

The Center for Quality of Management (CQM): A US Experiment in Mutual Learning

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1 Introduction

In early 1990, seven Boston-area companies formed the Center for Quality Management to learn from and aid each other in their TQM implementations. These companies were:

- Analog Devices, Inc.
- Bolt Beranek and Newman Inc.
- Bose Corporation
- Digital Equipment Corporation
- GE Aircraft Engine Division
- Polaroid Corporation
- Teradyne, Inc.

The companies that formed the CQM had characteristics typical of companies that decide to implement TQM [1, chapter 23]. With few exceptions, the seven companies that formed the CQM were all suffering from the economic slowdown that began in the late 1980s. Also, the CEOs of several of the companies had personally visited Japan and observed its business practices. At least one of the CEOs had lived in Japan, most had divisions in Japan and traveled to Japan frequently, and some had studied Japan's business practices through trade association committees on international competitiveness. Furthermore, several of these CEOs were regularly in contact with each other through existing business associations, such as the Massachusetts High Technology Council. Thus, business crisis and awareness of TQM as practiced in Japan motivated these CEOs to practice TQM.

The availability of three key individuals also made formation of the CQM possible. Ray Stata, founder of Analog Devices, was—and is—a well known figure in the Massachusetts high technology community, had influence with other CEOs, and was personally

inclined to seek improved business methods.¹ Thomas Lee had been a noted engineer at General Electric who had retired from a senior executive position at General Electric to become a professor at MIT where he directed a research laboratory. He was then invited to serve as director of the International Institute for Applied Systems Analysis (IIASA) based in Austria where he had met TQM expert Shoji Shiba. Upon completing his tour of duty at IIASA, Tom Lee returned to MIT as a professor emeritus with with a mission to help improve business practice in the United States, his adopted country. Tom Lee introduced Shoji Shiba to Ray Stata and other Boston-area CEOs, and in November 1989 arranged for Shoji Shiba to give a seminar at MIT that several of Boston-area CEOs attended.

As a result of whatever problems they were having at their companies, their knowledge of Japan and TQM, and Professor Shiba's introduction to TQM, the CEOs of the seven above mentioned companies decided to start the Center for Quality Management. Ray Stata of Analog Devices was chairman of the board, Professor Thomas Lee of MIT (on a part-time, pro bono basis) was president, and the board of directors consisted of the CEOs or other senior managers of the founding companies.²

The CQM was formed on the basis of a three-element model for societal diffusion, as expressed in its mission statement:

The mission of the Center for Quality Management is to accelerate understanding and implementation of quality management concepts and methods by creating a network of like-minded organizations to share knowledge and experience. This will require a common language and a shared understanding of the basic methodologies to define problems and design solutions. In the broadest sense, the long-term objective of the Center is to promote organizational and societal learning about how to improve the performance of human systems.

This model paralleled model that Shoji Shiba described that existed in Japan (mostly shown in Figure 1):

- An infrastructure to support networking
 - i. National promotional organization
 - ii. Training
 - iii. Knowledge dissemination
 - iv. Societal promotion activities
 - v. National standard certification
 - vi. Development of new methods
- Openness with real cases
- Change agents (or catalysts)

¹He had co-authored a book relevant to innovative management practices: *The Innovators: Rediscovering America's Creative Energy*, James Botkin, Dan Dimancescu, and Ray Stata, University of Pennsylvania Press; Reprint edition, March 1986.

²In essence, Tom Lee, Ray Stata, and Shoji Shiba were the *individual* co-founders of the CQM.

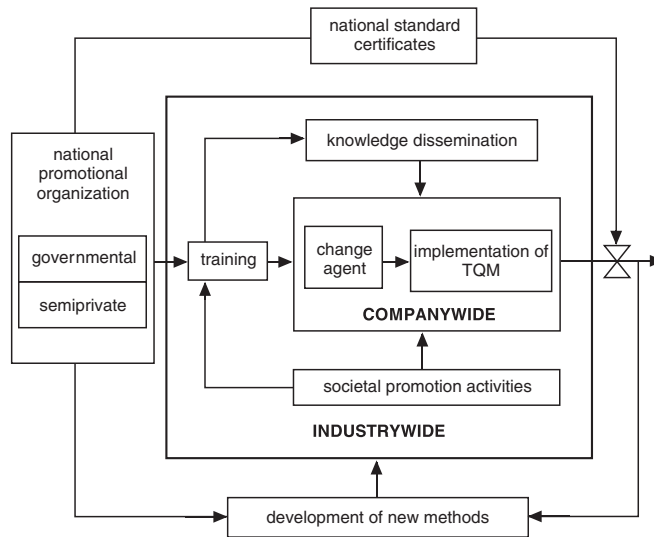


Figure 1: Infrastructure for Networking [shibafig16-2]

2 CQM design study and first year

Having decided to form the CQM, the founding CEOs needed a plan for the CQM's functions and operations, and they needed a joint understanding of what TQM was. To this end, they undertook a five-week design study in March and April of 1990. This design study was led by Shoji Shiba. All of the participants were senior line managers or senior quality staff members from the CQM companies, except three participants from MIT.

2.1 Five-week study

People from the first five companies plus MIT participated in the five-week design study. Shoji Shiba of Tsukuba University was our guiding advisor.³ Therefore, the CQM design study team was cross-functional, intercompany, and international. Although we did not realize it at the time, Shoji Shiba was guiding us through an example of PDCA, as defined in Table 1. The following text and Figure 2 describe the flow of our activities.

As part of the planning phase (Plan), we did team building, considered our goals, and were given basic TQM education.⁴ We did an LP diagram⁵ on what we learned about TQM (see top left of Figure 2).

In the visit stage (Do), we read about the companies we were to visit when reading materials were available. For each company we visited, we prepared an LP diagram of questions we wanted to ask. For the Japanese companies, Shoji Shiba translated our LP into Japanese and faxed it ahead so they would know what questions we had. Then, we

³I participated in this design study, representing my company, Bolt Beranek and Newman.

⁴In 1990, Shoji Shiba and the CQM Design Team were thinking in terms of TQM, the first set of methods adopted by CQM member companies. Today's reader may mentally substitute "business improvement methods" for TQM.

⁵Known outside the CQM as a KJ or JK diagram.

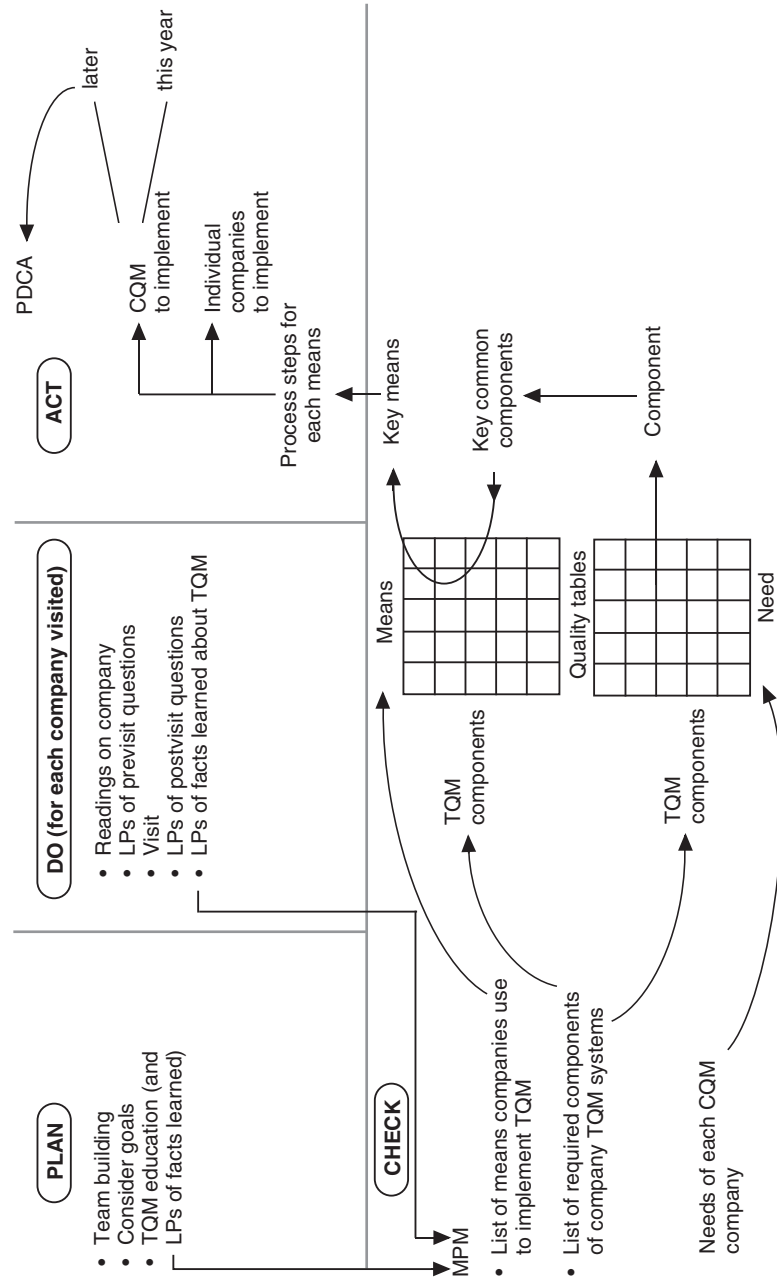


Figure 2: CQM Design Team's PDCA Process Activities [shibafig9-17]

Table 1: Activities in the PDCA Process

Stage	Activities	Weeks
Plan	Team building Basic education in TQM Preparation for fact finding	1
Do	Fact finding through company site visits in Japan and the United States	2, 3
Check	Consolidate facts, identify requirements (test by Deming and Baldrige benchmark), identify means, and construct quality tables of requirements vs. means and company weaknesses vs. requirements	3, 4
Act	Prepare first-year plan; outline future plan	5

[shibatab9-2]

visited the company. At the end of the visit, we checked our LP of questions to make sure all questions had been answered, and asked for further information on incompletely answered questions. After our visits, we prepared LPs of post-visit questions for each company. These would have been useful had we visited again, but we did not. However, it was helpful in thinking about questions for the next company. We also prepared an LP on the facts we learned and reduced this to a manageable group of facts using the MPM method (see top middle of Figure 2).

In the Check phase (bottom of figure), we studied what we had learned during our visits and from formal training in TQM as recorded on our LP diagrams. From these important facts, we constructed a tree of components of a TQM system, which we then checked against the Deming and Baldrige criteria. We also constructed a tree of means of implementing a company TQM system. We did a correlation of these components and means to find the most relevant means for each component. Then the individual participants of each of the five participating companies studied the needs of their own company and correlated these with the components of a company TQM system to find the most relevant components to each of their needs. We then identified the key components that met the common needs of all five companies. We used the key components to select the key means via the components/means correlation table (bottom of Figure 2).

In the Act (or standardization) phase, we sketched the process steps for implementing each of the key means and divided them into two categories: those each company had to do for itself and those the CQM could do for all the companies. The latter we divided into a group to be implemented in the first year and a group to be left to later years and future PDCA cycles (top right of Figure 2).

As we did our studies and analysis, Shoji Shiba taught us to use some of the QC tools, the LP method, relations diagrams, tree diagrams, matrix diagrams, and quality tables. He demonstrated that with an experienced facilitator, a cross-functional team without previous experience can simultaneously learn new problem-solving techniques and apply them usefully to an important and urgent problem. Figure 3 shows the principles by which we worked.

Inside the big rectangle of Figure 3 are the elements of our work process enabling us to do a thorough job: we focused on facts, data stratification, multi-valued thinking, working at a low abstraction level, and capturing words on labels; all of these enabled us to get the detailed facts. We obtained our raw data by focusing on process and using analytic tools to handle non-numeric (language) data from which we developed concepts and models we could test. These were our group norms. However, with these norms alone, we risked getting mired in detail.

Around the big rectangle are three elements that led to quick, high-quality work. First, we felt great urgency. We were on a high-level assignment from our respective companies, and we had a five-week deadline. The urgency required that we eliminate debilitating differences in perspective and language. Second, therefore, we made great efforts to learn and see the same things—we learned a common language and experienced the same things. This gave us logical and intuitive homogeneity, which enabled us to quickly build upon each other's ideas rather than spend time trying to understand what the others were saying. Third, we adhered to the continuous improvement concept. We didn't fix our mission concretely at the beginning of our study. Instead, we turned the PDCA cycle many times

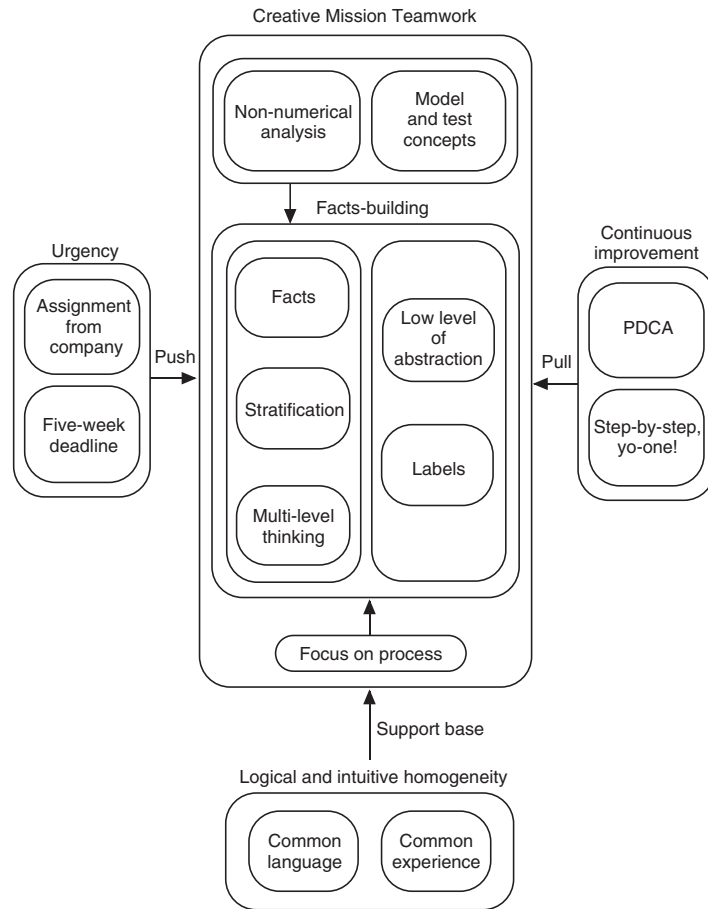


Figure 3: Principles Applied by the CQM Team [shibafig9-18]

in the five-week period, moving step-by-step with plenty of opportunity for feedback and reflection. This enabled a reasonable five-week goal and solution to emerge. We resisted the impulse to seek a perfect answer or unattainable quality of answer, assuming more PDCA in the future.

The design study report concludes with the following observation from the team:

The team worked in a very process-oriented way, following the tenets of TQM, and found these practices to provide a quantum leap in productivity of the planning and decision-making process. The team used the LP method of analyzing qualitative facts as a substitute for less structured discussion. By agreeing, as a team, on each process to follow before embarking on it, the team was able to work rapidly and achieve consensus on both substance and presentation of these complex issues within the five-week time frame [2].

The operational plan resulting from the CQM design study led to a committee structure, as shown in Figure 4. The intention was to have a lean staff and active committee structure (like JUSE in Japan), to put the know-how in the companies and not in the CQM staff.

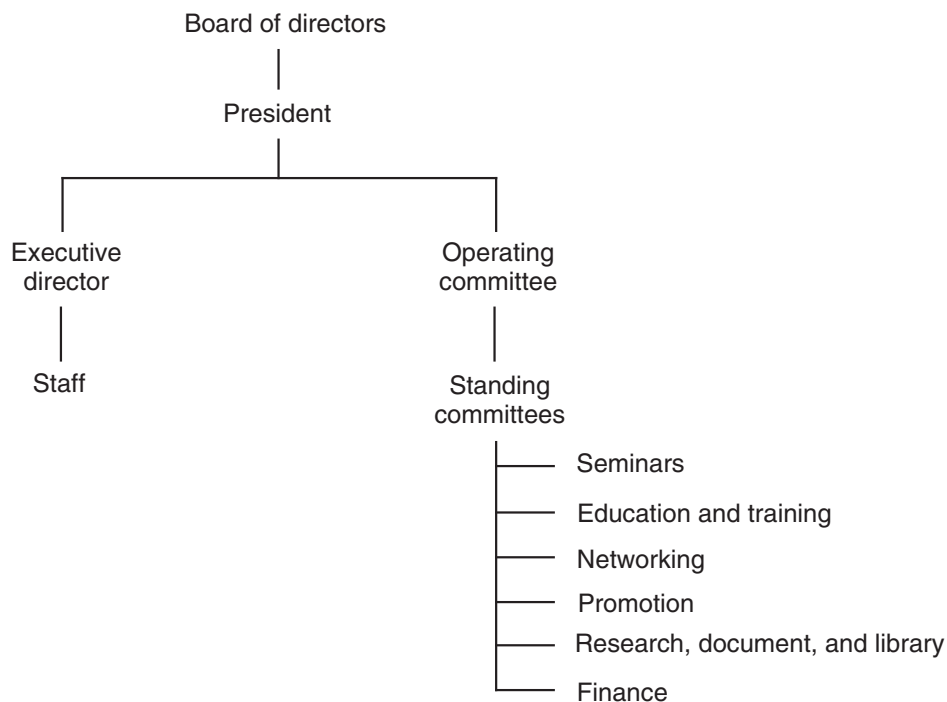


Figure 4: CQM Committee Structure [shibafig16-4]

2.2 Subsequent to the design study

After the design study ended, it took a few more weeks for the board to read the plan and approve it. Although a number of committees were proposed, not all of them became active in 1990. Activities that did take place in 1990 included the following:

- The seminar committee was active, sponsoring seminars by Florida Power & Light, Xerox, Motorola, and Corning.
- The research committee commissioned translation of the book *TQM for Technical Groups* [3].
- Shoji Shiba offered several one-day courses called CEO Introduction to TQM.
- Three or so CQM tool manuals were developed.
- The six-day course, TQM for Senior Managers: Planning and Implementation, was offered in two parallel sessions in October, November, and December to 48 executives of CQM companies.
- The 1991 plan was prepared, its starting point being PDCA on 1990 activities.

The six-day course on TQM for senior managers was a particularly noteworthy achievement of 1990. The course was developed by Shoji Shiba with help from the CQM design team, and it was taught by Shoji Shiba. Several CEOs and their direct reports attended the course, which included much group work with TQM tools and a number of case studies presented by CEOs, senior managers, and members of the design team. The design team took notes on the entire six days and converted them into transparencies and draft text that could be used again by other presenters and as the basis for this book. A key concept of the course was “no delegation of improvement,” which was demonstrated in many ways; for example, the CEOs themselves presented case studies.

The five week study effort involving senior leaders from members companies and the required attendance of 48 CEOs and other senior leaders in the six-day course created an idealistic, collaborative movement by a majority of the participants—a movement capable of much activity and progress in developing the CQM’s capabilities and the capabilities of the member companies.

3 Key Elements of the CQM Approach

The idealistic collaborative movement that developed during the early months of the CQM’s existence included the following key elements of the CQM approach.

Organizations, not individuals, are members of the CQM. It is not a professional society. The first criterion for membership in the CQM is active participation of the most senior manager (CEO or CEO-equivalent) who is committed to leading the organizational change and improvement efforts in his or her organization. The other criterion for membership is that the CQM member is willing to share actual case studies, good and bad. Without top management leadership, organizational change will not happen; without efforts to change and improve and willingness to share the results, an organization will have nothing to share and, therefore, will not be able to participate in the CQM’s mutual learning efforts.

Another key element of the CQM approach is that the CQM staff should be primarily for support and coordination of CQM members, and ideally the intellectual leadership of the CQM should reside in member companies. This is important because extensive organizational change and improvement methods we encourage in this book require a culture change. Thus, members must change how they think about and practice organizational improvement, and not primarily depend on outside consultants and outsourced training.

Two other key elements of the CQM approach are the adoption of a common language

and baseline approach to facilitate shared learning opportunities (in particular, the vocabulary and methods of this book were selected), and members provide an “improvement culture” to each other and society at large. While using the common language for communication and comparison, many members do not use this common language within their own companies or may adapt it to their own organizations.

4 1991–1998 Activities

The first year, 1990, was a year of organization. The second year, 1991, was a year of orientation, deciding what was really important to do and getting it started.

As of 1991, the CQM had several long-term aspirations:

- To handle CQM company facilities outside of New England (California, Europe, Japan, and so forth)
- To participate in development of a national quality culture in the United States
- To expand the CQM model or help others copy the CQM methods
- To develop improved, advanced methods of TQM, moving beyond what was copied from Japan

By the third year, 1992, the challenge was to figure out how to address demands for growth: how to select new member companies who will actively participate; how to provide services to the expanded membership while still depending on the committee structure; and how to expand the staff without diminishing the intellectual leadership of the companies.

Expansion and management transition

The CQM started in the Boston-area with seven founding members. Already by 1991, other Boston area companies heard about the CQM and its approaches to mutual learning for the benefit of all and wanted to join, bringing the membership level to 24 by the end of 1991. In addition, some Boston-area members of the CQM were divisions of companies located in other locations (for example, a division of HP located near Boston), and other Boston-area members had divisions in other locations (for instance, Analog Devices had a division near Silicon Valley). Thus, by January 1994, a chapter of the CQM had been established in Silicon Valley, with its own chapter board of directors made up of member CEOs and a local chapter director (a member of the CQM staff located locally to facilitate local CQM activities). The Silicon Valley chapter had ten or so initial members.

As CEOs in other geographic regions heard about the CQM, other groups of CEOs wanted their companies to be part of the CQM. In this way, CQM chapters were established in Louisville, Cincinnati, Western Europe, and Finland. By 1999, the CQM had over 115 members, 15 university affiliates, and 14 associate members. While the CQM did not actively seek expansion to other geographic regions, companies in new regions may become interested causing the CQM to expand further.

Within a couple of years of its founding, the committee system originally planned by the CQM Design Team (and used by each new chapter) ceased to be satisfactory for the CQM’s daily management. Thus, a paid, full-time CQM executive director (Toby Woll)

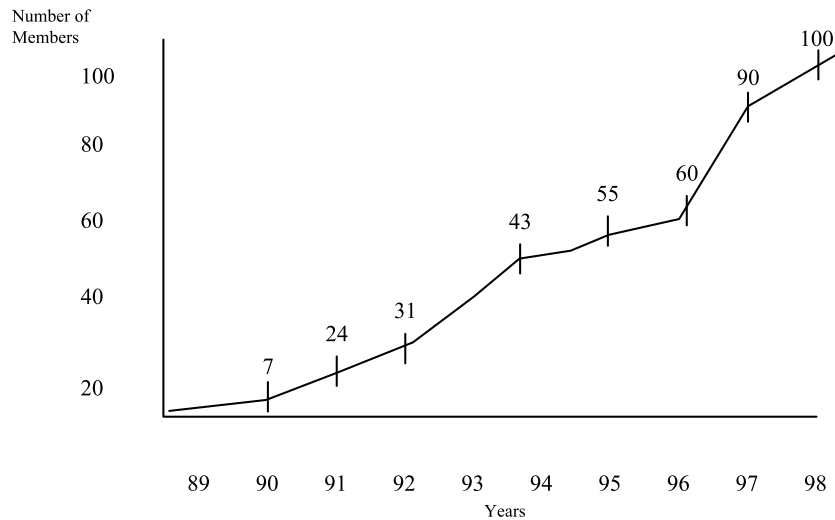


Figure 5: Growth of CQM Membership [davefig133]

was hired to manage the CQM central office support staff. Over time, the CQM staff grew to 20 or so people (including chapter directors).

Main areas of activity; name change

From the beginning, one of the CQM's aspirations was to develop improved, advanced methods, moving beyond what was copied from Japanese TQM. This point was particularly important. The CQM companies initially copied Japan for efficiency's sake (of course, they had to adapt what they learned from Japan to the U.S. business culture). The CQM members were also reluctant to do too much at one time: learning and beginning to practice the Japanese version of TQM was enough effort for most.

However, the CQM board and staff always understood there was more to organizational change and improvement than the Japanese version of TQM as then practiced. In particular, the CQM companies had the opportunity (and often necessity) to learn and develop improved methods to integrate them with their existing practice of TQM.

In 1991 to 1993, CQM member companies worked with Gary Burchill to develop Concept Engineering [4, 5]. By 1992, the CQM began an interchange with Russell Ackoff and his colleagues to learn the methods of Idealized Design [6]. In the years that followed, other methods were integrated with the methods CQM members were already using (see the subsection below on research). Thus, in 1994, the CQM formally changed its name from Center for Quality Management to Center for Quality *of* Management. The name change clarified that the CQM and its members were interested in more than the narrow "management of quality" using TQM as the means—they were interested broadly in the "quality of management" in their companies.

From the beginning, the spectrum of CQM activities have fallen into three categories:

- Education

- Networking
- Research

Activities in these three areas are described in the following three subsections.

Education

In 1990, Shoji Shiba with assistance from members of the CQM Design Team offered two instances of a six-day course on TQM for senior managers. In 1991, the six-day course on TQM for senior managers was offered three more times to 72 more CEOs and senior managers. The courses were taught by CEOs and senior managers who had taken the course with Professor Shiba, to show executive leadership in TQM and to learn the material better. Companies also took the material into their own companies and based internal activities on it.

Also, in 1991, skill courses in the LP method [7] and the 7 steps [8], based on initial versions developed in member companies (with Shoji Shiba’s guidance).

Since 1991, a variety of other courses have been added to the CQM portfolio. Many of these were developed in member companies and contributed to the CQM. Some were based on the results of CQM research efforts, again primarily “staffed” by people from member companies. One or two have been jointly developed in alliances with with other consortia.

The CQM “roadmap” of available courses as of 1999 is shown in Figure 6.

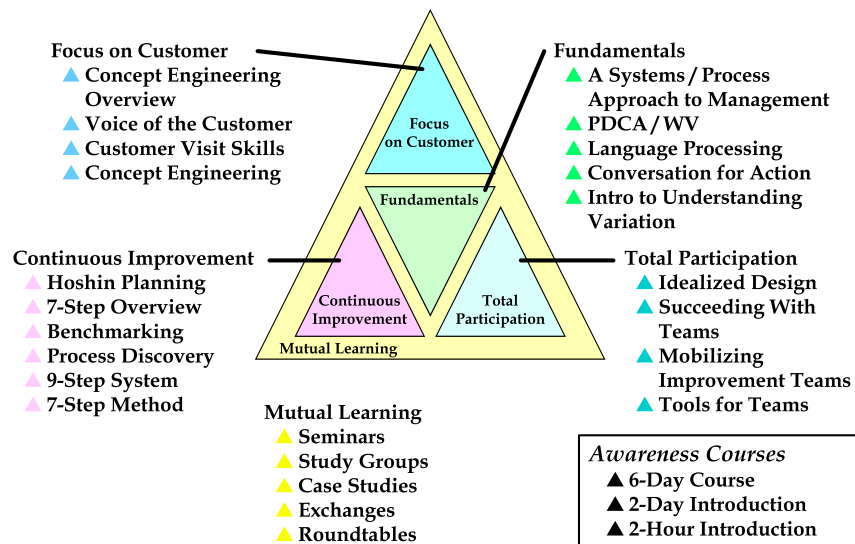


Figure 6: CQM Curriculum Roadmap [davefig132]

Networking

The CQM and its chapters and member organizations do networking in many ways:

- Each year since 1991, the CQM has held a seminar series with speakers reporting on the change and improvement practices in world-class organizations.
- Chapters have regular roundtable meetings on specific topics, by functional areas, and so on. Most common are CEO roundtables and chief change or quality officer round tables.
- Members give courses they have developed to the CQM for use by other members.
- Organizations exchange executive visits, executives teach in CQM courses offered locally, trainers and facilitators from one company attend train-the-trainer courses in another company, and upon occasion a delegation of visitors from one chapter visits companies in another chapter.
- People from one member company participate on improvements teams in another member company to see and learn a new method in practice, as is done for example within Kaizen Events in CQM's Cincinnati Chapter.
- Books, manuals, and the Journal of the CQM have been published to make methods and learning available in traditional printed format.
- Case studies, white papers, lists of resources, and notices of events are "published" either on the CQM's public Web site or on its member-only Web site.

Research

From the beginning the people from CQM member companies have worked together to learn, exchange, and develop new methods to add to the basic set of methods in the areas of the four revolutions from the first edition of this book. Guiding these efforts have been several principles:

- Look for weaknesses in their current management systems.
- Don't be bound to a single "school" or discipline.⁶
- Integrate and synthesize best methods into a system or step-by-step process (not just a set of tasks) that can be taught, practiced, and improved as more is learned.
- Do immediate field trials in member companies to get real-life experience.
- Keep repeating the improvement cycle, to recover from aspects of the initial process that didn't work the first time, to build on increased understanding and to deal with new circumstances.

Since 1990, various combinations of CQM members have worked in a variety of areas. In each case, six to a dozen people periodically met, studied, and synthesized for periods ranging from a few months to a year or more. Areas of CQM research, synthesis, practice, and improvement since 1991 have included:

- Development of Concept Engineering for finding the latent needs of customers and users [4, 5]
- A study of best practices of new product development—resulted in a seminar at which representatives of various CQM members presented their best practices

⁶At various times, the CQM has drawn on the following thinkers and methods: Russell Ackoff and Interactive Management, Chris Argyris and Action Science, Deming's version of TQM, Fernando Flores and the Language/Action Perspective, Eli Goldratt and Theory of Constraints, Peter Senge and his Five Disciplines, and many other thinkers and experts from many other areas and methods.

- Development, in collaboration with Russell Ackoff and his colleagues, of a step-by-step approach to Idealized Design [6]
- A study of the methods of culture change—conclusions never published
- Study of how the methods of TQM can be applied in service organizations [9]
- A survey of Cloutaire Rapaille’s concepts of Cultural Archetypes—concluded with a seminar with presenters from four non-CQM companies describing their use of Rapaille’s methods [1, pp. 61–62]
- Development of Conversation for Action (or Personal PDCA)—methods to find shared concerns, make keepable commitments and build trusting relationships [1, chapter 16]
- A survey of System Dynamics—concluded with an understanding of reasonable roles for system archetypes, causal loops, and simulation in the tool kit of methods of CQM members
- A tentative survey of Management of Innovation—never moved beyond the planning stages
- A survey of leadership—resulted in a seminar presentation, a set of working notes on CQM’s member-only Web site, and a paper summarizing the survey [10]
- A survey of Strategic Planning—resulted in a seminar presentation and a set of working notes on CQM’s member-only Web site
- A survey of Cycle-time Reduction—insights documented in a special issue of the CQM Journal [11]

Documentation

While it was not one of the fundamental legs of the three-legged stool of CQM activities (education, networking, and research), the CQM also had a significant documentation activity that supported its educational, networking, and research activities. The CQM created extensive presentation materials, student handouts, and instructor guides for all of the courses shown in Figure 6 and also for those course created after that figure was drawn. The CQM in effect published four books [12, 13, 14, 1]; these remain available, e.g., from Amazon.com.⁷ The CQM published nine step-by-step manuals [16, 17, 5, 18, 8, 7, 19, 20, 21]; these are all for sale from GOAL/QPC (www.goalqpc.com). The CQM published the *Journal of the Center for Quality of Management* for eleven years totaling 29 issues; these remain available in a public archive on the Internet (www.cqm.org). The CQM also maintained a members-only website via which members could share experiences in a non-public way.

5 More fundamental transitions

In general over the years, many CQM members followed the CQM recommended learning cycle: First, learn about the best practices of others. Second, individual companies integrate appropriate components into their own coherent management systems. Finally, share these new “best practices” with others. Learning best practices is not sufficient. A

⁷Also, our original intent was to publish our *Breakthrough Management* book [15] via the CQM.

company has to make the best practices their own. In so doing, the company develops a new best practice it can share.

Over the years several things happen that interrupted CQM's rapid growth:

- Japan began to have economic trouble and the dot-com boom started in the United States. US business executives (not necessarily within the CQM member companies) came to believe that the United States entrepreneurial approach was superior to the Japanese methods of TQM for achieving business success.
- The life cycle of the method known as TQM was declared over in the U.S. business press, and Six Sigma (which Jack Welch had adopted for General Electric) was declared to be the successor to TQM. Other methods were also significantly adopted as successors to TQM including lean production (based on the Toyota Production System).
- The existing CQM member companies began to ask, "What is next?"

Nonetheless, the CQM top management reacted by refusing to drop TQM as one fad to be replaced by another fad. Rather, the CQM (particularly Tom Lee) pushed the idea [22, 14] that each company needs to adopt elements from various methods (such those described in the subsection above on research) that are relevant to its situation into a coherent *integrated management system* for the particular company.

Also in 1998, CQM founding president (and pro-bono part-time employee) Tom Lee retired,⁸ and a new CQM president, Gary Burchill, was appointed.⁹ Gary had been involved with the CQM during its first three years while he was a PhD student at MIT's Sloan School while still in the US Navy. While at MIT and in these early CQM years, he had developed the CQM's Concept Engineering methods in conjunction with several CQM member companies. While back on active duty in the Navy, Gary had returned occasionally to participate for a day or two in CQM activities, particularly in the study group on conversation. He also led the writing of *Voices Into Choices* [13] for the CQM while still in the Navy. In 1998 Gary retired from the Navy after serving 20 years.

After the CQM had expanded to include a chapter on the west coast of the United States and a few companies in central Europe, Tom Lee, Toby Woll, and I noticed that there was not the same cohesive, idealistic spirit within the west coast chapter that there was in the Boston area chapter. Thus, when chapters were to be formed for central Europe, Cincinnati, and Finland, we suggested that senior executives from each of these potential chapters should participate in a design study such as had been done in Cambridge when the CQM first started. It was impossible to convince these chapters to do a five week study, especially without the draw of having Shoji Shiba lead them, so I led a three-day study in each of these locations. The Cincinnati study seemed to result in the desired attitude of the participants and member companies and, with the hiring of Jim Wahl to be Cincinnati chapter director, that chapter flourished. Jim was particularly insistent about the principle that senior executives from new member companies should attend the six-day course, and he and various company executives who participated in the design study have kept the

⁸Tom remained involved with the CQM, supporting Gary's efforts, until Tom's death in 2001.

⁹Gary was paid to be half-time president with the rest of his time going to being a half-time associate professor at Boston University's School of Management. I served as executive director while Gary was coming on board.

sprit of mutual learning alive ever since. In central Europe and Finland, the necessary sharing never happened as effectively. The Louisville chapter was started without a design study, but the CEOs there were already a tight group and did a good job of embracing the CQM ideals and creating a sustainable mutual learning community.

6 1998–2003

Gary Burchill had the difficult task of revitalizing the CQM.¹⁰

By the time Gary came on board in 1998, the CQM was losing money each month, and it was necessary to dramatically reduce the CQM central staff and give up a substantial portion of the leased office space at the Cambridge location. The plan was to stop the negative cash flow in 1998, become cash neutral in 1999, and achieve positive cash flow by 2000 based on customer intimacy and understanding member specific problems and opportunities, for example, by using “one-to-one marketing” skills such as member Hewlett Packard was using.

One of Gary’s first steps was to bundle together existing individual skill courses into bigger skill sets that allowed better management of processes. For instance the process discovery, process measurement, and 7-Step problem solving skills were combined into a process management skill bundle. Unfortunately, such bundling was received by member companies with a reaction of “So what—that is merely a bit of repackaging.”

Soon after his arrival from the Navy, Gary also embarked on a Concept Engineering effort involving 18 US CEOs and 11 European CEOs of member companies. From this there was a convergence of views that business was more complex than ever before.¹¹

The methods the CQM promoted and taught in its early years are sketched in the shaded circles along the main diagonal of Figure 7. Different methods were needed and taught and problem complexity increases and thus the organization complexity needed to address the problem.¹²

However, Gary’s CEO survey revealed that in the CEOs’ world of 1999 increasingly complex problems had to be handled at lower levels of an organization, increased organizational complexity meant that even relatively simple problems required effort from high in the organization, and new methods and old methods involving more people more often had to be aligned and integrated in pursuit of business purposes, as shown by the cloud shapes in the figure (both off the diagonal and on the diagonal), as described in the following points.

¹⁰This section and the next are largely based on a February 28, 2007, phone interview of Gary and follow-up email messages of March 4 and 5. A number of the sentences are direct quotes from his emails even though they are not indicated with quotation marks. A couple of small changes to Gary’s account were made based on a March 23, 2007, phone call with Eric Bergemann. Nonetheless, this section and the next are largely from one only Gary’s point of view. If an opportunity to publish this account should come up at some point, I would first seek more points of view about the history of the CQM’s last few years.

¹¹It also soon became clear to Gary that the challenges facing CQM were worthy of his spending full time on them, and he withdrew from his Boston University faculty obligations. Somewhere relatively early in this time line, I also decide to retire fully; and Gary also took on the role of executive director in addition to being president.

¹²The basic version of this figure, without the big clouds, was sketched by Art Schneidermann in the early days of the CQM.

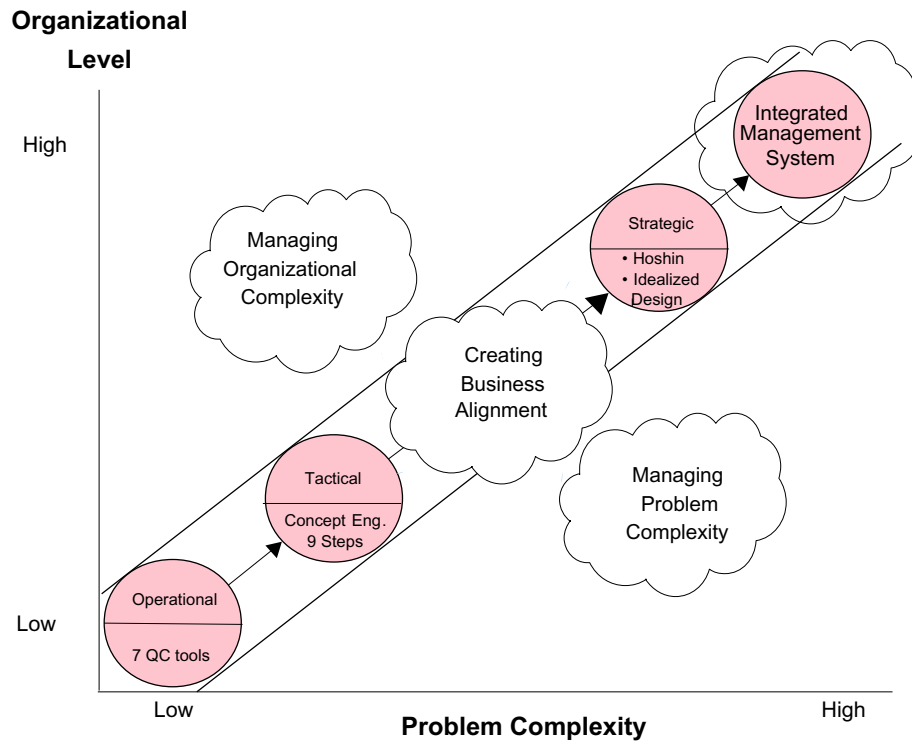


Figure 7: Problem Complexity versus Organizational Level [davefig250]

- **Problem complexity:** Increasing globalization, information technology, data availability, and time pressures are rapidly escalating decision complexity. As a result, the time to reach a decision often extends beyond the window of opportunity to take efficient action. Therefore, many complex decisions are based on the “gut feel” of senior decision makers. Unfortunately, research shows “intuition” is usually not applied consistently, which leads to second-guessing and half-hearted support within the organization. Organizations need pragmatic, visible, decision support processes. Individuals responsible for making, ratifying, or executing a given decision need to be able to trace the entire process from problem framing to alternative generation and selection.
- **Organizational complexity:** Downsizing and decentralized decision making trends have significantly increased the span of control of many key positions within an organization. Concurrently, the moves toward cross-functional teams and supply chain management have decreased the sphere of direct control of the people who are accountable for managing the organization. As a result, the effort required to coordinate the actions of diverse participants significantly hampers the realization of business objectives. Models and step-by-step processes are needed that span from recognizing a need to collaborate through the final stage of obtaining commitments to action. People need skills that enable them to concentrate their efforts to address business concerns while capturing the value of diverse perspectives.
- **Business alignment:** The escalation in organizational and problem complexity are

like black holes, drawing time and effort away from the short-term activities that are necessary to achieve longer-term objectives. Maintaining focus and alignment is important in the best of times, but critical during periods of high growth and dynamic conditions. Approaches need to be defined for building alignment between technology and market opportunities, long-term strategy, and the operational activities required to support a specific business cycle plan.

- Integrated management system: Integrating the elements and methods of business improvement and organizational change into an integrated system has long been part of the four revolutions we have described in this book. As companies must increasingly address issues of managing problem and organizational complexities, business alignment, and developing new methods to do so, each organization must continue to integrate the new methods into its unique management system.
- Net speed: Finally, in addition to the challenges illustrated by the clouds in the figure, the CEOs also felt tremendous pressure for improvement methods to be operated at so-called “net speed,” the speed at which many businesses perceive they must operate today.

Consequently, an R&D effort was carried out [1999-2000] involving four study groups in three chapters addressing the following topics:

- managing organizational complexity; studied within the Cambridge and resulting in the Four Gears method for leading without authority [23]
- managing problem complexity; also studied within the Cambridge chapter and resulting in the ARMED process for managing decision risk [24]
- making change commonplace; studied within the Cincinnati chapter and contributing to the Four Gears method and resulting in 7 Infrastructures manual [21]
- creating organizational integrity; studied within the Louisville chapter and contributing to the Four Gears method

A separate study team consisting of Gary Burchill, Steve LaPierre, Linda Ridlon, and Ann Gray addressed business alignment with insight from the Discovery Driven Planning methods of McGrath and MacMillan; this team created the SCORE method for selecting the right opportunities [25].

The next step was to retrofit the newly developed skills into the CEO perspective revealed by the CEO survey. Working on that, Gary Burchill, Steve LaPierre, and Jay Fitzgerald) came up with a model of the complexity forces that produce gridlock (a. time compression, b. information explosion, c. opportunity proliferation, and d. re-organization acceleration), as shown in Figure 8.

One wants methods that attack more than one of these at a time but not so many as to make things unmanageably complex. Attacking two forces at a time seemed like a good number; and, in fact, ARMED addresses gridlock forces a and b, SCORE addresses a and c, and Four Gears addresses c and d, as shown in Figure 8. Another study team (Gary Burchill, Steve LaPierre, and George Murray) was initiated to address forces d and b, and they drew heavily on the method of Rosenthal and Hatten to produce the CQM’s version of the Enterprize Model [26].

Four two-day courses were created (the methods also were documented in a special issue of the Journal of the CQM that also included case studies). From Gary’s point of view,

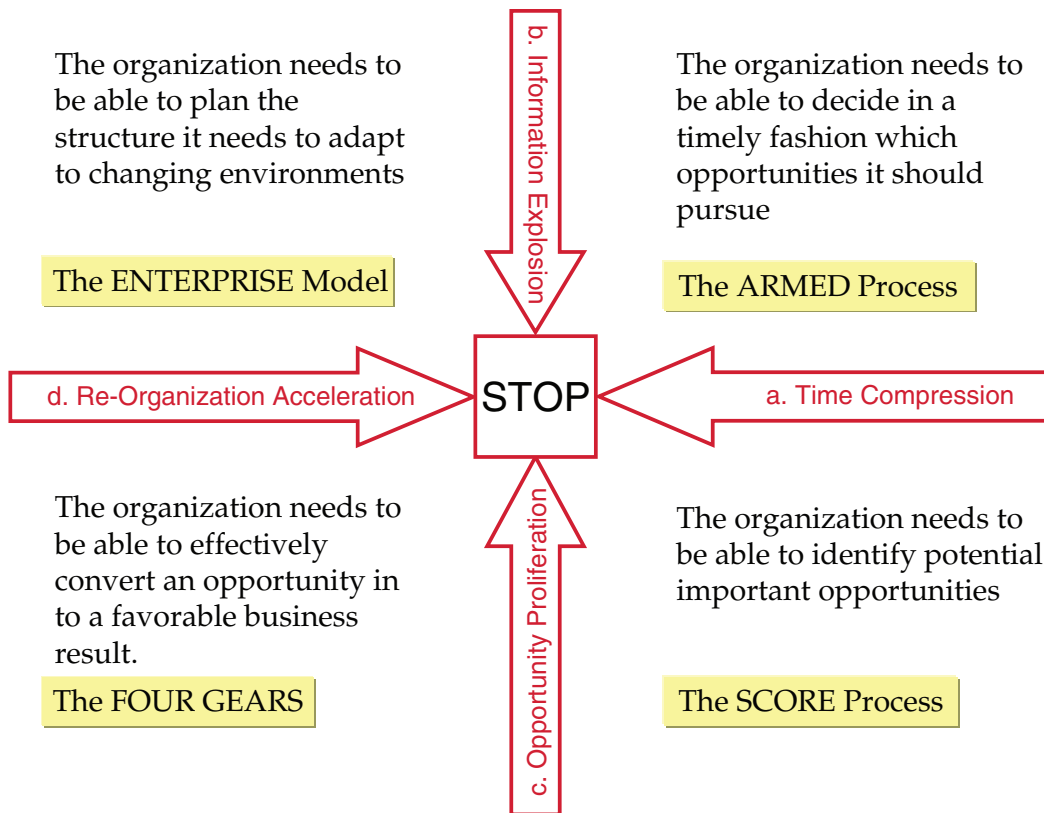


Figure 8: Complexity forces that product gridlock; skills that address pairs of gridlock forces [davefig19]

the methods were pragmatic and highly applicable—certainly greater than a 60 percent solution and sometimes an 80 or 90 percent solution. However, the product launch was weak. For instance, when the first set of courses was taught in Louisville, the CEOs there was disappointed that the courses were not finely polished even though this was only the second trial of the courses. In retrospect Gary believes he could have easily set the CEOs expectations to “this is our second trial of these courses, and we need your help in finding weaknesses and improving them,” and the CEOs would have been on board with helping to develop and roll out the courses.

In 2000 Bruce Wagner, then Cambridge chapter director and himself an experienced business executive, encouraged Gary to have the CQM staff trained in the Sandler Sales Method (www.sandler.com), which Gary did. This method teaches a relationship process between the provider and customer, beginning with conversations to ascertain if the problems of the potential customer are sufficiently painful to lead the customer to actually take action to solve the problems. The CQM’s goal was to establish annual agreements. The CQM had regular inter-chapter conference calls and compared experiences. This relationship building worked to some extent in Cambridge, Cincinnati, and California, the locations of the bigger companies which are able to commit to annual agreements.

However, in the first quarter of 2000, all of the contracts from the California chapter

companies were canceled. This was the proverbial “canary in the coal mine” that presaged other companies in the CQM also pulling way back on their training expenditures because of the downturn in the economy.

During the summer of 2001, Gary took a two month sabbatical to teach the Entrepreneurial Manager course for first year MBA students at the Harvard Business School. This was not planned in advance: A regular faculty member decided at the last minute that he would not teach the summer course, HBS was in a bind, other faculty members knew Gary and proposed his as a one-time replacement, and it seemed like a good opportunity for professional development (e.g., in how to teach) for Gary; Ray Stata and the CQM board concurred. A surprise consequence was that it reinforced Gary’s conviction that he had the necessary competence to start a company.

Then, in quarter 3 of 2001, 9/11 happened multiplying member uncertainty about spending money with the CQM. Nonetheless, late in 2001 a number of large Cambridge-based CQM members with a substantial history of productivity using CQM skills signed annual agreements and prepaid several hundred thousand dollars to alleviate a cash crunch.

Since companies would no longer send employees to courses (which had been a major source of CQM’s revenue), Gary and his team created “solve the problem” (STP) workshops. These were held on company sites, typically after a good bit of prior interaction of key people from a company to diagnose the problem and thus the general method of attack. During a two-day workshop Gary (or sometimes Steve or another of the CQM’s senior leaders-of-the-day) would apply a method and solve a problem.

These STP workshops were mostly very effective and produced two or three times the revenue that giving a course to an equivalent number of people would produce.

However, these also changed the nature of what the chapter directors had to do:

- from organizing mutual learning activities to finding tractable situations of 1-company-1-problem
- from mostly organizing activities to diagnosing company needs

As a consequence, Gary tried to recruit seasoned business executives as chapter directors. However, they tended to believe in the methods that had led to their own success rather than getting on board with the CQM methods, and in the face of financial crisis there was no time for a lengthy training process.

Gary particularly found himself constantly on the road doing the initial diagnosis and shortly thereafter leading the two-day STP workshops. The companies were paying a relatively low price for a “consultant” with Gary’s level of qualifications and skill.

In 2002 Gary took a 20 percent pay cut but continued to work more than full time. Then, about halfway through the year he reduced his hours to 80 percent of full time to match his pay. He was beginning to think about starting his own company.

In 2002, Gary also started a leadership study group involving 16 CEOs from the Cambridge, Cincinnati, and Louisville chapters. The group had a reading for each month and then a meeting with the author. The morning session of the meeting was dedicated to clarifying what the author had said. Discussion among the participants and the author took place in the afternoon session. This study group last a year, and uniformly the CEOs thought it had been valuable to them, but they also wanted to know “What is the product?”

Diane Burton of MIT became involved. Her research has to do with the proper social

model for each phase of the famous S-curve of the life cycle of a product line or business. This resulted in a day-long presentation of the potential method in conjunction with the CQM's annual meeting, and there were a number of STP "Business Leadership System Diagnoses" with companies in Louisville, Cincinnati, and Cambridge. A workbook and diagnosis framework was developed for these sessions. Diane Burton also did a very large scale research at Mercury Computer collecting data from hundreds of employees to validate the model.

Gary was also influenced by the work of John Holland (of the University of Michigan and the Santa Fe Institute) on complex adaptive systems, whose work was presented to the leadership study group and also a management seminar presented to members of the Cambridge chapter of the CQM. Had he stayed with the CQM, Gary says that he would have pushed the CQM to develop methods for companies to manage their positions on the S-curve and to manage the transitions between these positions. According to Gary,

Optimizing the business and social model for a given position on the S-curve is just as important for companies are seeking to maintain their businesses as for companies that are trying to move up and down the S-curve. We found a significant research opportunity at Mercury Computer which needed to be "ambidextrous" in that it needed the revenue and profits from its mature businesses to fund the R&D of its next generation opportunities. These challenges seemed to me to be pervasive and persistent and an opportunity to add significant value to large numbers of companies for a very long time.

In 2003 Gary reduced his CQM commitment to half-time and left the CQM at the end of 2003 to start his own company

7 The final episode

In 2004 a search was undertaken for the appropriate replacement for Gary Burchill as CQM president. While appropriate people were available, CQM couldn't afford the right type of heavy hitter president. The CQM board's thinking evolved to thinking that the problem was sales and marketing, not a product problem. CQM had lots of excellent products. Thus, CQM recruited and hired Lucinda Doran in late 2004 or early 2005.

During the period of search for a new president, Steve LaPierre and Eric Bergemann continued to execute the plan of developing good relationships with members, developing annual contracts, and providing process advising as trust business advisors, and the CQM had its strongest financial year in a decade in 2004.

At some point after joining the CQM, Lucinda did a financial analysis that convinced her that the CQM was technically insolvent (if it ceased business that day, it would not have enough money to pay its liabilities such as a multi-year office rental agreement) even though the CQM was quite solvent in practical terms. Lucinda visited the member companies and told them they needed to provide more funding of CQM; but this didn't go over well with member companies. Also her concerns about CQM's financial viability shook their confidence.

The CQM board members were also probably getting tired by this time of their ongoing struggle to keep the CQM going. Thus, in 2006, the board with Lucinda's help

began to focus on finding a successor organization to which the CQM intellectual property and member contract could be transferred. While integration into a university executive education program was a strong possibility, eventually GOAL/QPC acquired the CQM assets and liabilities.

Acquisition by GOAL/QPC was a reasonable outcome, as GOAL/QPC had a similar noble mission to CQM's plus it had a strong publishing arm that might make use of CQM's intellectual property. To date, GOAL/QPC has been making reasonable efforts to serve the CQM companies, and continues at this point to maintain the CQM website.

One final point is worth making. In its 16 year history, in addition to providing value to its member companies, the CQM provided a congenial and supportive environment for its direct employees. Many employees expanded their capabilities with with the CQM before moving on to more responsible positions.

8 Retrospective survey

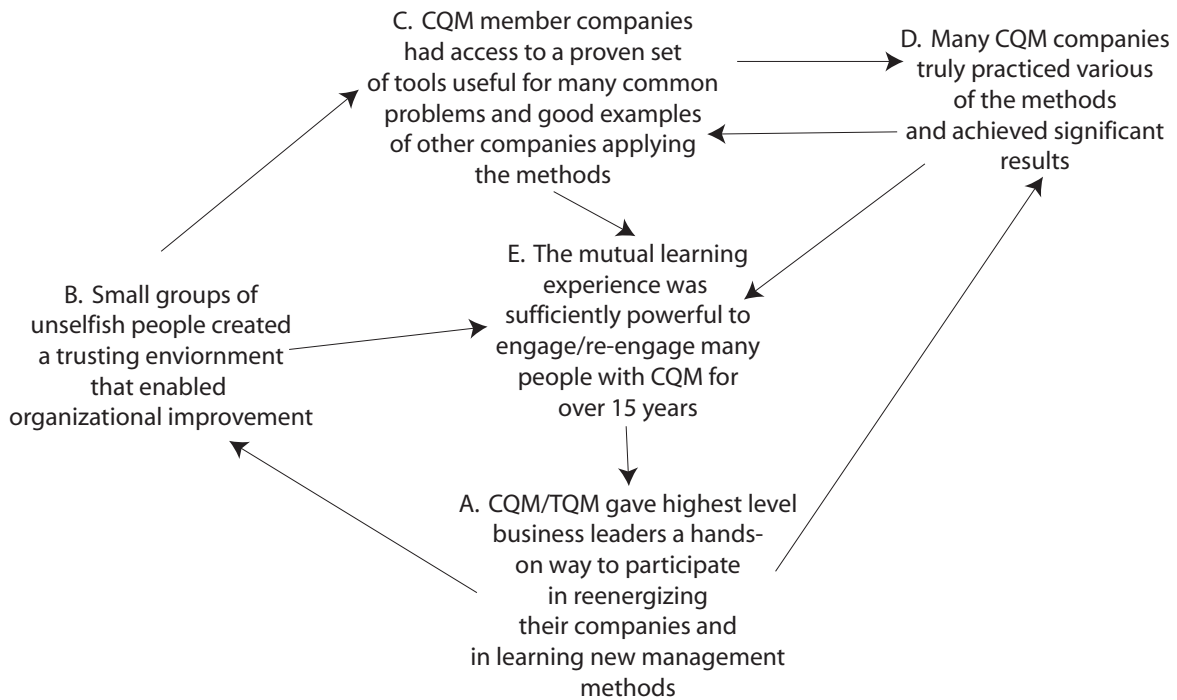
As part of preparing this historical sketch of the CQM, I asked ask Eric Bergemann (long time CQM operations director), Gary Burchill (retired president), Greg Fischer (CEO of a CQM member company), John Petrolni (long time quality officer from a CQM member company and part of the 1990 design team), Ray Stata (CQM chairman and co-founder), and Jim Wahl (long time Cincinnati chapter director) to give me LP "labels" on "Why the CQM had been valuable to member companies?", on "Why it ceased to be relevant?", and on anything else they wanted to mention. I also provided my own set of labels (I participated actively in the CQM from the time of the design study in 1990 through the time of the last issue of the *CQM Journal* in 2003).

The raw labels I received are included in the appendix along with the methodology I used to process them. The results of the analysis of the labels follow, in the form of causal loops.

My conclusions about Figure 9 are included with the figure.

The logic of Figure 10 should be relatively apparent from the figure. However, there are interesting details having fundamentally to do with the passage of time.

- A. A few years after the CQM was founded, TQM began to be considered passe in the U.S business press and by many business executives. Approaches such as Reengineering, Six Sigma, Lean Production, etc., were touted as being more modern alternatives to TQM. Also, Japan had a downturn in its economy and the dot-com bubble grew in the United States; these events convinced many U.S. executives that entrepreneurship and the United States' venture capital based system of supporting innovation was a more relevant approach to business success than business improvement using TQM.
- B. The CQM had always intended to expand on the initial set of methods Shoji Shiba brought to CQM, and it promoted the idea of Integrated Management Systems wherein each company chose its own subset among all of the available methods, e.g., TQM, Reengineering, Six Sigma, Lean Production, etc. As a result the CQM did not promote (and was not seen as being in touch with) any of the follow-on popular methods



Notes

1. All of the loops in this diagram are reinforcing loops.
2. To me, the main starting point of this diagram clearly is node A -- the participation of the highest level business leaders. A secondary starting point is the "proven set of tools" component of node C that Shoji Shiba could teach after Tom Lee introduced Shoji Shiba to Ray Stata, et al.
3. As long as the business leaders in node A keep seeing value from the CQM (node C) and the management methods (node D), all of the reinforcing loops keep things going up. As the business leaders cease to see the CQM and the methods as an appropriate way for them to drive their companies, the reinforcing loops lead to a decrease of all nodes in the diagram.

Figure 9: Why the CQM approach valuable was valuable [davefigwhy]

such as Six Sigma.

The CQM did develop a number of highly useful follow-on methods including methods of conversation, methods for mastering business complexity, and leadership in the face of the evolution of a business along the famous S-curve of product maturity. However, there was never sufficient consensus among the CQM companies to as to the general relevance of these methods. Partly this was because with many members there was much diversity of business areas and, thus, perception that different methods were needed for different companies. Also, the methods the CQM developed tended to be for more intangible tasks, e.g., conversation, business complexity, and leadership that were more often the work of higher level managers; my view is that high level executives have more difficulty disciplining themselves to use

- E. Also things evolved over time such that the CQM was no longer as necessary a source for training in the methods the CQM taught: because of the CQM's principle of societal networking: a) various CQM companies became self sufficient in teaching the methods, and b) many people who learned the CQM methods while with CQM member companies started their own consulting companies that taught the methods in competition with the CQM.
- F. Also over time, with more member companies and multiple chapters, and with the CQM's desire to provide good service to all companies and chapters, the CQM staff and infrastructure grew in size and cost.
- G. Thus, for three reason—less membership revenues (C), less training revenue (E), and more costs (F)—the CQM's business model became increasingly nonviable.
- H. Because the CQM was considered less relevant (C) and it was obviously struggling financially, members company leader lost interest in the CQM.
- J. In fact, it was the perception of some CEOs that CQM was in a downward spiral, which additionally cast doubt on the CQM's relevance and viability.
- K. Also over time, the CQM leadership itself withered away. Toby Woll left to take a less consuming job, Tom Lee died, Gary Burchill found greater potential fulfillment in doing something other than keeping the CQM afloat, and in time the members of the CQM's board of directors became increasingly reconciled to the view that CQM was no longer financially viable.
- L. In the end, the board of directors made the decision to merge CQM into GOAL/QPC with the goal of having GOAL/QPC continue to provide CQM member companies benefits CQM could not longer provide.

I have my own thoughts on what the CQM might have done differently from the beginning and along the line to enable it to survive longer. However, I will keep these assessments to myself and let you, the reader, draw your own conclusions. In any case, I believe that the CQM made a valuable contribution to its member companies and to international business thinking more generally for a respectable length of time (over 15 years), and a good bit of CQM's intellectual "property" has slipped into the mainstream of management practice.

9 A final speculation

I presented the contents of the previous sections of this paper to the participants of the Spring Camp on mutual learning communities in Fayence France in April 2007. Representatives were their from India, Norway, Shanghai, Hungary, Spain, Japan, Latvia, and (me from) the United States.

In comparing several examples of the evolution of learning communities, we began to see (with the help of Shoji Shiba) that perhaps it is more than difficult to sustain a learning

community over a long time and through changing business and methodological environments: perhaps it is impossible to maintain an idealistic, collaborative movement such as the CQM developed in 1990 in the face of significant changes in situation; perhaps when the CQM began to move into areas such as conversation and business complexity rather than the four revolutions, a few companies should have spun out (to perhaps be joined with other like-minded companies) to form a new entity with commitment and energy to work in those areas.

Of course, such spin-outs would create a (fascinating) new problem—how to pass the learning of one learning community to another learning community. This will have to be the subject of future consideration.

Appendix

Methodology

Labels were requested in the three categories mentioned in section 8; they are shown in the following subsection. After looking at the labels in the third category for a while, I decided that these labels could be rather easily be included in one or the other of the first two categories, and I did this. Then I did a net-touch on the labels in the first category and another net-touch on the labels in the second category. Then, for the first category, I used an approach similar to doing an LP (but more logic and less image) to do a bottom up organization of the group titles and lonewolves from the net-touch. Then I constructed a causal loop for each category using the five labels resulting from the LP. For the second category, I constructed a quasi-causal loop diagram directly from the net-touch. The two causal loops are shown in the last section of the main body of this paper.

Raw Labels

Why was CQM successful/useful during its time?

- Companies of comparable size/maturity/business heritage found practical solutions to similar business problems.
- Four Revolutions approach allowed founder entrepreneurs to grow their companies instead of cashing out/handing over to 'professional managers.'
- Small groups of unselfish people created a trusting environment that enabled organizational improvement.
- Talented individuals from Analog, BOSE, and BBN had company support to work 2 to 3 days a month, on individual and group work, for more than a year in the development of Concept Engineering in 1992-3.
- BOSE, Mercury and Teradyne willingly assigned top development teams, with CEO participation, for the beta-test of the 8-day Mastering Business Complexity Course in 2000.
- The structure and presentation of CQM tools, e.g. LP, 7-Step, CE, etc. is consistent across all companies and chapters based on common conceptual models and language.

- Ray Stata, Sherwin Greenblatt and Alex D'Arbeloff discussing the pro's and cons of a 7 step (CQM was CEO led)
- The image LP created for Tom Lee's memorial expressed the admiration the Louisville chapter had for Tom (use of common language)
- 4 of the 5 Louisville chapter founding companies immediately began the use of 7 steps after the 6 day course (we all shared problems that a common tool could be used for as opposed to the later CQM courses that did not have as wide appeal)
- When a Teradyne colleague and I attended the CQM SCORE methodology course in 1999, we were required to bring a daily work example that we then used in class to learn how to apply the methodology.
- On April 30, 2002, when I was attempting to show Teradyne managers the application of the SCORE methodology, Marci Sindell, Haemonetics SVP of Business Design, presented three Haemonetics Corp examples to Teradyne's CEO and thirty other top managers.
- From 1991 until 2004, the Teradyne CEO required every manager in the top three levels at Teradyne to attend the CQM Four Revolutions six day course.
- In 1991, Professor Shiba showed Teradyne's CEO how the deployment and use of the 7 step problem solving method would improve business results.
- CQM provided mutual learning opportunities
- CQM provided professional training materials
- CQM provided opportunities for relevant learning through study groups
- A large nursing home operator member stated that CQM helped him improve his bottom line by \$1.5M.
- A pizza chain operator member stated that CQM's Concept Engineering tool aided them in introducing a new full-service restaurant concept.
- Many members claimed the sharing of best business practices with other members helped them solve specific business problems.
- Multiple companies could benefit from specific, relatively low level tools such as 7 Steps, LP, Concept Engineering, etc., and learn from each other about their use.
- During the CQM growth phase, significant numbers of people had to take the 6 Day Course which brought in adequate revenue.
- The CQM took advantage of existing executive affiliations as the source of new members.

Why was CQM no longer able to sustain itself?

- The initial member consensus around Four Revolutions did not extend to Interactive Planning, Conversation, or any subsequent problem-solving methods.
- Though a non-profit, CQM did not make significant use of endowments, charitable fundraising, alumni contributions for long-term financial support.
- Mutual learning was difficult to sustain as the membership profile changed from homogeneous (New England high tech) to heterogeneous (companies of all sizes, industries, levels of maturity).
- By the mid to late 1990s the CQM infrastructure costs exceeded annual dues to such an extent that significant recurring education revenue was required every year from

members.

- CQM tried to avoid following mass movements such as: reengineering, six-sigma, organizational learning, etc where members could find viable alternatives in the marketplace.
- During the tech/internet boom then bust (2000 2), many Boston and California members were faced with an unprecedented rate of substantive corporate business challenges.
- unlimited use/duplication of the CQM content doomed the financial model
- the 6 day course was not followed by an equivalent body of work that attracted broad interest and mutual learning
- In 2005, I attended an operational excellence round table in which the participants made presentations that were conceptual and abstract versus detailed examples of what was done, how it was done, who did it, and lessons learned.
- Between September 2003 and June 2005, there were six different CQM sessions (conferences/annual meetings, etc.) concerning the topic of "leadership" and yet no action plans or suggestions for how to improve leadership were ever developed.
- In 2003, as Teradyne began a new initiative called Step Function Improvement, I could not find another CQM member company doing similar activities in which to share with and learn from.
- TQM became, whether or not true, "I already know it". TQM lost its luster.
- CQM members became self sufficient for training.
- There was no common vision beyond TQM about what to do for improvement work.
- Some members voiced disappointment that CQM failed to introduce new problem-solving tools as effective as those offered at its inception.
- Some Cincinnati members expressed concern that other CQM chapters were losing members with few new replacements.
- A few Cincinnati members expressed disappointment in the quality and cost of some of the networking events emanating from Boston.
- During the Internet boom era, US managers decided that the keys to better performance were innovation and leadership; simultaneously Japan was having harder economic times.
- The CQM developed tools for higher level activities (conversation, leadership, etc.) but many leaders don't have the discipline to use such tools, and there are relatively fewer people to teach them to.
- The CQM did not have something called Six Sigma which still could be widely applied in parallel in many organizations.
- The visionary leaders of CQM (Shoji and Tom) were no longer available to drive it forward.

Anything else important about CQM's history not captured with the other two questions

- Many CQM problem-solving methods are still easily mastered and broadly useful.
- The Mutual Learning experience was sufficiently powerful to engage/re-engage many people with CQM for over 15 years.
- Starting in 2002, for more than a year, 14 CEOs, from across the US, met in Boston for

a full day each month to discuss a book they had read with its author and each other as part of a Leadership Study Group.

- Member companies from Chapters with very different local markets placed significantly different requirements on the CQM Staff.
- The founding leaders in each Chapter: Stata, de'Arbeloff, Lee in Boston, Fischer, Paradis, Hillerich in Louisville, Platt, Nishimura, et al in Palo Alto, were recognized as significant business leaders in their respective communities.
- Shoji arriving 45 minutes before his seminar to prepare the classroom setting
- Ray Stata engaging Michael Maccoby on Productive Narcissism
- Gary Burchill and Russ Ackoff debating reality vs. theory
- Tom Lee passionately teaching CQM despite his failing health
- John Petrolini insisting that his SerVend visitors create a learnings LP after their visit to Teradyne
- Dave Walden taking verbatim notes from Shoji's classes!
- From the time of Tom Lee's death and Shoji Shiba's reduced involvement in the CQM activities, there seemed to be a less clear vision and action plan as to how to involve member companies in activities that were both interesting to them and useful in improving their business results.
- After Gary Burchill's departure as president of the CQM (2003?), the position was not filled until late 2005.
- Often when I spoke to CQM members about the founding principles of the CQM (such as CEO representation, CEOs and Sr. Mgrs. teach classes, learn by doing, sharing 'real' examples, etc.) I realized that many members didn't know about these principles.
- While CQM-Cincinnati generated over 40 percent of CQM's total revenues attributed to more active membership recruiting and networking activities, other CQM chapters failed to adopt similar operational activities.

Acknowledgments

I am grateful to the people listed in the first paragraph of section 8 for their inputs on what the CQM worked for a while and later didn't work so well. I am particularly grateful to Gary Burchill for his willingness to be interviewed on the last years of the CQM's existence and to Eric Bergemann for his review of the accuracy of my write-up of those years.

I also appreciate the attention and questions of the participants of the Spring Camp 2007 in Fayence, France, to whom I first presented this version of the CQM story.

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Finally, I appreciate Shoji Shiba's having invited me to attend the Spring Camp 2007 and his insights on my presentation (sketched in section 9).

Biographical sketch

David Walden spent over thirty years working successively as an engineer, technical management, and general manager. Most of this time was spent at Bolt Beranek and Newman Inc. of Cambridge, Massachusetts, where he was a member of the original development team for the ARPANET IMP, the precursor of the Internet routing technology. Since 1990 he has also thought, taught, and written extensively on the subject of improvement of business processes and business management. More information is at his website: www.walden-family.com/dave/.

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