

CENTER FOR QUALITY OF MANAGEMENT JOURNAL

Special Issue

In Memory of Thomas H. Lee (1923-2001)

About This Issue <i>David Walden</i>	Page 2
Biography of Thomas H. Lee	Page 3
Management Gurus and Educators <i>Russell L. Ackoff</i>	Page 13
Remembering Tom Lee with an Image LP <i>From the Louisville Chapter</i>	Page 15
Creation and Evolution of the CQM <i>David Walden</i>	Page 17
Report on G. Clotaire Rapaille's Syndicated Study of Leadership <i>Toby Woll</i>	Page 27
Insights from the Leadership Study Group (1997-2000) <i>Christine Duvoivier and Toby Woll</i>	Page 35
A Few Thoughts on Executive Competency Convergence <i>Stephen P. Kelner, Jr.</i>	Page 67
Implementing a Value-Added ISO9000 Program Using the 7 Infrastructures for Mobilizing Change <i>James Stith</i>	Page 73
Mapping Six Sigma to the CQM System of Tools <i>David Hallowell</i>	Page 83
Holistic Approach to Innovation Management <i>Thomas H. Lee and Val Livada</i>	Page 90
Following Tom: My Journey of Enlightenment <i>Shoji Shiba with Lois Slavin</i>	Page 107

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About This Issue

by David Walden
Editor, *CQM Journal*

This issue of the Center for Quality of Management Journal is dedicated to the memory of CQM co-founder and first president Thomas H. Lee. The various papers in this issue are about Tom Lee or related to work in which Tom was interested.

The first paper, prepared by the CQM Journal staff based on contributions of many people, is a brief biography of Tom's life, to introduce readers who did not know Tom well to the life of this remarkable man. The second paper uses a management tool Tom valued, the LP Method, to summarize how people in the CQM Louisville chapter saw Tom. The third paper is by Russ Ackoff, Tom's friend and a management thinker who greatly influenced Tom's thinking; in the paper Russ Ackoff makes an important distinction between a guru and an educator. The fourth paper in the issue, by me, provides a sketch of the history of the Center for Quality of Management and its evolution under Tom's leadership.

The rest of the papers in the special issue report on or suggest activities in keeping with Tom's belief that many concepts and methods need to be studied and each business needs to select the subset of methods best suited to its needs and culture and to integrate them into its own unique management system.

Three papers are on the topic of leadership, a topic Tom pushed the CQM to address in recent years. Former CQM executive director Toby Woll reports on the CQM's participation in a sponsored study of leadership by G. Clotaire Rapaille; she also recounts what made Tom Lee such an excellent leader. Former CQM Cambridge chapter director Christine Duvivier and former CQM Executive Director Toby Woll report on the CQM study group on leadership that Tom and Toby initiated in response to a survey of the needs of CQM member companies. Former CQM education director Steve Kelner's note makes a multidisciplinary connection in the leadership domain.

The next two papers make connections between the CQM set of methods and other popular methods. James Stith, CQM chapter director in Louisville, connects the 7 Infrastructures approach to mobilizing change with ISO9000. David Hallowell, a consultant and frequent CQM course leader, connects CQM methods for reactive and proactive improvement with organizational mobilization of Six Sigma.

The penultimate paper is among the last writings from Tom Lee, this time analyzing, with co-author Val Livada, how management of innovation fits into an integrated management system and its importance to a business. In several places, this paper mentions other papers to be written. Sadly, these potential papers can no longer benefit from Tom's insight and relentless energy.

The final paper of this issue is a very personal statement from Professor Shoji Shiba about Tom Lee and the extended relationship between these two men, from which (I must emphasize) CQM members benefited so much.

I will always miss Tom Lee, my mentor and co-founder of this journal.

Biography of Thomas H. Lee (1923-2001)

This biography of CQM founder and president emeritus Thomas H. Lee is based on eulogies by Ray Stata and Tom's three sons from the memorial service at MIT honoring Tom, reading the remembrances of Tom from the CQM web site's In Memoriam page¹ personal notes in papers in this special issue, an informal memoir Tom wrote at the request of one of his sons that Kin Ping Lee let us read, and many stories Tom and Kin Ping told us over the years.

We provide this brief biography of Tom for two reasons: first, to introduce the man to whom this special issue is dedicated; second, to emphasize the great distance Tom traveled in his life's journey.

Birth, family and childhood

Tom Lee was born Lee Tien Ho in 1923 in a small town in China. Tom's father was an intellectual who had a high position in the provincial government as a result of high scores on the examinations used in China until political upheavals and change in government in 1911. Tom's grandfather was a well-to-do merchant who had a salt monopoly; another relative was involved in an oil business. In those days in China, it was customary for many members of an extended family to live off the wealth of the more successful family members. Thus, Tom spent his early childhood in prosperous circumstances, as part of a large, complex, extended family, living in close proximity in a family compound, doted on by his mother. After the end of the dynasty in 1911,² Tom's father no longer worked; instead, he studied philosophy, literature, history, and so on, which he had Tom study with him on weekends and during school holidays.

In time, Tom's father moved Tom's immediate family to Shanghai. There, Tom attended elementary school, where Tom said he was not a very good student. Tom spent his junior high at an elite residential school where he was homesick and continued to do poorly in his studies.

This was an era of unrest in China, as various factions battled for control in the period after the end of the dynasty. At times in his youth, Tom's family had to hide to avoid literal battles among the competing war lords.³ Later, Japan invaded China, cutting the family off from the sources of their wealth, and occupied Shanghai where Tom's family lived. Such unrest continued through the time Tom left China in 1948.

The Japanese invasion and occupation of Shanghai awakened Tom to the fact that he needed to do better in school in order to get into a good college, and he became a superior student in his remaining years of high school.

College years

Tom was accepted into Chiao-Tung University to study mechanical engineering on the basis of his scores on a nationwide entrance examination competition for all government-run colleges. He chose mechanical engineering partly because his father emphasized to Tom as a boy the need for China to industrialize to catch up with the western industrialized countries.

¹ Center for Quality of Management web site, "In Memoriam Dr. Thomas H. Lee," <<http://www.cqm.org/tom-memorial>> (cited July 24, 2001, section entitled: "Stories, Memories, and Photos.") Contributors of remembrances to the web site as of this writing are: Lionel Barthold, Eric Bergemann, Rober Blethen, Gary Burchill, Paul M. Connolly, Christine Duvivier, Andreas Fassbender, Greg Fischer, Thomas R. Gerdes, Fritz Heimann, Christina Hepner-Brodie, Stephen P. Kelner, Marty McDonald, Kenneth William Miller II, Eamonn Murphy, John Petrolini, Linda Pizzotti, Ulrike Proske, Larry Raskin, Dave Walden, Ted Walls, and Kevin M. Young. In addition, Toby Woll contributed directly to this paper.

² This was the end of a long dynasty as was depicted, for instance, in the movie "The Last Emperor."

³ In time, the struggle for China after the revolutions involved war lords, the Japanese, Chiang Kai Shek, the Communists, and no doubt others.

However, Tom had begun to practice ping pong in high school and became an avid player in college. He chose to spend less time studying and more time playing competitive ping pong (and other sports) and generally having fun. In later years Tom delighted in telling how the grading system at his college included minus points for missing class. He missed so many classes that even when he got top scores on the final exam, his total score for a course could only add up to a C or D grade.

During Tom's college years, the Japanese continued to occupy Shanghai, although Chiao-Tung University continued to operate on a campus in the French concession area⁴ of the city under the auspices of a puppet government that nominally governed various parts of China under the control of Japan. However, after Pearl Harbor, the Japanese exercised direct control over Shanghai including the international concessions. The Japanese prevented entry of food that had previously come via the western powers and food that might come from the unoccupied Chinese countryside. Consequently, Tom and a cousin made surreptitious trips themselves to the countryside and smuggled rice back to their families.

Because the war continued to put pressure on the finances of the complex family of Tom's father, Tom dropped out of college after three years. He moved to Nankang and becoming a fire insurance salesman (having been trained to compute premiums on an abacus). While in Nanking, Tom also found an time to pursue a previous interest in Chinese opera, singing on an amateur basis.

In time, Tom grew restless selling fire insurance. Although it was becoming clear that Japan would eventually lose the war (which would free China from occupation), Tom and his assistant left the occupied portion of China and made their way by train from Nanking to Wuhu and then, after many days of walking, they arrived at Shan Lou near Chinese army headquarters. The day before they got to headquarters, the Japanese surrendered, ending the Japanese participation in the war.

This war in China was actually a three-way war, among the Japanese, Chiang Kai Shek's army, and the Communists, with a battle occurring whenever two of the three met. After the Japanese surrender, because of his family connections, Tom was taken back to Hangchow by the secretary general of the fourth army in boats with the general's family and servants (the soldiers, without family connections, walked home). During this trip, the entourage with which Tom was traveling was attacked by farmers sympathetic to the communist cause. People near Tom were killed, and Tom feared for his life. From Hangchow, Tom safely reached Shanghai where he returned to college.

Moving toward a career in business and life after college

During his final year in college (1945), Tom and a few others, including an expert Japanese mechanic, opened an automobile garage business. They depended on used parts (all that were available) to repair cars. Tom handled the business side of things, and the business did well until normal automobile businesses reopened and the Japanese mechanic went home.

During this time, Tom also was introduced to Kin Ping, the beautiful daughter of a well-to-do man in the textile industry. Tom and Kin Ping decided to they would marry, and Tom was introduced to Kin Ping's father. They became formally engaged in April, 1946, and

⁴ Each of several western powers had colonial enclaves in portions of Shanghai.

in June Tom graduated from Chiao Tung University with a Bachelor's degree in mechanical engineering.

Upon graduation, Tom heard of a job at a Shanghai subsidiary of General Electric. Coincidentally, Kin Ping had a family connection to this business unit, and Tom got a job in the mechanical department. In this GE subsidiary, Tom worked in a variety of businesses, representing a number of U.S. companies and helped handle the GE apparatus business. Out of this experience, Tom was selected to spend a period of time at GE in the U.S. being training in GE products by actually testing them on the manufacturing floor.

Tom's boss at the Shanghai GE subsidiary recommended Tom should take his fiancée with him, since things were unstable in China. Kin Ping agreed. (In recent years Tom told friends he thought he owed his life to his boss at the Shanghai GE subsidiary.)

Both Tom and Kin Ping described her father's concern with Tom, their potential marriage, and their trip to the U.S. In China, the custom was for relatives with less financial means to live off those who had had greater success, and Kin Ping's father was a person of great success who supported many people. He had doubts about Tom's abilities and worried that Tom (and Tom's family) might become a burden on Kin Ping and her father. Tom relished relating that he responded to this concern by telling Kin Ping's father that he had lived the first 25 years of his life without support from Kin Ping's father and was sure he could manage equally well for the next 25 years. In the end, Kin Ping's father agreed they could marry and go to the U.S.

Having obtained the necessary passports and travel clearances, Tom and Kin Ping were married three days before they sailed for the U.S. in June of 1948.

Tom's mother encouraged him to come home soon; however, Tom's father worried that China would remain unstable for a long while and suggested he stay in the U.S. until things were more settled.

Tom and Kin Ping said good bye to their families and left China for an uncertain life in a new country. (Tom did not return to China until 1972 to visit his mother who was ill.)

Schenectady

Tom and Kin Ping traveled to the U.S. on a military transport ship, paying a fare which required that they stay in separate men's and women's dormitories. It took two weeks to get to San Francisco, and from there they traveled by bus across the U.S., stopping along the way briefly to visit acquaintances and relatives.

They eventually arrived in Schenectady, NY, where Tom reported for work at GE. There he rotated through various jobs, which required him to do more manual work than he was used to, to do shift work, and to struggle with the unfamiliar English of the plant floor.

Soon, Tom attempted to matriculate to Union College's night program to better educate himself. However, his poor college grades (from missing so many classes) were a barrier, and the dean of admissions was unconvinced by Tom's story of getting top grades on the final examinations but still course grades of C or D. Tom always delighted in finishing the story of the reason for his poor grades in undergraduate school in China by telling about the challenge he made to the dean at Union College: if the dean would let Tom take two courses in spite of his poor undergraduate record, Tom guaranteed he would come out top in each course or he would go away and the dean would never hear from

him again. The dean agreed, Tom got 100 in both courses, he was formally admitted to the program for a Masters degree, and he graduated two years later with an all-A transcript.

In Schenectady, Tom and Kin Ping, after some struggle, found a comfortable place to live, and Kin Ping sought a job, to have something to do. The job was with a bus company reporting to William Smith, the comptroller. Tom and Kin Ping often talked of the personal kindness shown to them by Mr. Smith and his wife and thus why their first son is named William and Tom Jr. is their second son. The Smiths were known to Tom's children as Grandpa and Grandma Smith.

Tom's training program at GE had ended while he had one semester to go on his degree, so he enrolled as a full time student, planning to return with Kin Ping to China after he had his degree. Upon graduation, they booked their passage back to China and sold many of their belongings. However, with China's intervention in the Korean War, the U.S. ocean liners stopped service to China, and there was no way to get back.

Son William was born around this time and, being U.S. born, provided a basis for permanent resident status for Tom and Kin Ping, who were naturalized a few years later. However, Tom had no regular job and was earning some money mowing lawns for people. Both Tom and Kin Ping talked to people they knew at GE, and eventually Tom was rehired into the GE training program for which he had come to the U.S., until a permanent position was found for him in GE's Control Department.

By this point, Tom had concluded that the situation in China was such that he was unlikely to be able to return. Because climbing the management ladder of GE did not seem likely, given Tom's Chinese background, he enrolled in a PhD program at RPI to improve his marketability.

Tom's reasons for his changing approach to life — work to get ahead rather than happy-go-lucky — were, first, that in U.S. society one can get ahead with hard work, and, second, as an immigrant he really had no choice.

At RPI Tom got nothing less than 100 on tests, which particularly impressed one of his professors who was from GE, and made other connections back to GE through the RPI faculty. For his PhD topic, he chose to study electric arcs, an issue important to aspects of GE's business and did lab work for his thesis at GE. Upon graduation, Tom was offered an assistant professorship at RPI, and GE offered a somewhat larger salary for him to return to GE. He chose the latter. Nonetheless, Tom became an adjunct professor at RPI teaching two courses in the evening program.

Because he was Chinese, Tom could not get a security clearance and in time moved into the more commercial parts of GE's business. During this time at GE, he worked on a variety of projects with various interesting people, turned down some interesting opportunities, began to be known around the company, and ultimately was discovered by a research director in GE's Philadelphia laboratory who was looking for someone to do research on electric arcs and to build a practical vacuum interruptor. Thus, Tom and Kin Ping left their first home in America and the friends they had there and moved with their two children to Philadelphia.

Major technical achievements

A major issue in power transmission is switching the power on and off. At high power levels, electric arcs happen across the switching contacts and do odd things, like welding themselves shut when they are closed at high currents — not very useful for a circuit breaker. In the 1920s, Millikan (physicist) and Sorenson (electrical engineer) conceived a vacuum interruptor, i.e., a device in a vacuum for high power switching. GE bought the patent for the idea but could not make it work. By 1950, many had tried in various countries, but no one had succeeded in making the Millikan/Sorenson idea work in practice.

Tom later said that his decision to take on the task of making a successful vacuum interruptor was based on youthful arrogance. First he had to learn the state of the art of vacuum systems, of which he previously knew nothing. He had to learn the characteristics of various materials at high temperatures. He had to learn about zone refining. He had to learn about the geometries of interruptors, and so on. Fortunately, GE was a big company, and some of Tom's colleagues on the project already knew some of what needed to be learned; and there were people elsewhere in the company who could be consulted on some issues. Also, Tom had a supportive boss who let Tom's group do necessary experimentation

There were a number of important steps along the way, but finally Tom got an idea from a paper in a metallurgical journal about putting small amounts of impurities in copper contacts, which made the contacts withstand problems (e.g., welding shut) in the face of high power arcs. He and his group developed the necessary theory, obtained a patent on a mixture of copper and one-half percent bismuth, and GE announced the first power vacuum circuit breaker in 1961.

In parallel with his efforts as a development engineer for a new type of circuit breaker, Tom was doing research on electric arcs and publishing papers on the basic physics of electric arcs. In time, Tom published the book *Physics and Engineering of High Power Switching Devices*⁵. Through this activity, he came to know people and became known in the international physics community.

Having achieved major breakthroughs, both practical and theoretical, in 1975 Tom was elected to the National Academy of Engineering; and he served as vice president and then president of the Power Engineering Society.

By this time, Tom and Kin Ping had three children (the third son was Richard) and a comfortable life in Philadelphia. Nonetheless, Tom told us stories about the problems their sons faced in those days because Chinese children were not expected to have great capabilities and the steps he and Kin Ping took to make sure their sons achieved all they were capable of.

Moving further into management

With his success on the vacuum interruptor and the general success of the GE department in which he resided, Tom in time became a section manager and eventually manager of the entire laboratory operation. His compensation jumped, there was money to spend on family vacations, the family found Martha's Vineyard, and Kin Ping started a business of her own that eventually migrated to Martha's Vineyard.

More responsibility came Tom's way until he had laboratories

⁵. Thomas H. Lee, *Physics and Engineering of High Power Switching Devices* (Cambridge, MA: MIT Press, 1975).

throughout the power transmission group of GE reporting to him. He also had a steel processing plant reporting to him that didn't work well which he had the courage to shut down. He traveled around the world for GE and was widely recognized in the relevant professional societies.

In 1974, the corporate headquarters asked Tom to transfer from the power distribution activity to the larger power generation group to become chief strategic planner for that business. This was another story Tom enjoyed telling. Strategic planning had been introduced into GE by CEO Fred Borch, and it had not gone well. Managers who had not been successful running business were given strategic planning jobs. When this didn't work, fresh MBAs were hired for these jobs. Excellent looking strategic plans were created that had little practical value. When Tom was approached, he asked why headquarters wanted him to take a chief planner job when he knew nothing of strategic planning. He was told that no one understood strategic planning anyway and they wanted someone who could think.

Tom took the job, and he and Kin Ping (their sons were essentially grown by this time) moved near GE's headquarters office, first in New York City and later in Connecticut. The first major challenge in the new job was planning for the future of GE's nuclear reactor business where Tom discovered a vast but worthless backlog (customers weren't going to be able to pay what they owed) and no prospects for future power plant orders. Tom often repeated that this experience taught him the importance of thinking the unthinkable, because it may happen, and the importance of contingency planning. The experience also influenced Tom's book *Energy Aftermath*.⁶

During this part of his career — now on Reg Jones' watch as CEO — Tom also got to know Gerhard Neumann⁷ and the people from the jet engine business of GE. The GE jet turbine business faced an anti-trust problem which involved both the jet engine part of the company and power generation business where Tom resided. The solution involved an internal joint venture marketing activity between the two divisions, which was assigned to Tom's planning operation, definitely an unconventional reporting relationship. However, the internal joint venture was a great success, selling products throughout the world in the face of strong competition.

As he neared retirement, Reg Jones divided the company into five sectors with the leader of each being a candidate to be the next CEO. Tom was not happy with the assignment he was given as this CEO transition played out and, thus, he decided to leave GE.

Retirement(s)

MIT

A few years earlier, Philip Sporn, chairman of American Electric Power, established the Sporn Chair for Electric Power Education at MIT. At the time, Sporn asked Tom if he would leave GE and be the first occupant of the chair. However, Tom felt his family could not afford financially to leave GE, and told Sporn he would someday go to MIT, when he could afford to. Thus, when Tom decided to leave GE, he had a path into MIT, arriving as a full professor in 1980. This was Tom's first "retirement."

At MIT Tom taught a course in electromagnetics in the Electrical Engineering Department, and he began to get involved in some management courses, including the Management of Technology (MOT) program co-sponsored by the Sloan School of Management and the School of Engineering.

⁶ Thomas H. Lee, et al., *Energy Aftermath* (Cambridge, MA: Harvard Business School Press, 1990).

⁷ Gerhard Neumann, *Herman the German: Enemy Alien U.S. Army Master Sergeant* (New York: William Morrow and Company, Inc., 1984); Thomas H. Lee, "Managing for Creativity: How Gerhard Neumann and His Associates Ran the GE Aircraft Engine Business," *Center for Quality of Management Journal* Vol. 7, No. 2 (Winter 1998) 3-9.

Tom and Ed Roberts, co-founder of the MOT program, enjoyed telling how in a visit of Ed and Tom Allen (another Sloan professor) to GE shortly before Tom arrived at MIT, Tom approached Ed Roberts and Tom Allen and told them he would shortly be at MIT as a full professor of engineering and hoped to work with them in the Sloan School. Ed Roberts and Tom Allen didn't know Tom and were privately skeptical about someone coming from industry to become a full professor. However, when they arrived back at MIT, they found a message waiting for them that they had missed before they left. The message said they should be sure during their visit to GE to look up Tom Lee, who was coming to MIT as a professor.

Because of Tom's experience at GE, he was an excellent fit with the MOT program and in time became co-director.

A couple of years later, Tom was asked to manage one of several MIT laboratories working in the energy area. Tom helped MIT solve a larger problem at the same time by agreeing, not only to take over leadership of the one laboratory, but also to become the director of a combination of related MIT laboratories under the new name of the Laboratory for Electromagnetic and Electronic Systems (LEES). As director of LEES, Tom spend much of his time developing new sources of funding.

IIASA

In 1984, the suggestion was made that Tom become director of the International Institute for Applied Systems Analysis (IIASA) in Vienna, Austria. IIASA had been set up in the late 1960s and early 1970s in response to President Johnson's suggestion that the U.S. and Soviet Union should cooperate on non-military issues that all societies face. Because it was seen to be more stable than if included more countries than just the U.S. and Soviet Union, IIASA became a multi-national institution. After being interviewed by McGeorge Bundy (who took the lead in getting IIASA started for Johnson) and other famous people, visiting Vienna, understanding the IIASA needed someone to lead it in more applied than theoretical directions, and having Kin Ping's agreement that Vienna would be an attractive place to live, Tom accepted the position on the condition that MIT would give him a leave of absence.

On his first day on the job at IIASA, Tom began to chase down the financial situation — he had begun to study the financial statements before he got there — and discovered the institute had serious financial problems. He also quickly concluded that IIASA needed to put more emphasis on application of theory in practice in contrast with the near total emphasis on pure theory that prevailed when he got there. As the acting director of IIASA said at the time of Tom's death:

During [Tom's tenure as director of IIASA], IIASA overcame its acute financial difficulties and embarked on a more modest lifestyle. Lee emphasized quality control and introduced external peer review procedures. Increased interaction with the user community became a priority.

In addition to getting member countries to pay their dues (especially the U.S.), Tom established an office of sponsored research. As part of these activities, Tom had to deal with the people in the U.S. government's agencies that sponsor research and the people on President Reagan's staff that influenced those agencies.

During their time at IIASA, Tom and Kin Ping made many friends and learned much about life in other countries, including the socialist countries.

One person Tom got to know well through his IIASA experience was Shoji Shiba, whom he had sought out earlier at the suggestion of a well-placed Japanese business executive named Saba. Shoji and Mieko Shiba came to live in Vienna and from Shoji, Tom began to learn about TQM.

In 1987, Tom and Kin Ping went home to the U.S. by way of a long vacation trip that included a stop in Beijing. In Beijing, Tom became involved in organizing a trip of MIT economists to China to help with problems with China's wage and price systems.

“Leaving” MIT

Back home, Tom decided he no longer wanted to be a regular professor, and retired to professor emeritus status removing himself from the MIT payroll. However, he continued as co-chairman of the MOT program, continued to teach courses, and helped organize the Leaders for Manufacturing (LFM) program to emphasize within MIT the important area of manufacturing. He also participated in a number of National Academy of Engineering studies and other efforts relating to energy and the environment, engineering in the face of globalization of industry, and so on.

CQM

On his return from IIASA, Tom was convinced that American industry would be more competitive if its leaders were able to apply the operational strength of TQM in combination with the power of robust strategic planning. To that end, Tom began working with Ray Stata and other Boston area CEO friends of Ray to do something about the state of management of U.S. companies. He introduced Shoji Shiba, an expert in TQM, and Russell Ackoff, an expert in strategic planning, to Ray and the other Boston-area CEOs. Tom, Ray, Shoji, and several other CEOs started the CQM. Ray was chairman of the board, Tom was president and treasurer, and Shoji served as “guiding counselor.” The founding of the CQM is described in a paper co-authored by Tom,⁸ and the CQM's evolution from 1989 until today is described in this issue.⁹ Much of what Tom was thinking about during this period is documented in his book, *Integrated Management Systems*.¹⁰

Another retirement

In 1998 at the age of 75, Tom retired from the position of CQM president, although he stayed on as a board member and treasurer. He continued to visit the CQM office for a few hours every week or two, continued to provide new president, Gary Burchill, with support and guidance, and continued to push the CQM's development, including establishing a chapter in China.

When his Chinese college found that Tom had retired from CQM, the college alumni association invited him to take a five year term as president of the U.S. alumni association, and Tom accepted. Tom also began to become active with Transparency International, dedicated to combating corruption around the world.

And, he and Kin Ping continued to enjoy spending time with their three sons, three daughters-in-law, and eight grandchildren.¹¹ Their life was full of family and their many friends in Boston, on Martha's Vineyard, and around the world.

⁸. Thomas H. Lee and David Walden, “What is the Center for Quality Management?”, *Center for Quality of Management Journal* Vol. 1, No. 1 (Autumn 1992) 3-8.

⁹. David Walden, “Creation and Evolution of the CQM,” *Center for Quality of Management Journal* Vol. 10, No. 1 (Summer 2001) 17-26.

¹⁰. Thomas H. Lee, Shoji Shiba, and Robert Chapman Wood, *Integrated Management Systems: A Practical Approach to Transforming Organizations* (New York: John Wiley & Sons, 1999).

¹¹. In the ten years we knew him through CQM, we enjoyed hearing Tom tell about the trips he and Kin Ping took each of their grandchildren on, the trips they organized (especially to China) for large groups of family members, and hearing about and occasionally being visited by their youngest granddaughter, whom Tom and Kin Ping frequently cared for.

The scope of the journey

Over the course of his life, Tom Lee went from the happy-go-lucky son of a wealthy family in a non-industrialized country, through revolutionary times, to a new country with his new wife where they found themselves cut off by war from their home country, through technical accomplishment (including world class engineering breakthroughs) and because of his practicality and ability to work with others rose to a high position in General Electric, converted himself from a technology expert to a management expert, led major and important laboratories at GE, MIT and IIASA in Vienna, founded the CQM, had an extraordinary number of close friends throughout the world and people who credited him with influencing their lives, and raised three sons who assimilated into U.S. society (as did Tom and Kin Ping) and are now themselves elite members of their communities and professions.

At the time of his death, Tom Lee was the holder of thirty U.S. patents, had written over 100 technical papers, and was the author or co-author of four books and editor of two others. In addition to his honors from the National Academy of Engineering and his positions with the Power Engineering Society, Tom received the Power Life Award in 1980, was a fellow of the IEEE, a member of the Swiss Academy of Engineering Sciences, a fellow of the AAAS, recipient of RPI's Davis Medal for outstanding engineering accomplishments, and was awarded in 1990 the National Association for Chinese-Americans Outstanding Achievement Award.

The evening of the celebration of Tom's retirement from CQM, he told the story, that Toby Woll also recounts elsewhere in this issue¹² of growing up in a China where during the lunar eclipse they banged on drums to scare away evil spirits of the devils and then spending of his life in the U.S. where he knew well people who helped put a man on the moon.

Tom was a "son of China,"¹³ a man and scientist of the U.S., and a citizen concerned with the world. One of his last papers was entitled "Think Globally, Act Locally."¹⁴ Tom always thought big thoughts, and he always put them into useful practice, drawing together the necessary communities of interest from his friends and those that knew they would learn much by joining him in his endeavors. To many of us at the CQM, Tom was one of the greatest influences of our lives and one of our dearest friends. We cherish the time we had with him.

¹² Toby Woll, "Report on G. Clotaire Rapaille's Syndicated Study of Leadership," *Center for Quality of Management Journal* Vol. 10, No. 1 (Summer 2001) 27-34.

¹³ Jiang Zamin (President of the People's Republic of China), *A Letter to the Family of Lee Tien Ho*, February 8, 2001.

¹⁴ Thomas H. Lee, Shoji Shiba, and Robert Chapman Wood, "Think Globally, Act Locally," *Center for Quality of Management Journal* Vol. 8, No. 3 (Winter 1999) 23-48.





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Management Gurus and Educators

by Russell Ackoff

Russell Ackoff is a renowned management thinker, author, consultant and teacher. Tom and Russ were good friends for many years, and Tom often commented on the great influence of Russ on Tom's own thinking.

Tommy Lee never pretended to be a guru, but he was an outstanding educator. The distinction is not always clear. I dedicate this effort to make it clear to his memory.

guru *n.* an influential or revered teacher.

educate *v.* to train the mind and abilities of.

train *v.* to bring to a desired standard of efficiency or condition or behavior etc., by instruction and practice.

As usual, a dictionary fails to reveal the nuances of meaning involved in current usage. There are no pejorative implications in calling one an educator, but there frequently (but not always) are derogatory implications in calling one a guru. This is certainly the case, for example, when Micklethwaite and Wooldridge¹ refer to gurus as "witch doctors."

The term guru has become more popular in management circles than educator. Witness four recent books: *The Ultimate Book of Business Gurus* by Stuart Crainer,² *Management Gurus* by Andrzel A. Huczynski, *The Witch Doctors* by John Micklethwaite and Adrain Wooldridge,³ and *The Guru Guide* by Joseph Boyett and Jimmie Boyett.⁴

In management circles, guru, in its widely used pejorative sense, is one who promotes a panacea or fad, and, in some cases, founds a cult. Gurus produce doctrines that attract disciples. The doctrine defines which problems are meaningful, what the acceptable solutions to them are, and discards everything else as irrelevant. Thus, the guru puts thinking to rest; he provides all the relevant questions and answers, and his coverage pretends to comprehensiveness. What he expects from his followers, his disciples, is loyalty, no questioning of his outputs or manipulation of them. He expects them to proselytize, and at most to expand, extend, and illuminate his outpourings.

The appeal of gurus lies to a large extent in the simplicity of the doctrines they put forth. They are simple no matter how complex the problems at which they are directed. They provide a life raft to those managers who are incapable of handling complexity.

In other than managerial circles — for example, politics and religion — the disciples of a guru not only tend to form a cult but often become fanatics treating non-believers as enemies, often ones to be eliminated. Terrorism is the most extreme form of adherence to a guru.

In the political and religious arena gurus tend to be aggressive against "the enemy." But in business circles, this is rarely the case largely because there are so many gurus competing for followers that no one of them can dominate the minds, let alone the emotions, of potential followers. In politics and religion the number of competing gurus is seldom more than two or three.

Educators stand in sharp contrast to gurus. Educators do not try to bring thinking to a halt but to initiate it. They want their students to extend and expand the ideas they present and students are encouraged to question and modify without constraint. Educators want their solutions to be treated as beginnings, not ends. Gurus lead into; educators lead out of. Gurus provide ready-made solutions but educators provide ways of finding individualized solutions. This is reflected in an old Chi-

¹ John Micklethwaite and Adrian Wooldridge, *The Witch Doctors* (New York: Times Books, 1996).

² Stuart Crainer, *The Ultimate Book of Business Gurus* (New York: AMACOM, 1998).

³ Andrzel A. Huczynski, *Management Gurus* (London: International Thomson Business Press, 1996).

⁴ Joseph and Jimmie Boyett, *The Guru Guide* (New York: John Wiley & Sons, 1998).

nese proverb that says that if a fish is given to a starving man, he will soon be hungry again. But if he is taught to fish, he will never be hungry again. The former is the guru's way; the latter is the educator's. The output of a guru is a closed system of thought — closed to external influences and not subject to change; the output of an educator is an open system of thought — open to external influences and subject to change. A student can have many educators, but a disciple generally has only one guru.

An educator tries to transmit a way of thinking and a way of conducting inquiries. And he does not pretend that these are the only ways. Among other things, he recognizes that differences in personality lead those with different personalities to select different ways of thinking and behaving. Some, like Tommy Lee, try to bridge the differences between the outputs of different educators. There is no bridging to be done between gurus.

Effective educators do not teach. Teaching is usually an obstruction to learning. Managers learn that which they use to manage while on the job, not in school. Experience is a better source of learning than others, even teachers. However, a good educator facilitates one's learning process, enables one to learn more rapidly and effectively and motivates one to do so. To a large extent they do so by making learning fun. Every meeting I ever had with Tommy was fun.

Most teachers are more like gurus than effective educators.



Remembering Tom Lee with an Image LP

From the CQM Louisville Chapter,
with a Foreword by Greg Fischer

Contributors

- Greg Fischer is Chairman of Iceberg Ventures, LLC and former CEO of SerVend International
- Elaine Monson Gravatte is Chief People Officer of D.D. Williamson & Company
- Jack Hillerich is President & CEO of Hillerich & Bradsby Company
- Carla LaRoque is Vice President of Human Services and Quality for Bramco, LLC
- Nancy Moeller is Special Projects Supervisor for R.J. Corman Railroad
- Edie Nixon is Vice President of Information Systems for D.D. Williamson & Company
- Ted Nixon is President of D.D. Williamson & Company
- Jay Paradis is Chairman & CEO of Bramco, LLC
- Ron Santella is Vice President of Process Development and Human Resources for Hillerich & Bradsby Company
- James Stith is the Center for Quality of Management's Louisville Chapter Director

Foreword

Image LPs (Language Processing diagrams) are useful to develop richness of detail surrounding an experience or thought that is complex.

The life of Tom Lee represented many different experiences and emotions to the members of CQM's Louisville chapter. Thus, we decided to honor Tom, our teacher, using a tool that he taught us — the image LP. Contributors to this LP are listed (in the proper location) at the bottom right of the diagram.¹

In deference to Tom and Shoji Shiba, I readily concede that this LP also represents an application of the "60 percent rule." There certainly is not an adequately low level of abstraction in several of the lower level cards. But the caring and reverence in which we hold Tom should be evident — that is the important point!

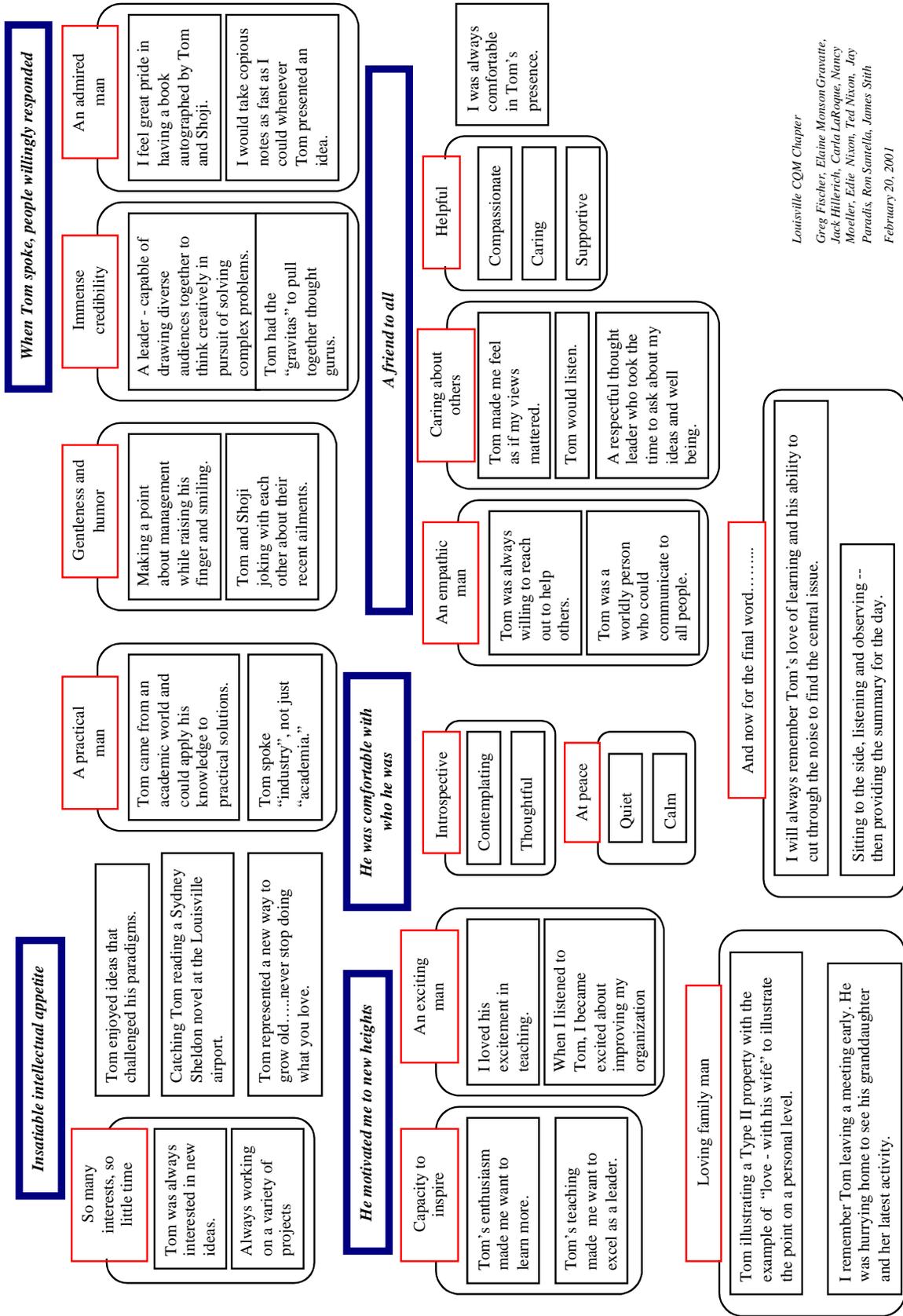
An image LP does not have to be multi-voted to establish priority for the red level cards. But a summary must be written. The summary of Tom's LP says it all: "A Soaring Presence — Tom was the ultimate teacher of life. His contributions have made the world a better place. His students will smile forever."

— Greg Fischer
March, 2001

¹ The Image LP may be found on the next page.

What are your images of Tom Lee?

A SOARING PRESENCE -- Tom was the ultimate teacher of life. His contributions have made the world a better place. His students will smile forever.



Louisville CQM Chapter
 Greg Fischer, Elaine Monson Gravatte,
 Jack Hillerich, Carla LaRoque, Nancy
 Moeller, Edie Nixon, Ted Nixon, Jay
 Paradis, Ron Santella, James Siff
 February 20, 2001

Creation and Evolution of the CQM

by David Walden

Dave Walden first met Tom Lee when Tom organized the CQM Design Team in 1990 and Dave was assigned by founding member Bolt Beranek and Newman Inc. to be a member of the team. They became close friends and worked together on many CQM activities over the next decade. Dave feels he owes the current direction of his life to Tom's support and intellectual exchange with Tom.

Tom Lee supported and encouraged the idea of starting the Center for Quality Management Journal, although we waited two years after CQM's founding before we attempted the first issue. In 1992 Tom felt the time was right and we formed an editorial board, began soliciting papers. Robert Wood, Trish McKinnon, Julie Fucarile, and I edited and produced the first issue in Autumn 1992. The first paper in that first issue was entitled "What is the Center for Quality Management?" by Tom Lee and me.

By 1995 Tom had initiated a change in name of the CQM, from Center for Quality Management to Center for Quality of Management, to emphasize the Center's concern with the broader issue of quality of management rather than only management of quality. In the Spring 1995 issue of this journal, Tom and Toby Woll wrote an update paper on the CQM entitled "Creating the New Center for Quality of Management."

I am using the opportunity of this special issue to update Tom's and my original paper to describe the CQM and its activities through 2000.

Initiation of the CQM

In early 1990, seven Boston-area companies formed the Center for Quality Management to learn from and aid each other in their TQM implementations. The companies that formed the CQM had characteristics typical of companies that decided to implement TQM. With few exceptions, they 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 the practice of TQM in their companies.

In November 1989, Professor Shiba gave a seminar at MIT that several of the CEOs attended. Professor Tom Lee of MIT, who had been Shiba's colleague at the International Institute for the Application of Systems Analysis in Vienna in the 1980s, arranged for Professor Shiba to give the seminar.

As a result of the problems they were having at their companies, their knowledge of Japan and TQM, and Professor Shiba's introduction to TQM, the following seven Boston-area companies decided to form the Center for Quality Management:

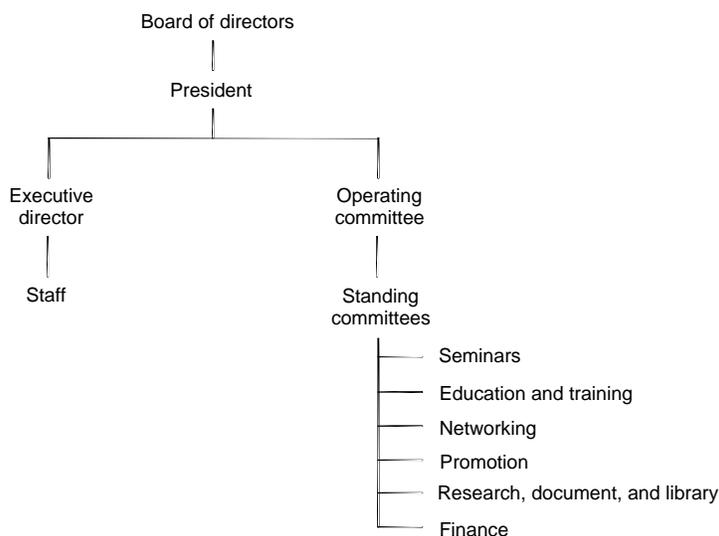
- Analog Devices, Inc.
- Bolt Beranek and Newman Inc.
- Bose Corporation
- Digital Equipment Corporation
- GE Aircraft Engine Division
- Polaroid Corporation
- Teradyne, Inc.

Ray Stata of Analog Devices was chairman of the board, Tom 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.¹

The CQM was formed on the basis of a three-element model for societal diffusion, as expressed in its 1989 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.

Having decided to form the CQM, the founding CEOs needed a plan for the CQM's functions and operations, and they needed a mutual understanding of what TQM was. To this end, they undertook a five-week design study² 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. The plan resulting from the CQM design study led to a committee structure, as shown in Figure 1. The intention was to have a lean staff and active committee structure (à la the approach of the Japanese Union of Scientists and Engineers), to put the know-how in the companies and not in the CQM staff.



¹ In essence, Tom Lee, Ray Stata, and Shoji Shiba were the individual co-founders of the CQM.

² Shoji Shiba and David Walden, *Four Practical Revolutions in Management* (Portland, Oregon: Productivity Press, 2001) 379-385.

Figure 1. CQM Committee Structure of 1990.

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.
- The first CQM tool manuals were drafted.

³ Kiyoshi Uchimaru, Susumu Okamoto, and Bunteru Kurahara, *TQM for Technical Groups: Total Quality Principles for Product Development* (Portland, Oregon: Productivity Press, 1993).

- 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, developed by Shoji Shiba with help from the CQM design team, was also 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. Two members of 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 a 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.

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 must espouse commitment to leading 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 require a culture change. Thus, member companies 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 the 6-day course and the book *Four Practical Revolutions in Management* 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 they may adapt it to their own organizations.

1991-1999 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 serve 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 CQM methods, and
- To develop improved, advanced methods of TQM, moving beyond what was copied from Japan ca. 1990.

By the third year, 1992, the challenge was to figure out how to address demands for growth:

- How to select new member companies who would actively participate
- How to provide services to the expanded membership while still depending on the committee structure
- How to expand the staff without diminishing the intellectual leadership of the companies

In the years between 1992 and now, each of these aspirations and challenges has been substantially met. The following subsections detail the path the CQM followed.

Expansion

The CQM started in the Boston area with seven founding member companies. By 1991, other Boston area companies had already heard about the CQM and its approaches to mutual learning for the benefit of all and wanted to join, bringing the membership to 24 companies 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 in 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 company 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

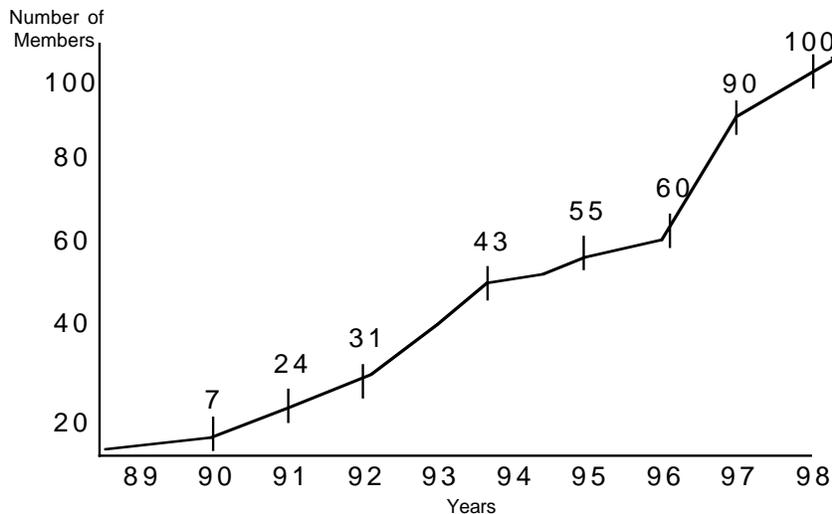


Figure 2. Growth of CQM Membership.

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 does not actively seek expansion to other geographic regions, companies in new regions may become interested causing the CQM to expand further. In 2000-2001 creation of a chapter in Ireland is underway, and ground work has been done for a chapter in China.

Management

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) was hired to manage the CQM central office support staff. Over time, the CQM staff had grown to about 20 people, including the chapter directors. As of 1998, founding president (and pro-bono part-time employee) Tom Lee retired, and a new CQM president, Gary Burchill, was appointed to be a paid full-time president; he also handles the job of executive director, with assistance from an operations manager (Eric Bergemann).

Focus

From the beginning, one of the CQM's aspirations was to develop improved, advanced methods, moving beyond what was copied from Japanese TQM.

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 practiced in the late 1980s and early 1990s. 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 1991-1993, CQM member companies worked with Gary Burchill to develop Concept Engineering.⁴ By 1992, the CQM began an interchange with Russell Ackoff and his colleagues to learn the methods of Idealized Design.⁵ In the years that followed, other methods were integrated with the methods CQM members were already using (discussed below in the Research subsection). 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 (and publications)
- Research

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

⁴ PhD thesis by Gary Burchill, *Concept Engineering: An Investigation of TIME vs. MARKET Orientation in Product Concept Development* (Cambridge, MA: Massachusetts Institute of Technology, 1993).

⁵ See special issue on Design and Planning in Organizations, *Center for Quality of Management Journal*, Vol. 5, No. 1 (Spring 1996).

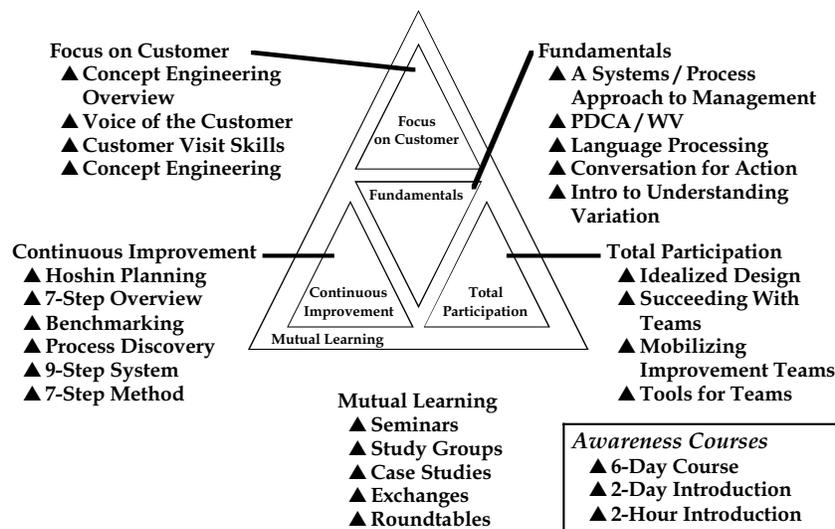
Education

In 1990, Shoji Shiba with assistance from members of the CQM Design Team offered two instances of a 6-day course on TQM for senior managers. In 1991, the 6-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. The executives also took the material into their own companies and integrated it with their existing internal activities in the context of their corporate culture.

Also, in 1991, skill courses in the Language Processing Method⁶ and the 7-Step Problem Solving Method⁷ were offered, 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 other consortia or consultants.

A "roadmap" of available CQM courses is shown in Figure 3.



⁶ *Language Processing*, a manual published by the Center for Quality of Management (Cambridge, MA, 1997).

⁷ *7-Step Problem Solving Method*, a manual published by the Center for Quality of Management (Cambridge, MA, 1997).

⁸ CQM staff and member companies refer to societal networking and mutual learning interchangeably.

Figure 3. CQM Curriculum Roadmap.

Networking (and publications)

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 roundtables.
- Members contribute 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 CQM chapter visits companies in another chapter.
- People from one member company participate on improvement 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 *Center for Quality of Management Journal* 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 members-only web site.

Research

From the beginning, people from CQM member companies have worked together to learn, exchange, and develop new methods to add to the set of CQM methods. Guiding these efforts have been several principles:

- Look for weaknesses in member companies' current management systems.
- Don't be bound to a single "school" or discipline.⁹
- 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, a few 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 — extensively documented and widely taught and practiced
- A study of best practices of new product development — resulted in a seminar at which representatives of various CQM members presented their best practices
- Development, in collaboration with Russell Ackoff and his colleagues, of a step-by-step approach to Idealized Design — applied in several CQM member companies
- A study of the methods of culture change — conclusions never published
- A study of how the methods of TQM can be applied in service organizations — resulted in a study report¹⁰ and use of the vocabulary of three different types of processes¹¹ common to all kinds of organizations
- A survey of Clotaire Rapaille's concepts of Cultural Archetypes — concluded with a seminar with presenters from four non-CQM companies describing their use of Rapaille's methods; see also Toby Wolf's article in this issue (page 27)

⁹. At 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.

¹⁰. Victor Aramati and Toby Woll, "TQM in Services: A Report by the CQM Study Group," *Center for Quality of Management Journal*, Vol. 6, No. 2 (Fall, 1997) 5-25.

¹¹. Operational, moment-of-truth, and innovative processes.

- Development of the Conversation for Action (or Personal PDCA) methods to find shared concerns, make keepable commitments and build trusting relationships — taught in several CQM courses
- 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 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 compiled by Christine Duviver and Toby Woll that appears in this issue (page 35)
- 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 Center for Quality of Management Journal .¹²

¹² Neil Rasmussen and David Walden, “Observations from the 1997-98 CQM Study Group on Cycle Time Reduction,” *Center for Quality of Management Journal* Vol. 8, No. 2, Special Issue on Cycle Time Reduction (Autumn, 1999) 3-34.

Over CQM’s first decade, many CQM members have 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, adapting things as necessary. Finally, share these new “best practices” with others. Learning best practices is not sufficient. A company has to make the best practices their own. In so doing, the company develops a new best practice it can share.

2000 and Beyond

As the millennium was changing, CQM continued to see the necessity of ongoing evolution of management practice to meet the changing demands of the modern world. Figure 4 illustrates the on-going evolution.

There are ongoing efforts to further improve existing methods, such as those in the shaded circles on the main diagonal of the figure.

The world is becoming a more complex place. As shown in Figure 4: a) increasingly complex problems must be handled at lower levels of an

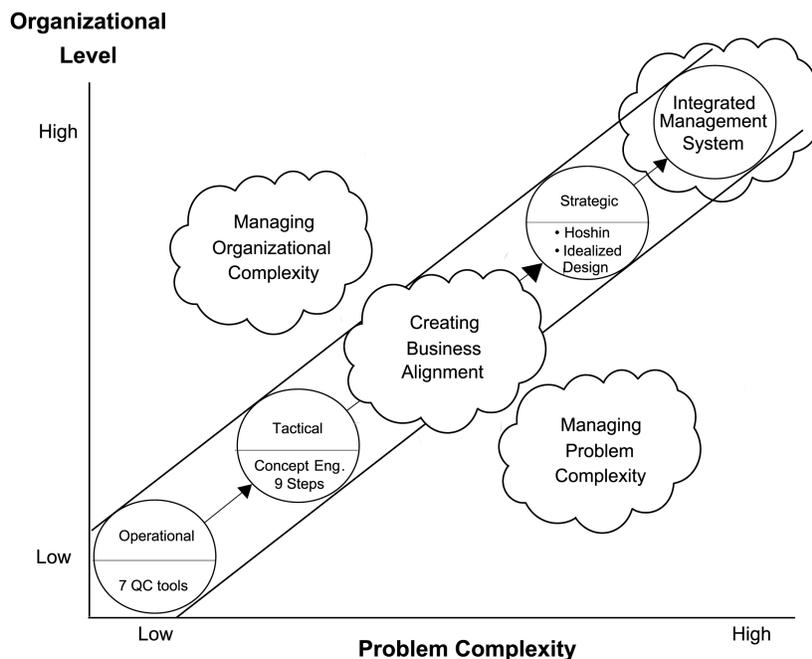


Figure 4. Problem Complexity versus Organizational Level.

organization, b) increased organizational complexity means that even relatively simple problems require effort from high in the organization, and c) new methods and old methods involving more people more often must be aligned in pursuit of business purposes.

Thus, in 2000,¹³ with new president Gary Burchill (who Tom Lee hand-picked when he retired) deeply into his new job, CQM chapters, representatives of member companies, and a few others undertook a major new initiative to develop methods under the title of Mastering Business Complexity.

¹³ Actually, beginning in 1999.

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 are trends that 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 systems

Integrating the elements and methods of business improvement and organizational change into an integrated system has long been part of the CQM approach. 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, there is tremendous pressure for improvement methods to be operated at so-called “net speed,” the speed at which many businesses perceive they must operate today.

To address the mastering business complexity issues described in the above subsections, the mechanism Tom Lee originally brought to CQM and continually promoted — study groups — was applied again.

- The Cambridge chapter undertook a study group on addressing problem complexity. This led to a new course on mastering problem complexity.
- The Cambridge chapter undertook a study group on addressing business complexity. This results of this study group fed into a new course on mastering organizational complexity.
- The Cincinnati chapter undertook a study group on making the so-called 7 Infrastructures¹⁴ more operationally defined. The results of this study group also contributed to the new course on mastering organizational complexity, directly addressed business issues of business alignment, and produced a new manual¹⁵
- To address the net speed issue, the California chapter based in Silicon Valley undertook a study group on quality improvement at Internet speed, and the Ireland chapter based in Dublin undertook a study group on rapid cycle methods. Results are just beginning to emerge.

At this writing (March 2001), Mastering Business Complexity methods resulting from the above mentioned studies are being taught, used and refined. And the CQM chapters and member companies continue to look for weaknesses that need to be addressed, undertake to study them together, and to develop still newer methods to provide high performance integrated management systems for organizations of all types, so each organization and its people can find their unique capabilities and prosper.

CQM continues to practice the methods that Tom Lee helped us learn and encouraged us to practice so that we may all enjoy life more.

¹⁴ Shoji Shiba and David Walden, *Four Practical Revolutions in Management* (Portland, Oregon: Productivity Press, 2001) ch. 21.

¹⁵ *Mobilizing Change Using the 7 Infrastructures*, a manual published by the Center for Quality of Management (Cambridge, MA, 2001).



Report on G. Clotaire Rapaille's Syndicated Study of Leadership

by Toby Woll

Toby Woll is Director of Learning Technology Initiatives for the MIT Sloan School of Management and the former Executive Director of the Center for Quality of Management.

In January, 2001, Tom Lee called me to ask if I would be willing write an article about Clotaire Rapaille's Study of Leadership in which CQM participated. Tom said that he had been rereading the notes from the CQM Leadership Study Group (1997-1999) and felt that there was "valuable stuff" in the notes on Rapaille. I had long since learned to agree to anything that Tom asked, for selfish reasons. Tom invariably had thought deeply about his topic and made his requests from a conviction that something important needed to be done. Asked to be an accomplice to his intention, I found that, without fail, I would learn an incredible amount. Some of the learning would come from Tom as he shared his own insights and thought process. Some of the learning came from the work itself. So, I agreed to his request with pleasure. When Tom died, I had not fulfilled my commitment to him. So, one of the objectives of this article is to record, for the CQM family, insights from Clotaire Rapaille about leadership. But, Tom always said we needed to know both the "what" and the "how" to improve. Therefore, I dedicate this article to Tom and use him as the case study of how a great leader behaves.

The Cultural Archotyping Method

Clotaire Rapaille is a psychologist who studies what he calls cultural archetypes.¹ His work has been used to create marketing campaigns for products (Procter & Gamble, General Motors), to structure the roll-out of quality initiatives (AT&T, American Society for Quality Control), and to help identify critical ingredients in customer loyalty, teamwork, and leadership (Ritz-Carlton Hotel Company).²

Rapaille proposes that people are motivated at three levels: the reptilian, the limbic, and the cerebral. In reverse order, at the cerebral level we deal with what Rapaille calls the "intellectual alibi" for why we do what we do. For instance, Rapaille gives the example that someone who lives in New York City will try to justify buying a large SUV by arguing that parking in snow is very difficult. At the limbic level, we act and react based on our earliest experiences. Rapaille argues that our imprinted, learned patterns are created as a conditioned response stemming from our earliest positive and negative experiences. The key here is that the response is very strong because it is "learned" in the context of the emotion of the experience. For instance, Procter & Gamble asked Rapaille to discover the American cultural archetype for coffee.³ Rapaille determined that Americans do not resonate with the taste of coffee. In fact, we tend to cover up the taste with sugar and cream. Instead, Americans' early positive associations with coffee are "home" and "smell." These come from our experience as very small children, securely tucked in bed, smelling the coffee our parents are brewing in the kitchen. As a result, Folger's very successful ad campaign was built around images of home and aroma, not taste. Finally, to motivate someone on the reptil-

1. Karen Bemowski, "Codes, Cultural Archetypes, and the Collective Cultural Unconscious," *Quality Progress*, Vol. 28, No. 1 (January, 1995) 33-36.

2. Karen Bemowski, "What Makes American Teams Tick?" *Quality Progress*, Vol. 28, No. 1 (January, 1995) 39-43; and "Americans' Nostalgic Affair with Loyalty," *Quality Progress*, Vol. 29, No. 2 (February, 1996) 33-36.

3. Keynote presentation by G. Clotaire Rapaille, *Center for Quality of Management 1996 Annual Meeting*, Colonial Hilton Hotel, Reading, MA (June 4, 1996); and Jack Hitt, "Does the Smell of Coffee Brewing Remind You of Your Mothers?" *The New York Times Magazine* (May 7, 2000) 71-74.

ian level, we would appeal to the individual's survival instinct. One can evoke very powerful levels of commitment and performance by convincing others that their survival depends on what is being proposed.

Rapaille's theory is that we need to understand as much as possible about people's limbic response mechanisms in order to position our products, services, ideas, or behaviors appropriately to motivate and engage them. If we tap people's reptilian level, we can get complete commitment. However, this is hard to do — and generally not applicable in a business setting. We can usually appeal to people on a cerebral level by making the logical argument — but this is rarely impactful. On the other hand, if we can tap into people's limbic responses and position our message in a way that resonates with their own emotionally charged, learned reactions and the context in which the learning took place, we can often evoke a superior level of commitment.

Rapaille's "cultural archotyping" methodology is a technique to discover and encode people's limbic responses. He argues that a particular population can have common experience that leads to common reactions. A cultural archetype can exist within a group, a company, or even a nation. For example, at the company level, Rapaille was asked to develop the quality cultural archetype within AT&T.⁴ The company was about to launch their quality program and wanted to increase the likelihood of its success. As a result of the study, AT&T changed the approach they had planned to use to one that was more consistent with the cultural archetype Rapaille discovered. AT&T, as a culture, was not going to react positively to calls for continuous improvement and achieving perfection. Instead, their early positive associations with quality revolved around trying to achieve the impossible, reaching for the stars, learning from mistakes, and being supported by the "older brother" figure. At the national level, Rapaille has described different national cultural archetypes for how a people define quality.⁵

Rapaille's method for discovering and encoding cultural archetypes involves convening representative groups to engage in a series of interviewing techniques. During the interviews, each group is asked to describe what they think about the product, service or topic under consideration. (This tends to surface the cerebral response.) Next, the group is asked to tell stories about it. (This begins to raise images and emotions.) Finally, using relaxation techniques, everyone is asked to remember and write down their own earliest, most poignant, and most recent experiences with the subject. The data include transcripts of the discussions, stories, and individual recollections. The results are analyzed both at the level of content and at the level of semantics. From what the groups think about the topic, Rapaille constructs a synthesis of their cerebral responses. Focusing on the verbs used by the interviewees in their stories and recollections, Rapaille constructs a structure (both the positive image and the negative image) of their limbic responses. His results are encoded in a description of the cultural archetype suggesting the groups' typical limbic response so that it can then be used to determine a strategy for proceeding.

CQM's Involvement

Tom Lee was intrigued by Rapaille's work having seen the cultural archotyping study about quality that Rapaille had done for American Society for Quality Control after the AT&T study.⁶ A series of discussions between Tom, Rapaille, and others in the CQM family followed. Rapaille subsequently invited CQM and its members to participate in a

⁴ Karen Bemowski, "Quality, American Style," *Quality Progress*, Vol. 26, No. 2 (February, 1993) 65-68.

⁵ "The Stuff Americans Are Made Of: An American Strategy for Quality Improvement," an undated privately circulated video tape featuring G. Clotaire Rapaille.

⁶ *The Stuff Americans Are Made Of: An American Strategy for Quality Improvement* (ASQC: Milwaukee, WI, 1993).

syndicated cultural archotyping study of leadership. Other participating companies included Kellogg, a General Motors division, and a large Canadian bank. Rapaille was interested in understanding the American cultural archetype for leadership because, quoting Peter Drucker:

...[leadership is] probably our most important challenge. Look, no government in any major developed country really works anymore. The United States, the United Kingdom, Germany, France, Japan — none has a government that the citizens respect or trust. In every country there is a cry for leadership.

The findings of the Leadership syndicated study were very interesting. Clotilde Rapaille presented them twice, once to the companies that underwrote CQM's participation in the study, Analog Devices, Bose, and Hillerich & Bradsby, and once to CQM's Board of Directors. What follows are the insights that Rapaille reported from the data gathered during the study.

Findings of the Study

Quoternity of leadership

Leadership is multi-dimensional. Rapaille identified four critical capabilities of leaders that are interdependent, equally essential, and seemingly orthogonal. The challenge is that the master leader must be competent in and able to integrate (with integrity) all four dimensions of the "quoternity," as seen in Figure 1.

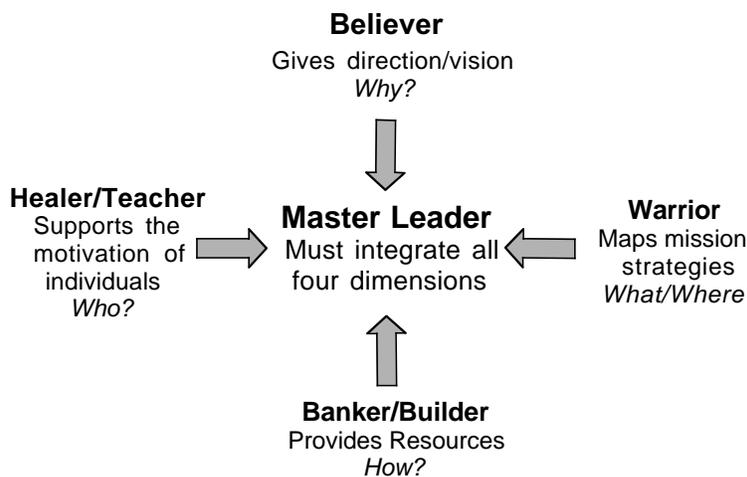


Figure 1. The Master Leader and the Four Dimensions of the "Quoternity."

Ambivalence toward leaders

Americans are very ambivalent about leaders. Rapaille identified four axes that describe different dimensions of our reactions to leaders and leadership (see Figure 3). The poles of each axis are mutually exclusive. For example, being the author of one's own fate is not consistent with allowing another to be in charge: as a society or as individuals, we have to trade off the opportunity for freedom of action for the security that social prohibitions bring. What the study made clear is that Americans look for very different leaders, depending on our situation. We vacillate between the extremes of these axes.

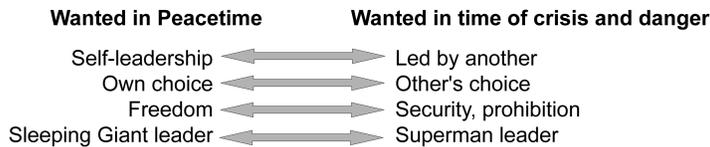


Figure 2. What we want from our leaders.

Depending on the conditions, leaders can be either loved or hated. When we feel secure and confident that we can learn and grow, we are drawn to the leader who presents a sleeping giant image. We want a leader who facilitates, enables, empowers, and lets us discover and succeed on our own. An assertive leader is seen as smothering and negative. However, in time of crisis, we lose our self-confidence. We are afraid of being overwhelmed. We want a strong, directive leader. Rapaille suggested that the acceptance of a strong leader is proportional to the amount of pain we feel. Our greatest susceptibility to a leader who wants to create change is when we are at the apogee of pain. As we evolve to a less stressful condition, the same leader we accepted before becomes an anathema.

Our bipolar response to leaders in this country makes it very challenging to be one. A master leader must adapt his or her style to the situation, knowing when to step back and let the action be driven by individuals and when to assert a strong hand. The ability to adapt must be coupled with the fortitude to be both revered and ignored. Equally important, leaders may have to look ahead, see the impending crisis, and create a sense of urgency and danger before the system presents a compelling reason for strong leadership. In effect, a leader must be willing and able to create pain under some circumstances.⁷

⁷ It would be interesting to diagnose the type of leaders that are most successful leading continuous improvement efforts versus leaders that succeed in getting breakthrough innovation. The CQM member companies have excellent examples of both.

The need for self-awareness in leaders

The ability of leaders to diagnose themselves relative to their surroundings is a critical skill. Leaders must be able to assess their own strengths and weaknesses in each of the four dimensions of leadership in Figure 1 (believer, warrior, banker, and healer).

A number of instruments exist to collect data, including 360° Feedback, to get data from people we work for and with. Gathering data and doing a personal Language Processing (LP) diagram would be another approach for self-diagnosis.

Rapaille determined that leaders should start by developing within themselves their own capability in all four dimensions of leadership. We must become self-leaders first. We must be clear personally about why we are doing what we do, what our strategies are, how we intend to accomplish our plan, and what the payback to us will be. An image LP has proven useful to businesses developing a vision for the future. It may be equally useful as a tool for individuals developing their personal statement of purpose. Matrices and tree diagrams are excellent tools to consider the “whats” and the “hows.” Fishbone diagrams allow us to answer the question why we do what we do.

A successful leader must be ready when the “call comes.” Readiness goes back to self-awareness combined with the ability to decode the clues/signals of the environment. Leaders need to be able to “jump up” out of the day-to-day activities and see the overarching, real or latent crisis.⁸ They need to analyze what the situation requires and how well the requirements match their own capabilities. For example, the situation may need a sleeping giant approach to leadership that does not fit their own style. Or conversely, there may be a general sense of well-

⁸ “Jump Up” is a term used by Professor Shoji Shiba to describe the reflection step that is necessary after you have “swum in the fishbowl.” After gathering accurate data by being a part of the environment and seeing it through the eyes of a swimmer, a leader must gain perspective and see the system as a whole. For more on swimming in the fishbowl and jumping up, see: Shoji Shiba and David Walden, *Four Practical Revolutions in Management*, (Portland Oregon: Productivity Press, 2001) 230-232 (fishbowl) and 187 (jump up).

being that the leader knows is a false sense of security. If so, the leader has to understand and have the appetite for actually creating a sense of pain and fear to motivate change. Interactive Planning⁹ and Systems Thinking¹⁰ may provide useful diagnostic tools for analyzing the environment. Skill in conversation is important in discovering and diagnosing other people's mental models and shared concerns.¹¹

Codes for leadership

As a summary, Rapaille prepares a coding sheet for each cultural archetype as a roadmap to follow. Though not a recipe, it provides useful points for discussion, which, along with the quaternity, could be the basis for self-analysis and skill building. See, for example, Figure 3.

- Code** • Hope — code for Leadership, Change — code for leader
 - Creating hope for change is the role of the leader

- What people do** • Sometimes people turn to leaders, sometimes they turn away
 - People want leaders to be able to provide external direction and to make room for self-expression
 - People both love and hate leaders
 - People require leaders to be able to adapt to the "mood" of others

- Why they do it** • Mothers provide the early imprint. They want their children to grow, but still be close to home
 - Children want to strike out and have the option to regress
 - The family is a potent image
 - Classic literature tells about the need to kill the leader to become one oneself
 - Having a metaphor or coach is like having a symbolic womb

- Logic of emotion** • The optimal situation is when there is congruence between the leader's style and skills and people's appetite for a leader
 - The pattern of the "call" for a leader is: Frustration, Awareness, Urgency, Call for Leadership, Hope for Change
 - Leaders may need to create a latent crisis and declare a breakdown in advance of others' desire to change

- Keys for leaders** • Leaders, acting as believer, use stories and words to connect with people's emotions
 - Verbs and simple language are most effective (e.g., "We will put man on the moon before the end of the decade.")
 - Symbols are the language of leaders
 - Like the mother/mentor coach, leaders celebrate the accomplishments of others while providing a safe haven when times are challenging

- Metaphor for leaders** • "Dreamer of the heart" and "poet" are metaphors for leaders.
 - Speaking to the heart is a critical capability for leaders

- What it is not** • Leadership is not about logic and scientific fact
 - Words to use: hope, change, stories, pictures, symbols, personal experience ("I was there, you can do it too."), words of emotion
 - Words to lose: numbers, policy, system, processes, graphs, "the cortex explanation"

⁹ Russell L. Ackoff, *Creating the Corporate Future: Plan or Be Planned For*, (Oxford University Press, July, 1999).

¹⁰ John D. Sterman, *Business Dynamics: Systems Thinking and Modeling for a Complex World*, (Irwin Professional Publishers, July, 2000), and; Peter Senge, *The Fifth Discipline: The Art and Practice of the Learning Organization* (Doubleday & Company, 1994).

¹¹ Shoji Shiba and David Walden, *Four Practical Revolutions in Management* (Portland, Oregon: Productivity Press, 2001) 297-328, Chapter 16, Coordinating Behavior.

Figure 3. Rapaille's coding sheet for each cultural archetype of leadership.

Case Study of a Master Leader

CQM members have embraced Tom Lee's conviction that "what" is only half the answer. Tom always insisted that we study "how" people behave in order to develop knowledge. True understanding and skill only come when we put what we have learned into practice and get feedback on our performance.¹² I have benefited beyond measure by having Tom as a mentor at CQM. And I will continue to learn from attempting to emulate his example.

¹² Shoji Shiba and David Walden, *Four Practical Revolutions in Management*, (Portland, Oregon: Productivity Press, 2001) 24-28.

How Thomas H. Lee demonstrated his skill in each dimension of Rapaille's quaternity

As *believer*, Tom expressed his vision for CQM in deeply personal and ambitious terms. Returning from being director of International Institute for Applied Systems Analysis in Vienna, he said that he was profoundly convinced that American business could become more competitive if its leaders practiced the best of strategic planning combined with operational excellence. His ambition was for senior executives to learn from lead thinkers in two areas: to integrate the methodologies, and to put what they learned into practice.

As *warrior*, Tom's approach was to adopt rules of engagement that were designed to create a context in which his objective could be achieved. Tom often referred to the Chinese leader and warrior, Sun Tzu, as the first recorded strategic planner.¹³ A masterful planner himself, Tom determined essential strategies, assessed the risks, developed contingency plans, and insisted on congruence between the means and the ends. For example, he built CQM into a community that put theory into practice as the norm by embracing the organizing principle of mutual learning among members who were sponsored at the CEO/president level.

¹³ Sun Tzu, *The Art of War*, Translated and introduction by Samuel B. Griffith (Oxford University Press, 1984).

As *banker*, Tom provided the ultimate resource — access to both his own experience and his personal contacts. His style was to open doors. Tom shared details of his own corporate career at General Electric in a way that was modest and convincing. He was willing to tell about situations where he had succeeded and also times he had failed. As a volunteer, Tom contributed in the same way he asked of all CQM members not only by calling on the expertise of others but also by refusing any compensation for his role as founder and president of CQM. Setting this example was a compelling way to inspire similar behavior in others.

As *healer*, Tom was able to balance, with infinite dexterity, his own enthusiasm with the motivation of others. He knew the importance of self-expression and relied on a design team, made up of senior executives from the founding companies, to design CQM. Although Tom's motivation was to improve society, he was content when CEOs joined the CQM to improve their own companies. His own ambition and expression did not have to be the center of attention. He knew the impact he wanted to achieve and recognized that he needed to work through the motivation of others to make it happen. It is also interesting to note that Tom always referred to the CQM family. This is the image identified by Rapaille as a very powerful symbol that can be used by a leader to convey his willingness both to allow experimentation and to accept possible failure and the need for support.

How Tom Lee adapted his leadership style to fit the mood of others

One of Tom's greatest gifts was his ability to migrate between direction setter and follower. He was comfortable letting the member companies set their own agenda. When the companies chose to focus on TQM as a system of management, Tom advocated this approach as a good place for the "CQM family" to start. At the same time, he remained quietly steadfast in his original intention and moved consistently (and often

alone) to generate interest in and mastery of strategic planning methods. Tom knew that he would have to wait until CQM members felt discomfort before he would get their attention. And when a number of CQM member companies began to experience the pain of strategic challenges, Tom was willing and prepared to become a passionate champion of integrating Professor Russell Ackoff's Interactive Planning methodology with TQM.

Tom's analysis of himself and his role in the context of the environment

Tom was a man who followed his own ambition and his own heart while valuing and adapting to the contributions, the perspectives, and the needs of others.

As a leader, Tom understood the importance of congruence between his goals and his own behavior. He believed that "quality is personal." As simple examples, Tom was always early to meetings, and he insisted the CQM staff be at work on time in the morning. When he had an insight, he would write it up as an article for the CQM Journal and urged others to do likewise. He would not ask others to do what he was unwilling to do himself.

Tom used his analysis of the situation to dictate how he behaved. Although Tom could have supplied answers from his own experience and study, he recognized that many people had to share in the creation of ideas for CQM to be successful. He repeatedly allowed others to supply the answer. When he participated in study groups, he took his share of the work and contributed thoughts on how to structure the inquiry but not the conclusions. He had consummate skill at asking just the right questions to lead a group to its own discovery. As director of a GE laboratory and as an MIT professor, he undoubtedly evidenced the same restraint. Telling a story on himself, he told about a time when he asked for funding for a lab twice before it was accepted. He chuckled when he admitted that he had had no hope of getting acceptance the first time but that he had known an idea, once sown, would germinate in time.

When it was required, Tom took a firm hand. At an operational level, when CQM's membership was not growing, Tom asked for weekly meetings in which CQM's accounts receivable were tracked and explicit plans were reviewed against progress. At an intellectual level, in his determination to integrate schools of management thinking, he relentlessly brought the thought leaders together, keeping the dialogue going, until they eventually came to have an interest in each other's perspectives.

Tom knew what his personal priorities were and acted consistently with them. In airports or waiting in lobbies, he would talk with passion about quantum physics or about his life growing up in China. He described the choice he made to go to MIT as professor in lieu of other, more lucrative offers. With his three sons and their families were in Boston, it was a simple choice for Tom. Tom wanted to give back to both of the countries that he loved, China and America. When he wanted more time to work for his alma mater, he dedicated his efforts to securing an excellent new president for CQM. He followed his passions always leaving his current effort securely moving forward. As he would joke, "retiring is having the chance to get tired all over again."

Thomas H. Lee, a symbol of leadership

Tom once said that he had been very lucky to have had the life that he did. He said that it was amazing what his life had bridged. He remembered, as a child, going out with the rest of the people in his village to bang ashcan lids during a lunar eclipse to frighten away the spirit that was eating the moon. From there, decades later on a different continent, one of his good friends was an engineer who developed the propulsion system that took the Apollo spacecraft to the moon. As a leader of himself and of others, Tom was created by and created his opportunities. His personal integrity and extraordinary ability to embrace new situations made him able to make the most out of life and to bring others with him on his explorations.

Tom was a man whose passion for life, appetite for change, and curiosity were boundless. His generosity of spirit affected all those around him as he set direction and allowed for self-discovery with equal skill. His life is a symbol of leadership for all of us to use as an inspiration going forward.



Insights from the Leadership Study Group (1997-2000)

by Christine Duvivier and Toby Woll

Christine Duvivier is a management consultant. She originally participated in the Leadership Study Group as an executive with Digital Equipment Corporation, and later as Director of CQM's Cambridge chapter.

Her experience includes leading worldwide change efforts and building cooperative cross-company processes to improve business results. She has worked with management teams to bring in, serve, and retain profitable customers in growth, turnaround, and merger situations. In addition to CQM companies, she has worked with DuPont, 3M, Ford, Procter & Gamble, Eli Lilly, Compaq, and First Chicago NBD.

Ms. Duvivier has an MBA with Distinction from Cornell University, where she won the Wall Street Journal Award in Finance, and a Bachelor of Science from the University of Delaware.

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Toby Woll is Director of Learning Technology Initiatives for the MIT Sloan School of Management and the former Executive Director of the Center for Quality of Management.

Outline

Abstract	Page 36
I. The CQM Leadership Study Group — Overview and Findings	Page 37
A. CQM study group approach	Page 37
B. CQM Leadership Study Group (1997-2000)	Page 37
C. Overview of findings	Page 38
II. Details of the CQM Leadership Study Group Analysis	Page 39
What successful leaders do and how they do it	
A. Continuously reflect on themselves (3 methods)	Page 43
B. Act flexibly and creatively with others to get things done (5 methods)	Page 44
C. Create a trustworthy, values-driven environment (6 methods)	Page 47
D. Don't lose heart (5 methods)	Page 50
E. Determine, plan and effect key strategic decisions (6 methods)	Page 52
F. Focus the organization on the right things — will do, won't do (7 methods)	Page 57
G. Manage the performance of others to achieve the organization's objectives (7 methods)	Page 60
Appendix — Leadership Study Group Reading List	Page 65

Abstract

Is there anything new that can be said about leadership? What can be learned from current leaders and experts in order to develop more leaders within organizations? These questions, from member companies, lead to the formation of the Leadership Study Group by Tom Lee, former CQM President, and Toby Woll, former CQM Executive Director.

*In this article, we share both the principles we discovered across the many approaches reviewed and the process used for our study. **Section I** provides background on the Study Group's approach to this topic and an overview of the group's findings. **Section II** gives the detailed findings that answer the questions: (1) What do leaders do, and (2) How do they do it?*

*The study group began with a hypothesis that leadership is the property of a system — individual or organization — and that it cannot be measured directly. We then selected six dimensions of leadership that could be used as the basis for studying different approaches (**Section I**). After reflecting on the views of both experts and CEOs, we summarized our understanding of "What Leaders Do" and How they go about doing these things (**Section II**). We found that existing approaches to leadership often emphasize a subset of the behaviors, characteristics, skills, and processes leaders use to create the results they seek.*

*One significant practice for a leader is self-reflection (**Section II-A**). Effective leaders continuously monitor their own values, actions, and motivations. They must be able to accept failures — in themselves and others (**Section II-B**). This helps them align personal values with organizational values, and to make the values explicit by teaching others in their organizations (**Sections II-C and II-F**).*

*Skillful leaders manage the emotions and moods of the organization (**Section II-D**), creating hope and matching their personal styles to others' so that others will put their hearts into realizing a vision or goal (**Sections II-C and II-G**). Leaders not only monitor internally, but spend a high proportion of their time monitoring the outside world, sensing when the world is shifting and making strategic choices (**Sections II-E and II-F**) to respond. They are thoughtful about how they intervene, striving to use structure, systems, processes, and investments to steer their organizations to the desired results.*

*Leaders develop skills through a combination of work experience, informal learning, and formal training. Although education will not take the place of experience, fundamental principles of leadership can be learned, enabling individuals to modify behavior and use tools or methods (**Section II**) that help them develop leadership ability sooner.*

*A representative list of study group readings is in the **Appendix**.*

Leadership Study Group Members:

Mark Braun, Boston University
 School of Medicine
 Rodger Dowdell, American Power Conversion Corp.
 Christine Duvoivier, Digital Equipment Corporation
 John Ferrie, Bose
 Mary Fothergill, Federal Reserve Bank of Boston
 Kent Hall, Office of Jefferson County Clerk (KY)
 Robert Herrick, Health Alliance of Cincinnati
 Rebecca Jackson, Office of Jefferson County Clerk (KY)
 Steve Kelner, CQM
 Thomas H. Lee, CQM
 Debra Moore, Franciscan Health System
 Larry Raskin, Analog Devices
 Rita Vasquez, Franciscan Health System
 Toby Woll, CQM

Other Leadership Study Group Contributors:

Gary Burchill, CQM
 Ronald Butler, Teradyne, Inc.
 Belinda Grosskopf, CQM
 Lois Slavin, CQM
 David Walden, CQM.

Section I. The CQM Leadership Study Group: Overview and Findings

I-A. The CQM Study Group Approach

CQM has traditionally formed study groups to examine a topic by examining multiple schools of thought, academic writings, and practical approaches. After immersing themselves in deeply learning about a topic, the study group summarizes the most important lessons for possible inclusion in the CQM curriculum. A study group consists of interested participants from member companies, CQM staff, and outside experts.

I-B. CQM Leadership Study Group (1997-2000)

Leadership is a popular subject, but an elusive one. Each of us knows good leadership when we see it, and most companies want more of it. But the different models available — and ongoing debates as to whether leaders are born, taught or forged — can leave executives stumped as to the best approach to take.

Given the wide range of opinions and the multitude of existing approaches to leadership, members of the 1997-2000 leadership study group wanted to expand their individual understanding of leadership theories and practices. We wanted to clarify the practices that are most useful for developing skill in today's complex business environment.

The group started with the hypothesis that leadership was not directly measurable. Russell Ackoff's work in systems theory identifies two types of properties:

- Type 1 properties can be measured directly and determined based on the properties of each element within the system.
- Type 2 properties are a property of the system as a whole, and cannot be measured directly.

For example, the weight of a car is the sum of the weight of each of its parts (Type 1), whereas a car's ability to transport people is a Type 2 property. The group's expectation was that leadership could only be understood as a property of the entire system, whether that system is an individual or an organization. This meant that it was the interactions of the leadership elements — such as personal characteristics or work processes — not the individual elements alone, that would determine the results of leadership.

The group selected six dimensions as a starting point for studying the elements of leadership (see Table 1).

Table 1. The six dimensions of leadership we studied.

1. *Personal characteristics*
2. *Personal behavior*
3. *Leadership through interactions with other people*
4. *Leadership in designing organizational structures and processes*
5. *Ability to produce results*
6. *Knowledge of the business.*

We saw that despite the many approaches to leadership, they tended to fall into two separate categories (described in the next paragraph). The Study Group wanted to determine whether these two categories could be combined, or whether one dominated.

One approach was the behavioral view of leadership, including personal characteristics: leaders are born with — or develop — the right attitudes, interpersonal skills, emotional intelligence, intellectual curiosity, or ambitious drive. The second approach was a process view of leadership: put the right processes in place for managing the dimensions of an organization, including interactions among people, physical goods, economic goods and information flows, and you will be an effective leader.

In addition to understanding the approaches, it was clear that leadership occurs at many levels. Today's top executives often cite formative experiences early in their careers that tested and molded their leadership abilities. The group wanted to understand what aspects of good leadership could be taught, enabling development skills at all organizational levels. As a result, we set out to identify an integrated set of practices, behaviors, processes, and skills, that can be used to develop leaders at multiple levels.

The diagram in Figure 1 shows the flow of the Study Group's work.

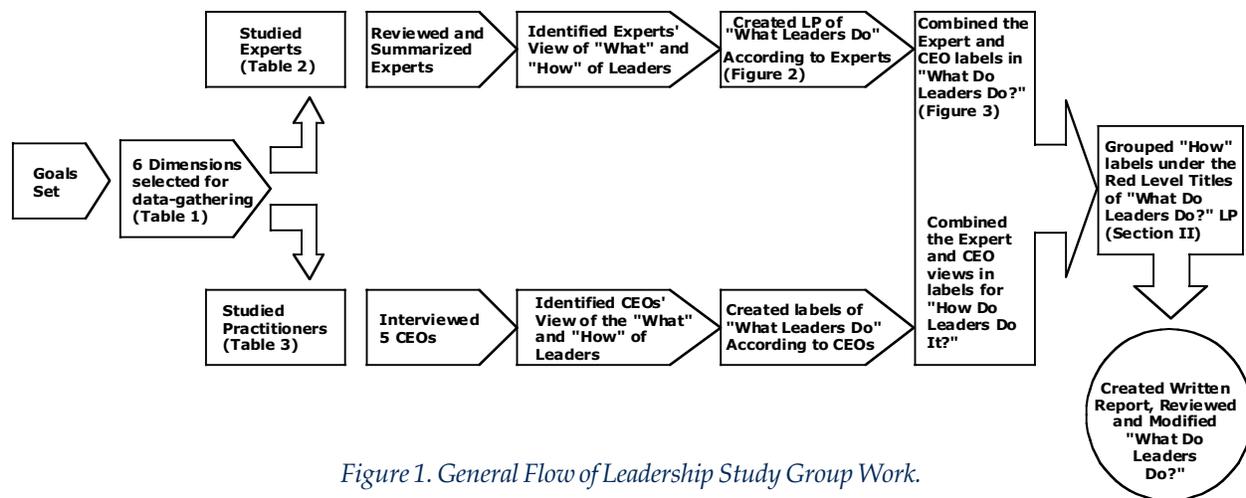


Figure 1. General Flow of Leadership Study Group Work.

I-C. Overview of CQM Leadership Study Group Findings

After studying a wide range of experts and practicing leaders, the group extracted critical skills, processes, and behaviors. Behaviors, processes and skills often reinforce each other and some leaders will use a process to achieve a result that another leader gets through natural behavior. For example, in trying to meet development commitments, some leaders will orchestrate a regular calendar of meetings and events, driving results primarily through process. Another leader will spend significant time talking with individuals, understanding motivations and coaxing, cajoling, or commanding others to achieve the results.

Each of these is used to a greater or lesser degree at different points in time and leaders' individual capabilities cause them to utilize some of the skills, processes, and behavior more than others. Clearly, the better a leader can develop capability in each of these areas, the better he or she can navigate a wide range of challenges.

Self-reflection turns out to be a critical behavior for many leaders, causing them to continuously monitor and motivate themselves. They

consider their personal values, evaluating their actions as well as the organization’s direction in light of their values. This helps them to avoid “losing heart” when things aren’t going well and to gain the trust of others.

Making values explicit to everyone in the organization, including stating them, acting consistently with them, and aligning individuals’ motivations to them, is another key behavior for leaders. Leaders actively teach values and seek input from the people in the organization, understanding that individual motives and purpose differ.

Skills for managing the emotions and moods of the organization by listening to others, encouraging their achievement, and creating hope are crucial components of leadership. Successful leaders adeptly match their style to others in order to engage hearts as well as minds, encouraging people to stretch themselves.

In addition, leaders spend significant amounts of time monitoring the outside world, sensing emerging issues, and making strategic choices to respond to external changes or opportunities. They are able to focus the organization on doing the right things, setting priorities.

Finally, leaders set the organization’s structure, systems, processes, and investments needed to move the organization to the desired outcome. They view the organization as a system, determining how the structure, systems, and individual work processes will create interactions both inside and outside the organization that will achieve the results desired. Financial implications of these choices, and the investments required, are fundamental to leadership. As a consequence, leaders spend a great deal of time making sure the choices they make generate additional funds for investment and communicating their reasoning to the stakeholders of their organization.

Our leadership study group found a range of practices that combine processes, skills, and behaviors to allow an organization of people to achieve a set of desired results. We did not find one simple, packaged approach, but we did see common principles across a number of experts and CEOs, as described in this article. We discovered a variety of practices, supporting these principles, which leaders can adapt and blend for better performance.

Section II. Details of the CQM Leadership Study Group Analysis

Figure 2 (page 40) summarizes the group’s study of leadership experts: beginning with several hundred statements of what it is that leaders do, we winnowed down what we learned from experts as shown in this diagram.

Figure 3 (page 41) shows the next step: summarizing what leaders do from the view of practitioners themselves.

Finally, in Figure 4 (page 42), the study group combined the learning from practitioner interviews with the summary from experts.

What Successful Leaders Do and How They Do It

The group summarized the findings into seven major categories (Figure 4). The details of our findings from Figure 4 are explained below in subsections *II-A* through *II-G*. Each of the principles is divided into a section describing the “what” of leadership, with references cited, and another section on “how” they do it. Each “how” section explains the

Table 2. The experts we studied.

- Russell Ackoff
- Chris Argyris
- John Beck
- Warren Bennis
- A. Brache
- Stephen Covey
- Max DePree
- Peter Drucker
- Fernando Flores
- Hay/McBer
- Ron Heifetz
- Rosabeth Moss Kantor
- John Katzenbach
- John Kotter
- David McClelland
- G. Clotaire Rapaille
- G. Rummmler
- Shoji Shiba
- Noel Tichy
- Neil Yeager

Table 3. Practitioners we interviewed.

- Rodger Dowdell (American Power Conversion)
- Chad Gifford (BankBoston)
- Cathy Minehan (Federal Reserve Bank of Boston)
- Alex d’Arbeloff (Teradyne)

Figure 3. What do leaders do? Practitioner Interviews.

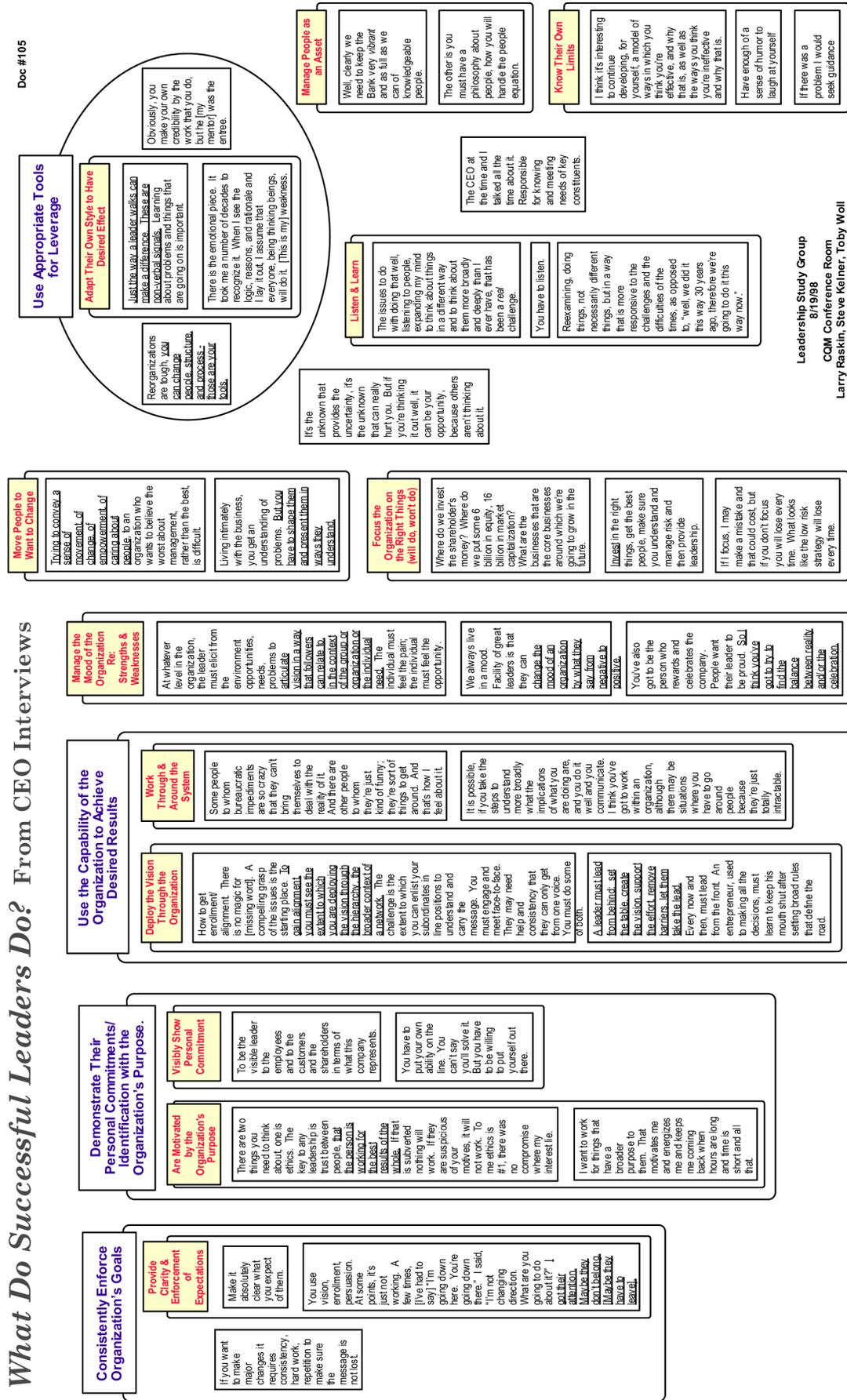
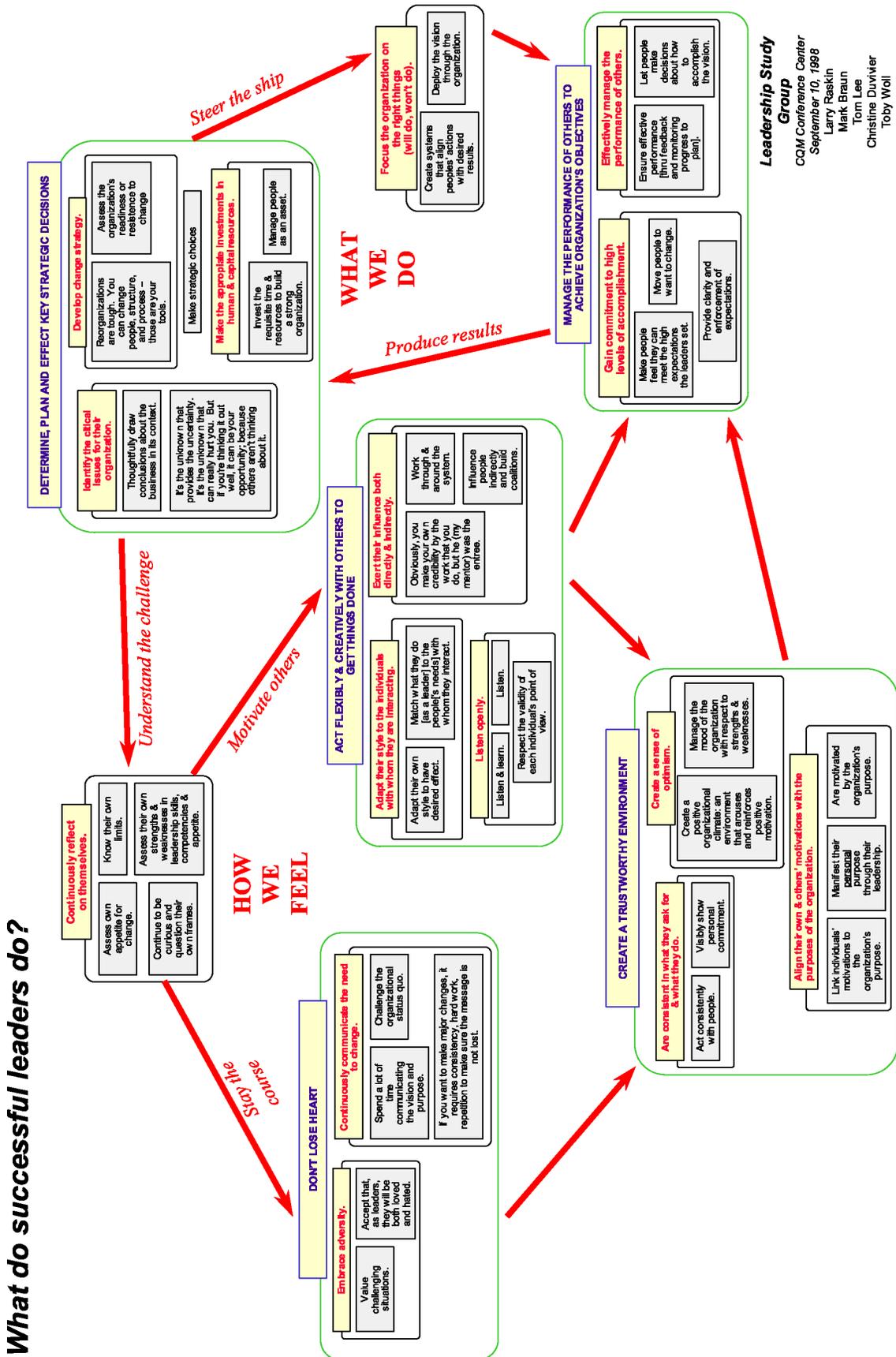


Figure 4. What do Successful Leaders Do?
A summary of experts and practitioners.



elements of the activity that we learned, examples from the CEOs interviewed, and methods that can be used to develop this capability.

II-A. Continuously Reflect on Themselves

What Do Leaders Do Who “Continuously reflect on themselves?”

We found they:

- Assess their own appetite for change (Rapaille)
- Know their own limits
- Continue to develop, for themselves, a model of ways in which they think they’re effective and why that is and ways in which they think they’re ineffective and why that is (CEO)
- Have enough of a sense of humor to laugh at themselves (CEO)
- Seek guidance when confronted by a problem (CEO)
- Continue to be curious and question their own frames (Shiba and others)
- Assess their own strengths and weaknesses in leadership skills, competencies, and appetites (Rapaille)

“Continuously reflect on themselves” – How Do Leaders Do It?

1. They know their own ambitions.

Elements: Leaders need to ask what, if any, personal long-range objectives they have. “Having a clear [personal] goal is not a consistent thing among people who are in leadership positions.” (CEO) They need to know what they enjoy doing with their time and to what degree their personal passions correspond to the organization’s goal. “Confluence between the kind of things that are important to me and the kinds of things that are important to the organization” [is important]. (CEO) Finally, leaders must know to what degree they are willing to control others or give control to others. They need to recognize where they are on the continuum of taking pleasure from doing “something well” to getting satisfaction for “having an effect on people.” (CEO)

Methods that can be applied:

- Personal LPs
- Assessment instrument of Power vs. Achievement vs. Affiliation motivation (Hay-McBer)
- Discussion with external mentor/coach to help in diagnosis

Example: “I love equipment. I like to deal with technical stuff. I am interested in technology.” (CEO)

2. They seek feedback.

Elements: Leaders need to get the people they work with and for to give candid, timely, and constructive feedback.(CEOs) Feedback is used to identify areas of weakness and that a leader has “to change my behavior. [My current way of acting] was not the best way.” (CEO)

Methods that can be applied:

- 360 Feedback
- Charter L4 Leadership Assessment Instrument
- Assess own skill in Rapaille's 4 quadrants of leadership: visionary, warrior, banker, healer
- Diagnosis by external mentor/coach

Examples: "We agreed to survive, we would not leave an argument [unresolved]. We would argue till 2 or 3 in the morning." (CEO)

"[I] recently asked my direct reports to participate in a 360, although it's very informal. They can do it sitting down and talking to me or sending me a piece of paper or whatever." (CEO)

3. They learn continuously.

Elements: Leaders scan the external universe for new ways of thinking. (many CEOs) They read books about new approaches and theories. They bring diverse disciplines to bear on the problems that they face. Academic training "helped me do my role challenging the triggers, understanding statics and dynamics, momentum and drivers, and vectors." (CEO) They keep their childlike curiosity. (Shiba)

Methods that can be applied:

- Reading books, articles, newspapers
- Taking "Time To Think" — 3Ts of Neumann at GE
- Discussion/colloquia with peers in own and other industries
- Benchmarking

Examples: "I read a lot of books about what was the right way to articulate WIP." (CEO) "In 1989 [I read and discussed] when I was getting interested in TQM." (CEO) "[I] had input from books, but this was before [joining CQM]." (CEO)

II-B. Act Flexibly and Creatively with Others to Get Things Done

What Do Leaders Do Who "Act flexibly and creatively with others to get things done?"

We found they:

- Adapt their style to the individuals with whom they are interacting
- Adapt their own style to have desired effect
- "[Use] non-verbal signals." (CEO)
- "There is an emotional piece. It took me a number of decades to recognize it. When I see the logic, reasons, and rationale, and I lay it out, I assume that everyone will do it. This is my weakness." (CEO)
- Match what they do [as the leader] to the people's [needs] with whom they interact
- Adapt leadership style to the degree of crisis in the environment. People like to be in charge of themselves when they do not feel in crisis. (Rapaille)
- Be adaptive to differences among people/cultures (Rapaille)
- Do a self-assessment to match what you think you do to what people you manage want/need you to do. (Charter Oak)
- Exert their influence both directly and indirectly
- Work through and around the system
- "Some people to whom bureaucratic impediments are so crazy that they can't bring themselves to deal with the reality of [them] other

people [think] that they're just kind of funny; they're sort of things to get around." (CEO)

- "You've got to work within the organization, although there may be situations where you have to go around people because they're just totally intractable." (CEO)
- Influence people indirectly and build coalitions (McBer)
- "Obviously, you make your own credibility by the work that you do, but he [my mentor] was the entrée." (CEO)
- Listen openly
- Listen and learn
- "The real challenge is listening to people, expanding my mind, thinking about things in a different way, and thinking about them more broadly and deeply than I ever have." (CEO)
- "Reexamining, doing things, not necessarily different things, but in a way that is more responsive to the challenges and the difficulties of the times, as opposed to 'Well, we did it this way 30 years ago, therefore we're going to do it this way now.'" (CEO)
- "Listen." (CEO)
- Respect the validity of each individual's point of view
- Believe that people are worthwhile. (Pipp)
- Start with the fundamental assumption that people are rational and that, in the social model, any system is multi-purpose (purposes of containing system, the system itself, and individuals in the system). (Ackoff)

"Act flexibly and creatively with others to get things done" – How Do Leaders Do It?

We found they:

1. Appeal to peoples' motivations.

Elements: Good leaders make efforts to understand others' purposes and appeal to their hearts and minds, using emotion and logic (Pipp). They may explain how the required changes will improve the lives of the people having to change (Rapaille). They don't force motives onto others; instead they activate and engage those they have (McClelland). Leaders speak with symbols, stories, and poetry, not numbers and policies. (Shiba, Rapaille)

Methods that can be applied:

- Conversations for Relationship, Opportunities, Possibilities, and Action
- Seek First to Understand, then to be Understood (Covey)
- Speaking in symbols and poetry (Rapaille)

Examples: "Each person had that red button that said 'set me off,' and they kept pushing it." (CEO) "When we give bonuses, 2 bags of rice per employee in Philippines is good. They give 1 cup to each of their extended family. You have to balance between standardization and customization." (CEO) "I wanted to create ownership positions for employees. We had a stock option plan for the whole company. Stock was not for direct labor." (CEO) "He makes people feel they can do anything by improving their self-confidence." (Neumann, GE)

2. *Actively listen to people.*

Elements: Leaders work to increase their face-to-face time (CEO) with people by keeping their doors open, walking the shop floor, seeking out people from different functions. They “try their darndest to listen to the people who work for [them], in the Research and Supervision areas in particular.” (CEO) Leaders listen with an open mind. “If someone has an argument you listen, say good point, and you make sure you understand it.” (CEO) Leaders listen with their eyes and hear beyond the words. “I talked with the next level of people and looked for fear in their faces, in their eyes. They were focused and energetic.” (CEO) Leaders listen without letting their ego and lack of patience get in the way. “[We] teach managers that listening to employees is not a weakness.” (Pipp) “We have very aggressive, smart people who lack patience.” (CEO) “To talk for consensus, [you cannot] be terribly arrogant about things.” (CEO)

Methods that can be applied:

- Conversation for Relationship, Opportunities, Possibilities, and Action
- Active Listening skills, dialogue skills
- Managing Organization Complexity
- Management by walking around
- Open doors
- Cross-functional teams
- Meeting management techniques

Example: “I, of course, had my own ideas, and he and I would differ from time to time. I think he just couldn’t figure out how he ended up taking direction from me.” (CEO)

3. *Solicit “out of the box” thinking.*

Elements: Leaders “use brainstorming to solicit far-out ideas and to include the outliers.” (Pipp) Orthogonal thinking takes time to digest, and leaders value it enough to validate and incorporate it.

Methods that can be applied:

- Brainstorming
- Cross-functional groups
- Inclusion of outsiders and experts in discussions
- Scheduled “Time-To-Think” — 3Ts of Neumann at GE

4. *Conduct conversations skillfully.*

Elements: Leaders use semantics daily. With skill in using numeric and language data, in using the language of report and the language of affection, in differentiating between fact and opinion, by moving up and down the ladder of abstraction, and by being skillful in multi-valued expression, leaders can have successful conversations. They know how to successfully blame the system, not the person in a conversation for breakdown. Leaders balance advocacy and inquiry. (CEO) Leaders create a trustful relationship by developing multi-views and making the cycle of reasoning part of their communication style. (Argyris)

Methods that can be applied:

- Semantics
- Conversation for Action and Breakdown
- Cycle of reasoning
- Active listening

Example: "I was a good debater (on the team at my University) and thought this was the way to win. It is self-defeating." (CEO)

5. Understand the informal power system.

Elements: Leaders are mindful of the interdependencies of the internal system "they align them or eliminate interdependencies." (Kotter) "I have to understand the power structure. I have to understand the context, what they are bringing at their level with their hidden agenda." (CEO) To do this, leaders "focus on each group's internal customers." (Pipp) Leaders draw on their left brain to change the system, and their right brain to support the existing structure. (Bennis) Leaders "read the culture." They can see that "they were in competition in some cases that were really bad blood in personal power. Maybe competition was working. Now all of a sudden, where it had been tolerable, now [I] saw it as mischief." (CEO)

Methods that can be applied:

- Conversation for Action and Breakdown
- Cycle of reasoning
- Active listening

Example: "In one division where we were not using new technology, I said 'how do you know you don't need the new technology?' They could not answer that. Also, they said, 'We don't have anyone available to work on it.' We needed to recruit talent." (CEO)

II-C. Create a Trustworthy, Values-Driven Environment

What Do Leaders Do Who "Create a Trustworthy Environment?"

We found they:

- Are consistent in what they ask for and what they do
- Act consistently with people
- Put first things first (Covey)
- Demonstrate constancy of purpose by standing fast on the charted course (CEO)
- Act in ways that are consistent with stated purpose (Covey)
- Visibly show personal commitment
- "Be the visible leader to the employees, to the customers, and the shareholders in terms of what this company represents." (CEO)
- "Put your own ability on the line. You can't say you'll solve it. But you have to be willing to put yourself out there." (CEO)
- Create a sense of optimism
- Create a positive organizational climate; an environment that arouses and reinforces positive motivation (McClelland)
- "Use emotion deliberately to motivate, not manipulate." (CEO)
- Manage the mood of the organization with respect to strengths and weaknesses
- Articulate the vision in a way that followers can relate to the context of the group, the organization, or the individual need (CEO)
- Change the mood of the organization from negative to positive by what they say (CEO)
- Find a balance between celebration and reality in a way that

- conveys the pride they feel in the organization's performance (CEO)
- Align their own and others' motivations with the purpose of the organization
 - Link individuals' motivations to the organization's purpose
 - Assess others' motives and treat them accordingly (McClelland)
 - Match the business purpose/vision to individuals' missions for themselves (Pipp)
 - Manifest their personal purpose through their leadership
 - Are passionate (Bennis)
 - Align actions with personal vision and missions (Covey)
 - Demonstrate the "core values" of the organization
 - Are motivated by the organization's purpose
 - Build trust that s/he is working for the best results of the whole, not for #1 (CEO, Bennis)
 - Work for things that have a broader purpose to them (CEO)
 - Accept failure and drive out risk-aversion. (CEO)
 - Understand defensive routines. (Argyris)
 - Risk-aversion is the result of emotion: analyze what drives it. (Argyris, Rapaille)

"Create a Trustworthy Environment" – How Do Leaders Do It?

We found they:

1. Talk and act with high emotional content.

Elements: Leaders communicate a passion for the goals and purpose of the organization, creating a sense of urgency in others (Kotter, many CEOs). They recognize that their non-verbal behavior communicates as much as what they say. They are aware of being "readable" and "think about how to convey anger, passion, optimism." (CEO) "Sometimes I speak about a position with intensity." (CEO) "People have to know how serious the leader is about an issue." (CEO) They keep the message simple, creating images, symbols and poetry to convey the vision, rather than numbers or policy. (Shiba, Rapaille) "You have to have a way to tell them what are the new strategies, what they need to do differently." (CEO)

Methods that can be applied:

- Self-reflection (Covey)
- Personal Interactive Planning Mess Formulation (Ackoff)
- Conversation for Action — discussion of mental models and shared concerns for self-expression
- Listen to the inner voice (Bennis)
- Learn from mentors (Bennis)
- Study poetry (Rapaille)

Examples: CEO's experience at TI, when a top manager threw a non-TI calculator on the ground, creating fear, and later leading to a strategic mistake in deciding to use a TI processor instead of Intel, despite the fact that project managers knew it was a bad decision. "Leadership symbolism is important." (CEO)

2. Give credit.

Elements: Leaders describe the importance of giving credit widely to others in the organization (CEO) as a way of building passion, enthusiasm, and pride. Leaders acknowledge the contribution of others in achieving the goals that have been agreed to.

Methods that can be applied:

- Create recognition events/opportunities — 6th element of the Shiba change infrastructure model
- Diffuse successes stories — 5th element of the Shiba change infrastructure model

3. Set a personal example.

Elements: Leaders know the business personally. “They need to be black nail managers.” (Neumann) They do not rely on consultants to “understand the business.” (CEO) “They do their own analysis.” (Shiba) “Leaders show they are ‘for real’ by demonstrating their values day to day in their behavior” (CEO), such as “setting an example of work/life balance” (CEO). “They avoid leading through intimidation, guilt, fear, or selfish desires” (Bennis). In addition “they get personally involved with people, for example, by rolling up sleeves and working with them or taking a sick employee to the hospital” (CEO).

Methods that can be applied:

- Request and analyze data, then share the results of the analysis
- Management by Walking Around
- Take vacations

Examples: CEO personally arranged for \$40,000 to pay for an employee’s operation. CEO coached senior manager to slow down as he walked down the corridor to enhance the impression that he was open for input by others.

4. Keep commitments.

Elements: They keep the commitments they make to others (CEO), in keeping with the techniques described in the “atom of work”.

Methods that can be applied:

- Conversation for Action and Breakdown

Examples: All the CEOs interviewed, having agreed to participate, followed through with a 1 ° hour interview.

5. Put themselves on the line.

Elements: One factor successful leaders refer to is taking unique or unexpected assignments (CEO) or personally jumping in and driving a project themselves (CEO). They did things they had not thought about before, or possibly were not comfortable with, when the opportunities presented themselves.

Methods that can be applied:

- Participate visibly in important project definition, monitoring, and celebration.

Examples: CEOs having taken an assignment in London earlier in career. CEO going to Chicago and personally participating in designing the system in order to get implementation started.

6. Do not engage in behaviors that are inconsistent with the vision/message (Kotter).

Elements: Leaders have to be consistent in order to build trust. They practice constancy (Bennis), giving a sense of confidence that they will persevere. They are persistent in telling and re-telling the strategic story of the mission/ vision/ goals. They focus on the “vital few” and try to practice what they preach. Leaders also identify the organization’s values, and they recognize the length of time required to move an organization.

Methods that can be applied:

- First things first (Covey)
- Conversation for Action
- Pareto Analysis of personal weaknesses (Personal PDCA)

Examples: “We kept working on it and explaining that that’s what rules our decision making process and at the same time we identified four internal values. It’s kind of an internal keel.” (CEO) “We always felt we should have a product policy and if we can’t meet someone’s needs, so be it. We [wouldn’t do it if we] could not do a quality job.” (CEO)

II-D. Don’t Lose Heart

What Do Leaders Do Who “Don’t Lose Heart?”

We found they:

- Embrace adversity
- Value challenging situations
- Be good at dealing with change yourself (Pipp)
- Embrace bad news/learn from adversity (Newmann)
- Accept that, as leaders, they will be both loved and hated (Rapaille)
- Continuously communicate the need to change
- Spend a lot of time communicating the vision and purpose (Pipp)
- Challenge the organizational status quo
- Challenge the traditional beliefs and assumptions (CEO)
- Sets expectations high enough so that systems must be dismantled and rebuilt, not just fine tuned (Pipp)
- “If you want to make major changes, it requires consistency, hard work, repetition to make sure the message is not lost.” (CEO)

“Don’t Lose Heart” — How Do Leaders Do It?

1. They embrace a weakness orientation for themselves and their organization.

Elements: The weakness orientation requires that the leader “solicit bad news” (CEO) and then “not shoot the messenger” (CEO). Celebration of people who identify problems creates a positive attitude about adversity. By describing their personal opportunities to overcome adversity as learning experiences, leaders model the behavior they want from others. (many CEOs)

Methods that can be applied:

- Application of the systematic problem solving in TQM
- Semantics

Example: CEO having 6:30 am meetings every day to review the daily “bad news” about an area of the business.

2. They trust their intuition.

Elements: Leaders describe the importance of learning to trust their intuition: “He taught me over a series of different times that you’ve got to trust your gut instincts, your own judgments.” (CEO) “I have to be proactive, use intuition, know where and when to look.” (CEO)

Methods that can be applied:

- Management by walking around
- Meditation

Example: CEOs choice to proceed with the IS implementation despite the project team managers’ assertion that they were not ready after he had heard the enthusiasm and seen the look in the eyes of the next level of workers.

3. They understand the nature of change.

Elements: Recognition of how hard organizational change is and how long it takes. (Kotter) “It takes time, you have to hang in. Some things take 2 years to get something back.” (CEO) “Leaders challenge the organization ‘defaults’ (Ackoff) because they know that In continuous improvement, you leave default conditions alone. In big changes, you must reexamine the defaults.” (CEO) They keep their momentum going by choosing to involve many people at many levels.

Methods that can be applied:

- Planning to calculate investment of own effort - and then double it
- Study of “learning rates” of organization in the past possibly using adoption rates expressed by logistics curve of prior learning/ change efforts
- Mess Formulation of Interactive Planning particularly obstruction analysis, mess map, and second order machine to identify cultural defaults and their adverse effects
- Conversation for possibilities to recruit key lieutenants before “going public”
- Mastering Business Complexity: Managing Organizational Complexity

Examples: “We spent a lot of time on it, we got a lot of input from a lot of people.” (CEO) “A lean management team can make incremental improvement. For massive change, you must have a major initiative. Functional VPs have to raise people’s awareness by talking it up.” (CEO)

4. They use mentors to support them.

Elements: Studying role models gives a recipe to combat confusion and insecurity. “I always admired the organization’s president as a leader.”(CEO) Mentors and coaches are useful in overcoming hurdles and avoiding discouragement. Advisors provide essential support: counselors who can help leaders see when they are personally stuck (CEO and professor), experts who provide good opinions on which the leader can rely (CEO and policy matter experts), peers in other companies (CEO and senior peer in a similar institution). Sponsors/mentors can open doors that would otherwise be closed. “He took me along and told the others at the meeting [that I] had something to contribute. I never had to

worry after that.” (CEO) “It can deal with the kind of informal rules that exist within that organization and help somebody along, without pulling them out of their place in the organization which might, in fact, be detrimental to their overall success.” (CEO) Visibility and proximity to the decision-makers also opens the doors.

Methods that can be applied:

- Mentoring programs
- Study of role models to keep on track (Howard Gardiner and other sources)
- Conversation for action to recruit advisors to supplement areas where leader feels insecure
- Enrollment in high visibility, high leverage project teams

Example: CEOs’ use of the professor who taught business and studied organizations to diagnose and convince himself that he had to change if the company was to grow.

5. They keep their sense of humor alive.

Elements: “Humor is critical.” (many CEOs)

Methods that can be applied:

- Fun and joy: time off and sociable times with co-workers
- Scheduled informal discussion time as part of every agenda
- Use of a humorous term to characterize a difficult situation

Example: A CEO arranged for his VP of Engineering, who did not like his engineers to be involved in tech support, to receive a really tough call. When VP confessed that he had been converted, the CEO told him over lunch the next day what he had done.

II-E. Determine, Plan and Effect Key Strategic Decisions

What Do Leaders Do Who “Determine, Plan, and Effect Key Strategic Decisions?”

We found they:

- Identify the critical issues for their organization
- Thoughtfully draw conclusions about the business in its context
- Recognize driving forces in the environment (Bennis)
- Exercise a variety of thought processes: conceptual/ pattern thinking, analytical/ cause-and-effect thinking, information seeking, strategic/ long view thinking (Hay/ McBer)
- Think about the unknown — “It’s the unknown that provides the uncertainty. It’s the unknown that can really hurt you. But if you’re thinking it out well, it can be your opportunity because others aren’t thinking about it.” (CEO)
- Make strategic choices
- The leader needs to be a simplifier. (CEO)
- The leader must make judgments as to whether to remove an obstacle— and stay the course— or revise the strategy and admit they went the wrong way. (CEO)
- Develop the change strategy
- “Reorganizations are tough. You can change people, structure, and process — those are your tools.” (CEO)

- Assess the organization's readiness or resistance to change (Rapaille)
- Encourage experiments and then scale (CEO)
- Make the appropriate investments in human and capital resources
- Invest the appropriate time and resources to build a strong organization
- Determines appropriate level of investments in human resources (CEO)
- Build the right management team (Kotter)
- Manage people as an asset
- "Keep the [organization] very vibrant and as full as we can of knowledgeable people." (CEO)
- Have a philosophy about people, how you will handle the people equation.
- Fund the necessary capital investments (CEO)

"Determine, Plan, and Effect Key Strategic Decisions" — How Do Leaders Do It?

1. They understand business trends and drivers.

Elements: Leaders ground their visions in a deep understanding of the organization, its markets, and trends. (Kotter) They analyze the trends and business directions to learn current and future needs for change. (Rapaille) However, leaders must gather real data about the business without a preconceived hypothesis. (Shiba) They must gather relevant information from the internal environment. "I always ask the business units to report on what are the key business drivers — not the money." (CEO) Leaders spend a significant amount of time scanning diverse sources of insight. "50-60% of my time, I scan the environment, our competitors, the technology looking for misalignment." (CEO) "I surf the web, the company. If I sense something, I drill down on that." (CEO)

Methods that can be applied:

- Studying business literature for economic patterns and trends
- Relation diagramming with top management of key business drivers
- Market research
- Interactive Planning
- Making key assumptions explicit and monitoring the key variables
- Causal Loop Diagramming

Examples: "[Company A] bought a \$50M competitor of ours and took them out of the channels, leaving a vacuum. It was very fortunate for us. They lacked the connection with the informal network, the business drivers." (CEO) "I study outside the company. I read the Wall Street Journal, Business Week, etc. and 6-7 books per year." (CEO)

2. "Jump up" and ask questions from the larger perspective.

Elements: Leaders need to "define where you are in as broad a context as possible. They have to understand, not only what you're doing and why it's important, but where it fits into the overall scheme." (CEO) "The trick is not to get into the details," (CEO) and not to shrink from asking, "what are the important challenges that face the organization?" (CEO) To do this, leaders need to intentionally shift their way of thinking to look from different perspectives: time, point of view, and space.

(Shiba) "I look for discontinuities in the organization." (CEO) Leaders need to be "open to possibilities" and "listen [to others] on a large range of topics." (CEO)

"It takes leaders' time, enormous amounts of thought and time." (CEO) Often, "there are so many interruptions, I cannot do deep strategic, architectural thinking at work. I do most of my thinking on weekends, at night, on business trips." (CEO) It is necessary to "step back every now and then, sometimes it's at 3 o'clock in the morning, sometimes at leisure, to reflect on experiences." (CEO)

As leaders "jump up", it is important that they are not trapped by past experience (Shiba) and instead learn from and gain "true understanding — from reflecting on [their] experience." (Bennis) The experiences may be personal or professional. Leaders continually reflect and distill lessons that can be applied elsewhere. "I make mistakes and learn." (CEO)

Finally, leaders use many different approaches to expand the way they think about things. They collect qualitative data of real, symbolic, and diverse cases for breakthrough thinking. (Shiba) "I look at statics and dynamics. I think about forces and acceleration." (CEO)

Methods that can be applied:

- Allocate Time-To-Think (TTT)
- LP Diagrams
- Systems Thinking
- Academic disciplines like linear programming, statics and dynamics, force field analysis, causal loop diagramming, etc.

Examples: "I'm looking to understand how technology is changing around us, how [it] is changing the local businesses, the way you deal with employees, the customers of our business." (CEO) "We have new competitors we've never heard of. [I ask] how do you get ready for that while at the same time keeping your core customers?" (CEO) "Academic helpers for me are statistics, state space systems analysis where you use differential equations in matrices to optimize the system. These have helped me in my thinking." (CEO)

3. Stay close to the customers and employees.

Elements: Leaders describe themselves as "go[ing] to the field to visit the real users" (Neumann) and "spend[ing] time face-to-face with customers." (CEO) Similarly, staying close to the people who serve the customers is critical. "The field service reported directly to Neumann." Listening to the employees is stressed by Pipp. Leaders also personally meet with customers who are having difficulties.

Methods that can be applied:

- Reporting structures
- System for leaders to do customer visits
- Leader training in listening to the "Voice of the Customer"

Examples: "I spent anywhere from one to three hours a day talking to customers to assure them that their deposits were safe." (CEO) "If we may lose the account, I will meet with them. I say, 'I'd be happy to go see the customer [who is at risk] and see what I can do.'" (CEO)

4. Make the tough decisions.

Elements: Leaders must be clear about: "what is part of the strategy, how to focus [the] resources, and what are [the] priorities." (CEO) "It's

not a question of good or bad. But you have to have your own plan.” (CEO) Knowing this, leaders “move ahead with new ideas” or, when necessary, decide to stop what is underway. “They didn’t do the plan. As the leader, I had to pull the cord.” (CEO) At times, only the leader can make the final decision on the element of risk the organization should undertake.

Leaders need to be able to keep the overall objective in mind when drastic measures are required. “You’re firing people left and right that have let you down. You’re also firing people that haven’t let you down” (CEO)

Leaders must balance when to include others in decision-making and when to do it alone. “Between 1985 and 1998, two of the leaders were the key strategic decision makers. The continuity helped a lot.” (CEO) “If you want strong leadership in the new generation, if you want them to grow up, they must feel like they’ve got it — I’ve really backed away. The only place I’d seek to intervene is when we see the [decisions are] violating the [basic value] of being a caring environment.” (CEO) “Consultative/participative [can be] pushed too far, and sometimes I’m guilty of that. I’ve pushed back and said [that] I don’t want to decide, I want the organization to figure it out. I think it’s a skill that comes through practice. I think it’s better that the leader has to be ° step ahead.” (CEO)

Having made the tough decisions, leaders must insist on support. “You say, ‘Here is your point. Did I get it right?’ and, ‘Here is my point, and I would like your support.’” (CEO) “I said, ‘Once we start, we are doing it and there is no other alternative, unless you want to leave. You need to back me 100%.’” (CEO)

Methods that can be applied:

- LP Method with top management explore the situation
- Operational Planning method for documenting strategic decisions and underlying assumptions
- Conversation for possibilities to recruit key lieutenants before “going public”
- Risk analysis
- Mastering Business Complexity: Managing Problem Complexity

Example: “I calibrate how big a change it is to decide if the people in the organization can make it fly. I must be in [synch] with [the] change readiness of the organization. How ready are they to absorb the change? I must prioritize which changes to make.” (CEO)

5. Make structural changes.

Elements: Leaders know that changes in “people and structure get people to rethink where we are going.” At the same time, “you should do [changes in structure] with a lot of thought and not often. It takes a lot of work.” (CEO)

Leaders flatten and change the organizational structure to enhance communication and change the culture. “He said the first thing we’re going to do is have that business report directly to you.” (CEO) Leaders need to move from a hierarchy to independent networks, create more heterogeneity, and allow more freedom. (Bennis) Often multi-dimensional organizational structure makes interaction easier. One leader also pointed out that “a bureaucracy can [be used to] teach people things, as well, [such as] what’s acceptable within an organization [or] how you approach [things].” (CEO)

The top management must be set up to work effectively. “We have 17

people on our leadership team — functional VPs, GMs of divisions, and [key] process owners.” (CEO) Sometimes the leader has “to change the Committee — how it operates and the people working on it have got to change too.” (CEO)

Methods that can be applied:

- Interactive Planning — Organization Design, Internal Market System
- Four Revolutions Course — Infrastructure Model
- Lean Manufacturing, Lean Cell Structure

Examples: “I had 23 people reporting to me, and [my advisor] said nothing is going to get done. The power is so diffuse. He was right. We made a [steering committee] of the top managers who meet and where the integration [can] take place” (CEO). “We looked at our org. chart and didn’t like it. We decided to draw it with the customer and product touchers and customer service at the top of the chart. Then we drew a funnel with the CEO at the bottom. This was an early way to communicate enabling vs. dictating” (CEO). “We had to completely change structures from divisions to global” (CEO).

6. Recruit and retain people.

Elements: Leaders realize that they are “really dependent on good people.” (CEO) As one CEO said, “If you can recruit talent, you’re half way there.” Leaders identify and “hire people who can think.” (Neumann) “We decided to hire the best people we could hire, even if they lacked experience. We hired young college grads, with no experience, who were very smart.” (CEO) Further, leaders are not threatened by having people work for them who are better than they are — “good management actually is constantly getting people who are better than you underneath you that keep lifting you up.” (CEO)

Leaders involve themselves personally in recruiting the best people. “I will spend time with any college kid that someone thinks may help. In the 60s, I spent half of my time doing this. I spent 4 weeks recruiting [one senior person] and 6 weeks recruiting [another].” (CEO)

Leaders make sure that they have the right people in the right places. “I always felt we could stand any individual contributor, no matter how odd ball they were. But for managers, I want them to be balanced.” (CEO) Leaders revise hiring criteria to ensure building and continuing the vision. (Kotter)

Leaders take responsibility for making sure that the jobs into which they bring talent are attractive and “give them an opportunity to make a difference inside and outside.” (CEO) It is important not to “over-staff” (Neumann), equally important to let talented people “run [their] own show” (CEO), and to personally “hang in” with talented people when the business is slow (CEO). To make an attractive environment, it may be necessary to revise job descriptions (Kotter), “redo every work area” (CEO), and create a culture that is consistent with the values that the leader wants propagated.

Methods that can be applied:

- Leader involvement in the recruitment process
- College recruitment program
- Organizational redesign
- Job redesign

Examples: “We just set up a pattern of moving more and better people into real estate, [and could begin] cutting expenses.” (CEO) “We have

no perks at [our company], except for salesmen's cars. If the president or a technician are flying to Japan, they fly the same way." (CEO)

II-F. Focus the Organization on the Right Things (Will Do, Won't Do)

What Do Leaders Do Who "Focus the Organization on the Right Things?"

We found they:

- Create systems that align peoples' actions with desired results
- Must align and monitor organizational strategy, function, process, and people to meet customer requirements. (Rummler Brache)
- Build in reinforcement for the behaviors and practices that support the organizational goals. (McClelland)
- Deploy the vision through the organization
- "The challenge is the extent to which you can enlist your subordinates in line positions and you can deploy the vision through the hierarchy, the broader context of a network." (CEO)
- "A leader [may have to] lead from behind: set the table, create the vision, support the effort, remove barriers, let them take the lead. Every now and then the leader must lead from the front." (CEO)

"Focus the Organization on the Right Things" – How Do Leaders Do It?

1. They create a sense of urgency and establish goals.

Elements: Leaders identify the overarching or latent crisis that must be addressed. (Rapaille)

They establish goals that demand performance that will produce the desired outcomes. Leaders insist on measurements that are visible so that people can assess themselves and others against the goals. (McClelland) Additionally, leaders use multi-dimensional measurement to ensure they do not achieve results in one dimension at the expense of another important dimension.

In addition, leaders recognize that people have to have a sense of accomplishment as they progress. Leaders manage to ensure meaningful interim goals are set and achieved (Kotter). In doing so, they effectively balance short- and long-term goals (CEO).

Methods that can be applied:

- Systems Thinking and Measurements (Ackoff — Interactive Planning)
- Conversations for Action
- Four Revolutions Course — Infrastructure Model, Mobilization, Phase-In, Hoshin Planning
- Mastering Business Complexity: Managing Organization Complexity

Examples: "A goal system delivers a lot of money. When the money is down, people get upset and are willing to make an effort. [When] we went from 30% to 15% [payout], people were willing to let go of the status quo." (CEO) "For shareholders it's managing for value, for customers it's meeting their expectations." (CEO) "There was a lot of leadership focus on goals, and there were a lot of bottoms-up goals set." (CEO)

2. Reward what they want to achieve.

Elements: Leaders align reward systems with desired outcomes (Kotter), being careful to pay people for what they want them to do and not pay people for what they want them to stop doing (Pipp). It is important to note that many compensation and promotion systems reward the status quo and reinforce the traditional culture of the company. If there are behaviors the leaders want to change, they consciously create a reward system to discourage them. In addition, leaders make sure they create short-term wins, so that people quickly see pay-back from the new approach (Kotter).

Methods that can be applied:

- Conversations for Action
- Organization design methods (Ackoff)
- Internal market systems (Ackoff)
- Celebration systems (rallies, awards, competitions)

Examples: “[We] created a bonus program of 10% of pretax earnings. What anyone can earn is dependent on how they did against the team-based and their individual goals.” (CEO) “I believe in service profit-sharing. If you’re exceeding expectation of customers, you do that by building, motivating, and training a great staff.” (CEO) “You can’t get good people to work for you if they don’t like the environment, and if you’re not paying them well.” (CEO)

3. Decide on who should steer successfully through transitions.

Elements: The leaders ensure the organization has the resources to move from the “old model” toward the new vision of the organization. They designate champions of the big initiatives. We “put project leaders in charge and give them real authority. They can be called ‘Chief Engineers.’” (Pipp) Leaders personally “do coaching for the low mindshare products.” (CEO)

Methods that can be applied:

- Operational and Hoshin Planning
- Systems Thinking
- Matrices to select among alternatives
- Four Revolutions Course — Infrastructure Model, Mobilization

Examples: “A leader must lead from behind: set the table, create the vision, support the effort, remove barriers, let them take the lead. Every now and then, [one] must lead from the front. An entrepreneur, used to making all the decisions, must learn to keep his mouth shut after setting broad rules that define the road.” (CEO) “To make the Web a key issue, I have to get a crusade leader, convince the stakeholders.” (CEO)

4. Decide what the organization will not do.

Elements: A critical role of leaders is to decide what projects they won’t do and terminate non-aligned activity without demoralizing the people who have been working on them. (Pipp)

Methods that can be applied:

- Operational and Hoshin Planning
- Matrices to select among alternatives
- Mastering Business Complexity: Creating Business Alignment

Examples: “If you have [too much] customer focus, you will never say

'no' to anything. Doing whatever it takes, with no process, no documentation, you will have no core competencies." (CEO) "As a small company, we never talked to a customer or a sales person before we were ready to go with a new product. Recently our product revenues were projected higher than the 20% we got. It turned out one division told about a product that would overlap with existing product. The sales force stopped selling product because of overlap. Harder to manage a larger organization." (CEO)

"If I focus, I may make a mistake and that could cost. But if you don't focus, you will lose every time. What looks like the low risk strategy will lose every time." (CEO)

5. Use "Swat Teams" to ensure a project is successful.

Elements: Leaders set up cross-functional teams with the right people for the right amount of time, then stop them. (Pipp) They also make use of "guiding coalitions" of people who are credible, powerful, and experts in the organization. (Kotter)

Methods that can be applied:

- Operational and Hoshin Planning
- Nine-step Method
- Four Revolutions Course — LP and CE Methods
- Work-Out / 7-Step Methods

Examples: "When we identify a problem, put together a project team, and I have a process for following it up. Y2K is a good example of that. Y2K comes, but that's under control." (CEO)

"We do an LP at the start of product development with the leadership team of 17 representing all functions and process owners." (CEO)

6. They learn and educate others about operational planning and process management.

Elements: Leaders ensure that the people in the organization are equipped to do process design and management. Changes will require process modifications or the creation of new processes. "You change processes. That is how you get people to cooperate." (CEO) "As a company matures and with the complexity of the company growing, as CEO, I need to put ° my effort on process. I've learned [from] Dell [that they] created a business model with very careful focus on only certain processes which they fine tuned." (CEO)

Leaders select the appropriate tools to diffuse. There are different approaches to material, information, and business processes. Leaders also focus on the skills that help people deal with the inevitable breakdowns.

Methods that can be applied:

- Operational and Hoshin Planning
- Four Revolutions Course
- Mastering Business Complexity: Integrated Management Systems
- Project Management
- Conversation Skills — Managing Commitments

Example: "I recognized that people [need to learn] about breakdowns, how to deal with breakdowns, how to blame the system [not the people], [this] is something you can teach." (CEO)

7. Include Community Relations as a priority.

Elements: Leaders recognize the importance of “Corporate Citizenship” and are personally committed to developing good relations with the communities in which they do business. It gives the organization a symbolic case where they are working for a goal that is larger than themselves and the financial results. They may champion a local cause, contribute to community groups, or institute a formal contributions review group within the company. In the best cases, they actively involve employees in selecting and organizing the ways in which the company participates in the community.

Methods that can be applied:

- Four Revolutions Course—LP, Matrices, MPM
- First things First, Mission, etc. (Covey)

Examples: “A symbolic gesture is the tone/emphasis of business in relation to the community. For example, United Way. We said that we wouldn’t do it unless our people want it. United Way made the pitch. They didn’t want to do it; instead they designed their own program.” (CEO) “I spend a lot of time in the Boston community.” (CEO)

II-G. Manage the Performance of Others to Achieve the Organization’s Objectives

What Do Leaders Do Who “Manage the Performance of Others to Achieve Organization’s Objectives?”

We found they:

- Gain Commitment to high levels of accomplishment
- Make people feel they can meet the high expectations leaders set.
- Set high levels of expectations for all business areas, e.g. Motorola’s Six Sigma (Pipp)
- Make people feel they can accomplish anything. (Newmann, GE)
- Create short-term wins. (Kotter)
- Understand how to insert oneself in a value-added way. (CEO)
- Move people to want to change.
- Try to convey a sense of movement, of change, of empowerment, of caring about people.
- Present business’ problems by shaping them in ways everyone can understand.
- Provide clarity and enforcement of expectations.
- Make absolutely clear what you expect of them. (CEO)
- “A few times, [I’ve had to say], I’m going down here. You’re going down there. I’m not changing direction. What are you going to do about it?” (CEO)
- Effectively manage the performance of others
- Ensure effective performance through feedback and monitoring progress to plan
- Give performance feedback (CEO)
- Monitor progress to plan, but put responsibility on participants. (Charter Oak)
- Let people make decisions about how to accomplish the vision.
- Push decision-making down in organization. (Charter Oak)
- Promote participation as an important part of the social model of management. (Ackoff)
- Let others help figure out how to accomplish it. (Pipp)

“Manage the Performance of Others to Achieve Organization’s Objectives” – How Do Leaders Do It?

1. They stay in touch.

Elements: Leaders spend time personally meeting people: customers, employees, and managers. “You can’t do enough of it.” (CEO)

Through communication, leaders persuade others to move in the direction they have set. Leaders “spend a lot of time, one-on-one and in groups trying to convince people.” (CEO) “To gain alignment, you must see the extent to which you are deploying the vision through the hierarchy, the broader context of a network. The challenge is the extent to which you can enlist your subordinates in line positions to understand and carry the message. You must engage and meet face to face.” (CEO)

At the same time, leaders get feedback about how things are going. “It was Tom who suggested I have employee breakfasts once a month, and I must say they have been very important as far as my own feeling of having some knowledge of what’s going on and how things are being received as opposed to how they’re being communicated.” (CEO) “When there is a lack of reports on metrics, a lot of the CEO’s role is to scan, touch customers, go to key trade shows, monitor key financial metrics, watch the competition, meet new people in the company.” (CEO)

The leaders made it their own responsibility “to create internal process to do communication — the processes and the system — quarterly newsletters, videos, [and other] communications with the rest of the company.” (CEO)

Methods that can be applied:

- Internal systems for communication, e.g. broadcast phone and e-mail messages, operational summaries monthly, videos, town meetings, etc.
- Operational Planning Systems (H-P, Analog Devices)
- Management by Walking Around
- Face-to-face meetings
- Conversations for Relationship, Opportunities, Possibilities, Action and Breakdown

Examples: “I went to every site and talked to myself about the changes that would need to take place.” (CEO) “I had to go around to all the groups and get people to buy into it, to get software, and to get the actual thing implemented.” (CEO) “I must say that having these assemblies with 300-400 people has been a lot of fun. I’ve really enjoyed doing them. And the feedback has been really positive.” (CEO) “In the Philippines, everyone came out of the factory. I made a 2 hour pitch which should have been 1 hour. They didn’t understand it at the end. But being there was a symbolic part of the crusade. They all came out of the factory and stopped work.” (CEO) “I get 100-150 emails per day. I answer all that are addressed to me specifically.” (CEO)

2. Establish and use a common language.

Elements: When leaders develop a clear strategy, articulate the goals, and communicate, communicate, communicate, leaders “create a common language throughout the organization.” (Pipp) In some cases, they use courses, either internally developed or external course, to create a new way of behaving and a common understanding of the goals and strategy for achieving them.

Methods that can be applied:

- Four Revolutions Course — 7 Infrastructure Model, Mobilization, Phase-In
- Conversations for Action
- Mastering Business Complexity: Managing Organization Complexity

Examples: Jack Welch, G.E.: “Number One or Number Two or Out!” “The great value of CQM — sometimes a leader can’t do it alone. You can insist that they take 6 days — if there is enough mass, it will move them off position. It is a question of change agent, group activity.” (CEO) “I had to raise the level of awareness that there was a gap and what the goals should be. I handle the alignment, the teaching.” (CEO) “Most of the communication has been around culture and values and management development and planning and transitions from one task to another task and so forth.” (CEO)

3. Provide Just-in-Time education.

Elements: Leaders encourage development and learning as part of the ongoing work. They “provide fact-based training, not large blocks of fixed-syllabus training.” (Pipp) They seek ways to teach people through feedback, performance reviews, and mentoring or development. Leaders learn and, in turn, teach new approaches in order to convey their seriousness of purpose.

Methods that can be applied:

- Mentoring, teaching
- Systems for targeted education and diagnosis
- Conversations for Action
- Four Revolutions Course

Examples: Develop people “on the fly” as needed. (Charter Oak) “I will tell you about creating the new Analog. We gave the senior management team megaphones for motivation.” “In our performance reviews is how to develop the competencies. There are a lot of values and vision.”

4. Provide management monitoring and feedback.

Elements: Leaders give feedback in many ways, including questions, measurements, and reviews. They recognize that their feedback is crucial to moving people in the desired direction. The leader’s feedback must be candid, timely, and constructive.

Leaders establish management monitoring and feedback systems. They set up and meet regularly with councils (of managers and low-level change-agents) to generate feedback. (Pipp) They provide fast feedback on performance [and point out if it is] as desired and not. (McClelland) When it is apparent that there are problems, leaders have the people responsible specify goals and tasks to remedy the situation. Leaders make sure that their people “take the ‘small bow’ and enjoy small [interim] successes.” (Bennis and Kotter)

Methods that can be applied:

- Conversations for Action
- Operational Planning System (H-P, Analog Devices 10-Step)
- Situation Analysis Tool
- Hoshin Planning
- Mentoring
- Milestone celebrations

Examples: “My skill is to ask the right questions, to find where are the weak links and asking questions there. This is what transitions require.” (CEO) “Sometimes just by asking an inadvertent question, I can have a huge impact.” (CEO) “When I see downgrades I didn’t expect, I send something back. I send cc:mail to them all, ‘what is going on here?’” (CEO) Have a formal “lessons-learned” process (benchmarking internally and externally) (Pipp).

“When you stop a project, management must help people understand that they did not fail just because the project was stopped.” (Pipp)

5. Adapt their monitoring style to the capabilities and maturity of others.

Elements: The leaders who successfully manage the performance of others are quite flexible in their interactions with others. They deliberately select personal styles, management approaches, and influencing strategies to match the individuals/situations they are dealing with in each instance.

Leaders determine the style that they are currently using for each person and task. They know their own strengths and weaknesses. They diagnose each person’s or team’s performance potential, ability, and motivation in relation to the task they are undertaking. As appropriate, leaders may apply the 4 management styles with individuals or teams: Giving clear, explicit explanations and directions (forming period), making decisions when necessary (focusing period), supporting the individual’s or team’s decision-making (performing period), or handing off responsibility for meaningful pieces (performing period). During Style 3, leaders often use open-ended questioning skills (e.g., what are the ramifications? Consequences?). (Charter Oak)

Methods that can be applied:

- Charter Oak L4 Model
- Inquiry and advocacy balancing skill
- Conversations for Relationship, Possibility, and Action
- Situational Leadership
- Covey

Examples: “I like trying to broker one opinion and another opinion, and getting people focused and doing things, working within the system to move it along.” (CEO) “You need your most persuasive power, it took a year. You make some key moves, let people know what you’re doing so that they are not surprised.” (CEO) “A degree of internal confidence, leadership, whatever you want to call it, on a hands-on basis, was needed.” (CEO) “In one division, we have a really self-directed work team. It’s amazing what they can do in a supported environment, how little leadership is needed.” (CEO) “Experimenting is important, to think about the optimal model and to do sensitivity analyses in a real world experiment. For example, we had two identical ads except they had different headlines. One generated 50% more leads than the other.” (CEO)

6. Manage risk and remove barriers.

Elements: Leaders understand risk-taking to move the organization to the right results. They take it upon themselves to determine how best to manage the risk. In particular, they try to relieve the fear of people in the organization by understanding the risk, deciding how they will manage it, and then communicating their confidence to employees. Where

necessary, they act to remove impending barriers that are beyond the reach of the individuals or teams.

Methods that can be applied:

- Mentoring
- Hoshin Planning
- Mastering Business Complexity: Managing Problem Complexity
- Conversation for Possibilities, Action, Breakdown

Examples: "I am trying to prevent [the increased risk aversion in my employees]. I ask myself, 'What's the worst that can happen and can we deal with it?'" (CEO) "...where you understand what they need most for you to be doing; and you do it well." (CEO)

7. Hold people accountable.

Elements: While leaders try to remove barriers for employees, at the same time they hold people accountable for the commitments they make. They set high standards and goals, provide the resources and support needed, then let people know they are accountable for their actions. Through the monitoring mechanisms that they set up, leaders require people to develop and report on action plans by which they are moving toward the ideal. (Charter Oak) They also hold people accountable for ethical and value standards set by the organization and make it clear that those who violate the standards will not remain in their positions. Following-through on this is one of the most difficult and important actions these leaders take.

When setbacks occur, leaders analyze the setbacks before searching for a scapegoat. Leaders hold people accountable for their commitments. (CEO) Leaders also hold people accountable for results. (CEO) Leaders understand when to do the first and /or the second based on a thorough understanding of the situation.

Methods that can be applied:

- Conversations for Action and Breakdown
- Performance Contracting Tool (Charter Oak)
- Hoshin Planning
- Operational Planning System
- Reward and Measurement Systems
- Covey

Examples: "I wanted them to have strong ethical standards." (CEO) "I feel every year I should be able to say to the Board: in a senior position, we've done this or some improvement. We have to fire the bottom 15%." (CEO) "This is what we expect of each other. If you're not in synch with that, you probably don't belong in this company. If there is someone in this company who doesn't really believe what we're doing in diversity, they ought to do something else." (CEO) "Recognize it may be necessary to remove managers who 'just don't get it.'" (Kotter) "What happens when you outgrow a person's capabilities? We have not lost 'keepers.' We had someone who moved from sales leadership to regional leadership with 8-10 reports. When he moved to country level with 60-70 people, he was not as good. Now he is leading our customer service team well." (CEO) "Learning about breakdowns, learning how to help people deal with breakdowns, how to blame the system, is something you can teach." (CEO) "Do not punish people if failures are not their fault." (Welch)

Appendix: Leadership Study Group Reading List

Russell L. Ackoff, *Systems Thinking & Thinking Systems* (Bala Cynwldy, Pennsylvania: The Institute for Interactive Management, June 21, 1993).

Russell L. Ackoff, "The Circular Organization: An Update," *The Academy of Management Executive* (February 1989) 11-17.

John D. Beck and Neil M. Yeager, *Leader's Window: Measuring Leadership Development* (New York: John Wiley & Sons, 1994).

John D. Beck and Neil M. Yeager, "How To Prevent Teams From Failing," *Quality Progress* (March 1996) 27-31.

Warren Bennis, *On Becoming a Leader* (Boston, MA: Perseus Publishing, 1994).

Stephen R. Covey, *The 7 Habits of Highly Effective People* (Simon & Schuster, 1990).

Max DuPree, *Leadership is an Art* (New Star Media, 1990).

Peter F. Drucker, *Managing for Results: Economic Tasks and Risk-Taking Decisions* (HarperTrade, 1986).

Fernando Flores, "The Leaders of the Future," *Beyond Calculation: The Next Fifty Years of Computing* (Copernicus imprint of Springer-Verlag, 1997): 175-192.

"Mastering Global Leadership," *Hey/McBer International CEO Leadership Study* (Hay /McBer Worldwide Resource Center, Boston, MA 38 pages, undated).

Ronald A. Heifetz and Donald L. Laurie, "The Work of Leadership," *Harvard Business Review* (Cambridge, MA.: Harvard University Press, February 1, 2000).

Ronald A. Heifetz, *Leadership Without Easy Answers* (Cambridge, MA.: Belnap Press of Harvard University Press, 1994).

Rosabeth Moss Kanter, *World Class: Thriving Locally in the Global Economy* (Simon & Schuster, 1995).

Jon R. Katzenbach, *Teams At the Top* (Cambridge, MA.: Harvard Business School Publishing, 1997).

Jon R. Katzenbach, *Real Change Leaders* (Crown Publishing Group, 1997).

John P. Kotter, *Leading Change* (Cambridge, MA: Harvard Business School Publishing, 1996).

Thomas H. Lee, "TQM, CQM, Mutual Learning and Management Integration," *Center for Quality of Management Journal* Vol. 6, No. 1 (Spring, 1997): 5-14.

Thomas H. Lee, "Managing for Creativity: How Gerhard Neumann Ran GE Aircraft Engines," *Center for Quality of Management Journal*, Vol. 7, No. 2 (Winter, 1998): 3-9.

Thomas H. Lee and David Walden, "Designing Integrated Management Systems" *Center for Quality of Management Journal* Vol. 7, No. 1 (Summer, 1998): 3-18.

David C. McClelland and David H. Burnham, "Power is the Great Motivator," *Harvard Business Review* (Cambridge, MA.: Harvard University Press, January 1, 1995).

Gerhard Neumann, "Aircraft Engines — Never a Dull Moment", transcript of the Twenty-Second Wings Club General Harris 'Sight' Lecture (New York City: Wings Club, May 16, 1985).

Geary A. Rummler and Alan P. Brache, *Improving Performance: Managing the White Space on the Organization Chart* (Jossey-Bass, Inc., Publishers, 1990).

Shoji Shiba and David Walden, "5 Principles for Effective Management," informal document transcribed October 10, 1997, and later subsumed by: Shoji Shiba, "Leadership and Breakthrough," *Center for Quality of Management Journal* Vol. 7, No. 2 (Winter, 1998) 10-22.

Neil Tichy with Eli B. Cohen, *The Leadership Engine: How Winning Companies Build Leaders at Every Level* (HarperCollins, 1997).

Jack Denfeld, "What Makes a Leader?" Leadership Skills, series part 14, *The Financial Post* (Toronto, Canada: date missing).



A Few Thoughts on Executive Competency Convergence

by Stephen P. Kelner, Jr.

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I have recently had the opportunity to contemplate issues of leadership, an issue of profound interest to Tom Lee, because of work I have been doing examining the pattern of competencies in top executives worldwide. Competencies, as most now know, are characteristics of people that differentiate performance in a specific job or role (Kelner, 2000; McClelland, 1973),¹ often identified through patterns of behaviors. Competencies may include underlying motivation, deep traits, self-concept, attitude, values, skills, knowledge, and anything else that separates the good from the bad, or the great from the good.

To my surprise, I found that executives were coming out a little different than I had anticipated based on previous experience: one small set of competencies, smaller than that used to differentiate non-executive roles, seemed to apply to success in virtually all executive roles. I would like to begin a discussion as to why, and suggest some implications of this.

Three key points before we begin:

1. The more complex the job, the more competencies matter to differentiate performance.
2. The more senior a management role, the more complex the competency model.
3. Competencies have levels of sophistication, and there are more complex "dependent" competencies which rely on prerequisite competencies to work.

No two jobs are precisely alike. Even the same technical role, say that of programmer, may be significantly different at Apple, IBM, and Microsoft not just because of the technical skills (probably similar or identical), but because of other competencies that help define how a person can use their technical skills. Digital Equipment Corporation was so democratic and egalitarian that virtually nothing could be decided without a collaborative team effort. By contrast, Compaq emphasized individuals taking responsibility — that asking forgiveness is better than asking permission. Both companies strongly emphasized innovation, creativity, and engineering excellence, but their approaches were radically different. No informed observer should have been surprised at the challenges Compaq had in integrating Digital. The challenge wasn't in the quality of people, but in the culture and the culturally driven informal processes they used, which in turn led to the requirement of specific competencies for success. Competencies can reliably define such very precise differences between apparently identical roles.

Competencies not only distinguish well between roles at the same level in different functions, but also between roles at different levels (even in the same function), most simply by the number required to define the role: a competency model usually defines a middle manager quite thoroughly with ten to twelve competencies, of which two are relatively unique to the given role, either because of culture or special

¹ One formal definition, after McClelland, is: "any characteristic of a person that differentiates performance in a specific job, role, culture, or organization." Other definitions exist, but this is closest to McClelland's original formulation.

job characteristics. I found in a past role that senior executive models tended to require fifteen to eighteen competencies, up to half of which were unique to the model.² We assumed at that time (1998) that this was due to the nature of the roles. Competencies differentiate between levels of performance in a role; executive roles in large firms are often the most complex roles in any organization, requiring extraordinary levels of competencies to even achieve mediocrity. One might deduce that therefore the competency differentiation between executives must be greater than for any other role, and so it seemed to be in earlier studies. Presumably, the more senior the role, the more competencies, and the more role-specific competencies (as opposed to generic ones) as well.

By contrast, a few years ago the late David McClelland performed a meta-analysis of executives assessed on competencies, and discovered that a mere eight competencies could consistently predict performance in any executive with 80 percent accuracy (McClelland, 1996). This apparent paradox — requiring only eight generic competencies versus requiring eight generic and eight role-specific competencies — was not resolved by McClelland, who strove to simplify rather than reconcile. The reconciliation seems to lie in two facts. The first scientifically valid set of scaled competencies — competencies that have sets of behaviors ordered into levels of sophistication or complexity — were developed by Hay/McBer (Spencer & Spencer, 1993) primarily from middle managers and sales roles, because those roles comprised the majority of the database of competency models used to build them (I was there). The competencies being developed for each new executive model were actually part of an emerging set of “executive generics,” distinct from those required in other roles.

The second fact is that most of the original competencies, developed for less complex roles, failed to differentiate at executive levels. Instead, the critical competencies were more complex, “dependent” competencies. For example: A significant degree of interpersonal awareness enables effective influence behaviors. A significant degree of influence ability is required to lead a group effectively. If one has a high level of sophistication with a group leadership competency, you need not seek interpersonal awareness, because this latter, which would be quite strong if measured, does not differentiate. It has become a minimum requirement for a role, meaning you can ignore it with impunity. If you can’t carry out group leadership without having high levels of influence ability, and in turn even lower levels of influence ability depend on high levels of interpersonal awareness, then the demonstration of group leadership will call upon the highest levels of interpersonal awareness as a matter of course. In other words, if you are a Certified Public Accountant we don’t need to ask if you can handle first-grade addition and subtraction. Interpersonal awareness is similarly basic to group leadership.

Thus the paradox is reconciled: we can ignore the original generics, which have become basic competencies rather than distinguishing, and the “role-specific” competencies are in fact a new core set of competencies common to executives only.

What I am finding now, working exclusively with top executives from large firms, strongly supports this view and McClelland’s early findings. At this early stage, as few as eight seven-point competency scales may be sufficient to predict success in a top-level executive role, even in very large organizations. Why would this be so?

Going back to the original definition of a competency, one may deduce that the convergence of competencies is due to a convergence of

² For example: A set of drivers and traits (Achievement orientation, integrity, Power/Influence motivation, customer focus), perceptual competencies (interpersonal awareness, organizational awareness, political awareness), cognitive competencies (analytical thinking, conceptual thinking or pattern matching, strategic thinking, information seeking), and action competencies (initiative, influence skills, group leadership, change leadership), as well as role-specific or function-specific competencies. The Catholic Health Association’s model of Transformational Leadership (based on 66 outstanding executives in Catholic healthcare) included such role-specific competencies as moral wisdom (the ability to make distinctions between core values and non-core values), finding meaning (seeing larger purposes in action), and faith in God.

roles: if competencies are specific to performance in a specific role and most executive roles share the same competencies, therefore any two executive roles in large businesses are far more similar than different. In the study I am completing, approximately 57 percent of the competencies are related to people and organizational influence (influencing employees, organizations, and partners); another 29 percent are cognitive and knowledge competencies (making strategic sense of the world), and the remaining 14 percent is business-results related entrepreneurial thinking (Achievement thinking, for McClelland fans). Looking more closely, the three categories of competencies differentiate executive leadership in large companies from senior management in the following ways:³

1. External versus internal focus: executives cannot stay focused on internal issues of their organization, but must look outward to other divisions or the market at large.
2. Strategic versus short-term focus: executives consider the future and create strategies or at least long-term plans to address them. Strategic thinking requires both analytical and conceptual thinking, working together.
3. Managing organizationally rather than individually: executives align whole organizations and influence through multiple levels, because in a very large organization virtually all executives have large organizations beneath them.

The executive convergence suggests that a pattern of relative weights has emerged, regardless of true effectiveness, because of the last phrase in point 3: virtually all executives have large organizations beneath them. Therefore, most executives must spend a large to overwhelming amount of their time being managers and leaders of people, and therefore “human skill” becomes the dominant set of skills for executive success.

One usually starts out as an individual contributor and then adds progressively more levels of management beneath. The more skilled you are at dealing with people, the more competent you will be at managing more layers to achieve performance. For executives cannot typically “do the job” themselves, nor can they even direct others how to do it. I have seen five layers in organizations as small as three hundred people; larger ones can — some would say must — have more. Even executives in charge of highly technical areas tend to have large organizations, and as a consequence spend most of their time managing. A CEO of a small startup, by contrast, could reverse the percentages for entrepreneurial versus people competencies; they simply don’t have organizations big enough to require sophisticated techniques to drive information through multiple layers.

In CQM’s Personal PDCA workshops, managers consistently estimate the amount of time spent in dialogue at work to be 60 to 80 percent, or more. When closely examining executive behavior for underlying competencies, one finds that even the intellectual competencies⁴ are not devoted to technical or process problem-solving, but to “people-solving.” In other words, not only do the human skills comprise the bulk of the critical competencies, but the other two skill sets end up supporting them.

My first question is: does it have to be this way? I suggest that the structure of most modern organizations has created this model. The “normal” route to advancement is to gather others under you to carry out tasks you cannot carry out alone, and seniority and compensation is largely determined by the number of people that entails. Therefore,

³. Similarly, Shiba (in Shiba & Walden, 2001) defined three sets of leadership skills: technical skill (corresponding to Note 1 above), human skill (corresponding closely to Note 3 above), and conceptual skill (corresponding to a large extent with Note 2 above). These align closely, if not exactly, with the three differences defined above, but no relative weights or strengths are defined in Shiba & Walden.

⁴. Shiba’s “conceptual skill.”

successful individuals — those who make it to executive levels — are those who have large organizations, by definition. The competencies required to achieve this are largely about influence, of your own people and others. It is understandable, but is it effective? To put it another way, is it a good idea for the Chief Technology Officer to spend more time (perhaps four times more) thinking about influencing his or her employees and peers than about technology?

There are alternatives. Examples do exist of CEO-COO teams which combine the visionary or “front man” with the technical or operations person, e.g., Apple in the 1980s or Home Depot in the 1990s. Chief Strategy Officers often have small staffs, and spend a significant amount of time thinking about strategy development themselves. Some technically focused companies allow for senior scientists: top-level experts (theoretically individual contributors) who might ideally bring two of the three executive traits mentioned above: thinking out and thinking strategically, but do not face the majority of human management challenges—except for influencing fellow executives, of course. It seems that this imbalance of skills is not always required at the highest levels — just usually.

Louis Gerstner of IBM appears to be a provocative example of how to balance out influence and non-influence competencies. Conventional wisdom requires leaders of technical firms to possess technical expertise themselves, or at least have experience running a technical business. IBM had never had any CEO who was not “born and bred” at IBM. Gerstner changed all that. He lacked all the three traits above, and indeed did not even own a computer. His focus was on leadership ability as regards people and organizations, as indeed it needed to be, since IBM’s issues were primarily organizational, not technical. For his turnaround role, influence competencies were appropriate.

But Gerstner did not ignore the technical end; he simply employed IBM technical experts to brief him or take action as necessary. Those people received considerably less press, but I wonder if those people were more purely technical than leadership focused. It appears that the guiding intelligence at IBM is a collective one. It is at most large firms, of course, but this is not always recognized. If this view is accurate, it supports the idea that some executives can manage without being technical people, as long as the technical experts are nearby, and vice versa. The technical experts need not be top managers as long as they work with those who are. In other words, the executive team need not all be managers, but can reflect other needs of the organization as a whole.

Looking at these issues and counterexamples, I now think the “executive competency convergence” is cause for concern. Two questions follow:

- First, are we selecting executive teams that are overly narrow in competencies, being overly focused on influence?
- Second, what talents and abilities are we failing to leverage because there is no room at the executive inn for those who do not fit this executive profile?

It appears that structure, rather than organizational objectives, has dictated the nature of most executive roles in large firms today. We should question the way things are traditionally done to ensure that we are actually promoting rapid, proactive improvement. To do this we may need to restructure the organization, the process of decision making, and the process for selecting leaders. We should ensure that the total set of leadership competencies — whatever they may be — is

appropriately represented in executive teams, remembering that competencies are supposed to differentiate between levels of performance. Ultimately, we should not let the common structure of large organizations dictate executive competencies instead of the true objective of business performance.

References

Kelner, S. P., Jr. (2000), "Human Motivation and Organizational Mobilization." *Center for Quality of Management Journal* Vol. 9, No. 1 (Summer 2000) 25-43.

Kelner, S. P., Jr. (2001), "Executive Competencies." Unpublished paper.

McClelland, D. C. (1973), "Testing for competence rather than intelligence." *American Psychologist*, 28, 1-14.

McClelland, D. C. (1996), Unpublished paper on executive competencies.

Shiba, S. & D. Walden (2001), *Four Practical Revolutions in Management*. (Portland, Oregon: Productivity Press, 2001) 329-339.

Spencer, L. M., Jr. & S. Spencer (1993). *Competence at Work: Models for Superior Performance*. (New York: John Wiley & Sons, 1993).





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Implementing a Value-Added ISO9000 Program Using the 7 Infrastructures for Mobilizing Change

by James Stith

Overview of the ISO9000 Standard

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The ISO9000 standard originated from the International Organization for Standardization which has its headquarters in Geneva, Switzerland. This body was founded in 1946 to facilitate global trade, and currently has over 90 countries as members.¹ The first edition was written in 1987 and by 1994, 76 countries had adopted ISO9000 as national standards. The standard, which was revised in 1994 and again in 2000, specifies generic requirements for a quality/business system. It is not product related, but process related and can be applied to any type of industry. The standard proliferated during the early 90's due to adoption by the European Community in 1992 as well as several market and competitive factors regarding quality worldwide at this time. The intent of the standard is to improve a company's business and quality system; to improve their business results, quality and customer service. Many organizations require their supplier base to achieve the standard as well. Another factor that has driven its adoption.

The standard has twenty elements with requirements in each element. The elements relate to the critical business and quality processes that organizations use to deliver products and services to their customers. Because the standard was written as a generic standard to be used across so many industries, it is not prescriptive in the way you must meet requirements. The requirements can be met in a number of different ways and the method to be used should be reviewed by the organization implementing the standard as to what delivers the best value to the organization and its customers. In some cases, organizations have implemented ISO9000 for the goal of achieving the certification and have met requirements in ways that do not add value to the organization or in the way the organization delivers value for its customers.

This, coupled with not receiving the expected business results from certification, has caused some to question the usefulness of the standard in driving business performance. Others have achieved substantial business improvement by implementing the ISO9000 program in a way that adds value to the organization. A general principle I learned from Dale Greer, a Lead Auditor with American Quality Assessors, is:

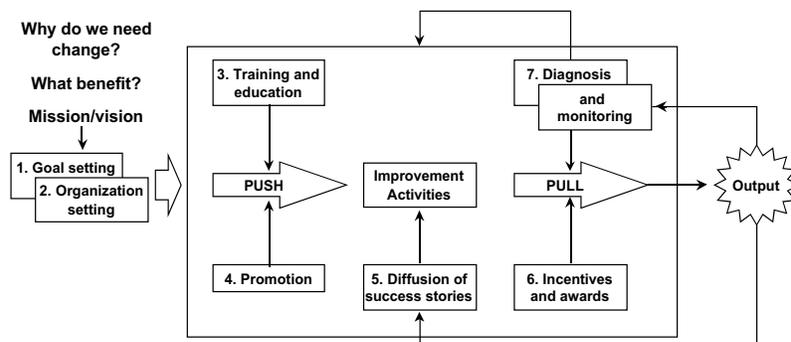
If you implement a program just for the sake of meeting an ISO9000 requirement and this approach doesn't add value to your organization, you must find another way. Somewhere along the way, common sense must prevail.

This helps prevent the "we are just doing the ISO9000 certification to put a certificate on the wall" phenomenon. This article will focus on an implementation strategy that adds value to the organization.

¹ A copy of the ISO9000 standards (and ISO10011-13) can be purchased from the American Society for Quality at 1-800-248-1946.

Overview of the 7 Infrastructures

The model infrastructure for mobilizing TQM,² typically called the 7 Infrastructures model, was originally taught to the founding CQM member companies in 1990 by Professor Shoji Shiba. The model is illustrated in Figure 1. Since then, the model has been applied in many companies, and it has become clear that the model is appropriate for mobilizing all sorts business improvement and organizational change activities. A key aspect of the model is its inclusion of both push and pull elements, a technique Shoji Shiba learned from Lillrank and Kano.³



² Shoji Shiba and David Walden, *Four Practical Revolutions in Management* (Portland Oregon: Productivity Press, 2001).

³ Paul Lillrank and Noriaki Kano, *Continuous improvement: Quality control circles in Japanese industry*, a technical report (Ann Arbor, Michigan: Center for Japanese Studies, The University of Michigan, 1989).

Figure 1. The 7 Organizational Infrastructures.⁴

In the 7 Infrastructures model, goal setting clearly communicates the high level, intermediate and specific goals of the change you want to make. Organizational setting is the resources you make available to make the change happen (teams, meeting rooms, money and time). Training and education is the training you schedule to teach people how to achieve the change. Promotion is how you promote that the change will take place. Unfortunately most companies stop here. They only push the change forward, and it stumbles and fails within a few months. After reviewing the 7 Infrastructures manual, I realize that change is like a rope. You can't push a rope; you have to pull it. The key of the 7 Infrastructures is the pull activities to align change. We have to diffuse success stories to encourage others to change. We have to align our incentives and awards to award behaviors that support change. We have to monitor, diagnose and make adjustments to monitor the change over time.

⁴ *Mobilizing Change Using the 7 Infrastructures*, a manual published by the Center for Quality of Management (Cambridge, MA, 2001).

Reflection on past TQM and ISO9000 implementation in the 7 Infrastructure context

I first learned of the "7 Infrastructures for Mobilizing Change" tool when I joined CQM in May 1999 by reading *A New American TQM*.⁵ While I liked the tool, I really didn't understand its full potential until I reviewed the CQM Cincinnati Study Group's elaboration of the 7 Infrastructure elements and accompanying diagnostic tool. When I was asked to use the diagnostic tool to assess a past implementation of a major change or system, I chose my past experiences observing a TQM introduction and serving as Quality Manager or ISO9000 Coordinator

⁵ Shoji Shiba et al., *A New American TQM* (Portland, Oregon: Productivity Press) 337-375.

during three successful ISO9000 implementations.

I observed a TQM implementation attempt while working for an organization in 1993. We set the goal to implement TQM. Our organizational setting included hiring a TQM coordinator and creating five cross-functional pilot teams. We conducted training and education for those five pilot teams (but no one else in the organization) on a problem solving method. We then promoted TQM through employee meetings and memos. We did not use any of the other 7 Infrastructures elements and basically only focused on the push elements. We had some fairly good short-term results. The pilot team made excellent progress. One team reduced the quotation process from several weeks to two days. After the teams disbanded, no additional teams were started, and six months later I did not hear anything further about TQM. The effort died.

In 1995, the same company decided to pursue ISO9000 certification and used the same approach for its implementation. We set the goal to implement ISO9000 certification. We set the organizational setting by assigning an ISO9000 coordinator and creating a ten-person audit team. We conducted training and education by handing each auditor a five-page audit sheet and asking them to conduct random audits. We promoted the effort through memos and banners, but did not use the last three pull elements. As you would expect, we got the same results as before. We did complete some documentation and conducted some unstructured audits; but the organization as a whole "ducked and covered," and six months later you no longer heard about ISO9000. Our ISO9000 coordinator left the company.

However, with ISO9000 an outside registrar conducts an audit every six months and reports findings. This is essentially the seventh "Infrastructures" element, "diagnosis and monitoring." Thus, in our organization, the registrar came in and told the senior team the effort was failing and changes had to be made. Based on this, the team put together an implementation plan and hired a new ISO9000 Coordinator. The CEO held an all employee meeting to discuss the plan. He set the goal, as follows:

We are going to get ISO9000 certification to improve the quality and customer service we give our customers and improve our efficiency and profitability [element 1 — goal setting]. We have also assigned a new ISO9000 Coordinator and are asking for fifteen employees to volunteer from all areas of the company to join our internal audit team [element 2 — organizational setting] and we have scheduled two full days of training for that team [element 3 — training and education]. We have adjusted our performance reviews to include how well you support the ISO9000 program as part of what you are measured on [element 6 — incentives and rewards]. Also, our senior team will be conducting monthly meetings to assess how we are performing towards our goal [element 7 — diagnosis and monitoring].

Based on this meeting, I stayed with the internal audit team and took the lead on implementation in my division. Although it was not easy, we did achieve the certification and the company has held the certification for the last five years. We did not have the 7 Infrastructure tool at that time, but I think it would have saved a lot of time and money if we had used it. In particular, we did not do anything with element 5 — sharing of success stories.

Why We Need a Structured Approach to Implementation

In reflection, I thought through why I felt that a tool like the 7 Infrastructures is needed to mobilize a business/quality improvement initiative such as ISO9000. I believe the answers lies in the cost of poor quality model, seen in Figure 2; in and Covey's four quadrant model, illustrated in Figure 3.⁶ In cost of poor quality,¹ you can spend your time and money in one of three areas: failure (costs to handle internal or external problems), detection (costs to detect problems before they occur) and prevention (cost to prevent problems from occurring in the

⁶ Glen Gee et al., *The Quality Manager Primer*, 3rd ed. (West Terre Haute: Quality Council of Indiana, 1998). QCI taken from: Campanella, J. editor, *Principles of Quality Costs*, 2nd ed. (Milwaukee, Wisconsin: ASQ Quality Press, 1990).

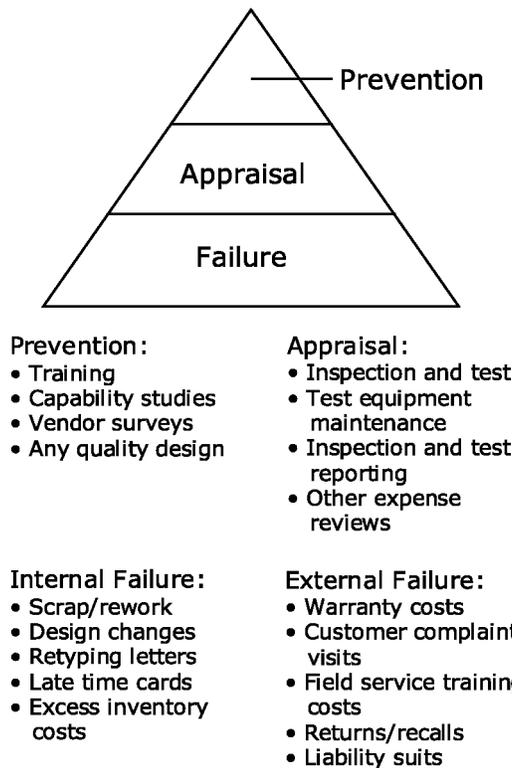


Figure 2. The Cost of Poor Quality Model.

first place).

Many times we spend a great portion of our time handling failures (customer complaints, internal breakdowns) without taking the extra step to put in a detection system to detect this in the future or even better, a preventive system that prevents the problems from ever reoccurring. Per the cost of poor quality model, as you invest in prevention your failure and detection costs will go down and the total cost of poor quality should go down. This is easy to say, but hard to do because of the difficulties making prevention activities a priority in our daily work.

Without making prevention and improvement as a priority, day to day fire fighting will preclude time and meetings set for improvement. A structure or game plan is needed to ensure that improvement is given as much or more priority than the crisis of the day. In theory, as more time is spent on prevention, failures will decrease and detection can be removed; but without a structured approach this will never happen. In many cases, the senior management team rewards the fire fighters in

the organization and doesn't ask them to go the extra step to standardize improvements. Many times we see our white knight (fire fighter) put on their armor and drive away the dragon (crisis of the day) and we reward them for their efforts only to see the dragon appear again and again over the course of several months as the same old routines continue. It is only until we insist the knight kill the dragon (standardize the solution) that we can advance to the next problem.

Covey's four quadrants model⁷ explains this pattern of behavior. Quadrant 1 (crisis/fire fighting) issues that are both important and ur-

⁷ Stephen R. Covey, *The 7 Habits of Highly Effective People* (New York: Simon & Schuster, 1989) 146-170.

	Urgent	Not Urgent
Important	I <ul style="list-style-type: none"> • Crises • Pressing problems • Deadline-driven projects, meetings 	II <ul style="list-style-type: none"> • Preparation • Prevention • Values clarification • Planning • Relationship building • Needed relaxation • Empowerment
Not Important	III <ul style="list-style-type: none"> • Needless interruptions • Unnecessary reports • Unimportant meetings, phone calls, mail • Other people's minor issues 	IV <ul style="list-style-type: none"> • Trivia, busywork • Some phone calls • Time wasters • "Escape" activities • Irrelevant mail • Excessive television • Excessive relaxation

Figure 3. Covey's Four Quadrants Model.

gent will get the bulk of your time, while issues that are important but not urgent (quadrant 2 prevention) will always get pushed to tomorrow. In many organizations, this is a vicious downward spiral. In Covey's model, you must divert time from quadrant 3 (not important but seemingly urgent) and quadrant 4 (not important and not urgent) into quadrant 2 (prevention) to eventually reduce quadrant 1 problems to create a virtuous upward spiral. To do this, you must make quadrant 2 activities a priority. The 7 Infrastructures is a structured tool that ensures sufficient time is spent in quadrant 2.

Many experts will tell you "spend roughly 10% of your time on documentation and 90% on implementation." Using a simple yet structured tool to manage your implementation is an excellent way to ensure you do this. That is why we also recommend "fleshing out" your 7 Infrastructures plan into a 4W1H1C table (What, Who, When, Why, How

What (will be done)	Where (will it be done)	Who (will do it)	When (will it be done)	How (will it be done)	Check (to ensure it's completed)

Figure 4. The "4W1H1C" Table.

and Check to see that it is completed) to focus on the details of implementation. While I have seen plans in Gantt chart format without these details, using the 4W1H1C tool or combining it with your Gantt chart better assigns responsibility and details which can be easily overlooked. For the purpose of this article, we will cover the "what" elements of this table in the examples below but encourage implementers to complete the table for each action item.

Applying the Push Elements of the 7 Infrastructures

While the 7 Infrastructures can be used to implement any change you want to make (including other business and quality improvement standards or initiatives such as Baldrige), I will focus on a specific application to an ISO9000 implementation, including examples of the methods, which can be used in each step.

Push elements

We will begin with the push elements of goal setting, organizational setting, training and education, and promotion with some examples of items that need to be completed and then the critical items listed in the chronological order that they will be executed.

Element 1: Goal Setting

Under goal setting, I think it is critical to tie the reason for implementing ISO9000 to key business goals of quality, customer service and profitability. I believe the failure to do this combined with an unfocused approach is what has led to the current debate regarding whether ISO9000 is a value added business improvement system or an inflexible and unnecessary paperwork fiasco to put a piece of paper on the wall (ISO9000 certification). Certainly, ISO9000 can be either, depending on how you structure the implementation and the goal of the program.

Other goals that need to be set are the sub-goals under quality, customer service and profitability that are needed to ensure these major goals are met. These can be cycle time, inventory turns, customer satisfaction indicators, supplier goals, sales revenue, production goals, quality goals, training goals, etc. Needed ISO9000 implementation sub-goals are: when the different initial documentation will be completed (quality manual and work instructions), and when the critical ISO9000 requirements will be met through the task teams (procedures manual).

Goal setting items:

- Establish a value added business system as the reason for ISO9000 certification (not the certificate itself)
- Clearly tie the ISO9000 program to critical business goals
- Clearly set the organizational performance goals per ISO requirement 4.1, and
- Clearly set the ISO9000 specific implementation goals or milestones for documentation and standardization of key processes.

Element 2: Organizational Setting

Under organizational setting, key resources must be assigned to the implementation. This starts with CEO and senior team commitment to the ISO9000 program. The management representative and ISO9000 coordinator (sometimes the same person) must be assigned. The management steering team that will lead the implementation must be created and the management review team, which will review the audit performance and quality system performance, must be created (sometimes the same team). Task teams must be created to implement the documentation and standardization of critical processes in the organization. The audit team (sometimes only 1 person although I recommend a team) must be created.

A registrar must be chosen who will come in, conduct the third party audits and recommend the company for ISO9000 Certification. Sometimes a consultant is selected to assist the management representative although I personally recommend you build the competency inside your organization through training. Training rooms must be allocated to train these individuals in their roles (see Education and Training) and time must be set aside for training and meetings regarding the implementation. Lastly, there needs to be an implementation timeline with hard milestones and dates that will not be compromised because of the latest crisis of the day. You will need this included in your gameplan (7 Infrastructure plan) to be able to execute this initiative. Remember “If you fail to plan, you plan to fail.”

Organizational setting items:

- CEO and senior team support for the ISO9000 program.
- Establish the management representative and ISO9000 coordinator (may be the same).
- Establish ISO9000 steering team and management review team (may be the same).
- Establish task teams to complete documentation/standardization and specific goals.
- Establish internal audit team and dates of audit program
- Select registrar and dates of audits.
- Select ISO9000 consultant to assist ISO9000 coordinator (optional).
- Select training rooms and times for training and meetings.
- Complete a comprehensive timeline for your 7 Infrastructures plan.

Element 3: Training and Education

As part of training and education, several groups need to receive training. The management representative and ISO9000 coordinator will need training in how to implement ISO9000. In addition, they will need training on the ISO9000 standard itself (I recommend the five-day Lead Auditor Course). The steering team will need an overview of the standard and training on how to meet their specific requirements within the standards. All employees will require training on the goal of the program and what they need to do to implement and maintain the program. Training will be needed on how to write the quality manual (ISO10013) and how to write procedures and work instructions.

Internal auditor training will also be needed for the audit team (recommend two to three days), and I would recommend at least two people in the organization have lead auditor training (five days) so you can be

prepared for the level of audits the registrar will conduct. Individual task teams may require training in their specific areas of the standard, i.e., creating the calibration program (ISO10012) and creating the audit program (ISO10011). A training program may also be needed for many other areas of the standard (corrective action, statistical techniques, continuous improvement, preventive maintenance, supplier management, document and data control, design, and so on).

Training and education items:

- Train management representative and ISO9000 coordinator in how to implement ISO9000 (and possibly the 5-day Lead Auditor Course).
- Train steering team on overview of ISO9000.
- Train all employees on ISO9000 goal and their role.
- Train internal audit team on auditing ISO9000.
- Specific training for different requirements of ISO9000.

Element 4: Promotion

Promotion is rarely covered in ISO implementation courses, but is critical to the implementation. Common methods of promotion of the program I have seen are: hanging a ISO9000 banner with target date for certification in all areas of the organization, posting the quality policy of the organization and posting a barometer type scale with key milestones at different points up the scale that is colored in as they are completed. CEO meetings and department meetings are another way to promote the program. Employee newsletters are another way. You can post the Gantt chart or 7 Infrastructures plan with milestones for everyone to see. I have also used cartoons that talk about ISO9000 as a creative way to promote the program. Other ways are promotional videos or employee quality days or events. Perhaps the most important Promotion item is visible management support. Another ISO9000 saying is "Say what you do and do what you say" or "walk the talk". If a CEO or management person says, "I fully support the ISO9000 program" and then cancels meetings or does not follow the system, the employees will believe what they see over what they hear.

Promotion Items:

- Promote CEO support of the program
- Promote the gameplan for implementation and milestones
- Visible management support for the program, and
- Pull elements of the 7 Infrastructures.

Unfortunately, a lot of implementation efforts stop after the push elements. Without the 7 Infrastructures pull elements the effort will fall down and never regain its feet. Many organizations have difficulties finding ways to share success stories, provide incentives and rewards and do diagnosis and monitoring because they do not have experience in these areas; however, these elements are desperately needed.

Pull Elements

Now we deal with the pull elements of the model: sharing of success stories, incentives and rewards, and diagnosis and monitoring.

Element 5: Sharing of Success Stories

Sharing success stories is a great way to get people to support the implementation. Many organizations post their key metrics and status of corrective actions in a common area. As results improve, this will drive further improvement. As chronic organizational problems get solved, this will build momentum and support. Employee newsletters and possibly website postings are another way to discuss what stage of implementation you are in and how it is working. You can also cite specific success stories in avenues above. If one team has standardized their area and saved the organization \$50,000 through cost savings, other areas may form teams based on the success stories. Sharing success stories can also be an excellent way to benchmark among divisions or even departments in the organization.

Sharing of success stories items:

- Post key metrics and corrective actions improvements.
- Share closure of each milestone to show progress.
- Share specific improvement stories to support teams and benchmarking.

Element 6: Incentives and Rewards

Providing incentives and rewards is another vital element. You need to reward the behaviors that support the ISO9000 program without creating unnecessary competition. Tying employee support of the program to performance reviews and profit sharing is one way to do this. I have also held all-employee celebrations such as a barbecue dinner after receiving the certification, which can boost morale and support for the effort. Similar celebrations can happen after achieving certain milestones. Hats, coffee mugs and other non-monetary rewards can be useful in driving standardization and improvement. Management accountability is also critical, as discussed under the promotion element above. If management does not follow the new program, this will act as a disincentive to the rest of the organization.

Incentives and reward items:

- Align the new behaviors you want by possibly modifying your old reward system.
- Tie organizational performance improvement goals to reviews and profit sharing.
- Use non-monetary rewards as appropriate.
- Ensure management accountability for implementation and following improvements.
- Celebrate the successes of completing the various milestones.

Element 7: Diagnosis and Monitoring

Diagnosis and monitoring is perhaps the most critical area. While the registrar will be conducting a pre-assessment audit (which gets you ready) and the certification audit itself, you must conduct diagnosis and monitoring internally to build a strong enough business system to warrant certification. I recommend organizations conduct a gap analysis fairly early in the program to identify major gaps against the standard. The audit team will also conduct audits; and the results, along

with other key metrics and goals the teams have set, will be reviewed by the management review team. I recommend a monthly meeting to review progress against the key metrics, completion of 7 Infrastructures milestones, and audit results. Your 7 Infrastructures plan will not be foolproof and will need to be modified or augmented over time. Without Diagnosis and Monitoring of the plan, appropriate improvements will not be made.

Diagnosis and monitoring items:

- Gap analysis
- Internal audits
- Pre-assessment audit
- Certification audit
- Monthly review of the quality system audits
- Monthly review of critical business metrics
- Monthly review of the 7 Infrastructures game plan

Life after Certification

Since a successful ISO9000 program is not about getting the certificate, but about gaining the benefits of a formal business improvement program, it is important to evolve your 7 Infrastructures plan after you achieve certification. While many organizations almost lose their certification during their first surveillance audit, even more do not experience the business improvement they expected because they focus too much on the certificate itself. It will be even more important to build on the program after certification to really drive continuous improvement of your business results. A revised 7 Infrastructures plan focused on the appropriate business goals per goal setting can improve your odds of achieving the improved business performance you sought by certification.

For further information on this powerful change tool, please get a copy of the manual, *Mobilizing Change Using the 7 Infrastructures*,⁴ which includes more details of each step of the 7 Infrastructures as well as many tips for each step. It also contains a unique diagnostic tool you can use to assess what areas of your existing implementation could use additional attention. I believe framing your ISO9000 implementation into this model will lead to a much more successful and value adding ISO9000 program.



Mapping Six Sigma Deployment to the CQM System of Tools

by David Hallowell

David Hallowell has worked for over twenty years in various aspects of new product development. As an engineer and R&D group manager at Digital he was responsible for developing and fitting new interface card packaging and interconnect technology to emerging market needs. As a consulting engineer he worked across Digital to advise business and technical teams on the effective use of analytical tools.

He worked with the team at Motorola's Six Sigma Research Institute on the original black belt training curriculum and delivered that training worldwide.

His work with CQM, on the team that developed the first Concept Engineering course and for over six years as a course leader and team advisor has helped put CQM tools into practice in many of the member companies.

Dave is a partner at Six Sigma Advantage, focusing on the application of Six Sigma principles to software development and information technology.

This article, offered in dedication to Tom Lee, aligns with two things that I remember about him. First, he encouraged people to explore and understand practices from a wide variety of sources, integrating the aspects that worked into their own management systems. Tom was well aware of Six Sigma from its earliest days. Second, he was a leader at General Electric, the company that later became an important proving ground for the evolved version of Six Sigma we know today.

1. Introduction

The phrase Six Sigma has enjoyed an interesting history and evolution. Originally coined by Motorola in the late 1980s, the term referred to their TQM stretch goal to reduce defect rates and cycle times in a pager manufacturing business 68% and 50%, respectively, each year for four consecutive years. As that initiative was associated with their winning the Baldrige award, there was considerable interest in the way metrics and improvement tools were used to drive such gains. Because Six Sigma was seen as a TQM implementation strategy, it might very well have faded in press appeal along with the label "TQM" in the 1990's — but something changed all that. General Electric CEO Jack Welch made Six Sigma a highly visible part of his plans to aggressively use quality and efficiency to bring billions to the company's bottom line over several years running. This gave Six Sigma a new beginning and a new identity as a business system. Wall Street quickly became enamored of Six Sigma in a company's agenda, motivating leaders in many kinds of businesses to find out what it was and figure out how to apply it. While the name remained the same, the methodology rapidly evolved, absorbing much of what companies in the 1990s were learning about customer focus, process analysis, and business improvement.

The Center for Quality of Management has long recognized Six Sigma as a deployment approach that could be useful in connection with their broader system of management methods.^{1,2,3} Thus, CQM member companies are in a powerful position to evaluate the current wave of interest. On one hand, they may see Six Sigma as a repackaging of tools and methods that have long been familiar. On the other, they may recognize some value in the way that Six Sigma has adopted business and organizational learning savvy. This article seeks to inform each of those perspectives — highlighting links and leverage points with CQM tools, while challenging the CQM community to consider stretching their toolkits in a few important places.

We will use text briefs and tables to consider and summarize the potential mapping of the toolkits. After an initial framing of Six Sigma in section 2, sections 3 through 5 follow Six Sigma from its origins in reactive improvement to a more complete system, broadening connections to finance and design, and applications to areas like services and software. Touching on such a large topic area in a short article requires

¹ Day 6 of the CQM's Four Revolutions of Management course outlines Six Sigma implementation issues.

² Shoji Shiba, Alan Graham, and David Walden, *A New American TQM: Four Practical Revolutions in Management* (Portland, Oregon: Productivity Press, 1993), 391-410.

³ Early meetings with Motorola's Bob Galvin, George Fischer, and original Six Sigma architect Bill Smith brought insight into the CQM learning system.

an assumption that the reader already knows the meanings behind the labels of the many tools we will reference.⁴

2. Framing Six Sigma

A first step in understanding Six Sigma is to realize that it has many meanings. The phrase can refer to:

- A strategic initiative — stretch goals with targets and means
- A statistical measure — particularly a “sigma level” rating as a performance benchmark
- A common language and reporting system — built on thinking statistically and using facts to drive and track improvements across all aspects of a business.

Combining all the above, Six Sigma motivates the building of scorecards that integrate quality, productivity, financial, and work-environment metrics. “Balanced Scorecards” very much like those conceived at Analog Devices⁵ and popularized by Kaplan and Norton.⁶ are often tailored to build management dashboards that focus Six Sigma project selection and document results.

In their early Six Sigma work, Motorola reported how important (and difficult) it was to shift their focus from performance measures like yields and percent satisfied customers (defective units or transactions) to the more detailed diagnostic measures like defects within units or complaints. That shift to a weakness orientation paid off, driving many reactive improvement projects that returned significant dollars (which were also, importantly, documented). Diffusion of those success stories helped fuel new applications and an ongoing learning about what worked best. Some examples of that learning and evolution include:

- Moving from Motorola’s original “Six Steps to Six Sigma” to the simpler “Define, Measure, Analyze, Improve, Control” (DMAIC) flow popularized in companies like GE and AlliedSignal.
- Simplifying the user’s view of the mathematical underpinnings. Early programs stressed and even belabored Poisson distributions, z tables, etc., and often confused participants about the schemes for counting “opportunities for defects.” Today’s programs present simpler scorecards that guide users without so much theory.
- Developing a framework to broaden the reach to important new areas like:
 - Design for Six Sigma
 - Six Sigma for Services
 - Six Sigma for Software
- Firmer connection of Six Sigma metrics with business results. GE had a lot to do with this — per their phrase “Completely Satisfying Customers’ Needs Profitably” as they rolled out Six Sigma.

⁴ For those readers not already familiar with the CQM set of tools or Six Sigma, I would recommend two books: Shoji Shiba, Alan Graham, and David Walden, *A New American TQM: Four Practical Revolutions in Management* (Portland, Oregon: Productivity Press, 1993) ; and Mikel J. Hary and Richard Schroeder, *The Breakthrough Management Strategy Revolutionizing the World’s Top Corporations* (New York: Doubleday, 1999).

⁵ The idea of what has come to be called the “balanced scorecard” came from Art Schneiderman, then chief quality officer at Analog Devices, Inc. A sketch of the way Analog Devices developed this idea can be found in: Shoji Shiba, Alan Graham, and David Walden, *A New American TQM: Four Practical Revolutions in Management* (Portland, Oregon: Productivity Press, 1993) 596-597.

⁶ Richard Lynch was a colleague of Art Schneiderman’s, and was, like Schneiderman, an early contributor to the CQM. He also helped to spread the use of these ideas in his book: Richard L. Lynch and Kelvin F. Cross, *Measure Up! — Yardsticks for Continuous Improvement* (Cambridge, MA: Basil Blackwell Publishers, 1991), and for The Balanced Scorecard, see: Robert S. Kaplan and David P. Norton, *Translating Strategy into Action* (Cambridge, MA: Harvard Business School Press, 1996).

3. Six Sigma for Process or Product Improvement

The Six Sigma approach for reactive improvement today follows a flow that is often summarized with the terms “Define, Measure, Analyze, Improve, Control (DMAIC).” As Table 1 (on page 86) illustrates, this aligns strongly with CQM methods and tools for Process Discovery, 7-Step Problem Solving, Understanding Variation and Process Control. Anyone familiar with the 7-Steps will see that DMAIC maps to the steps directly. In addition to calling out the obvious similarities, comments in the table highlight Six Sigma distinctions, which generally include the use of statistical methods to supplement simpler “Seven QC Tools” analysis and the connection of project selection and results documentation to business measures.

4. Design for Six Sigma (DFSS)

Six Sigma practitioners quickly realized that the design process offered special leverage. DMAIC project leaders began to talk about a “five sigma wall” that seemed to defy their efforts to drive out defects in an operation. When DMAIC analysis pointed to root causes in the design of a product, service, or software, the improvement focus moved upstream. People began to tailor Six Sigma for the design process and its fuzzy front end. Looking to combine the best practices in Voice of the Customer and Concept Development with the statistical capability-based matching of requirements with design and delivery plans, a number of deployment flows and toolkits evolved.⁷ Table 2 (on page 87) outlines the team activities and tools comprising a “Design for Six Sigma (DFSS) process.

As a number of CQM member companies are major names in the Six Sigma arena, there are some interesting case studies documenting the use of Concept Engineering and FOCUS for Six Sigma Projects. One of those companies is Honeywell. After their merger with AlliedSignal they report that they learned a lot about Six Sigma for manufacturing and operations (DMAIC), but when it came to supporting AlliedSignal’s initiative to drive Six Sigma into Design, CQM and Concept Engineering delivered the tools of choice with onsite advising for several highly visible Green Belt projects.

⁷ Some companies use a flow that abbreviates the terms “Define, Measure, Analyze, Design, and Verify” (DMADV) and others use some variation of the sequence “Identify, Design, Optimize, and Verify” (IDOV). Most implementations share the same basic tools and approaches.

5. Six Sigma Skill Profiles

One strength of Six Sigma has been its ability to drive training. Senior leaders have come to see the link between investment in skills and impacts on the business. In some cases they line up to get their people into 10-15 day boot camp training programs. A common set of terminology around the skill sets is the “belt” levels. Table 3 (on page 88) summarizes the skill sets with notes about how they are often deployed. In ways that are very parallel to the CQM 7 Infrastructures, Six Sigma companies have learned about how to plan for training and to connect it with participants’ real work. Project support, facilitated through the Belts and Champions while diffusion of success stories (stressing financial benefits) and intranet information and analysis resources help sustain and grow awareness and support.

Table 1: Characteristics of Six Sigma Reactive Improvement.

Stage	Team Activities & Accomplishments	Comments
<p>Define</p>	<p>Charter a team Understand:</p> <ul style="list-style-type: none"> • Project purpose, goals and scope • Relevant customers, suppliers, processes, work-products and services • Critical requirements and key process output variables (KPOVs) with their measures and targets <p>Baseline current performance Define the factors (often called key process input variables, or KPIVs) that may be the variation at the root cause of the problem or improvement in the focus of this project.</p>	<p>These activities map directly to CQM Process Discovery and project framing in Step 1 of the 7-Step Project Problem Solving Method.</p> <p>Performance measures may be expressed in terms of process capability ratios (Cp, Cpk) or defect rates (defects per unit or defects per million opportunities).</p> <p>Hypothetical cause-and-effect diagrams and factor analysis: consistent with CQM practice.</p>
<p>Measure</p>	<p>Gather data — paying particular attention to detailed, diagnostic measures.</p>	<p>A core principal in Six Sigma is the shift from performance /rollup measures (like yield, profit, percentage of satisfied customers) to diagnostic measures (like defects, waste, complaints). This tracks exactly with CQM’s weakness focus.</p> <p>Tracks with CQM methods for Understanding Variation.</p>
<p>Analyze</p>	<p>Summarize the data, graphically and /or statistically — while preserving its meaning.</p> <p>Use insight gained in the initial analysis to identify root causes and /or fundamental relationships of key process input variables (KPIVs) to the KPOVs under study.</p> <p>Verify the root causes or mathematical relationships of KPIVs to KPOVs (such relationships are often referred to as <i>transfer functions</i> in Six Sigma terms).</p>	<p>In simple cases, this tracks with Steps 2 and 3 of the 7-Step Problem Solving Method. Charts and graphs, statistical comparisons.</p> <p>In more complex cases, Six Sigma companies use an extended analysis toolkit which would include:</p> <ul style="list-style-type: none"> • Dynamic process modeling • Statistical hypothesis testing • Design of experiments • Regression analysis • Monte-Carlo simulation • Optimization using combinations of the above tools.
<p>Improve</p>	<p>Generate alternative solutions Screen solutions /select the best</p> <p>Pilot the solution</p> <ul style="list-style-type: none"> • Documenting gains • Checking fo side-effects 	<p>Step 4 of the 7-Steps</p> <p>Idea generation and solution evaluation elements in Concept Engineering (CE) and FOCUS could be useful here as well.</p> <p>Like Step 5 of the 7-Steps, with “before” and “after” analysis.</p> <p>Added analysis may include:</p> <ul style="list-style-type: none"> • Cost-benefit analysis • Process capability ratios (Cp, Cpk) and defect rates (defects per unit (DPU) and defects per million opportunities (DPMO)).
<p>Control</p>	<p>Scale and standardize the improvement</p> <p>Instrument the process for ongoing monitoring and learning.</p>	<p>Tracks with SDCA.</p> <p>Control charts (per Understanding Variation).</p> <p>Financial accounting of savings and gains.</p>

Table 2: Design for Six Sigma.

Stage	Team Activities & Accomplishments	Comments
Identify	<p>Clarify project purpose, sponsorship, and the “voice of the company”:</p> <ul style="list-style-type: none"> • Goals, scope, schedule, and resources • Alignment with other initiatives • Stakeholders. <p>Identify the relevant customers and target environment(s).</p> <p>Assemble and capture information on customers and context:</p> <ul style="list-style-type: none"> • Use-scenarios • Stated and latent needs. <p>Identify Critical-to-Quality (CTQ) requirements.</p> <p>Verify and characterize requirements:</p> <ul style="list-style-type: none"> • Rank ordering / importance weighing • Sensitivity and tradeoff-analysis. 	<p>Tracks very much with the Concept Engineering (CE) Stages 1-3.</p> <ul style="list-style-type: none"> • Preference surveys • Conjoint analysis • Desirability modeling.
Design	<p>Generate solution concepts which address:</p> <ul style="list-style-type: none"> • All the key (customer and company) requirements • The “total product” from customer and company view. <p>Evaluate Solution Concepts — strengthening, refining, hybridizing as appropriate.</p> <p>Select a best solution concept for detailing / optimizing in the next step.</p> <p>Do downstream design planning, forecasting:</p> <ul style="list-style-type: none"> • Relationships between detailed design work and the CTQ requirements • Risks related to performance gaps in the emerging design. 	<p>Structured innovation methods — like Concept Engineering (CE) Stage 4.</p> <p>Pugh Concept Selection</p> <p>Quality Function Deployment (QFD)</p> <p>Failure Modes and Effects Analysis (FMEA)</p>
Optimize	<p>Tune the design as it emerges:</p> <ul style="list-style-type: none"> • Determine the mathematical relationships (transfer functions) that describe the ways in which key design input variables influence important design performance measures. • Make tradeoffs and adjustments for best performance — predicting and documenting downstream results. 	<p>Design of Experiments, Monte-Carlo simulation, Desirability Modeling, Multi-response optimization with constraints.</p>
Verify/Control	<p>Verify that the design is ready for release.</p> <p>Instrument the design and downstream implementation for ongoing monitoring, control, and closed-loop learning.</p>	<p>Performance testing</p> <p>Measurement systems analysis</p> <p>Statistical process control — applied to products, services, and software.</p>

Table 3: Green Belts, Black Belts, and Champions.

Six Sigma Skill Level	Tools/Skills	Comments
<p>Green Belt</p> <p>Six Sigma trained people who remain on the job.</p>	<p>Six Sigma process roadmaps (DMAIC and IDOV) and orientation to the basic process analysis and quality improvement tools:</p> <ul style="list-style-type: none"> • Process Diagrams and analysis • Types of data, measurement, and sampling • Practical aspects of descriptive and inferential statistics, probability, confidence intervals, and hypothesis testing applied to process and product data in their work areas. 	<p>Green Belts will typically run a Six Sigma project with returns from \$25,000 up, with help as needed from Black Belts.</p> <p>Teaching Language Processing is light or conspicuously absent in most Six Sigma curricula. CQM language processing tools (LP), so powerful in framing process and data analysis, may represent a distinct advantage to CQM member companies.</p>
<p>Black Belt</p>	<p>All of the above, with more depth and with other tools, including:</p> <p>Design of Experiments (DOE) — through advanced topics like:</p> <ul style="list-style-type: none"> • Response surface designs • Multi-response optimization • Residuals analysis <p>Data and Measurement Systems analysis:</p> <ul style="list-style-type: none"> • Analysis of Variance (ANOVA) • Gage Repeatability and Reliability • Tolerance Analysis • Data Transformation <p>Statistical process control (SPC)</p>	<p>Deployed at a rate of about three per hundred in the organization they support.</p> <p>Black Belts drive projects, and advise on-the-job Green Belts.</p> <p>Many companies require each candidate Black Belt to find a project with \$70,000 to \$150,000 in financial benefits as a prerequisite for their five weeks of training. Documented completion of the project may be required for Black Belt certification.</p>
<p>Champion</p>	<p>Trained as a Black Belt, with additional integration to the business and company leadership:</p> <p>Business planning and project planning tools, per the business.</p> <p>Connected with the senior leadership in order to identify and lead key projects.</p>	<p>Staff members with Black Belt experience.</p> <p>In some organizations, staff promotions depend on demonstration of Black Belt results.</p>

6. Appraising Six Sigma as a CQM Member Company

We have seen that CQM is already positioned in strong alignment with the philosophy and methodology of Six Sigma. There are a number of ways that alignment could be leveraged:

- Use the CQM tools in ways that reflect what has been learned about successful Six Sigma deployment. This could re-energize work with the tried and true tools including those familiar in:
 - Hoshin Planning. Use work on scorecards, which may be ongoing already, to connect quality, productivity, financial, and work-environment metrics with stretch goals in operations and design. With or without the label, these efforts could “Six sigma-tize” the business system. Match those goals with means including a staff serious about applying the right power tools from statistical, qualitative, and people-skills disciplines.
 - Mobilization. Six Sigma learning about diffusion of expertise, through black belts, green belts, and champions, with documented connections to financial gains may hold valuable lessons for more other deployment models.
 - 7-Step Problem Solving Method. Recognizing that 7 Steps maps directly to the Six Sigma DMAIC approach.
 - Understanding Variation. Building on that course’s tools describing measurement, data distributions, and probability-based analysis.
 - Concept Engineering. Concept Engineering has the essence of what mature Six Sigma companies realize they need when their focus moves from reactive process improvement to more fundamental design and development improvement.
- Supplement the CQM toolkit with the higher octane statistical tools (like Design of Experiments, modeling, and optimization) in the places where they provide real benefits. Smart implementation here would avoid the pitfall seen in many Six Sigma implementations of “saturation bombing” whole organizations with statistical tools they may never use. Focusing on the critical few black belts and just enough green belts could provide a powerful boost to a strong CQM foundation already in place.

In summary, we have taken a brief look at some Six Sigma fundamentals in an effort to find connections and distinctions related to the CQM tools and system. The hope is that some issues have been demystified, leaving the reader with a better appreciation of what they may already have. The areas where Six Sigma has proven the benefits of tools and deployment strategies outside the CQM mainstream provide a bit of a challenge. Don’t let “not invented here” get in the way of some healthy exploration of benefits. If you do open yourself up to a more thorough review of Six Sigma methods and implementation stories, your CQM experience should prove quite valuable as you integrate what you learn.



A Holistic Approach to Innovation Management

by Thomas H. Lee and Val Livada

1. The Integrated Management System Concept

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This is Tom Lee's final paper for the *Center for Quality of Management Journal*.

In the integrated management systems (IMS) concept,¹ we propose that there are three basic management functions: planning, operations and managing change (Figure 1). Then, we further propose that we consider a three dimensional space with the three basic management functions as the coordinates. These three basic management functions are operations, planning, and managing change (Figure 2). Thus, every management issue can be treated as a vector in this three-dimensional space. For example, leadership can be such a vector. It can have three components: leadership for planning, leadership for operations and leadership for managing change. Some parts of the three components may be different but some parts may be the same.

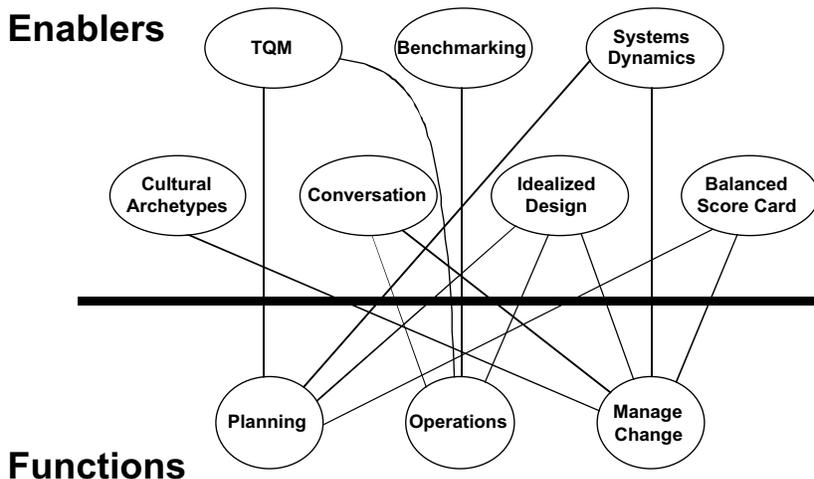


Figure 1. Integrated Management Systems: Enablers and Functions.

For a complete concept, we must also distinguish between management functions and enablers (Figure 1). By enablers we mean individual tools, methods and disciplines. For example, TQM, systems dynamics, benchmarking, interactive planning are enablers.

The challenge to management is to design the system so that the needs of all three components of Figure 2 are met and they are well integrated at all times. To accomplish this objective, the designer must choose the most appropriate enablers in very much the same way as a designer of an automobile choosing the features of all the parts in the car. Furthermore, management must remember that each enabler rep-

¹ Thomas H. Lee, Shoji Shiba and Robert Chapman Wood, *Integrated Management Systems* (New York: John Wiley & Sons, 1999).

resents only one component of the overall framework and should not be treated as the central driving principle.

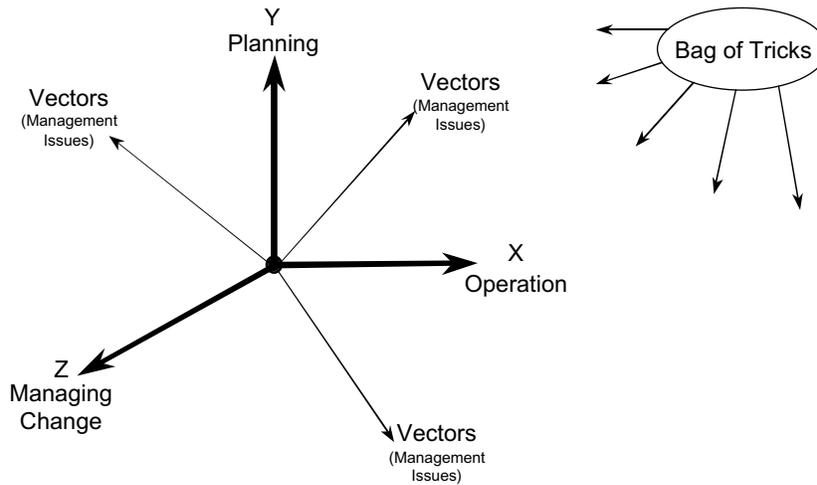


Figure 2. The Three Basic Management Functions.

The need for IMS is particularly acute at the present time. As we are undergoing an industrial transformation of unprecedented proportions driven by technology and globalization, the complexity and intensity of competition have all eliminated any margin of error for management decision-making. These dynamics have also highlighted the need for continuously coordinating the three dimensions with added emphasis on the management of change. To illustrate:

- More than 100 years ago, the Dow Jones Industrial Index was introduced. When Dow Jones wanted to celebrate its 100-year anniversary, they planned to invite the original 30 companies to participate. Much to their surprise, only one of the original 30 companies was still in operation: General Electric Company.
- A recent study by Dutch Shell showed that in the short period of about 15 years one third of the Fortune 500 companies disappeared from the scene. Readers of this report usually argue that not all the companies that disappear actually go out of business. There are mergers, acquisitions etc. But, that is not the real point. The real successful ones do the acquiring and absorbing. The ones that are acquired or swallowed are usually the less successful ones.
- In the 1980s, the United States faced a serious problem of competitiveness against Japan in the field of automobiles, electronics and consumer products. But in the 1990s, Japan had an economic crisis. For the less informed, the crisis in Japan was evidence to them that TQM (Total Quality Management) does not work. Nothing could be further from the truth. TQM is basically a powerful operating system, though it has only a limited planning component. Japan's economic crisis was caused mostly by strategic errors that lie in the planning dimension. In contrast, the US loss of competitiveness in the 1980s was caused mostly by operational ineffectiveness.

From these observations, one can arrive at the following conclusions:

- An organization can fail due to inadequate performance in any of the three dimensions.
- Since an organization is a system of which the overall performance

depends on the interactions among its elements, the three functions must be integrated and not treated separately.

- We have been told many times that doing the right things is more important than doing things right. But, the real demand on managers is that they must do all the right things right.

2. The Multidimensionality of Systems

We have heard very often that one of the weaknesses in the US management community is our faddish culture. Various management methods are often positioned by whoever is doing the writing or speaking as competitive with each other. The press often presents stories that one management theory or another is now obsolete, has not lived up to its billing, or has been replaced by a new theory. Also, in the interests of their own market position, consultants and gurus sometimes describe their own methods in memorable but simplistic terms that downplay or exclude other methods. In reality, most methods only address one of the many dimensions in the system. If we recognize the fact that multidimensionality is a fundamental characteristic of a system, we can go a long way to avoid the pitfalls of these individual methods (or enablers as we called them). Another important point is that for a multidimensional system, there is no single unique way to represent the system, just as we can describe a three dimensional vector in Cartesian coordinates, in cylindrical or in spherical coordinates. The three dimensions we proposed in Figure 2 are thus only one way to describe management systems.

However, now things are even more complicated. While we have chosen planning as one of the dimensions for the management functions, planning by itself is a system. It has its own elements. Consider, for instance, the planning process developed by Ackoff and Gharajedaghi: the idealized design planning process.² Figure 3 shows the idealized design planning system. One can see that there are a number of dimensions: the purpose, the environment, the functions (products and services), the architecture and the processes. Gharajedaghi emphasizes that to plan in a systemic way, one must

² Russell L. Ackoff *Creating The Corporate Future* (New York: John Wiley & Sons, 1981); and Jamshid Gharajedaghi, *Systems Thinking: Managing Chaos and Complexity: A Platform for Designing Business* (Butterworth-Heinemann, 1999).

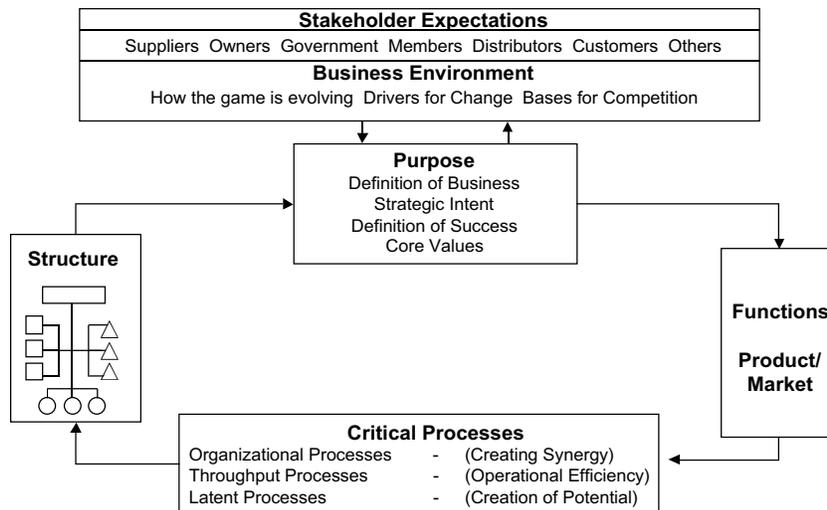


Figure 3. Idealized Design Planning System.

utilize an iterative approach because these elements interact with each other.

In this paper, we will apply the IMS concept to a very important vector: management of innovation. But, before we do that, we first discuss the coordinates we have chosen for the three dimensional space. A theoretical question one might ask is, "Are these coordinates orthogonal?" The answer is that they are not. We have been asked a number of times why we single out managing change as a dimension. Are there changes to be managed in planning and in operations? The answer is, obviously, that yes there are. We single out managing change for two reasons. First, we choose these three dimensions because they are concepts practitioners are accustomed to. We do not feel that orthogonality is necessary because, theoretically we can always transform a space from a set of orthogonal coordinate systems to a set of non-orthogonal systems. Second, there is a very significant human element in managing change that is not often emphasized in planning and operations, at least for businesses that are reasonably stable and do not experience vast or rapid environmental or technological changes. Under these latter conditions, the human element assumes dominant importance.

Another theoretical question that may be asked is, "Is the set complete?" The answer is that we don't know. The concept we are proposing is new. We need to test its validity by experiments just like any scientific hypothesis.

3. The Importance of Design

A key concept in systems science is that a system has two types of properties:

- Type one properties are those properties of a system, which can be deduced from the properties of the elements. The weight of an automobile is such a property.
- Type two properties are those that only the system (the whole) has. None of the elements have it. The ability of an automobile in transporting people is such a property. Type two properties are due the interactions among the elements in the system. To get the type two property we want, we must design the system so that the elements interact properly (see last paragraph of this paper).

Most management issues are type two in nature. They usually have components in all three coordinates — some planning, some operations and some major changes from the ongoing situation. Sometimes they occur in sequence as a function of time; sometimes they overlap in time. Also, these components interact. So, one must design the system for these issues. For this purpose, one needs a model. In the case of leadership for change both the first author's studies¹ and the independent study by Shoji Shiba³ converge to a common model, which Shiba called the engine. It involves three major steps: commitment, mental breakthrough (unlearning and the creation of mental models), and technical breakthrough. For each one of the steps, we were able to identify the potentially useful enablers. (A separate paper will be prepared on this topic.) For the subject at hand, we propose a model as described below.

³. Shoji Shiba and David Walden, *Four Practical Revolutions in Management* (Portland, Oregon: Productivity Press, 2001), Ch. 27.

4. The Model for Innovation Management

We have selected innovation as the core issue for this paper because we firmly believe that the ability of a organization to continuously commercialize successful (i.e., profitable) new products is the most critical management issue facing corporations. It is often misunderstood and undervalued, but is increasingly scrutinized as vital, especially in light of the recent trend in growth industries.

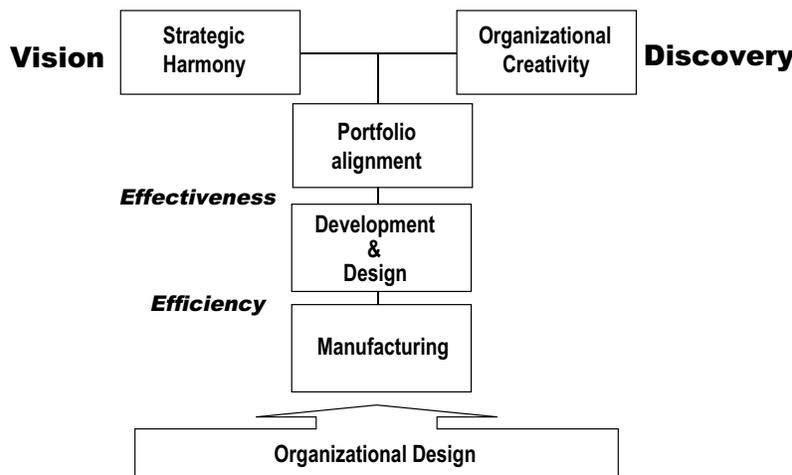


Figure 4. Innovation — A Holistic Perspective.

In Figure 4 we have attempted to illustrate the simplified yet comprehensive structure of the innovation model. We show five blocks in the model. In this paper, we will only discuss the first three blocks (strategic harmony, organizational creativity, and portfolio alignment). The reason is that the first three blocks deal mostly with the planning dimension while the last two deal with implementation. We will save the discussion on the later two for future articles.

4.1 Strategic Harmony: Issues and Enablers

The first block, strategic harmony, is of obvious importance, though often neglected. In many organizations we have worked with, the determination of strategy is usually a task that belongs to the top management. Of course, in situations where mergers, acquisitions, partnership, etc., are involved, only the CEOs and their closest associates can decide what to do. The director of research and development is usually outside the loop. This is unfortunate because innovation within can easily have effects of equal magnitude. The lack of coupling between the traditional strategic planning process and R&D planning is really a weakness of the planning system.

One of us (Tom Lee) was heavily involved with the strategic planning process in the General Electric Company. So, we will discuss some of the strategic harmony issues using what happened in GE as examples.

When Reg Jones was the CEO, for many years he argued against the description of GE as a conglomerate. He pointed out that GE had developed in an evolutionary way after Edison founded the company. Because it needed to be in the electric generation business, it had to produce turbines and generators. To do that, the company had to have competence in fluid flow, high temperature materials, insulating materials, magnetic materials, and several other areas. Further evolution into motors, gas turbines, aircraft engines, engineered materials and so on was a natural consequence of the core competence within the company. Thus, Jones dismissed the idea that GE was a conglomerate on the grounds of core competence. Today, we know the concept of core competence is well accepted by most companies as a key strategic issue. We will come back to discuss the enabler for core competence planning.

Let's look at another strategic harmony issue that is not often appreciated. That is the question of how much of the sales revenue should be invested in R&D. When Tom Lee was in GE, the benchmark was the national average. The USA used to spend about 2.7 percent of GNP on R&D. Therefore, GE was quite happy with its own measure of about 3 percent of its revenue being spent on R&D for most of its businesses. This concept stayed within the company for so long that it actually became a corporate culture. We will illustrate this fact with two examples. The first example was personal with one of the authors. He was in charge of the R&D for a division known then as the Switchgear and Control Division. There were five strategic business units: the High Voltage, Medium Voltage and Low Voltage Switchgear Departments, a General Purpose Control Department, and an Industrial Control Department. All four businesses were getting along quite happily with 3 percent of Sales for R&D, except the High Voltage Switchgear Department. Its products were at the frontier of technologies: high voltage, high current, high temperature plasmas, high speed measurement systems, high pressure and supersonic flow etc. The department needed to spend at least 10 percent of its sales in R&D just to keep up with competition. Tom Lee was in charge of R&D for that division for almost 19 years. He lived through four vice presidents. Every time a new vice president came on board, he had to explain why this department needed that much R&D. Not too many years after he left that post, the only department that did not survive the turbulence in the corporation was the High Voltage Switchgear Department.

In Tom Lee's opinion, this cultural issue was responsible for even a bigger problem in GE. For a number of years, GE gambled on three major new technological businesses: Nuclear Power Generation, Electronics and Computers, and Aircraft Engines. By the late seventies, it was obvious that only one of the three was going to make it as an attractive business. Jones was very concerned. He initiated a Corporate Technology Study to find out why. But, no one ever suggested that the cultural issue of 3 percent R&D was a problem. Looking back today one cannot help but wonder about the impact of that cultural issue. We now know no computer or electronic firm can survive, investing only 3 percent on R&D. In nuclear, GE was trying to win the game by marketing gimmicks — turn key jobs, promised reliability, larger plants based on the concept of economy of scale, etc. Actual money spent on R&D was quite limited. As an example, there was no testing facility for key components like flow-control valves until the late 1970s. Even then, the shift of more money to R&D was a consequence of a very high-level task force study under the leadership of Charles E. Reed. The only successful gamble of the three was aircraft engines. But for that business GE received approximately 500 million dollars per year on R&D from the

United States Air Force. Even with that kind of support, the development of the engine business still needed shielding from the corporate attack by a Vice Chairman, so that the General Manager of the business, Gerhard Newmann, could successfully build the number one position for GE. This was indeed a case of "innovators' dilemma."⁴ Shiba (see again footnote 3), in his breakthrough studies also found a number of cases where the CEOs had to find ways to deal with the "innovator's dilemma" issue.

Having discussed two strategic harmony issues, let us now turn to potentially useful enablers.

4.1.1 Core Competence Planning

In a paper published in 1990, Prahalad and Hamel discussed the importance of core competence.⁵ It was an important contribution in that it went beyond Reg Jones' description of how GE evolved. It pointed out the incompatibility between the SBU (Strategic Business Unit) concept developed by GE and the core competence argument for GE's evolution. The issue was: how do you utilize the core competence concept to strengthen the SBU's positions. The paper of Prahalad and Hamel took the either/or position — SBU or core competence. But we believe that the real challenge was not either/or but how do we incorporate the core competence concept into the SBU structure. Our faddish culture was also apparent in the introduction of the SBU concept. Spearheaded by the Boston Consulting Group and fully accepted by GE, the concept was actually a success story for the beginning of the strategic planning process in industry. GE's earnings went up mostly because it divested a number of weak activities. But, the matrix did not solve all the problems as we have shown in GE's technology gambles.

The position of Prahalad and Hamel was quite understandable. There were many examples that illustrated the apparent incompatibility between the two approaches. Here's another example from GE. For many years, GE was by far the major supplier of transformers. Because the business was big, GE divided the transformer business into three departments: The Power Transformer, Medium Transformer, and Distribution Transformer Departments. The boundary between the Power Transformer Department and the Medium Transformer Department was set at 200,000 kva. Since each department general manager wanted to grow its business, the Power Transformer Department wanted to move that dividing line downward while the Medium Transformer Department wanted to move it upwards. Because of this conflict, engineers in one of the departments were actually told by their general manager not to talk about technical matters to the engineers of the other department. Another example comes from the Carrier Corporation. Carrier had a market-oriented organization: a company in France, a company in North America, etc. When Japanese companies introduced the split air-conditioning system, none of the individual companies had either the resources or the will to develop the new technology for the entire company. This was a major problem for Carrier for some time.

Most successful companies did not follow the either/or approach. They tried to integrate the two concepts. This happened in Eastman Chemicals and Corning. On a broader basis, HP's Medical Products Division applied a similar approach to TQM implementation and Chrysler applied it to the management of corporate finances.

We now describe the enablers for core competence planning. One of us (Livada) has adopted the concept to develop a process for core com-

⁴ Clayton M. Christensen, *The Innovator's Dilemma* (Cambridge, Mass.: Harvard Business School Press, 1997).

⁵ C.K. Prahalad and Gary Hamel, "The Core Competence of the Corporation," *Harvard Business Review* (Cambridge, Mass.: Harvard Business School Press, May-June 1990).

petence and technology planning and applied in a number of companies. Because his process is not published, we show it in Appendix A.

4.1.2 Overcoming Cultural Barriers

The second strategic harmony issue we discussed relates to corporate cultural issues. Overcoming cultural barriers is in many ways a more difficult task. Culture is like a default parameter in a computer. If you don't know enough to tell the system to behave differently, it will do the same thing it always has been doing. But, how do you know what the culture is? There are many enablers that can help us. We will discuss a few in the following. We believe that the key to this problem lies in what Ackoff talks about learning. He argues that there are four steps in the learning process: from data, to knowledge, to understanding, and finally to wisdom.⁶ We believe that understanding is the key to this issue. We will discuss two enablers: understanding the weaknesses of the organization, and understanding of individual weaknesses.

6. Russell L. Ackoff, "On Learning and the Systems That Facilitate It," *Center for Quality of Management Journal* Vol. 5 No. 2 (Fall, 1996) 27-35.

4.1.2.1 Understanding the Weaknesses of The Organization

The first step in the idealized design process is what Ackoff and Gharajedaghi call the mess formulation.² It asks the question: what are the obstacles that prevent the accomplishment of the corporate objectives. They utilize the multidimensional approach as shown in Figure 5. To create this type of understanding, two conditions must be satisfied. First, a team must be formed with members from different parts of the organization who are knowledgeable in the operations of the company. Second, the top management must support this effort by promising that complete honesty and transparency is the key. No messenger must ever be shot. We have seen many cases where this process actually brought cultural issues to the surface. We believe that the mess formulation process can be very useful in the first step of Shiba's engine: unlearning.

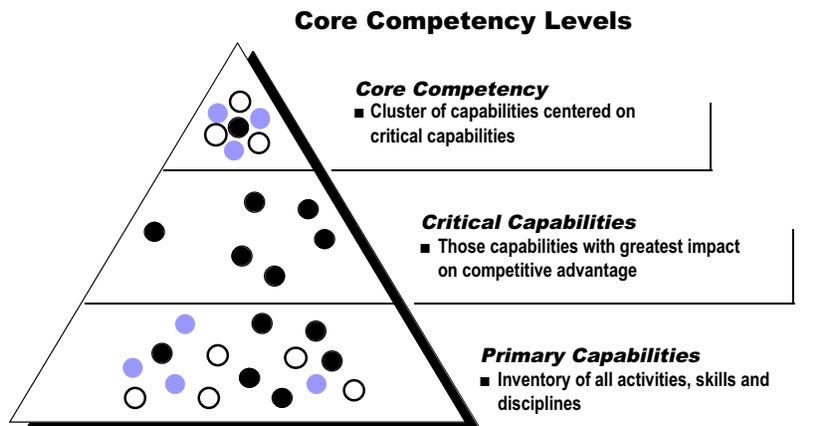


Figure 5. Core Competency Hierarchy.

4.1.2.2 Understanding Individual Weaknesses

The second step in Shiba's engine is creating new mental models. For that we need to understand the weaknesses of individuals. For this we believe the Action Science⁷ developed by Chris Argyris and his associates can be very helpful. They discuss single loop learning versus double loop learning, they discuss espoused theories versus theories in use, and they discuss defensive routines. A book written by Thomas, *What the Machines Cannot Do*,⁸ reports beautifully how defensive routines are at work in major corporations. In addition to Argyris' teaching, we believe that the work of Rapaille⁹ on cultural archetypes can also be useful.

We conclude this discussion by finally pointing out the systemic nature of the problem. We cannot solve all cultural issues by understanding people's defensive routines alone. Sometimes structural changes are needed. Shiba⁴ reported two cases in his study on leadership for breakthroughs: Teradyne and Maeda.⁴ Changing the organizational structure solved that problem.

In a CQM workshop by both Ackoff and Argyris, Ackoff is right in his assessment that the interaction among people is a key factor in any organization; and that Argyris' teaching helps us to improve the interaction between people. Combining the two ideas is thus highly effective.

For the first block in our model, we showed that there is more than one issue, and for each issue we show some enablers. It is impossible to cover all issues and their enablers in this paper. In Appendix B, we list some enablers for all the five blocks.

4.2 Organizational Creativity

Let's now move to the right block on the top, organizational creativity. Some people have referred to this as the fuzzy front end. Let's see why this is so. The output of this block is supposed to be a large number of ideas that should be tested for strategic harmony and then fed into the first vertical block for screening which we have called portfolio alignment. The fuzziness arises in several ways. At the core of it all is the inescapable fact that innovation deals with the new, the unknown, and often the unpredictable. It depends on the ability of individuals and organizations to sense new developments, both internal and external, conceptualize "nodal connections," and translate them into prototypes, estimate / communicate value propositions, and facilitate decision-making. In addition, all the above need to carefully balance the opportunities and needs of the technology drivers with those of the marketplace.

For the former, the ability to track key technologies, promptly identify significant events of existing and emerging technologies and predict directions, pace and likelihood of success requires a very robustly designed crystal ball. In the absence of such a device, companies have honed their skills at enablers such as technology mapping.¹⁰ Although technology road mapping is receiving increasing attention, it is still largely an art instead of science. Perhaps the technological lifecycle phenomena, or logistic dynamics should receive more attention.¹¹

What makes this issue even more complex is the fact that, increasingly, the technologies that need to be monitored are multiplying in numbers and are often being impacted by external dynamics. In short, key technologies that will influence the competitiveness of an organization are developed in "adjacent or distant market segments" and to

⁷ Chris Argyris, Robert Putnam, and Diana McLain Smith, *Action Science* (Jossey-Bass, Inc., 1985).

⁸ Robert J. Thomas, *What Machines Can't Do* (University of California Press, 1994).

⁹ Karen Bemowski, "Quality, American Style," *Quality Progress* (February 1993); another resource: Archetype Studies, Rapaille International, Inc. P.O.Box 459 Crowsnest Road, Tuxedo, New York 10987.

¹⁰ Stephen Gehl, Gail McCarthy, and Alvin Pak, "Industry Roadmaps for Technical Innovation," Presentation at Sigma Xi Forum on Trends in Industrial Innovation (Nov. 21, 1997) Stephen Gehl, EPRI, 3412 Hillview Avenue, Palo Alto, California 94304.

¹¹ Cesare Marchetti, "Society as a Learning System: Discovery, Invention and Innovation Cycles Revisited," Undated Research Report (International Institute For Applied Systems Analysis, Laxenburg, Austria); and Thomas H. Lee and N. Nakicennovic, "Technology Life Cycles and Business Decisions," *International Journal for Technology Management* Vol. 3 No.4 (1988).

aggravate the problem, companies are purposely unloading key in-house research to external sources.

From a market perspective, there is a need to understand the latent needs of customers.¹² By latent needs we mean that even the customers themselves do not know them. However, if someone produces a product that satisfies the latent needs, the customers will love it. A very good example was the use of sound to trigger the shutter of a camera. We all had experience in trying to take a group picture with a camera set on a tripod with the group assembled and waiting for the photographer to rush into the group to take up his position. There were only a few seconds to do that before the shutter went off. If the photographer was an elderly person, he would be huffing and puffing. The picture may not be very good. With the new feature, the photographer can walk back slowly to the group, get himself in position and then say to the group, "please shout." The unexpected result of this method is that when people are shouting, they all look happy, a latent need for all photographers.

But how do you find out the latent needs of customers? One of the enablers developed for this purpose is CQM's Concept Engineering approach.¹³ Co-author Tom Lee described an experience of his as follows:

When Shiba gave the CQM 6-Day TQM course for the first time, he had scheduled the "customers' voice" for the third day. There he talked about the difference between customers' voices and images. I felt that the difference was not completely understood by the class. Shortly after, Gary Burchill decided to do more research on this topic for his PhD thesis. He found that the use of images was a very powerful tool for the search of customers' latent needs. After Gary had developed the Concept Engineering process, IBM invited more than 70 people from MIT to spend a week in IBM on the subject of TQM. One of the presentations was on QFD (Quality Function Deployment), an elaborate system for handling customers' voices. Most of the customers' voices in that presentation related to mainframe computers. Mike Golay, a nuclear engineering professor in MIT whispered to me, "How do you get from these voices to the conclusion that there may be a need for PCs?" I told him during the coffee break that IBM did not do the right thing. They never asked the customers' images. Mike asked, "What do you mean by images?" I said, "Let's illustrate with an example. On one Sunday afternoon, it is snowing and cold outside. But, you have to go to MIT to run a thermohydraulic computation. What is your image? The image might be: you have to put on your hat, coat and gloves to clean off the snow on your car and then go to MIT. After you get to MIT, you might find that someone else is using the computer. So, you have to sit in your office doing other things. What does the first image tell you? It says, 'Wouldn't it be nice if you did not have to leave home on a snowy afternoon?' What does the second image tell you? 'Wouldn't it be nice if you had the computer all for yourself?' These are the latent needs that would lead you to PCs. Customers' voices alone will not do that."

After Gary finished the development of Concept Engineering, we tried to test out his methodology in three CQM companies. I will not repeat that story and the subsequent success here. But, I do want to point out that to make this system work, we had to address a scope (or culture) issue. Traditionally, marketing people have the responsibility of market research. To make this system work, we must have engineering people working with marketing people in their interviews. In more than one place, implementation ran into defensive routines from the marketing

¹² Shoji Shiba, Alan Graham and David Walden, *A New American TQM* (Portland, Oregon: Productivity Press, 1993).

¹³ *Concept Engineering: A Manual* (Cambridge, MA: Center for Quality of Management, revised August, 2000); and Gary Burchill and Christina Hepner Brodie, *Voices into Choices* (Joiner Publications, 1997).

function. This is another example that organization and process design cannot be separated from innovation or strategic management.

Another source for fuzziness is the conversion of tacit knowledge into explicit knowledge as discussed by Nonanka and Takeuchi.¹⁴ Again, Tom Lee reports:

I became aware of the importance of tacit knowledge from my work in negotiating licenses for GE with Japanese manufacturers on steam turbines. After World War II, GE was the unquestioned leader in steam turbine technology. Japanese companies like Toshiba and Hitachi were GE's licensees. As part of the negotiation team for GE, I was surprised by what the Japanese companies were willing to pay for the license. They were willing to buy a complete turbine generator set so that they could come to GE's factory in Schenectady to find out how every single step was managed. Then I discovered that some of the steps can never be learned on paper or on drawings. Balancing of the wheels is one of them. There was an old master in the Schenectady shop that does that for all machines.

In some ways the importance of tacit knowledge was somewhat de-emphasized by the advances in computer technology, particularly the field of AI (artificial intelligence). For some time, people thought eventually computers could be as intelligent as people. Debate on this possibility has been going on for some time. In their book on *Mind Over Machines*,¹⁵ the Dreyfus brothers convincingly argued against this possibility. They used the word expertise instead of tacit knowledge. But we believe we are talking about the same thing.

A number of changes must take place. We must involve the owners of tacit knowledge in the process of concept engineering. Even the design of the office structure and how to select people for different types of innovation can contribute significantly to the conversion. We list here the work of Tom Allen¹⁶ and Gerry Gordon¹⁷ as useful enablers.

4.3 Portfolio Alignment

Combining the first two horizontal blocks takes us to the block of portfolio alignment. An early paper¹⁸ by one of us and applied by the other author pointed out that a number of orthogonal questions should be asked, some on the individual projects and others involve the entire portfolio which must be tested in terms of strategic harmony and robustness against environmental surprises. This of course is one way of planning for contingencies.

Let's go to the input for this block. From the strategic harmony block and the fuzzy front-end block we have a number of ideas that should be considered. These ideas may come from many different parts of the organization. When we put them all together how do we know that this is the sensible combination. In the paper¹⁸ we proposed that five orthogonal questions should be asked. Three of the orthogonal questions deal with the merit of the individual projects: are the projects worth doing, are the projects well planned, and should the projects be funded with own resources? The fourth question deals with strategic harmony and the fifth question tests the robustness of the portfolio as a whole against environmental surprises. We will discuss in some detail the fifth question: robustness. We single this one out not because it is more important than the others but because it is often not done. For the other four questions, readers are recommended to go back to the original paper.

Any plan, whether strategic or operational, is based on a set of assumptions. When some of the assumptions are no longer valid the plan

¹⁴ Ikujiro Nonanka and Hirotaka Takauchi, *The Knowledge Creating Company* (Oxford University Press, 1995).

¹⁵ Hubert L. Dreyfus and Stuart E. Dreyfus, *Mind Over Machines* (New York: The Free Press, 1986).

¹⁶ Tom Allen and Ralph Katz, *Managing Professional In Innovative Organizations* (New York: Harper Business, 1988).

¹⁷ Gerald Gordon, John B. Bush and Polly Rizova, "Management of Technical Innovation," (Proceedings of the Portland International Conference on Management of Engineering and Technology, 1997).

¹⁸ Thomas H. Lee, J.C. Fisher and T.S. Yau, "Getting things Done: Is your R&D On Track?" *Harvard Business Review* (January/February 1986).

must be reexamined. Unfortunately, for most plans, what happens in real life is often not part of the assumptions. This should not be surprising because most plans are extrapolations of the past. Surprises are usually not part of the extrapolation even though environmental surprises are more the rule than the exception. Tom Lee notes that when he was in charge of planning in GE, he always had an assumption in the contingency plan: suppose there was a revolution in Saudi Arabia, what would GE do. His assumption was wrong. There was no revolution in Saudi Arabia, but there was one in Iran. The response needed was almost the same.

Let us tell a little story about the system described in the referenced paper.

At the end of the project, we invited about 15 senior managers in the utility industry to spend two days on the subject of robustness. We asked each one of them to list what they think are the surprises that may happen and give their subjective guesses of the probabilities that these surprises may happen in the next 15 years. The results were like this: 15 surprises may happen and when we add up the probabilities the indication was that three of the fifteen might happen in the next 15 years. These were mostly unthinkable types of contingencies like third world war, another nuclear accident like Chernobyl etc. But, 15 years later, three of them did happen. One of the suggested surprises was that natural gas might become the dominant energy supply in the world. Remember this was after the OPEC crisis: President Carter turned down the thermostat in the White House and put on sweaters. We were running out of gas. A law was passed to forbid the use of natural gas in boilers. And EPRI had no research project for that contingency! As a consequence of this exercise, EPRI did initiate some combined cycle projects to protect against this contingency. Today all generation additions in the US are natural gas fired combined cycle systems.

Contingency planning has been further modified into scenario planning by Dutch Shell.¹⁹ Gharajedaghi has proposed that the assumptions of a plan should be stored in a read only memory. The important point here is that there are limitations in any kind of planning, including technology planning. Contingency planning must be part of the innovation management system.

The output of this block is a set of projects for development and design. The number of enablers is very great for the remaining part of the model. It is impossible for us to compose a near comprehensive list. But, in looking at Appendix B, we hope that the following conclusions are rather obvious.

5. Conclusions: What Do We Need?

Many problems exist in organizations that can prevent innovative efforts to be successful. While some of them involve architecture and processes, many relate to the basic question of interaction among people.

There are enablers for most of the individual issues. In that sense, we are fortunate in that research has been done in spite of the faddish culture that was created as a by-product. On a positive note, the research done by the gurus and academics is really a treasure, on which we have yet to learn how to capitalize. This is the purpose of the IMS concept.

Recently, Russ Ackoff wrote a short memorandum for CQM entitled "Reflections on CQM and its Role in Management"²⁰ in which he discussed what managers should do in relation to the offer of help from

¹⁹ Peter Schwartz, *The Art Of The Longview* (Currency Doubleday, 1991).

²⁰ Private communication with Russell L. Ackoff.

consultants and consulting organizations (he referred to these offers as input related offers). We quote:

Those who can use such professionals effectively must know the types of problems to which the expertise of the consultants can be applied. This requires more than superficial knowledge and understanding of the expertise, the absence of which is more common among managers than medical doctors.²¹ Knowledge involves awareness of what an expert can do; understanding involves awareness of where and when that expertise is relevant. The misuse of experts derives more from a lack of understanding than a lack of knowledge.

²¹ Russ used the medical profession in his paper to illustrate his points.

Then he pointed out that great danger lies in the distortion by many experts of the problem to make a particular expertise appear to be applicable. Many of the enablers that we call them belong to the input oriented class that Russ talks about. The challenge to organizations is therefore clear: We must have an organization that can develop not only the knowledge of these enablers, but an understanding of where they are relevant.

The concept of Integrated Management Systems emphasizes the importance of design. One cannot design without having the understanding of the elements. We end this paper by quoting from page 214 of *Integrated Management Systems*:¹

In lecturing on the importance of interactions among the elements of a system, Ackoff sometimes uses the following example. If you decided you wanted to create the best automobile in the world, you might begin by finding out which manufacturer makes the best engine and acquire one of those. Then you might research fuel pump, carburetors, chassis, electrical systems, brakes, and so on until you have purchased the best of each. The problem is you could never assemble all these elements to make a car. They just wouldn't fit.

David Walden of CQM pointed out the problems with this example. This is not the way real life works, he noted. Automobile designers study all the best made parts, decide what features they want, and then design their own elements to make sure they fit into a coherent whole. Therefore managers must be designers. They must understand all the enablers and know when and where they are useful for their design. This is not a job that can be left to gurus because most of them never managed anything. This is the challenge for the organization. We need learning organizations for this purpose.

Appendix A. Competencies based technology planning

The planning of technology, or the development of a technology vision, has often been misunderstood and largely ignored in many organizational settings. In some cases, what passes for technology planning is no more than a last minute, at the end of the strategic planning process, alignment of technical resources to newly established business goals. The latter having been developed without significant input or participation from the technical community.

The reasons for this situation are varied and substantial. To begin with, there is the traditional technology-business chasm that undermines effective interactions between the functions. In addition that, there is also the inherent difficulty of defining technology. Definitions have included skills, people, projects, labs, disciplines, products, markets, etc.

Beginning in the early to mid-eighties and continuing for more than a decade, American industry faced with the challenge of improving operational efficiency-focused its attention on its market delivery capabilities. This spawned a flurry of strategic activities that included TQM, time to market, re-engineering, etc. In the technology arena the key developments were the decentralization of corporate R&D activities, the focus on short-term objectives, and the equating of technology planning to development portfolio allocations.

The result was a dramatic improvement in rapid product development and a significant improvement in new product quality. This was achieved by establishing direct reporting relationships between the business and the development (big D) functions, by focusing technical and business resources on the needs of the direct customer, by efficient resource allocation processes, and by adoption of streamlined new product development processes.

At the same time however, it also provided a series of by-products that are now getting the attention of top management. Decentralization, usually without coordination of the segments, has resulted in the loss of leveraging of common capabilities and critical mass. The focus on speed and short term horizons has significantly diverted resources from the longer term/higher risk/higher impact objectives. Finally, the complete focus on market/customer driven strategies has minimized the impact of technology driven visions/opportunities. In short, while many companies have performed admirably in the short term, there are significant questions as to their ability to maintain that momentum for the long term.

Complicating matters, most companies have instituted aggressive growth strategies that require magnitude improvements in their ability to internally innovate and will demand entry into new markets/areas.

To succeed, companies must hone their skills at developing and implementing planning processes that:

- link market and technology visions
- create a common language
- build company-wide consensus on critical activities
- generate robust action plans

The core competencies planning approach can help facilitate this process. Based on its definition, proposed by Prahalad and Hammel, it focuses on identifying the most critical capabilities of the organization, those that provide (or should provide) competitive advantage as valued by the

customer base. While this seems straight-forward, it often is more difficult than it appears, especially in a corporate setting.

Our approach is to carefully develop organizational consensus by combining rigorous content analysis with good process management. A simple depiction of the components of core competencies was offered in Figure 5. From a practical perspective, the quest for developing a competencies based strategy can be undertaken either:

- Bottom-up. Starting with the development of the inventory of capabilities and working with task teams at the lab/division levels to migrate toward the ultimate target: core competencies.
- Top-down. Working with a top team to selectively propose and then analyze candidate competencies.

In this appendix we deal with the former, because it is often more robust and generates better and broader consensus. The approach consists of the following steps:

- Develop a comprehensive inventory of all technology capabilities, across divisional boundaries, allowing for a mixture of definitions, i.e. disciplines, technologies.
- Rigorously select the few capabilities that have the greatest impact on successful competition. These often represent no more than 10% of the total inventory (second tier of the pyramid).
- Carefully evaluate the connectivity between these critical capabilities, the product portfolio and the market segmentation (see Figure 6). The intent here is to identify the strategic nodes, be it fundamental capabilities that support broad product families or key market segments.
- Assess the company's present level of expertise in these critical capabilities, (Figure 7) from the perspective of competitive positioning as well as maturity of the technology.
- Begin to aggregate capabilities (usually around a leading critical capability) into core competencies and assess the viability of each component as well as the entire grouping.
- Based on all of the above steps, begin to evolve a technology based vision/strategy that incorporates the Strengths Weaknesses Opportunities and T: threats and proposes a set of action plans to address them.
- Finally, fully integrate this strategy with the market based SWOT analysis that usually occurs in traditional strategic planning (Figure 8, market dynamics).

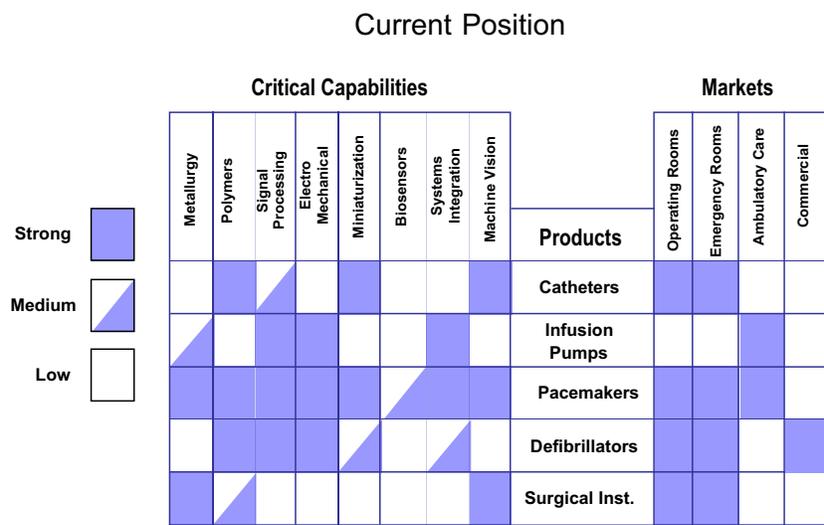


Figure 6. Technology Planning Framework.

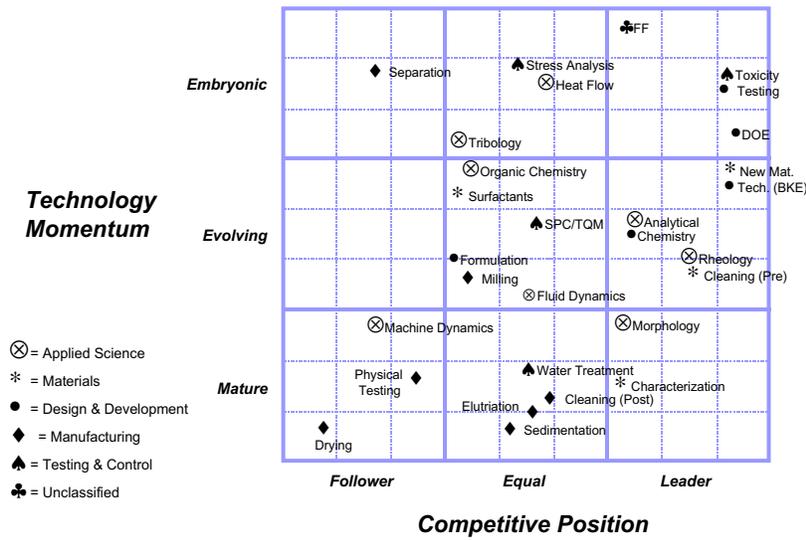


Figure 7. Technology Profile.

Customer Requirements	Index	Critical Capabilities					Competitive Positioning		
		CNC	Electro Forming	Metrology	Conv. CNC	Appl. Eng.	Design Eng.	Low	High
Pressability	50%			■		■	■	●	▲
Dimensional Accuracy	20%	■		■			■	■	▲
Technical Support	15%					■	■	■	▲
Lead Time/ Responsiveness	7%		■		■		■	■	●
Surface Finish	5%					■	■	■	▲
Long Life	2%					■	■	■	●
Roughness (Bond)	1%						■	■	●
Price							■	■	▲

Figure 8. Market Dynamics

Appendix B. Partial List of Potentially Useful Enablers

There is no way that we can produce a comprehensive list for all the enablers. The following list is for one purpose only — to confirm the final conclusion of this paper — that we need learning organizations and we need designers from the learning process.

Strategic Harmony

- Core Competence Planning
- Idealized Design
- Action Design
- Cultural Archetypes
- Contingency and Scenario Planning
- Value Mapping
- Portfolio Alignment
- Balanced Score Card
- Technology Road Mapping and Planning
- System Dynamics

Organizational Creativity

- Concept Engineering
- Tacit Knowledge Conversion
- Tom Allen's work
- Gerry Gordon's work
- Invention and Innovation Waves
- Logistics of Technology Substitution
- GE Aircraft Engine System
- Organization Design

Portfolio Alignment

- Risk analysis
- Portfolio assessment
- Options Theory
- Contingency Planning

Development and Design

- Triz
- Design Structure Matrix
- Design for Assembly
- Design for Manufacturing
- Value Engineering
- Project Management Organizations and Processes
- Phase Reviews
- Rapid Prototyping
- Project team structure
- Robust Design
- NEC's TQM for Technical Work System

Manufacturing

- Theory of Constraints
- Design of Experiments
- Modeling and Simulation
- Team Management
- Quality Assurance
- Logistics



Following Tom: My Journey of Enlightenment

by Shoji Shiba
with Lois Slavin

Tokyo: 1985

Shoji Shiba is currently a Visiting Professor at MIT, where he teaches graduate courses at the Sloan School of Management and in the Leaders for Manufacturing Program. Until 2000, he also was Professor of Business Administration and Dean of the School of Applied International Studies of Tokiwa University in Japan. Shoji Shiba also is Professor Emeritus of Tsukuba University in Japan, and also was an Adjunct Professor during an earlier stay at MIT.

In 1989 Dr. Shiba helped establish the Center for Quality of Management.

I first met Tom on a hot summer day in 1985 in front of a very beautiful Japanese garden in the lobby of Japan's Hotel Ohkura. At the time, the Japanese economy was very strong and TQM was a major driving factor in its development. Tom kindly invited me to come to the International Institute for Applied Systems Analysis (IIASA) as a TQM expert.

From the first time we spoke, I immediately understood that I could communicate very deeply with Tom. We were on the same wavelength! This kind of emotional encounter is very rare. I have had perhaps three or four in my entire life and one of them was with Tom.

Tom was able to embrace all of who I am. His leadership style supported and nurtured me, helped me grow, and gave me the freedom to evolve. Tom had the infinite capacity to embrace any human being exactly as he or she is and to help them evolve.

My heart anticipated that something in me would change from knowing Tom. The 16 years of our friendship have been the most fruitful and enriching of my life.

Vienna: 1986

In 1986, I became a senior researcher at IIASA in Vienna after taking a leave from Tsukuba University. Tom, as IIASA's Director, had a grand apartment in the center of Vienna with beautiful antique furniture. Tom's lovely wife, Kin Ping, invited the wives of the East and West IIASA employees to visit. When my wife, Mieko, came home, she talked with me for a long time about how impressed she was with the size and grandeur of Tom and Kin Ping's home. Sixteen years later she still talks about it!

I believe Tom studied red wine in Vienna and he learned it very well. That was another thing we had in common! Mieko and I believed that Kin Ping and Tom had a beautiful family life.

In contrast, Tom's work as director of IIASA was very difficult because this was the time of the Cold War. The East and West — the communists and what they called disparagingly the "capitalists" — were hostile. Former President Lyndon Johnson had established IIASA to help mediate these relationships through joint research in planning for the development of science and technology.

Tension between the East and West was very high at this time. For example, if I wanted to cross the Iron Curtain, border guards searched my car completely from top to bottom, even though I was an international officer. They took out the seats and even used a mirror to search underneath my car. When I visited factories in the Soviet Union or walked around the city, I was followed and photographed.

I'm sure Tom had great difficulty managing IIASA, because it consisted of so many different countries, each looking out for its own interests. Many were not eager to negotiate. However, as far as I know, there were no severe conflicts in IIASA's daily operations. Tom understood the needs of each country. IIASA's atmosphere was peaceful and enjoyable, with good communication between East and West. This showed Tom's great managerial abilities, as well as his great personality. His wisdom and inclusiveness enabled him to honor all of the different kinds of people at IIASA and to bring harmony to both sides.

Budapest: 1987

In 1987, Hungary's Minister of Industry, Mr. Kapoli, asked me to introduce TQM to Hungarian industry. Tom was a strong supporter of this enormous project and he consequently freed me up from the routine work at IIASA so I could go to Hungary. I spent seven weeks in Budapest. During the following two years, I went to Budapest almost every week.

Tom believed in me and let me do what I wanted on this project. He never deterred me, pushed his ideas on me, or criticized what I did. He just believed in me. When Hungary established the IIASA-Shiba award, Tom was very supportive.

Hungarian industry operated under a planned economy. In contrast, TQM had developed in a completely different economy — a market economy. Hungary's Minister of Industry had great courage and took significant risks in inviting me to introduce "capitalist" concepts to a communist country. Tom also had great courage in taking the responsibility to let me work there. However, Tom never spoke of this kind of risk-taking. He just quietly assumed the responsibility for me.

Cambridge, Martha's Vineyard, and Tokyo: 1989

In January 1989, I was in Japan and received an international call from Tom asking if I could come to MIT to make a presentation on TQM concepts. This was around the time that the book *Made in America* from MIT was published and Japan was more competitive than the U.S.

I came to MIT that spring and presented one TQM session in Tom's class and another to a wider audience in an auditorium in MIT Building 4 or 6. Before the presentation, he kindly invited me to his summer home on Martha's Vineyard. In the evening, we enjoyed whiskey and lobster with Kin Ping. We discussed how to rectify the weaknesses within U.S. industry and how to reinvent U.S. competitiveness.

I suggested "mutual learning" and told Tom that sharing best practices within industry and within countries is one of the keys to Japan's success. Tom came to Japan that summer and visited JUSE (a center for exchange of best practices within Japan). He toured Japanese factories, and I believe he met his good friend from GE, Mr. S. Saba, former CEO of Toshiba. This tour helped Tom experience the importance of mutual

learning. Before visiting Japan, he understood mutual learning logically, but the visit confirmed its power. Tom then committed himself to transforming U.S. industry by using mutual learning to introduce new management concepts and tools to American executives.

When I look back on the years when I introduced TQM to Hungary I see that although he supported me strongly, Tom was outside of the fishbowl. In the U.S., however, Tom actually jumped into the fishbowl and encouraged many other CEOs to jump in also. And he succeeded!

Boston: 2001

I recall Tom's love for his wife, Kin Ping, and their family. I recall the image of Tom crossing Boylston Street with Kin Ping, hand-in-hand. My Mieko said, "Let's follow Tom and Kin Ping, hand-in-hand."

Last summer, Tom, Ray, and I had dinner at Legal Seafood, with red wine. Tom spoke joyfully about his three sons, the second generation, doing a very good job. He was unmistakably very, very happy.

On January 24, 2001, just before Tom passed away, Kin Ping, Tom and I had dinner together at a restaurant. I asked him to try a new drink, chopped cucumber and spirits over ice. He liked it very much and told me, "I delegate the job of driving to Kin Ping, so I can drink this." Maybe he preferred red wine, instead of such a curious drink. I regret not offering him red wine.

I pray that his eternal rest is peaceful.



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