development Methodology

To ground the discussion in experience, each of the participating companies presented key insights or initiatives:

• Vic Aramati described DIGITAL's work to reengineer five core processes and DIGITAL's use of the process Palettes and Six Sigma. In addition, Vic discussed the need to provide backup systems to support and empower employees so that they, in turn, can create satisfied and secure customers. Digital had recognized that to reassure the customer the employee must feel secure.

- Synetics described their initiative to develop promotion criteria to ensure that management had the appropriate skills to manage processes and people. Synetics also shared their qualitative customer survey results, which highlighted the company's need for clear processes. Finally, Synetics described one of their discoveries: What they thought was a process problem in their help desk application turned out to be a communication problem.
- One member described the internal survey they had done to identify how to promote managers who had appropriate skills.
- Keane presented their exploration of important things to consider in determining how to measure service quality; for example, they had the idea of surveying employees to find out what they liked about their customers.

Several themes began to emerge as common to all the participating companies' efforts to meet customer needs:

- Timeliness of information
- Efficiency of processes
- Link between customer and employee satisfaction
- Lack of knowledge about and use of process management

We began to think that if we could develop an effective diagnostic model, it would be easier to develop tailored solutions for achieving excellence in service delivery.

The LP

To validate the appropriateness of the issues the case studies and readings had surfaced, each company committed to doing a Language Processing (LP) session with a diverse group of employees who provided service. The question each LP group was asked was:

What are the impediments that keep you from serving your customers on a daily basis?

Of particular value was an LP everyone could relate to. It was completed with employees from sales, marketing, help desk, and operations departments. Figure 3 gives the LP report as it was presented. The insights and conclusions were the subject of intense discussion and learning. Some key themes from the LP:

- Insufficient staff
- Insufficient data
- Communications difficulties
- Tendency for staff to learn from the customers what the company is doing before they are told by the company
- Policy and standardized process constraints

• Lack of clarity about who is responsible for customer satisfaction



Figure 3: LP Completed by a Cross-Functional Team

Potential Solutions

At this point in the research process, the study group decided to identify the specific elements that had an impact on service delivery. Based on our current understanding, we hypothesized that the following elements were important, and that the following known quality methods could address them.

Employee Satisfaction (addresses the link between employee and customer satisfaction): We knew that there was an emotional component to be calculated both for employee satisfaction and for customer satisfaction. To the degree that there was data to show that there was a correlation between employee satisfaction and customer satisfaction, we hypothesized that the former could be a barometer for the latter. If this proved true, then one solution suggested would be to use surveys and other systems for testing the level of employee satisfaction as an early warning system for the levels of customer satisfaction. We also thought that it was critical to address the reward and recognition system for individuals and teams in the service environment. (Digital, Keane)

Management Skills: The ability of managers to effectively manage programs and drive change in an environment where employees are confronted with the reality of customers who are "here-and-now" seemed very important. It seemed critical that managers have a process orientation and act as shock absorbers for their direct reports. Managers needed to take responsibility for fine-tuning the system while allowing the employees to concentrate on dealing with each "unusual case." So the team theorized that program and process management training and skill were essential for managers. (Synetics, Federal Reserve Bank)

Information Access (addresses insufficient data): To the degree that up-to-date information was key to the individual employee's ability to manage the customer's needs in the "here-and-now," a reliable information infrastructure was viewed as critical by the study group. The use of a Notes-type database and the concept of a knowledge aquifer that would be available to all employees regardless of the point of customer contact were suggested as ways to invest resources for the greatest payback. (Federal Reserve Bank, Synetics, Digital)

Process Management and Improvement (addresses insufficient staffing and inadequate knowledge of processes): In the area of service processes, the group hypothesized that a variety of TQM methodologies could be applied in many different ways to good effect. For example, by using Concept Engineering as part of a service process design effort, a company could get customers to help define the service and could involve internal stakeholders who might otherwise sabotage the process. An organization could use ISO certification to enforce a process orientation and to begin process definition and documentation. Goldratt's Theory of Constraints and process modeling could help companies anticipate staffing needs and could offer ways to handle the exceptional as well as the steady state. In addition, it was suggested that companies should study new structures (e.g., roving teams or automatically reallocated resources) as a step toward creating effective and efficient processes. Finally, the group hypothesized that the ability of service processes to have real-time feedback loops and data gathering made these processes a rich ground for improvement. (Synetics, DIGITAL, Federal Reserve Bank)

Metrics and Relation to Performance (addresses lack of accountability and responsibility): Confronted by the universal experience that developing metrics in a service environment can be very difficult, the study group suggested that using ISO certification as a discipline could speed up the development of standards. We considered voice of the customer as a tool for testing the relevance of metrics that were selected. We also discussed the discipline of Hoshin management or policy deployment as a possible "solution" to service organizations' characteristic unwillingness to assign metrics. (all members)

Empowerment and Authority to Act (addresses policy and regulatory constraints): Finally, given the "here-and-now" quality of many service operations, the study group hypothesized that top management and CEO initiatives were critical to mobilizing change efforts. Employee behavior change, and training of management to inspire the new behaviors, should help create the correct mindset for service. The group saw the chartering, building, and training of teams as essential ingredients in a service environment. The goal would be to engender in employees the ability to feel-and be-empowered, in such a way that all employees would take the authority and responsibility for satisfying the customer at the same time that they would enhance their own sense of satisfaction. K. Bemowski's interesting article about the work of Clotaire Rapaille on teams (see Bibliography) enlarges on this idea. (Federal Reserve Bank, DIGITAL)

Enterprise Model and Process Matrix

We adopted a model of an enterprise and developed a matrix for the analysis of service processes.

To test the preceding hypotheses, our enterprise model (or, for that matter, any business entity, no matter how small) can be very simply described as a closed loop system that starts and ends with customers. The enterprise consists of employees and managers who work on value-adding processes for the sake of the customers. Customer feedback and satisfaction measurements are constantly gathered, allowing a process of continuous improvement. There is also a partnership with suppliers. The glue that maintains the whole system is the information stream or "knowledge aquifer." The definitions of these individual elements are listed below, and the system as a whole is shown in Figure 4. (For simplification purposes, Figure 4 does not show the environment, competitors, regulatory agencies, etc.)



Figure 4: Enterprise Model

Customer: Anyone, whether internal or external to the enterprise, who is impacted by a product, service, or process.

Process: An interrelated sequence of value-adding actions performed to achieve an output.

Process Management: Understanding, measuring, controlling, and improving a process to achieve an output desired by the customer.

Supplier: One who supplies necessary people, materials, or information to add value to the process.

Information: The collective experience and knowledge that is needed to add value to the process.

Employees: Those employed by the enterprise who provide added value to the process.

Management: The collective body of those who manage an enterprise or a collection of processes.

Metrics: Standards of measurement.

In the context of this enterprise model, the study group considered the typical business processes that exist within service sector companies such as hotels, fast-food restaurants, insurance companies, and consulting firms. We identified three types of business processes common to all service companies:

- Operational processes
- Moment-of-Truth processes
- Innovative processes

Table 2 relates these three processes to many different elements and dimensions of organizations. (Hereafter we will simply refer to this table as "the matrix.") This format was inspired by and adapted from the excellent work by A. T. Kearney (see Bibliography).

Elements/ Dimensions	Operational Process	Moment-of-Truth Process	Innovative Process
Process Management	Repetitive, measurable, easily applied statistical tools.	Repetitive process, unique situations.	Repetitive but creative to yield unique solutions.
Customer	Generally not involved in process.	Has "here-and- now" needs, is often "in-your- face".	Has longer-term working relationship, mutual understanding.
Suppliers	Ensure that right resources are available on time.	Generally not involved in process.	Partner and complement skills.
Information	Defined in advance and documented.	Must be diverse, accurate, and instantaneous; requires interpersonal skills.	Fosters communication and consolidates knowledge.
Employee Skills	Process control, teamwork, problem solving.	Presentation, empathy, and sensitivity.	Sensitivity to customers' latent needs, creativity.
Management Skills	Delegation of authority to stop the process.	Delegation of authority to satisfy customers' immediate needs.	Delegation of authority to shape outcome. Management of innovation.
Metrics	Concrete, definable.	"Perception is Reality" hard to track.	Project management, customer acceptance.

Table 2: The Matrix

For some examples of what we mean, consider those shown in Table 3.

Business	Operational Process	Moment-of-Truth Process	Innovative Process
Hotel	Laundry	Check-in	Design of a new facility
Fast-Food Restaurant	Kitchen	Order taking	Design of a new sandwich
Insurance Corporation	Claims processing	Sales/customer service	Design a new claim form
Consulting Firm	Accounts receivable	Customer presentations, walk-throughs	New project

Table 3: Examples of Business Processes that Exist in Service Sector Companies

Having agreed that the matrix captured most of the critical elements of the business processes, we decided to:

1. Verify whether or not the study group's observations were in fact borne out in our companies;

2. Validate the matrix as a tool for diagnosing and prescribing how to manage in a service environment; and

3. Generate additional examples of how member companies have actually implemented solutions.

The next sections describe the results of our efforts to verify and validate the three key processes and the matrix by generating case studies from our own companies. At this stage in the research, the study group also began to observe that, although we were looking through the lens of service organizations, the matrix seemed equally applicable for any enterprise in any sector. We will expand on this point in "Discussions and Dialogue."

Operational Process

Elements/Dimensions	Manifestations
Process Management	The process is repetitive, yields tangible results, and can be measured and controlled with statistical tools.
Customer	The "customer" is the next process. External customers do not usually participate directly in the execution of the process.
Supplies	Suppliers participate in the execution of the process by ensuring that the right resources are available on time.
Information	The needed information (data, process description, quality standards, etc.) is defined in advance and documented.
Employee Skills	Employees need to be skilled in process control, teamwork, and problem solving.
Management Skills	Managers need to give authority and capabilities to employees, to monitor the performance of the process to standards, and to stop the process as warranted.
Metrics	Metrics for Operational processes are concrete and definable.

Table 4 below restates important aspects of Operational processes.

Table 4: Important Aspects of Operational Processes

Operational Process Case Study: The Federal Reserve Bank of Boston

The mission of the Federal Reserve system is to conduct monetary policy, to ensure the safety

and soundness of the banking system, and to ensure the integrity and promote the efficiency of the U.S. payments system.

A TQM program has been applied to various business processes at Boston's Federal Reserve Bank in support of new product development (e.g., electronic check products) and improvements to existing processes (e.g. Fedline customer support). The 7-Step Problem Solving Method and traditional quality control (QC) tools were used widely but met with varying degrees of success. The "Check Error Reduction" was selected as a test case for Operational processes.

To set the context, the Fed performs accounting functions to debit and credit the accounts of paying/receiving financial institutions. Checks are physically sorted for delivery to the paying institution. The Fed sorts dishonored checks (insufficient funds, stolen, fraudulent) sent in by paying institutions, returns such checks to the bank of first deposit, and makes the necessary accounting adjustments.

The goal of the Check Error Reduction project was to reduce the number of internal errors in the check operation.

The problem-solving approach used by the Fed involved teaming, the 7-Step Problem– Solving Method, process maps, LP diagrams, Pareto charts, cause-and-effect diagrams, checksheets, solution and implementation matrices, and so forth.

Table 5 helps to demonstrate the usefulness of the matrix we are proposing.

Elements/ Dimensions	Manifestations	Solutions
Process Management	 Repetitive check sorting process, yields tangible results, measurable and controllable with statistical tolls. Only management has data. Not always easy to extract needed data from system. 	 Develop manual and map process. Create feedback reports showing error data at detail level. Use jam stamps (i.e., "inspected by") Long term: There needs to be an easier way to get the data. Continue to review error rates for variation.
Customers	Customers are also our suppliers.	See below.
Suppliers	Suppliers are also our customers.	 Improve "internal supplier" input. Secondary outcome: initiation of partnership between the Boston Fed and customers to focus on improving incoming

		work.
Information	• The needed information can be defined in advance and can be documented.	Ongoing meetings to review data.
Employee Skills	• Employees skilled in process but not in teamwork or problem solving.	 In-house sorter operator training by Unisys. Employee performance feedback generated.
Management Skills	 Errors not known until down the line. Strict processing and shipping deadlines dictate that jams, not people, stop the process. 	• Stopping the process in not highly feasible or necessary, in this case.
Metrics	 Customer satisfaction survey metrics. Standard Federal Reserve system and bank targets. Customer-driven metrics not yet in place. 	• Long term: Metrics must be linked more closely to customer satisfaction.

Table 5: Check Error Reduction Case Study Matrix

Summary

In summary, the Boston Fed's check sorting process conformed to the characteristics of the Operational process description. In terms of its process management, it responded well to the use of the 7-Steps, 7 QC tools approach to improvement. The outcome also confirmed that beneficial improvements occurred in the other elements/dimensions that the matrix identified (e.g., customer and supplier relationships, information usage, employee skill development).

The key benefits of the project: Errors were reduced; other improvement efforts were spawned; teamwork and staff involvement increased; employees were exposed to new skills; there was increased feedback and communication; recognition was given; internal/external project publications generated interest; and partnerships developed within the bank, within the industry, and with other Feds.

The key learnings:

- The 7-Step Problem Solving Method worked well here.
- Process mapping (with modifications) is an extremely helpful tool.
- The team had lots of data but lacked an easy way to get to it and manipulate it.

- There was a prevalent assumption before this project, that people with 20 years' experience at the Fed did not need training.
- Employees were surprised that they were capable of using the quality tools.
- Teams should have at least one person capable of doing analytical activities.
- Taking people off the line for extended projects, is extremely difficult; consequently, improvement efforts require quick TQM methods.

Moment-of-Truth Process

Table 6 below summarizes important aspects of Moment-of-Truth processes.

Elements/Dimensions	Manifestations
Process Management	The process is repetitive, but employees must cope with unique customer situations and demands.
Customers	Customers have "here-and-now" needs and are often "in-your-face." Time is not your friend.
Suppliers	Generally, suppliers do not participate in the execution of the Moment-of-Truth processes.
Information	Diverse and accurate information is critical for employees to satisfy instantaneous customer needs.
Employee Skills	Good interpersonal skills and sensitivity to customers needs are critical.
Management Skills	Managers must ensure employees' satisfaction and skills, create a strong backup system, and delegate authority to front-line staff so they can satisfy the customers' immediate demands. managers' role is to monitor staff's real-time performance and give coaching feedback, because employees are too engaged in delivery of the service to self-diagnose.
Metrics	"Perception is reality."

Table 6: Important Aspects of Moment-of-Truth Processes

Moment-of-Truth Process Case Study: DIGITAL

Digital Equipment Corporation is a world leader in implementing and supporting networked platforms and applications in multi-vendor environments. Building on its core competencies in software, systems, networks, and services, DIGITAL, working with its business partners, provides a complete range of information-processing solutions from personal computers to integrated worldwide networks. DIGITAL develops, manufactures, and sells products and services worldwide.

The DIGITAL Call Center, serving the Americas, opened in November 1996. Customers and partners dial toll-free numbers, such as 1-800-DIGITAL, and are linked directly to Customer Care agents, or CCAs (voice response units have been eliminated) who address questions and

manage calls to a complete resolution. Handling more than 100,000 calls per month, the Call Center is staffed by a diverse group of knowledgeable professionals specializing in customer care, telemarketing, telesales, order management, and finally presales technical support. In the presales process, the subject of this case study, technical support specialists interact on the telephone with customers seeking solutions in real time.

The call escalation process is worth describing here.

- 1. All calls are received by the Customer Care agent, who strives to understand the caller's issues and operating environment and decides, based on process documentation, where to connect the call. Meanwhile information about the call is entered in a database and forwarded along with the call; this eliminates the need for the caller to repeat the questions, a source of customer irritation.
- 2. Appropriate calls are directed immediately to the Technical Support specialist who is most knowledgeable in the specific product area. These specialists, in turn, provide customers and partners with configuration assistance and technical product solutions.
- 3. If the issue is complex, the call can be routed to Advanced Support specialists, also within the Call Center. There, consultation with the client can be done off-line; in a three-way conversation; or, if DIGITAL staff need time to research questions, during a callback session. In fact, Advanced Support personnel maintain a laboratory that allows them to simulate the caller's environment so as to experience the problematic situation directly.
- 4. If Advanced Support cannot resolve the caller's concerns, they have a direct link to DIGITAL engineering teams, who can provide real-time engineering information and support.

Once the caller's issues are resolved, the Advanced Support person is responsible for sharing the gained knowledge with the rest of the team. In fact, part of the compensation package is based on knowledge sharing. Advanced Support personnel enter the knowledge they acquire in a Web page for their product category. This eliminates redundant discovery and problem solving. The whole process is documented, practiced, measured, and constantly improved based on weekly customer feedback obtained by a third-party customer satisfaction survey.

The Call Center management believes that employee satisfaction is vital for high levels of customer satisfaction in the Moment-of-Truth process. Therefore, they have devoted particular attention to training and rewards. Technical and Advanced Support teams are trained in:

- Call Center processes and tools.
- Generic technology geared toward the knowledge level of the individual.
- Product-specific know-how and certification.
- Interpersonal skills: "Total Quality Relationships" and "Relationship Selling" are courses focused on conversations with customers on the telephone. Supervisors spend additional training time on techniques for auditing live conversations and providing positive feedback and coaching. This extensive training gives Call Center personnel the ability and the tools to delight their customers.

The compensation of the Call Center personnel is also oriented toward incentives for satisfying

the customers. For example, part of the bonus of Advanced Support personnel is based on:

1. Team delivery of quarterly knowledge transfer goals. The quarterly team goal is 120 knowledge transfer hours; for example,

- one hour of credit is earned for each Technical Tip published in the Technical Support WWW homepage,
- one for each hour of on-line technical consulting via WWW homepage TechTips, and
- eight for each four-hour seminar prepared and delivered to Technical Support, CCAs or telesales.

2. Individual average issue resolution time. The goal is to achieve an average escalated issue resolution time of 16 working hours.

3. Call Center Quality goal. The attainment of a Call Center quality metric of 88 percent in customer satisfaction meets this goal.

Table 7 illustrates the applied Moment-of-Truth process in the DIGITAL Call Center case.

The DIGITAL Call Center's high-performance team has had exceptional success in its solutions, which are customized to the dimensions of the Moment-of-Truth. It is striking that in this case the "soft side" of the transaction is addressed with very concrete solutions. For example, the company provides specific training in telephone skills and applies metrics to knowledge transfer while monitoring and maintaining very specific productivity metrics. Management receives training in fostering morale and in coaching skills to relieve the stress of the environment. Finally, the team gathers and acts upon customer input weekly, obtaining constant (if not real-time) feedback. This case serves as an excellent example of how particularly important it is to tailor traditional quality implementations to real-time processes.

Elements/ Dimensions	Manifestations	Solutions
Process Management	 Multiple presales calls asking how to enhance a current computing environment. These calls need to be nurtured to potential sales leads. The process is repetitive but could lead to a variety of outcomes. 	 Shift from a voice response unit to live Customer Care agents who help guide callers to the correct process/product queue. Process mapping: Formal queuing, routing, and escalation process developed, documented, practiced, and measured. Definition, qualification, documentation, and measurement of sales

		leads
Customers	• End user (customer, partner, or a DIGITAL sales representative) has business needs for DIGITAL products and wants an answer now.	 Setting of a Call Center goal: to have customers feel, "<i>I am glad I called</i>." Training in ability to recognize caller's specific needs and customize dialogue accordingly.
Suppliers	 Internal suppliers provide information, deliver training, manage flow of data, etc. External consultants and suppliers provide information systems, telephone switches, etc. 	• Suppliers are heavily depended upon but do not participate directly in the "here-and-now" process.
Information	 All calls must be handled to minimize the number of transfers and the need for callers to repeat information. The needed information is diverse and technical 	 Caller information, problem solving, knowledge, and tools are: Categorized and made widely available. Web based, with a searchable index. Made available to partner with a password.
Employee Skills	 "Customers can be very tough; working phones can burn people out. You have to like people." Everyone has to have ability to provide answers to technical questions that will result in customer confidence. Excellent interpersonal skills and sensitivity are needed: "capability without the arrogance. "Personnel should be technically oriented, fast learners, resourceful, problem 	 Hiring based on knowledge and potential for telephone skills. Heavy emphasis on training, including special technical training and telephone etiquette (correct but rude answers are disastrous). Bonus-augmented compensation that reinforces knowledge transfer. Documented job descriptions and hiring process.

	solvers.	
Management Skills	 Ability to lead an engineering team. Direct experience with the work. Ability to create a reasonable and enjoyable atmosphere in a high-stress environment. Understanding of the fact that employees will treat customers exactly the way they are treated. 	 Standard operating procedures manual that describes required management role, style, and direction. Open offices (no wall to ceiling) and casual dress code <i>for all</i>. Challenge to managers to capture the team's enthusiasm and show that it can make a difference.
Metrics	 Metrics designed to allow the call Center to reach the goals of: Responding within seconds, sharing information, and providing correct answers quickly. 	 Manager audits of live conversations and regular coaching feedback. Call Center weekly aggregation of third-party customer satisfaction survey. Operational metrics such as: Number of calls per day Number of calls rerouted and to whom Percentage of calls mistransferred Average speed of answering the phone Number of sales generated Knowledge transfer Issue resolution time

Table 7: Applied Moment-of-Truth Process for DIGITAL's Call Center

Innovative Process

The important aspects of innovative processes are described in more detail in Table 8.

Elements/ Dimensions	Manifestations
Process Management	The process is creative and yields unique solutions.
Customers	The customer is someone whose needs require a working relationship and mutual understanding. Time is your friend in these relationships.
Suppliers	Suppliers are your partners and complement your skills, services, and abilities to execute the process and/or solution.
Information	Information systems are needed to enhance communications among all stakeholders, project information management, and consolidation of knowledge.
Employee Skills	Employees must have sensitivity to customers' latent needs, superb creative skills, and ability to share skills and knowledge.
Management Skills	Managers need abilities to develop employees' skills, monitor projects, manage innovation, retain people, and give authority to people to shape outcomes.
Metrics	Critical metrics are project management and customer acceptance data.

Table 8: Important Aspects of Innovative Processes

Innovative Process Case Study: Synetics

Synetics is a full-service worldwide systems integrator. The firm has earned a reputation for technical excellence and for its commitment to continuous process improvement. Its core capabilities include information systems planning and requirements analysis, network design and installation, system acquisition, software application development, help desk reengineering, training and maintenance, and support. Characteristically, consulting service providers see each customer's contract as unique and resist well-defined business processes. Yet Synetics recognized that process management, crucial to:

- Managing and meeting customer expectations;
- Making the best use of information systems;
- Mobilizing the workforce;
- Establishing and managing to metrics.

Synetics' efforts to apply the 7-Step Problem Solving Method to their business processes had proved difficult. However, the proactive TQM problem-solving tools, Concept Engineering (CE) and Quality Function Deployment (QFD), turned out to be extremely useful. These tools facilitated customer buy-in and satisfaction and helped promote a mutual understanding of customers' needs and solution technology up front. Synetics integrated the TQM tools into several programs:

• *Rapid Action Development.* RAD is a high-speed process-oriented software development methodology involving a small team of users and developers.

- *Joint requirements planning and joint application design.* JRP and JAD make use of frequent customer reviews.
- Notes databases and standard project notebooks. Development teams share information on projects and services through such tools. Parenthetically, the "Project Notebook" is a Synetics success story that emerged from an employee suggestion program; an award-winning 7-Step quality action team developed the Notebook. The Notebook was adopted widely throughout the company and is now also offered as an application for customers.

Synetics used Concept Engineering to develop an information system for a distributed help desk application.

The customer-the IRS-had conflicting ideas about what their distributed help desk should be; Synetics, for its part, believed that a preconceived solution would not meet customers' demands. CE offered a concrete and productive methodology for developing a new solution that would meet customer demands. Because of time constraints, the team experimented with shortcuts to the CE process. For example:

- The JRP was used to collect the voice of the customer (CE step 2).
- The Synetics team performed the requirements LP but not the image LP (step 3).
- The team did the importance questionnaire but not the Kano questionnaire (step 7).
- The team used QFD to correlate requirements with functions but not with metrics (step 7). (For a description of the CE steps referred to above, refer to the CQM Manual *Concept Engineering*.)

This is an excellent illustration of learning, using, and adapting TQM techniques in an innovative process environment. The modified CE process worked very well for Synetics despite time and customer constraints.

To test the innovative process matrix, Synetics recorded their experience. (See Table 9)

Elements/ Dimensions	Solutions
Process Management	Identify repetitive project processes; apply project management tools to measure and control.
Customers	Partner with customer to achieve mutual understanding of customer needs and solutions technology. (Concept Engineering proved useful here.)
Suppliers	Team with other firms and consultants to complement skills; need for value-added reseller (VAR) relationships to provide full service system integration solutions, pricing and mutual sales support.
Information	Share on-line databases for financial status against plan, process documentation, and Project Notebooks.
Employee Skills	Employees need communication skills, to relate with

	customers and understand their needs; state-of-the-art expertise on a variety of tools and techniques; a high degree of creativity, to meet customer expectations; and the ability to work in teams, an essential for sharing skills and knowledge.
Management Skills	Managers must have project management skills for complex innovative projects, the ability to mobilize and empower highly creative teams, and leadership qualities conducive to an environment that will grow and retain professional staff.
Metrics	Identify, document, and measure key processes; use project management tools to track key well-defined metrics; implement ISO9001 quality structure as a good discipline for documenting processes.

Table 9: Synetics' Innovative Process

Summary

In the Innovative process case study, the need for a project management orientation and project metrics is clear. However, the emphasis is on tools like Concept Engineering to create mutual understanding; and the focus on managing for creativity distinguishes Innovative processes from the other two types of processes.

One Company-Three Processes: The MARKEM Application

The CQM Service Study Group presented its findings to the CQM Chief Quality Officers Roundtable on June 14, 1995, a meeting graciously hosted by Energy Systems Industries in Boston, Massachusetts. The team asked the roundtable members to apply and test the model in their business environment. Participants from MARKEM, Titleist and Bose have validated the usefulness of the model. We will include here the feedback from MARKEM, authored by Richard P. Bangham, Division Manager, Customer Service.

MARKEM Corporation is a global enterprise that provides in-plant printing systems for product identification and decoration application. The corporation is headquartered in Keene, New Hampshire, with more than 1,600 employees worldwide and annual sales in excess of \$200 million. The business encompasses the design and manufacture of printing systems; sale of supplies (e.g., ink for printing); and sales/service, with particular attention to the elimination of equipment downtime.

MARKEM Corporation has concentrated activities in the development of printing systems that employ a wide range of technologies. Current efforts include the application of digital-to-print technology. New generations of products will set standards for product performance in terms of image quality, resolution, speed, and reliability.

MARKEM evaluated its processes and their characteristics using the matrix for the three types of processes.

Operational Process: Bulk Shipments to MARKEM Business Centers

MARKEM serves its non-U.S. customers primarily through business centers located in key areas of the world. Each MARKEM business center receives in weekly bulk shipments goods to serve

its customers from Keene. The consolidating, packing, and shipping of these bulk shipments is an operational process. (See Table 10)

Elements/ Dimensions	Manifestations
Process Management	Weekly repetitive process leads to tangible results in terms of bulk accuracy, which is measurable and controlled with data.
Customers	"Customers" are MARKEM business centers in the Netherlands, Britain, Singapore, Canada, and Mexico.
Suppliers	Three primary manufacturing centers are in Keene, NH.
Information	The needed order information is defined in advance and is documented.
Employee Skills	Employees are skilled in the process, but not in teamwork and problem solving
Management Skills	Errors are not known until discovered by the customer, the MARKEM business center that receives the shipment.
Metrics	"Bulk Accuracy Report," expresses accuracy as a percentage of items shipped, at the line level (e.g., 99.5 percentage line shipment accuracy).

Table 10: MARKEM's Consolidation, Packing, and Shipping Process for Bulk Shipments

Moment-of-Truth Process: The Tech Service Hot-Line

MARKEM offers a tech service hot line (an 800 number) for customers to use when they have technical questions and problems with regard to the operation of their MARKEM printing system. (See Table 11)

Elements/ Dimensions	Manifestations
Process Management	This is a help desk-like service: Customers call and ask for their particular questions or problems.
Customers	The customer's an external MARKEM customer (end user) who has a "here-and-now" question or problem with the operation of a MARKEM printing system.
Suppliers	MARKEM's three business groups are the primary information source for hot-line staff.
Information	Tech support requires a broad, very diverse, base of technical application and knowledge.
Employee Skills	Employees need strong interpersonal customer-focused skills; Technical competence in mechanical. electrical, and software areas; and lots of MARKEM system application experience.
Management Skills	Managers delegate authority to tech service hot-line employees to satisfy customers.
Metrics	None.

Table 11: MARKEM's Tech Service Hot-Line

MARKEM's Model 6000 Rotary Gravure System Development

MARKEM continues to develop new products integrating new technology. One example is the Model 6000 rotary gravure system. (See Table 12)

Elements/ Dimensions	Manifestations
Process Management	The purpose of the creative process is to design and develop a pad printing system that moves the art of pad printing to a reliable production process (i.e., broadens the market for MARKEM in-plant printing systems).
Customers	Customers are external industrial manufacturing companies using competitive pad printing equipment and/or silk screening.
Suppliers	Supplier is MARKEM's Science and Engineering Division.
Information	ISO9001 design review procedure, Project Notebooks, Concept Engineering, and so on provide information.
Employee Skills	Needed are communication skills, interviewing skills, ability to work in teams, creativity, ability to translate customers' words into deeds.
Management Skills	Needed are project management skills, leadership abilities.
Metrics	ISO9001 design review practices serve as metrics.

Table 12: MARKEM's Model 6000 Rotary Gravure System

MARKEM has embarked on a Concept Engineering project to develop a pad printing offering that is much easier to set up and operate effectively in an industrial manufacturing environment.

Summary

Richard Bangham wrote, "I found this exercise extremely useful. A light bulb went on for me when I discovered the fact that we are very light on using metrics in evaluating our [tech service hot-line] performance, the fact that we have not empowered people in our Bulk Shipping Department to problem-solve as a means of improving accuracy, and the fact that ISO9001 practices are very useful in Innovative processes."

Dave Walden on Moment-of-Truth Service Processes

Having attended several Service Study Group sessions, Dave Walden, CQM's director of R&D, submitted a note on "Statistical Process Control in Moment-of-Truth Service Processes." The following is an adapted excerpt; the entire note is available from the CQM library.

Moment-of-Truth processes are those processes where service workers must deal with customers in real time, such as airline ticket clerks or customer support hotline personnel. [Clotaire Rapaille has described his research showing that customers' loyalty is demonstrably higher when they have received an excellent response to a problem than when the customers have not encountered any problem at all.] People personally involved in Moment-of-Truth processes often feel that their processes are different from Operational processes such as one often finds on a manufacturing line. And indeed, some statistical process control (SPC) techniques that are typically applied to control or improve Operational processes may seem more difficult to apply to Moment-of-Truth processes.

Yet the use of SPC for Moment-of-Truth processes is an important early step people should consider as they seek customer satisfaction. Using SPC may be the only valid way to tell whether a Moment-of-Truth process is working correctly and what factors contribute to that success. Furthermore, use using SPC may be the only valid way to tell whether improvement efforts are making things better, wasting efforts, or actually making things worse. For instance, some factors that may be important to control Moment-of-Truth processes include employee satisfaction, [because employee satisfaction and customer satisfaction are correlated]; information systems [to provide the data employees need in dealing with customers]; company policies, practices, and economics; empowerment of employees to make real-time decisions to deal with customer situations; employees' expertise with regard to company policies, practices and economics; employees' interpersonal skills; and so on.

Once one has decided which factors to investigate, there are many ways to establish cause and effect. First, one might simply change one factor in a controlled way (e.g., give additional role-playing in listening skills) and see if the results metrics change. Second, one might try to develop quantitative metrics (e.g., objective or subjective "listening skill ratings" for employees) and then use statistical methods to find correlations with results metrics. Third, one might try to find correlation between the results metrics for different employees and the employees' specific characteristics – for example, their profiles, their Myers-Briggs profiles, their years of experience in Moment-of-Truth processes, and so on. In any case, SPC may be necessary to validate apparent changes in performance.

However one evaluates and measures Moment-of-Truth processes, practice is critical. The people best prepared to deal with unexpected Moment-of-Truth situations are those who have worked hard in advance to practice handling these situations before they occur in real life– people such as airplane pilots, top-rank tacticians on racing sailboats, successful salespeople, and surgeons. For front-line personnel the chances of successfully navigating a Moment-of-Truth are a lot better if people can apply what they know from a known, commonly successful pattern of responses, as in the DIGITAL case study.

Discussion and Dialogue

We started this paper by proposing a model that necessitates the tailoring and optimization of modern TQM approaches to various businesses--a model that avoids the reliance on a one-size-fits-all formula for quality programs. In particular, CQM members from the service sector found that they had difficulty when they tried to apply the manufacturing companies' strategy of deploying 7-Step Problem Solving throughout the company. The CQM Service Study Group undertook to understand the unique environment of service firms and, to adapt TQM practices to fit this environment.

But the team's true discovery (the Aha!) was that a unique quality approach is not needed for the service sector. Instead, we realized that there is a natural emphasis or bias in manufacturing enterprises that is different from the emphasis in the service enterprises. In a manufacturing environment, Operational process management and improvement techniques are crucial, while an external customer focus may often take a back seat. The reverse is true in service companies, where it is difficult to recognize the added value to the customer of improving Operational processes as against the urgency of serving the customer in real-time through Moment-of-Truth and Innovative processes.

In fact, the study group came to understand that all organizations deal with each of the three types of processes in the course of doing business; and the unique characteristics of these processes in different organizations demand different strategies and methods to enhance and improve them. So, while the 7-Step Problem Solving Method may be an effective emphasis in a manufacturing enterprise, service companies may choose to limit their deployment of 7-Step Problem Solving to identifiable Operational processes. The focus in service enterprises, at least at first, may be on Concept Engineering, project management, and communication skill building in their Moment-of-Truth and Innovative processes. The challenge for every organization is to recognize and differentiate between the different processes, diagnose the strengths and weaknesses in the different elements/dimensions, and deploy the correct improvement methodology.

The matrix developed in the course of this research has been tested and has proved useful as a way to diagnose and shape quality programs based on the target audience (the business process and its workers). The matrix becomes the tool through which a company can decide how to tailor TQM methodologies for specific types of processes. The matrix presents how process management, customer and supplier relationships, information resources, skills, and measurements will vary depending upon the nature of the process. It allows us to acknowledge and recognize that methods that may be appropriate for manufacturing may not, for example, work well for teleselling.

For example, let us consider training. As a firm decides how to prioritize training dollars and resource time, should it give the same training to those involved in Operational processes as it gives to those involved in Innovative or Moment-of-Truth processes? This paper suggests not. In fact, one of the causes of the angst that existed among the study group members was that we had all been trying to implement the same tenets of TQM everywhere from the factory floor to the sales office. The study reported here, however, suggests specialization is valuable and offers a verified tool (the matrix) to facilitate customization of employee training. For the Operational process folks, firms want to emphasize statistical techniques and teamwork. The primary focus for the Moment-of-Truth folks is interpersonal skills and empathy. The Innovative folks would certainly benefit from skill in project/program methodology and Concept Engineering.

Using a customized approach, a firm can tailor its quality training program and implementation strategy to be more cost effective and to have greater appeal and relevance to the target population.