VISIONARY LEADERS FOR MANUFACTURING

A Learning Community History

DAVID WALDEN

VLFM JICA Learning Series

Confederation of Indian Industry

VLFM JICA Learning Series

VLFM Programme is a path breaking programme aimed at creating a critical mass of Visionary Leaders for India's manufacturing sector. The programme forms a part of the Joint Co operation Agreement signed by the Prime Minister of India and the Prime Minister of Japan in December 2006. Guided by Prof. Shoji Shiba, it is the first time in India that the government, the industry and the academia have come together to work towards the transformation of India's manufacturing culture. The partners in the programme include:

Government of India
National Manufacturing
Competitiveness Council

National Manufacturing Competitiveness Council, Govt of India:
The National Manufacturing Competitiveness Council (NMCC) has been set up by the Government to provide a continuing forum for policy dialogue to energise and sustain the growth of manufacturing industries in India.

CII
Confederation of Indian Industry

Confederation of Indian Industry:
CII is a non-government, not-for-profit, industry led and industry managed organisation, playing a proactive role in India's development process.

Indian Institute of Management, Calcutta:
IIMC is an institution with global reputation, imparting high quality management education

Indian Institute of Technology, Kanpur:
IIT Kanpur is a premier engineering institute of India.

Indian Institute of Technology, Madras:
Indian Institute of Technology Madras, is one among the foremost institutes of national importance in higher technological education, basic and applied research.

JICA

Japan International Co operation Agency (JICA)
The Programme is being delivered under Technical Collaboration with Japan International Co operation Agency (JICA).

There are four different programmes under the VLFM umbrella. These are as follows:

1. Programme for Visionary Corporate Leaders in Manufacturing being spearheaded by CII
2. Programme for Visionary Managers in Manufacturing being spearheaded by IIM and IITs
3. Programme for Visionary Entrepreneurs from Small and Medium Enterprises being spearheaded by IIM with support from CII
4. Programme for Visionary CEOs in Manufacturing being spearheaded by NMCC with support from CII

While the Programme for Visionary Corporate Leaders and Visionary Managers are currently being delivered, the other two programmes are in planning stage and will soon be launched.

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The VLFM Community is grateful to the Japan International Cooperation Agency (JICA) for the support in printing this VLFM JICA Learning Series Publication.

For a list of corrections, see `www.walden-family.com/vlfm`
Send corrections to `dave@walden-family.com`

Dedicated to Indian Industry
and the
Many people who have facilitated my observation of it

Contents

Preface

This monograph begins (Chapter 1) with a description of the Confederation of Indian Industry's VLFM program — a highly innovative Indian learning community. Next come some early results from the program (Chapter 2).

However, VFLM didn't just happen overnight. It is a next step in a succession of learning community activities in India (Chapter 3) and in Japan and the United States (Chapter 4).

A final chapter (Chapter 5) makes some observations that correlate the prior learning communities with various aspects of the VLFM program.

I believe the example of VLFM is important for India and the world. VLFM is an innovation learning system that advances at least three important concepts to improve capabilities for achieving tangible results:

- Learning as a collaborative process of sharing among individuals and companies rather than receiving a set curriculum from traditional teachers. This is particularly important given the uncertainty of the current economic downturn.
- Explicitly developing future leaders who can integrate from shop floor details to top level strategy (and across disciplines) rather than the traditional focus on improving professionalism within a discipline.
- Focusing on process as the way to achieve results rather than only measuring progress toward results with metrics.

Reading about VLFM and the other learning communities in this monograph should provide insight in three areas:

- How to initiate a national diffusion program (including the value of participation from industry, academia, and government).
- The importance of a learning community utilizing its historical and cultural heritage and current circumstances to initiate and mobilize change.
- Success factors for creating and sustaining a learning community.

There are some limitations to what is described in this monograph:

- The VLFM program upon which I focus, and which has great promise and initial results, is still developing.
- Things have primarily been seen from the point of view of the planners/initiators of the learning system/community rather than by its customers; in fact, participants are viewed as one of the elements of the learning system.

- I perceive it as a strength that this monograph primarily sticks to giving the concrete facts about a limited numbers of learning communities (which I know or have studied in depth), but some readers may see it as limitation that the book is not more comprehensive and does not provide a more general theory.

My understanding of the topics in this monograph comes from being directly involved since 1990 in two U.S. learning communities and study of two learning communities in Japan; working together with Shoji Shiba for many years and co-authoring his *Breakthrough Management* book[1] (in addition to two of his earlier books); discussing the CII 2004–2006 learning communities and VLFM with Shoji Shiba on many occasions since 2004; spending a week in 2007 at a small workshop on learning communities organized by Shoji Shiba and including representatives of CII and two companies participating in VLFM; talking with Sarita Nagpal for many hours over several days at a pair of quality conferences in Houston, TX, in 2008; and finally visiting the VLFM Centre at the CII Godrej Centre of Excellence in Mumbai and member companies in the region in late 2008.

Acknowledgments

Deputy Directory General of CII, Sarita Nagpal provided support in many ways for my work in writing this book. I also thank her for allowing me to quote and use figures from CII documents.

I interviewed a number of people in connection with writing the parts of this book relating to India. I note each of them at the appropriate places in the book's text. I am enormously grateful for time they spent, the help they gave, and the insights into culture and business practice they provided.

Saideep Rathnam, G. Sunderraman, and Kiran Deshmukh arranged for the interviews or the written content that resulted in the cases studies of results from the Anand, Godrej, and Sona groups.

I appreciate the hospitality shown to me by S.D. Puranik and his staff at the CII Naoroji Godrej Centre of Excellence during my September 2008 visit to India. I also visited several CII member companies. I particularly appreciated lunch as the guest of Sunil Kaul of Behr India and Prakash Kulkarni of Gabriel India, the comforts of the Anand guest house in Pune, lunch as the guest of Akhil Agarwal of Perfect Circle in Nashik, lunch as the guest of G. Sunnderraman at the Pirojshanagar campus (Vikhroli, Mumbai) of Godrej, and the comforts of the Godrej guest house on the Pirojshanagar campus.

Kiran Deshmukh reviewed several chapters and corrected me on several points.

Kalpana Narain has spent much time obtaining documents, checking facts, and reviewing my writing. She also facilitated my activities during my visit to India. Her help and contributions to this book have been invaluable.

I began my journey of involvement with learning organizations when I was introduced to Shoji Shiba and the MIT LFM program (and the resulting Center for Quality of Management) by the late, venerated Tom Lee.[2] I will never forget Tom's friendship and effect on my life.

I now have been working closely with Shoji Shiba for 19 years. His impact on this book (and many of the described activities) is pervasive. Shoji Shiba's impact on my life continues unceasingly.

As indicated in the dedication and in these acknowledgments, many people helped me as I tried to grasp the outline and some details of the quality journey of the Confederation of Indian Industry and its member companies. (I have tried to cite all sources in the References section or the main text of the book.) Nonetheless, as an outsider, this book perhaps has misinterpretations, omissions, overstatements, or simply errors. I alone am responsible for any such inaccuracies, and I apologize for them. I regret if I have slighted anyone. If you see something wrong (whether seriously wrong or just a typographical error), please let me know: `dave@walden-family.com`

David Walden
November 2008

Part I

A story from India

This part of the book first describes, in Chapters 1 and 2, the Visionary Leaders for Manufacturing (VLFM) program of the Confederation of Indian Industry (CII). Then, in Chapter 3, it describes predecessor CII activities that in some ways fed into the VLFM program. Thus, taken together, the chapters in this part of the book describe an important thread in CII's journey from the time it became involved with modern quality methods, through its cluster and more recent communities of learning activities, to the VLFM program. The visionary leaders who created these activities are also mentioned.

Some Indian terms.

crore, 10 million = 100 *lakh* = 10^7 = 1,00,00,000 in the Indian number system

Gurukul, the domain of a guru and his extended family of students

lakh, one hundred thousand = 10^5 = 1,00,000 in the Indian numbering system

Rangoli, a form of sand painting popular in India

Rs., Indian Rupee; 1 Rs. = about US $45 at the time of this writing in September–November 2008

Spelling and punctuation. I have used American English punctuation and mostly used American English spelling in this monograph. The few spelling exceptions are quotes from written material from India. I know the rules of American English and don't know the rules of English as used in India.

Geography. For non-Indian readers, Mumbai and Bombay are the current and prior names for the same place. The same goes for Kolkata and Calcutta and for Chennai and Madras.

Special Acknowledgment. Ms. Kalpana Narain provided me access to the raw content for Chapter 1 and raw content and draft text for Section 3.3.

Chapter 1

India's VLFM program

1.1 Introduction to the program

According to its website,[3] the Confederation of Indian Industry (CII) "is a non-government, not-for-profit, industry led and industry managed organisation, playing a proactive role in India's development process. Founded over 113 years ago, it is India's premier business association, with a direct membership of over 7,500 organisations from the private as well as public sectors, including [small and medium enterprizes and multi-national corporations], and an indirect membership of over 83,000 companies from around 380 national and regional sectoral associations."

CII's Visionary Leaders for Manufacturing (VLFM) program[4] was envisioned in 2006 and began operation in 2007, as described in the following paragraphs.[5]

The need

In our book *Breakthrough Management*,[1] Shoji Shiba and I discussed (in Chapters 1 and 2[6]) the rapid changes now going on in the world and the increasing pressure such changes put on management. In particular, we emphasized that the management paradigms of standardization and incremental improvement (top two rows of Figure 1.1) for efficient production that delivers high quality products that satisfy customers are no longer sufficient for many businesses. Now a third paradigm is required (bottom row of the figure): as the life cycle of one business begins to head into decline, a new business must be found and developed. Thus, a new kind of business leader is required — a *visionary leader* who is facile with standardization and incremental improvement but also has a knack for seeing into the invisible future. In our book, we showed an illustration Shoji Shiba calls the The Eyes of Buddha (Figure 1.2). The leader needs an eye to monitor management-for-control, or else the company will not meet the minimum contract between the company and society. The leaders needs an eye to monitor management-for-incremental improvement, or else the company will not keep up with changing customer requirements. And the leader needs the wisdom to see the path to future breakthrough, or else the company will have no tomorrow.

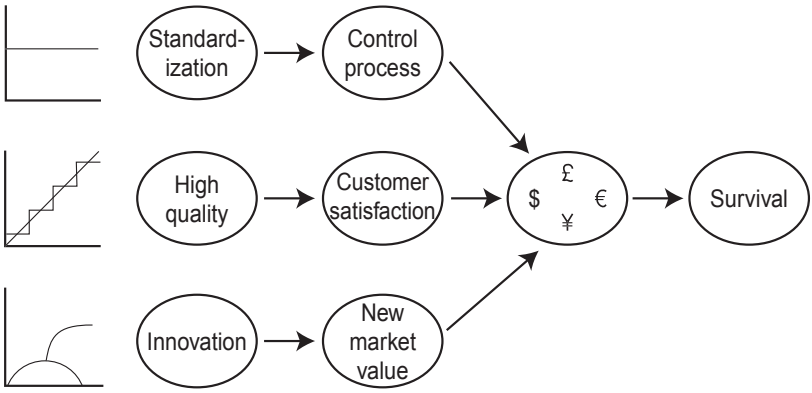


Figure 1.1: Three management paradigms.

Each of these three paradigms requires a different focus.
Control: process focus, total discipline, continuous standardization.
Incremental improvement: customer focus, total participation, continuous improvement.
Breakthrough: opportunity focus, total dedication, continuous unlearning.

A specific program

Indian industry, particularly in manufacturing, is witnessing growth rates of 14 percent.[7] To sustain this growth, Indian manufacturing needs transformation through policy changes, infrastructure, and a strong thrust on building competitiveness. One important aspect of building competitiveness in manufacturing is to create visionary leaders that can transform the manufacturing culture in India to create a uniqueness about Indian companies that puts them ahead of all others. Given the fast clock speed[8] that is bringing a rapid change in Indian business environments and to develop competitiveness in the manufacturing sector, industry requires a set of visionary leaders who are capable of innovation and breakthrough

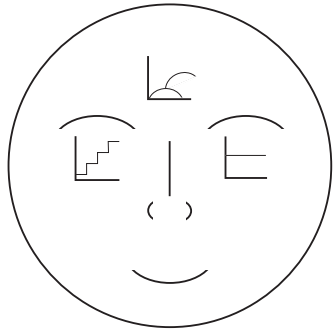


Figure 1.2: An adaptation of a Buddhist motif: eyes of the past (right), present (left), and future (top middle).

thinking to envision future concepts and products and to become trend-setters in their business, thereby transforming the Indian manufacturing industry.

The Visionary Leaders for Manufacturing or VLFM program was developed to be an especially advanced and innovative learning system, with a focus of developing at least 200–250 visionary leaders for India over a three year period starting in 2007.

With the view of building a culture of innovation amongst the senior leadership of industrial companies, the program focused initially on imparting skill-based training in addition to conventional methods of acquiring knowledge and understanding. The program modules are designed to have only 30 percent theory and 70 percent practical application for rapid transference of skills. Learnings gained from the program are immediately applicable in the industry.

Four components

To meet the needs of a cross section of manufacturing industry, four different courses of study were planned.

A. Programme for Visionary Corporate Leaders in Manufacturing
B. Programme for Visionary Managers in Manufacturing
C. Programme for Visionary CEOs in Manufacturing
D. Programme for Visionary Entrepreneurs from Small and Medium Enterprises (SMEs)

The above listed programs are known in the rest of this book as Opportunity A, Opportunity B, Opportunity C, and Opportunity D. At the time of this writing, Opportunities A and B have each graduated a class (starting in 2007 and ending in 2008), and each is working with its second class (starting in 2008 and to end in 2009). The first instance of Opportunity D has just started at the time of this writing, and Opportunity C had not yet been started.

Unique partnership

VLFM is a nationwide programme under the umbrella of the Indo-Japan Cooperation Agreement 2006, signed by the prime ministers of India and Japan. It is a partnership between the Indian industry, academia in India, and the Indian and the Japanese Government. The collaborating institutions include:

- National Manufacturing Competitiveness Council, Government of India. The NMCC has been set up by the government to provide a continuing forum for policy dialogue to energise and sustain the growth of manufacturing in India.
- Japan International Co-operation Agency, Japan. JICA contributes to economic and social advancement in developing countries and helps expedite Japan's international cooperation as one of the implementing bodies of Japan's Official Development Assistance.
- Confederation of Indian Industry.

- Indian Institute of Technology, Kanpur. IIT Kanpur is a premier Indian engineering institute recognized globally for excellence in research and cutting edge technology development.
- Indian Institute of Technology, Madras. IIT Madras is among India's foremost institutes of higher technological education and basic and applied research.
- Indian Institute of Management, Calcutta. IIM Calcutta has a global reputation for the quality of its management education.

Shoji Shiba worked closely with CII and with NMCC to bring about the launch of VLFM in August 2007. The NMCC has recognized this programme as a key National initiative under their "Skill development" initiative. The Ministry of Human Resource Development has also played an important role in bringing premier Institutes such as IIT Kanpur, IIT Madras, and IIM Calcutta together to participate in the initiative.

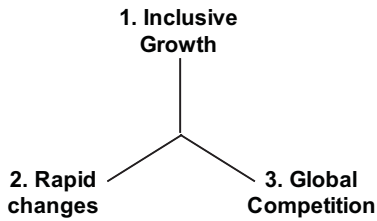
1.2 Opportunity A

Many of the more general points made in this subsection apply to the entirety of VFLM, but this thinking has particularly been expressed in the context of Opportunity A which has blazed the trail for the three VLFM opportunities (A, C, and D) that are coordinated by CII. Many of the resources, such as the VLFM classroom, apply or will apply to Opportunities C and D as well.

Overview

In his presentation at the CII Quality Summit on September 23, 2008, Shoji Shiba showed a slide illustrating the challenges facing Indian manufacturing.

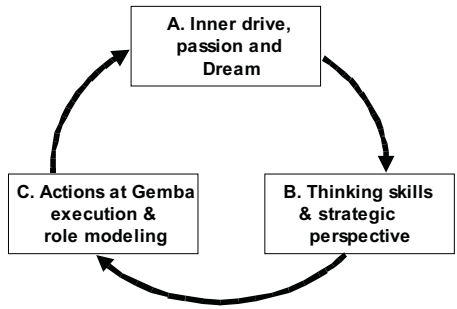
India's challenges are



The challenges of global competition and rapid growth are obvious, but they also produce opportunities of which India has famously taken considerable advantage in recent years. Nonetheless, they remain significant challenges.[6] Regarding inclusive growth, Kalpana Narain says,[9] "India has a huge mass of population living in the rural areas and a percentage of these are living below the poverty line. India needs a growth model that includes these masses in the process and thus lifts up the entire country. India cannot afford to have a model where these masses are not included in the growth process and do not contribute to it."

These three challenges in turn create a **challenge for Indian industry** — that of *needing a large number of visionary leaders for manufacturing*.

The **challenges of the leaders** themselves are



Basically what this slide is saying is that leaders must function at three levels. (1) They must dream about the possible future and have the inner drive to go after it (see Figure 1.4 on page 10). (2) They must have thinking skills and a strategic perspective to understand appropriate changes to make and how to make them. (3) The leader's "actions at Gemba" (how he personally goes about making his observations on the manufacturing floor or in the customer environment) make him a better or worse role model.[10]

Shoji Shiba's slide concluded, "In the end, the agenda for manufacturing is going to be driven by the leadership team. Success depends solely on leadership skills and perspective."

As described in the previous subsection, the VLFM program is a win-win partnership among several organizations from industry, academia, and government to produce 200-250 visionary leaders in three years.

Opportunity A is aimed at developing senior managers into visionary leaders — from competent managers who know how to motivate people, are strong on execution, and deal effectively with problems as they arise to leaders who have a nobel mind, have the three eyes of Buddha (page 4), and can discover the future invisible problem.

Philosophy and thinking

Thinking about VLFM began in 2006 with the objective of transforming Indian manufacturing industry. That vision has continued to evolve and there is now a far-reaching dream.

VLFM involves innovative models of transformation, collaboration, and the development of human potential.

The *model of transformation* involves breakthrough in three dimensions.

1. In the present, break free in space, expanding horizons:
    a) Go beyond small m of manufacturing to Big M (Figure 1.8, page 14).
    b) Extend your thinking to the entire value chain (Figure 1.8 and TPS[11]).
    c) Develop skill in applying value stream mapping.[12]

2. To anticipate the future, increase depth of perception:
    a) Perceive visible changes (Figure 1.9, page 15).
    b) Develop skill in applying the Five Step Discover Process to see the invisible and unknown (Figure 1.9).
    c) Understand the deeper meaning of relationships (Figure 1.3 on page 9).
3. Break with the past:
    a) Break the barriers that lock-in a mind set about the connections among historical assets (Module 3, Table 1.1, page 17).
    b) Create new breakthrough solutions (Module 3, Table 1.1).
    c) Protect the future (Module 4, Table 1.1).

VLFM's *model of collaboration* extends an ancient idea and contrasts with the competitive model of the western world, particularly in the United States. People from various other parts of the world migrated to the United States and once there competed fiercely to gain a significant share of the benefits of new developments. Win-lose situations frequently developed with the winners gaining what the losers lost. In this game of the survival of the fittest, the less-fit often, perhaps typically, perish. Society as whole progresses with the strong survivors. In this system there is sometimes collaboration where the collaborators have exchange relationships — I'll give you this if you'll give me that. This give-take approach obviously works, often well; but in the United States' win-lose environment, it also often degenerates into take-take dominance relationships.

VLFM instead cultivates a give-give model as the basis for collaboration in its learning communities. Shoji Shiba sees this alternative give-give philosophy as being the next step in an ancient progression. Indian culture and learning migrated to China: India gave these to China. Thus, with some features in common, India and China each evolved in their own ways. In turn, China gave aspects of culture and learning to Korea which in turn gave them to Japan. At each step the receiving country "gave" aspects of its own prior culture and learning and its own adaptations to the mix. Now, Japan (e.g., through JICA, Shoji Shiba, and other Japanese experts) are giving India the culture and learnings of Japanese manufacturing to which India is expected to contribute its own localizations and cultural strengths. This give-give approach is expected to produce a quantum leap in Indian manufacturing.

In Shoji Shiba's view, give-give collaborative learning is at the root of human, social and cultural evolution. He sees the true evolution of society as having happened when the more obvious competitive forces have generally coexisted with the ubiquitous collaboration in their communities.

Of this, Kalpana Narain says,[13] "The VLFM Programme is focused on realising human potential and helping the participants develop a noble mind. Sessions such as those on spirituality urge participants to look beyond not only themselves but also their plants and their organisations. This opens their minds to listening to the voice of the customer and perceiving their latent needs. CII and the academic partners in VLFM Programme also recently decided to collaboratively work on a few projects

of national importance under the VLFM Programme. (These could be projects like the nano car.)"

Anyone acquainted with Shoji Shiba or who has read his books[1,14] will be familiar with the WV-model where one alternates between thinking (theory) and experience (practice). Such alteration between theory and practice (which I'll call up and down, respectively) is the essence of the scientific method, for example, for alternating between sensing a problem moving down to collect data, moving up to formulate a specific problem to solve, moving down to collect the relevant specific data, moving up to plan a solution, moving down to try the solution and take new data, and moving up to analyze the data to see whether the solution worked.

The WV model can also be applied to seeking opportunities for visionary leadership (Figure 1.3). Suppose I am open to meeting new people who perhaps have idea different than mine. I get together with a person (or persons), perhaps for dinner or a glass of wine, with no specific aim in mind but just to discover the uniqueness of the other person. If this goes well, I may decide that I want to know more. So perhaps we continue our social get-together, now or at a later time, and continue to share experiences with each other, still with no specific aim in mind. We may discover some common interests and wishes and, thus, begin to share a common dream. With this dream in mind, we can look for relevant opportunities, hopefully find a specific project, and then carry out the project using conventional project management tools, formal or informal contracts, and so forth. If the project is a success, my interest in learning more about the other person may grow, as will my willingness to risk developing relationships with other people and, thus, I may find still more unexpected breakthrough possibilities.[16]

This is win-win thinking. Win-win opportunities occur naturally in a give-give context. Certainly it is not an instance one person trying to take advantage of another person and not even an instance where each person

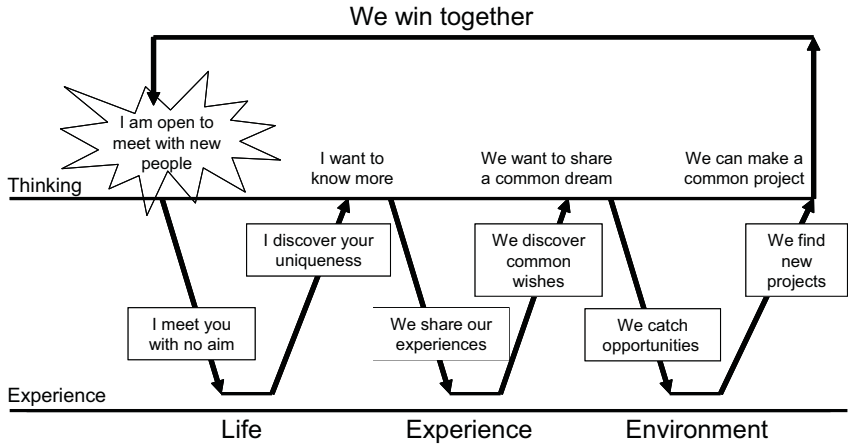


Figure 1.3: The WV-model for openly seeking opportunities for breakthrough.[15]

is trading something the other person wants. In the win-win approach, one offers what one has in the hope of building a trusting relationship which will improve the world, but it is also OK if this happens to result in a specific breakthrough project for one of the parties.

Regarding the model of *developing human potential*, historically we have thought that new skills are the root of competency development. Application of these skills in real-life situation consolidates the competency, success in life follows from practicing these skills, and this brings job in life. This is shown on the left side of Figure 1.4. (Of course, sometimes success also brings greed rather than unalloyed joy, but we ignored that possibility in our previous exposition.[14])

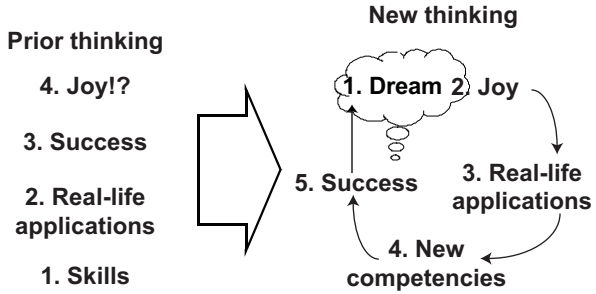


Figure 1.4: A dream is needed.

Shoji Shiba and VLFM now see things in a different way (right side of the figure). The starting point is a dream combined with the joy of learning. Learning happens with real life learning experiments — with improvisations. New competencies and skills are mastered with practice. The competencies help realize our dreams and potential. Those achievements allow one to dream of new possibilities leading to expanded excitement for learning new things.

This change in point of view is needed for breakthrough. The historical view is based on preconceptions about the skills that are needed which, when mastered, typically lead to being very good at doing what has always been done. The new joy-of-learning-based point of view, especially when combined with a dream, leads to mastering unanticipated skills that are essential for the unfolding future.

This is true for the community of Indian manufacturers as well as well as for individual leaders. Industry and the country as a whole need a dream of future possibilities and to have the joy to go after the dream.

These three innovations in point of view offer the possibility of breaking with the past and transforming Indian companies and Indian society:

- Break with the past, expand horizons in the present, learn to look into the future.
- Seek to realize human potential, dream with a nobel purpose, joyfully learn, develop competence from practice and improvisation.

- Transcend the traditional limitations of the confining work environment, practice the give-give spirit of selfless actions to realize a nobel dream, perhaps extending to society as a whole.

Details

The details of Opportunity A discussed in this subsection are based on what happened with the first, 2007–8, batch of Opportunity A participants.[17,18] The second, 2008–9, batch of Opportunity A participants are going through the program now, and the program is similar, with some changes based on what was learned in 2007 and on changing business circumstances.

The schedule is included in Table 1.1 on page 17 (I'll come back later to the curriculum shown in the table). Each of the six modules,[19] was about a (6 day) week long with about six weeks between modules. Thus, the participants spent about 35 days actually attending VLFM over the better part of a year. Module 1 is split into two sections, with half the participants in each section so Shoji Shiba can work with smaller groups in helping them learn the Five Step Discovery Process. While modules 5A and 5B take place at plant sites around India and Japan, much of modules 1–4 take place in the VLFM classroom, with day trips for more plant visits.

The VLFM classroom was created under the patronage of Mr. Jamshyd Godrej (Figure 1.5, top left) and is located, with the CII Godrej Centre for Excellence, in the Udyanchal Primary School (top right) on the Godrej factory campus, already an active environment for learning. Mr. Godrej also personally reviewed progress and was involved with Shoji Shiba in design decisions. (Mr. Puranik, Dean of the VLFM program and Executive Director of CII's Godrej Centre for Excellence managed the construction day by day.)

On the first day of each instance of Opportunity A, the pathway to the VLFM classroom is decorated in a festive way (bottom right), including Rangoli art (bottom left).

The VLFM classroom area is treated as an area of learning that requires respect, like a Gurukul (Figure 1.6, top left). The classroom itself is unique in that it has white walls on all sides, suitable for posting group work and chairs but no desks or table for the students (top right). There are no desks to give the participants practice in taking notes while talking with customers and others in situations where typically no desk is available; they also practice sitting forward in their chairs, which in customer situations shows interest and attentiveness. The students and faculty all wear the same uniform shirt. Sometimes the students work at large sheets of paper posted on the wall (bottom left) and sometimes sitting on the floor (bottom right). Sometimes participants sit on the floor simply to make it easier for those in the back to see a speaker.

Shoji Shiba sees three components in the evolution to create visionary leaders: (1) meet the minimum requirements to be a competent global manager; (2) enhance the strengths of Indian managers; (3) develop the characteristics of visionary leaders.

To the first end, *minimum requirements*, Shoji Shiba posts the icons

Figure 1.5: Scenes from the VLFM classroom area: Godrej plaque and Mr. Godrej; school children; Rangoli art; decorated stairs and Shoji Shiba.

Figure 1.6: Scenes from the VLFM classroom area: shelves where participants and faculty respectively remove their shoes; chairs in white walled room with participants in uniforms without tables; participants working at wall; participants sitting on the floor.

Figure 1.7: Minimum requirements to be a competent global manager.

in Figure 1.7 prominently in the VLFM classroom. Minimally, a global manager must stop having a *me first attitude*. Otherwise he has too narrow a window onto the world and will miss many opportunities. A global manager must also focus on getting the job done and not *pass the buck* to someone else; there is no time in a global environment for buck passing and certainly no place for the job never being done at all as often happens when the buck is passed. A manager in a global world must take action and not just debate possibilities and *talk talk talk* about action.[20]

Manufacturing managers have always been concerned with production efficiency; this is already a strength. To *enhance this strength*, manufacturing managers need to expand their horizons of horizontal exploration, understanding the possibilities for a state-of-the-art production facility (e.g., in keeping with the concepts and practices of the Toyota Production System[11]) and knowing how to apply to tools to create such a production line (e.g., the V-Map methodology, also from Professor Furuhashi[12]).

To be *respected as a leader* in the global marketplace, the manufacturing leader must see manufacturing in a big context, e.g., deal with all aspects of manufacturing, as shown in Figure 1.8, not just the production floor at the center of the figure, which has traditionally been a manufacturing manager's purview and thus focus.

He must also be able to perceive the invisible, unknowable future, for

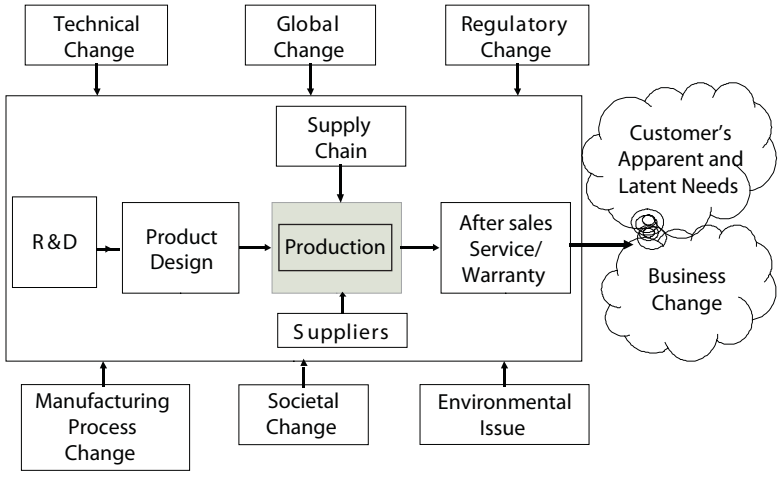


Figure 1.8: small m to BIG M.

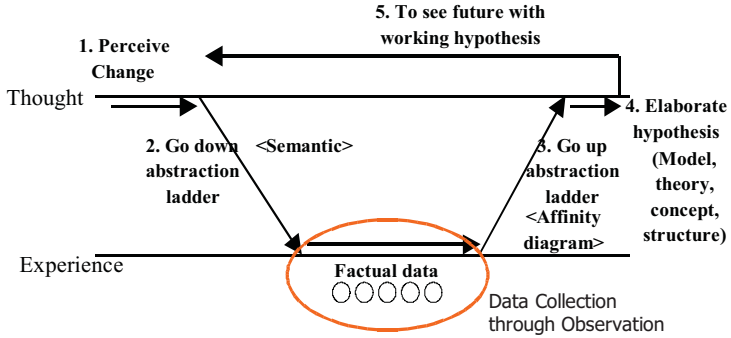


Figure 1.9: Five Step Discovery Process.

which a practical tool is available — the Five Step Discovery Process,[1,21] as shown in Figure 1.9.

The process starts with perceiving a change in the environment that requires a change in what the business is doing. As is the essence of application of the scientific, one moves repeatedly between the level of thought (theory) and level of experience (empirical data). One works one's way down the ladder of abstraction to get to the factual data (no judgement, no inference, multi-valued thinking) collected by observation in the Gemba. One organizes the factual data into related groups and moves back up the ladder of abstraction to fact-based conclusions. From this point at the level of theory, one structures a model or theory, typically addressing cause and effect. Then one moves forward based on this model, making appropriate changes in the way one conducts one's business, and sees how the changes work in the real world, again moving down to the level of experience to collect raw data from the changed way one is doing business. Notice that in this process of moving between the levels of theory and experience, one is undoubtedly alternating between using the left (language and analytic) and right (intuitive and creating) sides of the brain.

The Opportunity A modules are structured to cover the BIG-M concept (Figure 1.8), as shown in Figure 1.10. They provide a powerful mix of hands-on methods, plants visited, and lectures. In fact the ratio of lecture to more hands-on activities is planned to be 30-70.

Now review the curriculum sketched in Table 1.1. It covers at significant depth with a broad range of techniques, but focused on only a few techniques, with significant opportunities to practice the techniques and see the techniques in action. This is quite different from courses on many specific topics which cover that topic comprehensively.

The approximately six-week intervals between modules permits the participants to spend a decent amount of time in their real job between sessions, and provides the participants with an opportunity to reflect on the methods to which they have been introduced in the context of their own companies.

The between module homework assignments are shown in Table 1.2. The homework involves pre-work for the upcoming module and on what

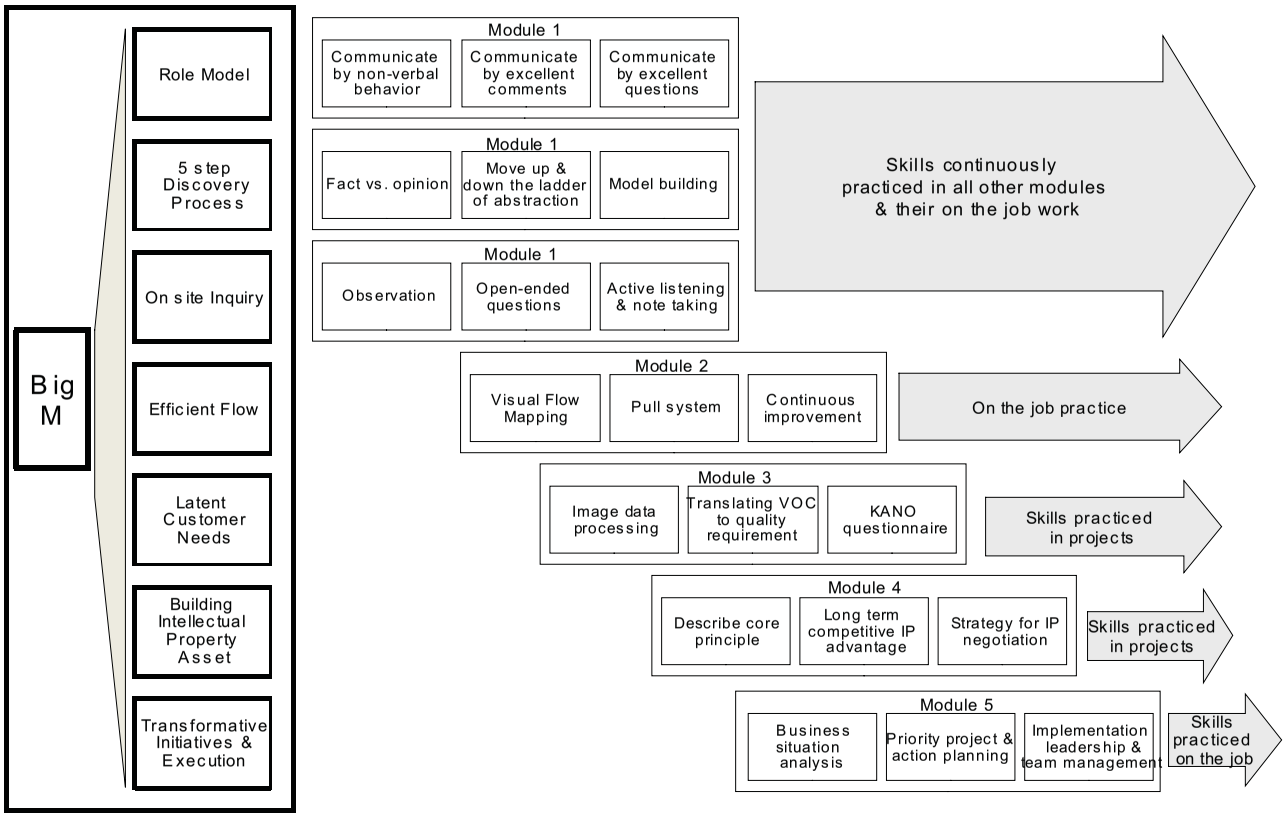


Figure 1.10: Module design elements — the modules have been designed to provide interventions keeping the Big M perspective in mind.

Table 1.1: Opportunity A schedule and curriculum.

Module 1 – Orientation and breakthrough management	September 23–28 and September 30–October 6, 2007
a. Introduction to VLFM and ice-breaking among participants; b. Leadership and role models; c. Five Step Discovery Process (5SDP); d. Plant visit and application of 5SDP; e. Showroom visit and application of 5SDP	
Module 2 – Contemporary manufacturing systems; efficient flow	November 10–15
a. TPS—Introduction and leader's role; b. TPS—the Toyota way; c. Implementation of TPS; d. Plant visit; e. Exploring spiritual leadership	
Module 3 – Product design and development; latent customer needs	December 16–21
a. Attractive quality creation; b. Product concept creation; c. R&D success story from Sony; d. Patent strategy of Toshiba; e. Mall visit to find the latent customer needs	
Module 4 – Strategic transformation	January 27–February 1, 2008
a. Key tools for strategy building; b. Finance in business; c. Example from Canon of intellectual property strategy; d. Patent strategy; e. Company transformation — case studies	
Module 5a – India plant visits	March 2–8
a. Tata Toyo; b. TechNova Imaging; c. Mahindra & Mahindra Farm Equipment Segment; d. Galaxy Surfactant	
Module 5b – Japan plant visits	May 25–31
a. Komatsu factory; b. Nissan factory; c. Toyota Shokki factory; d. Presentation by Indian businesses in Japan; e. Speakers (e.g., CEOs) from other Japanese companies	

they learned in the previous module. The V-Mapping mentioned in the table is a key part of applying TPS and is taught in Module 2.

Figure 1.11 illustrates the detailed schedule for one module, in this case module 2 as presented in 2008. Each other module has a similarly focused and diverse content. The schedule for a module may vary from one year to the next. Flexibility in the content of a module is key to adapting to the real world situations participants face. For instance, in the face of the economic downturn of 2008 which is extending into 2009, module 4 was completely changed.

Here are some additional facts, primarily about the 2007–2008 instance of Opportunity A.

In addition to Chief Advisor Shoji Shiba, six Japanese experts participated in the program, working in an average of 1.5 modules. Shoji Shiba himself served as director for module 1, and four very senior executives from Indian industry served as directors for the other modules. Each of these individuals had previously participated in a learning community (page 64). Each of the module directors also served as a facilitator in other modules, along with five other people (four from CII and another business executive). Each module director was supported by the director of another module and a facilitator. Each facilitator served in an average of three modules. Four members of the CII staff provided infrastructure support the modules. Thirty-two executives from industry, university professors, and other management experts spoke during the modules, an average of over six guest speakers per module for modules 1–4.

Table 1.2: Homework assignments.

Before Module 1

a. Read the book *Breakthrough Management*; b. Prepare a presentation on My Organisation, covering my company's business goal, factors affecting the business goal, and my role in achieving the goal.

Between Modules 1 and 2

a. Research a role model; b. Create a current state map for your company; c. Make a list of recent changes faced by your company.

Between Modules 2 and 3

a. Create a V-Map of one line of your plant based on learning's from Module 2; b. Research and make a presentation on a new model of mobile phone; c. Create a concept for a new television.

Between Modules 3 and 4

a. Repeat presentation on My Organisation, covering my company's business goal, factors affecting the business goal, and my role in achieving the goal; b Analyze the balance sheet of your company and that of your best competitor, comparing several different ratios, identifying the drivers of these ratios, comparing the drivers and noting factors where you or competitor excels, and derive action plans;

Between Modules 4 and 5A

a. Consider "my dream for my company" and "my dream for myself"; b. Study the companies to be visited in Module 5A.

Between Modules 5A and 5B

a. brush up on the knowledge required for good and meaningful on-site visits; b. to learn beforehand about the factories and places to be visited, c. to be able to compare India as seen from within against India as seen from outsider's perspectives

The quality and breadth of faculty and guest presenters is extraordinary. Thus, among other benefits, the participants in the program — the future leaders — have an opportunity to observe and interact with already eminent leaders. The amount of time a number of high level Indian executives give to the VLFM program is astonishing. Thus, in addition to the official collaboration of industry, academia, and government mentioned in a previous subsection, there is also a more immediate collaboration of industry and academia (and a few contributions from government) in delivering the program.

Modules typically had special night session speakers and demonstrations in an informal environment. These included sessions on global dining etiquette and the language of gestures (through Indian classical dance), a wine tasting session, and a session on understanding creativity by understanding art and theater.

Three Indian plants were visited during module 1, one plant during each of modules 2–4, and four plants during module 5A. The plants were from a wide range of industries. In module 5B the participants visited the Nissan, Komatsu, and Toyota Shokki plants and the Toyota Commemorative Museum of Industry and Technology, heard a presentations by the CEO of Harley Davidson Japan and a few Indian entrepreneurs who have been doing business in Japan, and learned about *Shinkansen*,

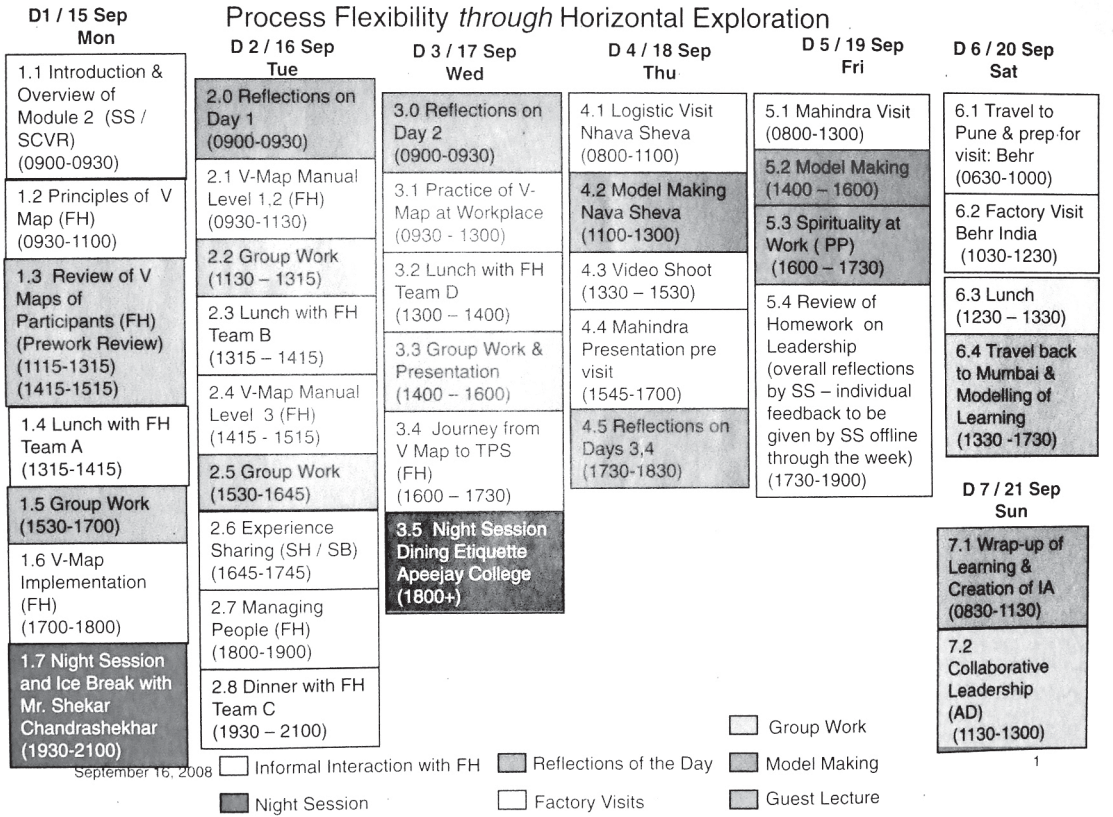


Figure 1.11: Example detailed schedule for Module 2 — posted on the wall of the VLFM classroom during a VLFM session.

the Japanese Bullet Train. The breadth of plants visited is matched only by the quality of plants visited. These plant visits provide participants with invaluable insight and inspiration.

The first batch of 46 participants were all senior managers in their manufacturing companies, with an average of approaching 20 years of manufacturing experience; all had engineering backgrounds. The participants came from a couple of dozen companies (counting the divisions of Godrej as separate companies). (In the instance of Opportunity A happening now, another couple of dozen companies are represented, some of the same companies as in the first batch and some new companies.) A number of the companies are sending multiple people to successive sessions to build a critical mass of such newly trained leaders in the companies. These participants are furthermore encouraged to diffuse what they learn in VLFM amongst colleagues in their workplaces to expand the critical mass of like minded people at the workplace.

With participants from so many different companies involved and with the amount of time they spend together over the course of the program, considerable cross-company interaction is fostered. Such continued networking and sharing is also facilitated through the VLFM website and encouraged at the VLFM annual meeting.

There is also a very explicit effort to make this program self-sustainable with continuity from batch to batch. The initial module directors, deputy directors, and facilitators came out of the learning community activities and from the CII staff. Going forward the module directors for successive instances are selected from the deputy directors and facilitators from previous instances, and the deputy directors and facilitators of the next instance come from participants of the previous instance.

The participating companies and their executives and the participating institutes are all modeling the give-give philosophy:[22]

1. All module directors of Opportunity A are from the industry and spend unlimited time at the programme with the idea of sharing their experience and learning. They often have to work nights to perform their functions at their organisations which giving their most to the VLFM Programme
2. Many of the participants of Batch 1 have come back to the programme as Deputy Module Directors and Facilitators to share their learnings with the Batch 2 participants.
3. The mentors for Opportunity D are from Batch 1 and 2 of Opporunity A. For Opportunity D the institutes also have adopted the give-give philosophy in that they are charging minimumally for their professors' time.

I remember also that two of the projects Mr. Sunderraman described to me at Godrej (page 42) had an explicit component of enabling profit for "poor villagers" and others who may not be well to do already. Obviously, if one thinks about the BIG M all the way to the customer, then one may see win-win opportunities that involve customers who have previously not been included in India's recent fabled growth.

1.3 Opportunity B

The Post Graduate Programme for Executives — Visionary Leadership in Manufacturing Program (PGPEX-VLMP, or VLMP for short) is a joint program of the Indian Institute of Management Calcutta (IIMC), the Indian Institute of Technology Kanpur (IITK), and the Indian Institue of Technology Madras (IITM). The first year summary[23] (from which all of the content of this section has been taken) lists the Confederation of Indian Industry, the National Manufacturing Competitiveness Council, and the Japan Industrial Cooperation Agency as "stakeholders" in the program, and lists Shoji Shiba as having assisted in the creation of the program.

The program 2008 summary acknowledges its patterning on MIT's original Leaders for Manufacturing (page 80) program and its successors elsewhere in the world. The program is a somewhat non-traditional university program (like LFM), and it is also quite distinct in its approach from the other VLFM opportunities:

- Aimed at helping managers with upwards of eight years experience become senior managers.
- Ao date participants have mainly participated as individuals rather than representatives of their companies (although a small percentage of participants may be sponsored by companies and the program would welcome more sponsored participants).
- A majority of the time is spent in classroom training versus practical training (the reverse is true for the other VLFM opportunities).
- While there is more emphasis on creating a learning community than in the typical university course, there is less emphasis than in the other parts of VLFM.

I will sketch this component of VLFM in much less detail than I do for the other components of VLFM.

VLMP is a one full year residential program with 32 weeks of classroom interaction (a total of 960 interaction hours) and quarter of the year in an internship in industry. Upon completion of the program, participants are given a joint certificate from the three academic institutes.

The year program from the first year of Opportunity B, which I have copied essentially verbatim from the Class of 2008 brochure,[23] is shown in Figure 1.12. This program may very well change from year to year.

A majority (25) of the institute faculty members during the 2008 session came from IIMC, with eight faculty members from IITK and eight from IITM.

The backgrounds of the 28 participants in the class of 2008 were highly varied:

- experience in eight different functional areas (half of the participants from operations or production)
- from ten different industrial areas
- ages from 27 to 43 years (with two-thirds of them under age 32)
- experience in 20 or more different companies
- from ten to 23 years of work experience

Module 1	Module 2	Module 3	Module 4	Module 5	Module 6	Module 7	Module 8
*Breakthrough Management by Prof. Shoji Shiba	Financial Management	Domestic Industry Visit	Supply Chain Management	Aotomation & Robots	Industry Internship	Japan Industry Visit	Interpersonal Skills
Global Scenario	Marketing Management	*Prof. K. Mori: Lecture on Product Development	Product Design and New Product Management	Computer Integrated Manufacturing			Leadership & Change Management
Regulatory - National & International	Production Management		Automation & Robotics	Problem Formulation			Vision to Execution
Strategic Analysis	ERP, Workflow & BPR		Computer Integrated Manufacturing	Data Analysis			Ethics & Values in Business
Decisions Making Tools	*Prof. Kano: Lecture on TQM		Advanced Materials				Entrepreneurship
Organizational Structure & Management	HR & Labor Laws		Data Analysis and Decision Making				*OHSAS and Automobile Quality Systems
Managerial Economics	*Prof. Furuhashi: Lecture on |TPS						*Project Mgt. certification by PRINCE2, UK
Financial Analysis	Project Management						
*ISO9001 training & cerification by BVQI	*SAP module by IBM Global Services				* means adjunct instructors		

Figure 1.12: VLMP curriculum.

One participant's experience.

Shoji Shiba and I spoke to Mr. Ajay Dhar at the CII Godrej Centre of Excellence in Mumbai on September 22, 2008. He had just finished participating as a facilitator for the module 2 week of Batch 2 of Opportunity A. Mr. Dhar added to our story of VLFM a sketch of his finished, year-long participation in Opportunity B.

Mr. Dhar previously worked at Maruti Suzuki (a leading Indian automobile manufacturer) for 21 years, in the machine engineering department. After that long with the company he felt he was too much in his comfort zone and wanted to learn and do something new. When he saw the advertisement for Opportunity B, it seemed the perfect chance for him — although the cost to him would be a year without salary and that much again for course tuition, travel, and living expenses. It also meant spending much time away from his wife and children who stayed in Delhi while he spent time at the two IITs and the IIM and in his internship.

Describing new insights he got from the academic parts of the program, Mr. Dhar mentioned the following:

- from IIM Calcutta: the Five Step Discovery Process, deeper insight into financial management, strategic management, and soft-side communication skills
- from IIT Kampur: nano technology, product design (from ideation to realization), and supply chain optimization (in both directions — receiving incoming materials and components, and receiving used products back for recyling)
- from IIT Madras: forecasting and scheduling, technology management, supply chain management and network design, and widening and lengthening one's window of perception

Mr. Dhar did his internship at Sona Koyo Steering Systems in Gurgaon where he did value stream mapping of two product lines; and from his Japan visit as part of Opportunity B he got new insights (even though he'd visited Japan twice before) that can be transferred to India and new insights about Japan more generally.

Mr. Dhar says the following about Opportunity B. It brought new objectivity to his thinking — less subjectivity and more evidence based. It also gave him a dramatically expanded view of the business cycle — insight about the paradigm shift from small m manufacturing to Big M manufacturing. Finally, it showed him the need for role models for leadership and the increasing importance of collaborative leadership. Another benefit of participation in Opportunity B is the network he now has of his 29 other participants in the program and the continuing opportunity for them to learn from each other through a Google Group they have established.

Having recently finished Opportunity B, Mr. Dhar took a position with Sona, in Delhi. However, while still in his orientation period with Sona, CII arranged for him to be seconded for the week of facilitation of Module 2 of Opportunity A. Of this participation in Module 2, Mr. Dhar notes that even though he was a facilitator, he himself has learned a significantly more detailed approach to value steam mapping. He also found the amount of visibility (various data charts) that Behr maintains its factory floor "is eye opening."

1.4 Opportunities C and D

Opportunity C, for CEOs, has not yet been created or offered. There is sufficient demand, but the various opportunities are being launched in a phased manner based on the urgency of need for each opportunities. Opportunity C launch could happen in 2009.

The first instance of Opportunity D, for small and medium size enterprizes (SMEs), began in late September 2008.[24]

Opportunity D for SMEs has considerable philosophical overlap with Opportunity A and some organizational overlap. However, there are also many differences.

Opportunity D is envisioned as a program for accelerated growth for small and mid-size companies — to help convert SMEs identified as having potential for high growth to actually become "locomotive," high growth companies. The phrase "locomotive company" is used to mean a company that by way of its own performance and its example pulls Indian industry ahead more generally. Two top leaders from each identified company, including the owner or CEO, are invited to participate in the program and to work together as a community, similar to the cluster approach (page 61).

The plan for achieving transformation of identified SMEs is a "One Stop Shop" mentoring program (Figure 1.13).

Over a period of one year, the participants are to undergo five highly interactive modules of three days each as shown in Table 1.3

The participating companies will also be exposed to already noteworthy Indian and Japanese SMEs and larger companies from which they can

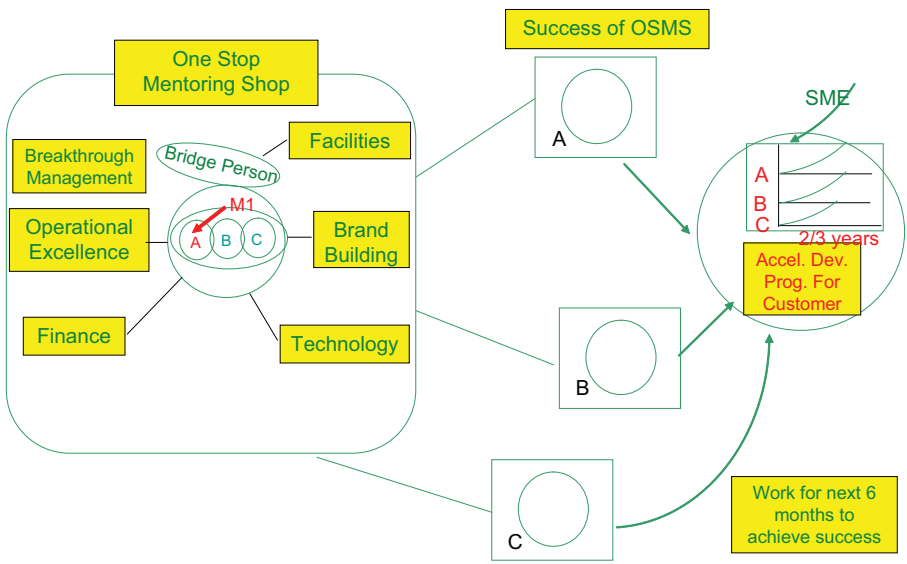


Figure 1.13: One stop mutual mentoring system and its diffusion; a bridge person (mentor) provides a one-stop interface to other resources to each of companies A, B, and C to enable accelerating growth for the companies.

Table 1.3: Opportunity D schedule

Module 1, Creating Breakthrough, September 26-28, 2008
two month gap
Module 1, New Business and New Product Development, September 26-28, 2008
three month gap
Module 3, Exploring Business Opportunities, February 2009
two month gap
Module 4, Excellent Operations, April 17-19, 2009
two month gap
Module 5, Global Marketing Strengths, June 19-21, 2009

learn lessons through interactions with business leaders from India and Japan, including as part of a trip to Japan.

The formal instructors are coming from faculty drawn from IIT Kanpur, IIT Madras, IIM Calcutta and EDI (Entrepreneurship Development Institute) Ahmedabad. Additionally, CII deputy directory general Dr. Sarita Nagpal was the module director for the first module. CII is the implementing agency and is doing the overall planning and scheduling of the program, in consultation with Shoji Shiba. Interventions from various Japanese experts are also planned.

Each company owner or CEO is to be associated with a set of mentors from industry and academia who will provide support to identify and implement locomotive projects leading to introduction of innovative products, increased marketing strength and operational efficiency, and instilling a philosophy that can help to make the company move from SME to a "Big" enterprize. These mentors will include:

- experts in business functions including finance, strategy, HR, leadership, and business development
- technology experts in specific domains
- visionaries

The mentors come from Opportunity A participants, CII, and IIT Kanpur, IIT Madras, and IIM Calcutta.

The participating companies range in size from Rs. 50 to Rs. 500 crores turnover, are from the manufacturing sector, and have good corporate governance practices. A minimum of 30 percent growth from year to year should have been achieved, as the program's goal is not to motivate SMEs to have higher aspiration; rather, the goal is to transform SMEs with high potential into "locomotive" companies.

The companies will need to demonstrate a very high spirit of entrepreneurship for achieving very aggressive targets. A letter of intent from the owner or CEO is "invited," to include a commitment to participate in each of the five modules. The companies must have a focus to invest in technology through R&D and willing to work with the academia in India and Japan to create future products. The companies should be willing to commit to learn and undergo this process of transformation through a hand-holding mechanism prescribed by Prof. Shiba and his team.

A CII press release at the start of Opportunity D said,

> Through this programme CII aims to create a critical mass of 15–20 Visionary SMEs over [the three-year period from 2008–11], who [will] become role models for others to follow. The aim is to build world class companies leading the charge of Indian SMEs in the global arena. A simultaneous exponential impact is likely to take place as these SMEs start sharing and diffusing their learnings with other SMEs. It is also expected that peer pressure will energize many more SMEs into launching their journey towards excellence and leadership, creating hundreds of VSMEs through a snowball effect.
>
> Like the CII Cluster Programme, launched almost two decades back, this programme has also started small. In the first year the CII Cluster Programme benefited only 5–6 companies, [but that] has now grown to over 850 companies through a snowball effect, [and] has impacted more than 1100 SMEs. Many of these companies, such as Sona Koyo Steering Systems Limited, have grown into world-class companies. The VSME programme will follow a similar pattern and is expected to create a larger impact over the years.

The press release also quotes Mr. Jamshyd Godrej, Chairman of the CII VLFM Division, as saying, "This is a defining moment for Indian industry when India has started its journey of creating Visionary SMEs." And Dr. V. Krishnamurthy, Chairman of the National Manufacturing Competitiveness Council said, "This is a unique programme [aimed] at making some of our small and medium manufacturing industries into world-class companies."

The first instance of the SME program was just starting when I visited India in September 2008.

The first Module was held at the CII Naoroji Godrej Centre of Excellence, with a trip to the Behr factory (page 33) and to a factory of one of the participating SMEs, as a benchmark. The plan is for the second, third, fourth, and fifth modules taking place at participant companies, with the third module taking place in Japan. Three companies are participating in this first pilot of Opportunity D, with a total of six people from the participating companies. The faculty, mentor, support staff, etc., numbered 12. This participant-staff ratio clearly indicates CII's intention to make a success of this program. It is edifying to look at some of the details of this first instance of Opportunity D and its first module.

Day 1. Presentation of the objective of Opportunity D and how the one-stop mentoring system will operating (Figure 1.13); presentation of each company by each company following a six point outline suggested by Shoji Shiba, comments on the presentations, revision of the presentations, and comments by the participants; get together over dinner with discussion of dining etiquette.

Day 2. Travel from Mumbai to Pune; instruction by Shoji Shiba on seven diverse points of view to improve observation skill; visit to one of the participating companies and then to Behr India; presentation of the

Figure 1.14: Study continues on the bus.

case study of Matsushita (Panasonic) by Drs. Venkatesh (IIT Madras) and Bansai (IIT Kanpur).

Day 3. Instruction in visual management of the planning process; assignments of faculty and mentors to participating companies; instruction in the process of exploration and five principles for effective exploration (a variation of the Five Step Discovery Process) and its application in planning the company's future; development of an information technology structure (using Skype) for face-to-face communication with mentors and other participating companies; assignment of implementation homework to take place before then next three-day group session, including how the company's presentation of its work will be judged, and a homework reading assignment.[1,25]

During the first 3-day session participating companies drew up their vision statements and the paths they wish to take for learning from this program. As the time I wrote this, they were working, with two dedicated mentors, to achieve these plans within a defined time frame.

The modules in Opportunity D are short compared with those in Opportunity A — three days versus a week for each module. However, other programs will be organized from time to time depending on the need of the participating companies. For example, the program organizers are already planning a one day V-Map training session at the premises of one of the participating companies. This special session will involve at least

8–10 members from each of the participating companies, a critical mass of people to actually apply V-Mapping in their company.

In addition to the mentoring by the two dedicated mentors, Shoji Shiba will also provide mentoring, and the participants will also be able to access a pool of mentors coming from the participating academic institutes and from over 150 VLFM practitioners created or involved over the first 18 months of VLFM. Members of the VLFM Community follow a give-give philosophy and are committed to transforming India's manufacturing sector. For example, the alumni of the VLFM Programme have already started diffusing their learnings within their organizations and amongst their suppliers, expanding the VLFM community and benefiting a larger number of organizations.

1.5 How VLFM came about

During the period when Shoji Shiba was at MIT (1990–2003), Dr. Sarita Nagpal of CII visited him six times. She repeatedly invited Shoji Shiba to visit India, but he didn't accept her invitation. Then in the winter of 2003 the owner of the Sona Group, Dr. Surinder Kapur, visited Japan when Sona Koyo Steering Systems (page 49) was awarded the Deming Prize (on of November 11, 2003). Dr. Kapur's company is also a member of CII and he had a close relationship with Dr. Nagpal.

During the Deming ceremony, Shoji Shiba gave a half-day seminar on the benefit of a company receiving the Deming prize, which impressed Dr. Kapur. Kiran Deshmukh, CEO of Sona Koyo, sketched what happened as follows,[26]

> November 11th that year was historic also for another reason. It was on this day, that Dr. Kapur and I met Prof. Shoji Shiba in Tokyo during the Deming Award ceremony. I had read Shiba-sans books on TQM and had used them extensively in the training that I was conducting in the company. Some discussions on that day, and several follow-up correspondences between him and Dr. Kapur finally resulted in him agreeing to come to India and guide a community of companies on his methods of breakthrough management.

Thus, Shoji Shiba visited India under CII auspices in 2004 and the learning community activities of 2004-2005 began (page 64), with Dr. Kapur's company being a founding member.

Kiran Deshmukh emphasizes the following:[27]

> Shoji Shiba was clear and firm on one thing; he would not come to India guide a single company (like our Sona Group). He would only come if there were a committed community of like-minded people. I believe that Shoji Shiba's condition of guiding a community of industries rather than a specific company was the true driver of establishment of his learning communities.

As part of the learning community activities, Shoji Shiba initially gave a workshop aimed at CEOs and their number two people and later gave workshop for real change leaders from the companies. He also worked within companies to help them transform themselves. Various of the CEOs were interested in a follow-on program for senior managers.

Consequent to the learning community activities, Shoji Shiba was invited to the office of Dr. Abdul Kalam, then President of India, who asked him to help the Indian manufacturing community at the national level. Thus, Shoji Shiba made a multi-year commitment to help in India.

Dr. V. Krihnamurthy also has had a long term relationship with CII and is chairman of the National Manufacturing Competitiveness Council (NMCC). The IIT in Kanpur, IIM in Calcutta, and Dr. Surinder Kapur are also on the board of the NMCC. NMCC also pushed for a program for senior managers. Consequently, Shoji Shiba suggested doing something like the MIT Leaders for Manufacturing Program (LFM), which includes collaboration between academia and industry.

Also, a textbook was needed as part of the various activities in which he was involved in India and elsewhere. Thus, Shoji Shiba and I wrote a more up-to-date version of his *Breakthrough Management* which had been published in Japan in 2003. The English edition came out in 2006, and H.E. Yasukuni Enoki, Ambassador to India, held hosted a ceremony at the Japanese embassy in New Delhi in honor of publication of the book. Ambassador Enoki also created a bridge to the Japanese International Cooperation Agency (JICA, part of Japan's Department of Foreign Affairs) for Shoji Shiba to seek help with undertaking a program in India. JICA's participation made sense manufacturing methods are an important aspect of Japanese culture and deserve to be promoted externally along with other parts of Japanese culture.

A core team was created, representing the various Indian organizations, to plan the activity, with JICA support for Shoji Shiba's participation. The core team consisted of Dinesh Sharma of Sona Koyo, Gautam Gondil of Tata Quality Management Services, Dr. Ashok Mittal of IIT Kanpur, Kalpana Narain under a free lance assignment to CII, and Shoji Shiba as the "guiding hand."

The core team held its kickoff meeting in the JICA office in New Delhi on June 5, 2006, where the committee worked for a week. The committee then traveled successively to IIT Kanpur, IIM Calcutta, IIT Madras, back to IIT Kanpur, and finally back to New Delhi and the CII office there. The entire sequence of visits and accompanying study and analysis took approximately one month. The core team recommended that a VLFM program for senior managers which was to be something like what is now called Opportunity A.

However there was debate among the involved institutions regarding: (a) the proposed ratio of practice (70 percent) to lecture (30 percent); (b) the length of the program (tens of days in a year or a year full-time); and (c) whether the program was residential or not. Shoji Shiba returned to India several times after the initial month of core team activity, and in December the core team sent out a survey to about 500 members of Indian industry (of whom about 100 responded) to resolve the various debates. This resulted in the vision for the four VLFM initiatives now known as Opportunities A through D.

Opportunity A would be for senior executives of companies and would stick with the 70-30 practice-to-lecture model. The survey revealed that managers participating in VLFM under sponsorship of their companies

could not be away from their jobs for more than a week at a time nor away more than 35 days total in a year. Thus, a schedule was planned for 6 one-week sessions with about 1.5 months between sessions.[28] The first instance of Opportunity A began in September 2007. It went well, and the second instance started in July 2008. Opportunity A will also expand in 2009.

Opportunity B was created as a one year residential program including an internship in industry.[29] The first instance of Opportunity B started in August of 2007 and finished a year later. The program went well, the IITs and IIM were happy with the program, and the next instance of the opportunity began in August 2008. Expansion of Opportunity B is scheduled for 2009.

A CEO course (Opportunity C) was envisioned, but it has not yet been developed. Finally, NMCC wanted a program for small and medium-sized enterprizes (SMEs), and thus Opportunity D was created. The first instance of Opportunity D began on September 26, 2008.

Chapter 2

VLFM early results

Forty-eight people participated in the first instance of Opportunity A that ran from September 2007 through May 2008. At the end of the session, it was too early to have specific results in participating companies from what participants learned during the session. However, a survey was carried out to learn what the participants' CEOs thought of their participation in Opportunity A. The CEOs were questioned about any behavior changes they saw in their participants and about plans they had for future use of participants within their companies.

As judged by their CEOs, over 96 percent of participants had changed their behavior to a fact-based approach to management. Over 78 percent were now using the tools and methods they learned in Opportunity A. Fifty-two percent of participants showed improved leadership capabilities. Forty-two percent of participants exhibited a broader view of manufacturing, from a small-m viewpoint to a big-M viewpoint.

In terms of increased use to the company, 49 percent of participants had already been assigned to a more challenging jobs; for 35 percent of the participants, CEOs had definite plans to assign participants to more challenging jobs; and the CEOs of the remaining 16 percent of partcipants' CEOs said they would consider more challenging assignments for the participants.

A first annual meeting of Opportunity A alumni was held on July 26, 2008, at which the participants in the first session were given certificates of completion.[30] As part of the annual meeting, the graduates wrote secret commitments for themselves to meet before the next annual meeting and put the commitments in a "time capsule" box.

Also at the first annual meeting, the participants for the upcoming second session of Opportunity A were introduced to the graduates of the first session. The availability of a VLFM website for continuing sharing and a VLFM alumni society for continuing networking were also announced.

At the annual meeting participants from both sessions dedicated themselves to changing India's manufacturing sector. Kalpana Narain reports that, from her continuing interactions with the first session graduates, they are working on their commitments to themselves, and their actions

(for instance, helping delivery the second session) indicate a deeds-not-just-words approach to improving the manufacturing sector.

VLFM is incrementally creating a series of publications (available for use by all opportunities, A–D). CII coordinates the creation and publication of the documents, with printing paid for by JICA.

Here is a list of documents already published in the VLFM Series:

- *Learnings from the Toyota Production System — To Higher Competitive Advantage*, Professor Takeyuki Furuhashi, 2007, 101 pages[11]
- *Making Excellent Comments* (a methodology on how senior managers should make comments which will benefit the person to whom the comments are directed), ≈10 pages
- *Review Report, VLFM Programme, Opportunity A, Sept. 23, 2007–March 2, 2008*, 55 pages
- *The Tata Steel Story* (based on a VLFM session presented by Dr. J.J.Irani, Director, Tata Sons), ≈10 pages
- *V-Map - Draft Version 0*, Professor Takeyuki Furuhashi, September 2008, 45 pages[12]
- *Concept Creation* (based on a VLFM session presented by based on the session by Mr. Mori, a expert from Japan), ≈10 pages

VLFM also publishes a newsletter from time to time and is currently planning to publish a compilation of sessions presented by:

- Kaustubh Shukla, COO, Godrej PES Division
- Pranav Parikh, Chairman, TechNova
- Arnoud De Meyer, Dean, Judge Business School, Cambridge University

As I wrote this in September 2008, sufficient time had passed for specific results to be realized by companies from the participation of their senior managers in the first session, and case studies of such results are the subject of the rest of this chapter.

The following case study descriptions assume the reader is already familiar with the Toyota Production System. For more about TPS, see page 71.

These case studies were current at the time I drafted them in late September 2008.

2.1 Anand Automotive Systems

Anand Automotive Systems is a manufacturer of automotive components and systems in India, with an annual sales turnover of $634 million. The company was founded in 1961 by Mr. Deep C. Anand. Today Anand comprises 16 companies in nine states of India. In addition to supplying many or most of the domestic automotive firms, about 15 percent of its total sales comes from the export market. The total employment of the Anand group of companies is over 7,500 people. Unusually in the Indian automotive business, a significant majority (13 of 16) of the group's companies are joint ventures, typically, with overseas companies. Mr. Anand apparently sees joint ventures as a better approach to overall company growth, and

he somehow has the knack of keeping these joint ventures working. When I asked Mr. Akhil Agarwal, president of Perfect Cirle (an Anand joint venture), "Why joint ventures rather than simple licensing?," he said that the joint venture leads to continuing involvement, with the partner continuing to provide technology updates.

There is substantial collaboration, standardization, and resource sharing across the Anand group of companies. For instance, Anand University assists in training across the group.

Anand has been involved with CII for some time and, thus, it was natural for several of the companies in the group to participate in the second of Shoji Shiba's learning communities. That activity went well, and five people from Anand participated in Batch 1 of VLFM Opportunity A, and six people are participating in Batch 2.

Mr. Saideep Rathnam arranged for me to talk with top managers at two Anand companies — Behr India and Perfect Circle. Mr. Rathnam is a senior director of the Anand group and is dean of Anand University. Mr. Rathnam noted that operating engineers who have been with the company for two or three years are given an assessment for potential. Those with appropriate potential are moved to quality engineering or maintenance engineering, starting with five months of intense training — 4 one-week training sessions with five weeks between each pair of training sessions.

Mr. Rathnam was in the first batch of real changes leaders during Shoji Shiba's learning community activities. He now directs Modules 2 and 4 of Opportunity A and helps with Module 1.

The following two subsections describe some of the effects VLFM has had on the two Anand group companies, Behr India and Perfect Circle.

Behr India Ltd.

Behr India is a 60-40 joint venture between the Behr Group in Germany and Anand. It makes engine cooling systems (including the Visco© fan clutch) and HVAC systems for automobiles made by many different companies. In addition it provides a global purchasing service of Behr worldwide and engineering services for other parts of the Behr group.

Behr India sent two people to Batch 1 of Opportunity A, Mr. Suraj Hukkeri and Mr. Sumit Bhatnagar.

On September 20, 2008, on the several hour bus trip from the CII office in Mumbai to Behr India's factory in Pune, I talked at some length to Tribhuvan Rasyara, General Manager - Operations (i.e., plant manager) for the Pune factory and himself is a participant in Batch 2 of Opportunity A.

When I asked Mr. Rasyara what impact he saw from the VLFM program on Behr India, he first mentioned that he had seen a significant change in the attitudes and behavior of Mr. Bhatnagar and Mr. Hukkeri resulting from their participation in VLFM. (Since participating in the VLFM program, Mr. Bhatnagar has been given higher responsibility, leading a joint venture elsewhere in the Anand group; and Mr. Hukkeri is said to be on track for promotion within Behr India.)

Also, Mr. Rasyara explained, the company began using the tools Mr.

Hukkeri and Mr. Bhatnagar learned in VFLM. For instance, the company had a long term problem with employee attrition. They had discussed the problem in the past but no action came of it. After Mr. Bhatnagar and Mr. Hukkeri learned the Five Step Discovery Process in VLFM, the company used that tool to build a model of their attrition situation which showed the specific aspects of the problem they should work on. This resulted in concrete actions for the first time and a consequent improvement in attrition rate so they now have what they believe is the most competitive rate in the Pune region.

Another technique Mr. Rasyara mentioned was Professor Takeyuiki Furuhashi's Visual Mapping Process for Value Stream Engineering.

Mr. Rasyara particularly mentioned the cross-company plant visits that are part of VLFM. Such visits are not common in Indian industry, and he sees them as a good part of the VLFM program. He gives credit to CII for the inter-company nature of the program (most programs he has known have been classroom-only programs), and he particulary appreciates that CII is involving a reasonably small community of participating companies (which makes the program different than either big class or professional society sorts of activities).

After arriving at the Behr plant for this cross-company plant visit, the VLFM group was shown a brief Powerpoint slide show about the company. As part of this presentation, we were told that in late June and early July, between the time of Opportunity A Batch 1 and Batch 2, Professor Furuhashi had visited the Behr India plant and worked with a team of five or six engineers. Professor Furuhashi's primary goal was to develop a manual[31] for what he came to call the V-Map process (Visual-MAPping). According to the Behr people, the process evolved and improved as Professor Furuhasi developed the draft manual. In particular, their view of fluctuations changed, and they saw the benefit of level flow.

They used their improved insight and Professor Furuhasi's better methods to improve their material and work-in-progress flow and the quality of their products. For instance, change-overs of a machine from one product to another used to take 40 minutes, and they previously ran the same product on a machine for three days between change-overs. The change over time has been lowered to 5 minutes with product change overs moving to alternative days and now every day, and their ambition allow a change over for every shift. Because of the reduction in materials and work-in-process, they have also freed up considerable space. Because there are global layout standards in Behr, Behr India exported its improved approach to the rest of Behr.

Then we went on the plant tour. The 48 VLFM people were divided into about 8 groups of 6 each, and each group looked at a different part of the factory with the help of a guide from Behr. I joined the group that looked at the production line for producing the HVAC for the Mihindra Scorpio car. Mr. Rasyara also was a member of this group (viewing one production line in the plant he manages when not attending VLFM) which is probably why I was assigned to the group.

My first reactions were (a) how clean and tidy shop floor is, and (b) the

impressive amount of information they show visually at each production cell (they call them "fractals").

The group of which I was part was guided through the process for making an HVAC system for the Scorpio car. In keeping with the principle of driving the process from the customer end, we were guided from the customer-end backwards to the beginning: the outgoing loading dock → finished good storage → HVAC assembly → completing heat exchangers using controlled atmosphere brazing technology (NOCOLOK®) → bending metal for the parts of the heat exchanger → incoming material storage.

Production teams regularly update a multi-skill matrix for the operating engineers. The matrix shows individual skill levels, and plans for each person to graduate to next skill level. This is visual tool is posted at each fractal. Further many operating engineers who started off their careers in production lines have now graduated to various higher functions such as heading a production line or working in the quality function, engineering, etc.

I assume the group continued to the receiving dock, but at that point Mr. Hukkeri took me away from the factory tour for a meeting with Mr. Kaul, Chief Operating Officer and General Manager of the Behr India plant (a meeting in which Mr. Hukkeri also participated).

I asked Mr. Kaul how he decided to send Mr. Hukkeri and Mr. Bhatnagar to participate in Batch 1. He explained that they decide at the Anand group level who attends VLFM. He had previous interactions with Shoji Shiba as part of the learning community activities; and he fought for two people from Behr India to be sent to improve the likelihood of the company benefitting from the program (this was also in the face of a CII quota for numbers of people from each company). He noted that Mr. Hukkeri and Mr. Bhatnagar were senior people with a good sense of the company who were likely to stay with the company and give back from what they learned.

Mr. Kaul said that they have had success in improving two of their lines even though they thought they were world class before their eyes were opened to new possibilities. Mr. Kaul also sees a change in his managers — he sees new vitality, and he senses that the engineers on the shop floor like it there.

A few days after the plant visit, Mr. Hukkeri sent me some additional data on the results of Behr's V-Mapping work, as shown in Table 2.1

The V-Map approach has four levels: level 1, level 2, level 3A and level 3B. Behr India had completely level 1 mapping for all of their production lines. Additionally, they had completed mapping for two lines all the way down to level 3B, and *Heijnka* implementation was going on for those lines. They were scheduled to extend V-Mapping down to level 3B to their other lines, realizing additional benefits such as those mentioned above for the two lines that have already been fully mapped. Overall, they the following schedule for the year beginning in August 2008: 1. V-Map training for all fractals (finished); 2. V-Map training (in process); 3. Map all fractals to obtain their current state at levels 1, 2, 3A and 3B; 4. Identify

Table 2.1: Additional results from Behr India, plus two future steps.

	Before	After
1.	No leveling of production causing over production leading to shortage of trollies and line stoppage.	Implementation of *Heijunka*, triggering on per-customer consumption and thus reducing fluctuations.
2.	EPEI (Every Part Every Interval) figure of 3 days; setup frequency of one model every three days.	EPEI figure of 1 day; setup frequency of one model every day (see post-change *Heijunka* box in Figure 2.1).
3.	*Kanban* was used for tanks.	Tanks *kanban* replaced by on-line feeding, thus eliminating work-in-progress.
4.	180 heaters stored on each trolley with trollies requiring 34 square meters of space (see left side of Figure 2.2).	Heaters stored in bins (rather than trollies), 18 heaters per bin, with bins taking 11 square meters of space(see right side of Figure 2.2).
Next step		Relocate leak tester to be 15 meters closer to the oven exit.
Next step		Then relocate rework station to be 50 meters closer to the leak tester.

improvement areas; 5. Implement improvements; 6. Re-map all fractals to confirm improvements; 7. *Heijunka* calculation; 8. *Heijunka* implementation; 9. Linkage to *kanbans*.

Perfect Circle

Based in Nashik, India, Perfect Circle[32] is India'a largest exporter of piston rings.

On September 21, 2008, I visited with Mr. Akhil Agarwal, president of Perfect Circle, another Anand company (a joint venture with the U.S. company Dana Corporation). Mr. Agarwal was educated in metallurgy and has 37 years of business experience. He has been with Perfect Circle for 20 years and has been president since 1994. Previously he was general manager of the company.

Mr. Subodh Korde, general manager of the ring division, was also present for the meeting with Mr. Agarwal.

I asked how Perfect Circle became involved with VLFM. Mr. Agarwal said that the Anand group CEO, Mr C.S. Patel, has had lots of interaction with CII over the years; and Shoji Shiba had already been working with the Anand group. Mr. Patel initiated the Anand Group's involvement in VLFM.

Mr. Agarwal saw the need for visionary leadership to find and meet the needs of the future customer. Thus, he designated Mr. Korde for participation in Batch 1.

According to Mr. Korde,[33] the company's main product lines are plain rings and chrome rings. Within plain rings, they have three product families: (1) napier rings as original equipment for automobiles mainly in Europe; (2) small rings as original equipment for compressors in India; (3) plain oil rings for after sales service. Within chrome plated rings, they

Figure 2.1: Heijunka box after reduction of EPEI; see point 1 of Table 2.1.

Figure 2.2: Heater storage before and after; see point 4 of Table 2.1.

have four product families: (1) ductile (nodular iron) rings with diameters greater than 100 mm as original equipment for heavy duty engines; (2) ductile rings with diameters less than 100 mm for domestic after sales service; (3) chrome oil rings mainly for after sales service; (4) chrome compression rings mainly for after sales service. Perfect Circle also has a business of supplying of *sets* of rings from both the plain and chrome product families, depending on customer requirements.

Mr. Agarwal stated that Perfect Circle has applied the methods learned in VLFM such as TPS (or lean manufacturing) and value stream mapping in a pair of areas. They have identified the need for customer satisfaction in deliveries, including for delivery lead times. They have also substantially reduced their work-in-progress and travel time within the factory, which in turn have freed up a substantial amount of space in the factory. In their "plain ring" family of products, a consequence is reduced scrap and reduced customer complaints. Specific results are shown in Table 2.2

They have designed the current and future value stream to drive manufacturing from customer need. They have reworked the capacity of each value stream. Manager authority and responsibility has been aligned with each value stream. The reports for production planning, production, quality, and accidents have been aligned with value streams. Manpower requirements and deployment has been aligned with value streams. Employee group activity has been aligned with value streams.

Among some of the more specific actions, an astonishing figure they mentioned to me is that, over the past almost 18 months, they have moved 117 machines — an average of over 7 machines per month. They have also implemented an accident clock and a safety awareness poster, and have begun implementation of an *andon* system.

Mr. Agarwal and Mr. Korde also noted some future goals. They plan to reduce scrap for chrome rings by 23 percent; however, they believe that this will require some new technology. They plan to reduce total inventory 15 percent. They plan to continued training sessions for managers

Table 2.2: Results at Perfect Circle over the past ≈18 months, mostly relating to plain rings.

Inventory	Work-in-progress down 45 percent; total inventory down 26 percent; value of WIP down 27 percent.
Distance traveled	Napier rings reduced by 85 percent; small rings reduced by 58 percent; oil rings reduced by 79 percent.
Floor space released	A total of 889 square meters released from 8 different factory area; 11 percent reduction in space.
Lead time	Napier lead time reduced 53 percent; small rings lead time reduced 75 percent.
Pull system	A visual kanban system has been installed, that operates on a FIFO basis where additions to a kanban can only be made when a unit has been removed by the following step, driven by shipments to customers and cascading all the way back to triggering suppliers; a 50 percent lot size reduction has resulted.
Scrap reduction	43 percent reduction in plain ring scrap.

on value stream mapping and lean thinking (to date 72 people have attended training sessions); they are also providing hands-on training for value stream mapping and layout design.

Mr. Korde (whose original degree was in electrical engineering and who has a graduate diploma in finance) took me on a trip around his factory.

During my tour I met several of Mr. Kordo's operating team which included: Kumar Rao (layout change), Subhash Patil (production), Alim Shaikh (production), Suhas Khade (production), and Sunil Phatale (production planning), who I did not meet. Their big challenge was to change the culture of all the people in the organization.

On the tour, I saw some of the following:

- A bulletin board where they share up-to-date information on company performance with all employees — figures for safety (daily), delivery (monthly), morale (daily), quality (monthly), growth (monthly), and productivity (monthly).
- The empty area along one whole side a factory building and the empty wing of the same building where space had been freed up by their value stream mapping.
- *Andon* lights for eight different value streams.
- A 4W1H action plan for the next 90 days posted on a bulletin board at each cell.
- Carts and trollies in boxes painted on the floor as visual *kanbans* for work-in-progress between pairs of machines.
- A poster (Figure 2.3) portraying the company's safety concept — each person has a responsibility for safety for his or her own benefit and for the benefit of the entire "family" (i.e., company).

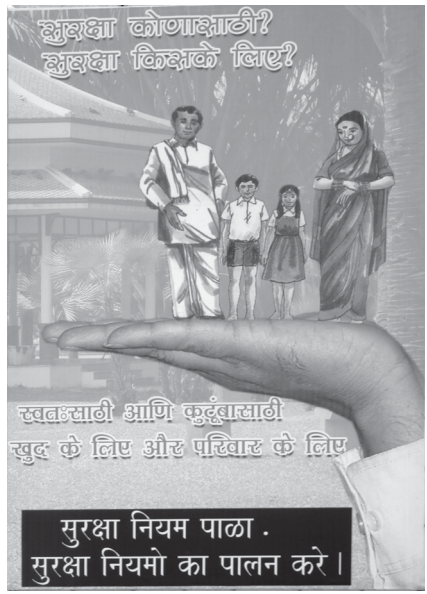


Figure 2.3: Perfect Circle safety poster.

- A first-in-first-out system in finished goods consisting of a set of metal shelves, open on both sides, with boxes of finished goods placed on one side of the shelves and pushed, as an additional box is added, to the other side of the shelf from which boxes are removed. Where the inventory of a certain type resides on these shelves is controlled with a set of plastic pockets on the end of one bay of shelves, where each position in the layout of pockets indicates a specific area on the shelves, and the writing on the card in a pocket indicates what is in the area of the shelves; with not so many types of inventory, a person can see at a glance what is where.

Mr. Korde and some of his key managers also showed me a room with the walls covered with charts and other paper tools — such as current state maps, floor plans for buildings and movable paper cutouts representing each machine. They have spent much time moving the paper cutouts around the floor plans as they incrementally figured out significantly improved positions for each machine.

From the room, I was taken to a bulletin board near one set of machines where they had figured out how to additionally improve the flow of material between a set of machines (Figure 2.4).

As we walked, Mr. Korde had told me some more things about the way they worked and plan to work going forward and where they had gotten their insight.

- He learned about the *andon* system and color standards in VLFM.
- He saw an accident board in another company.
- He led the first cycle of improvement, but his subordinates will lead the next cycle including teaching other employees and suppliers.
- To date they have done value stream mapping of their production line; they will also do it for the inspection function.
- They used a "part-and-process" approach to value stream mapping which assumes all parts with the same process reside in the same value stream. In this approach, a chart is made (one for plain rings and one for chrome rings) with processes on x-axis and parts on y-axis. This highlights groups of parts with the same or similar processes. They call these groups "product families."
- They did a current state map for all product families.
- The value streams are now distinct to the extent possible, where in earlier days the value streams were mixed together. "With a conventional system, you can't tell what is happening when a customer calls," says Mr. Korde.
- They drive many things off the value streams: the daily production report, the weekly plan for deploying people, and the daily inspection report are all organized by value stream. In fact, the entire budget for the next year is keyed to the value streams.
- They have moved many machines but they still need to get *all* the plain ring machines into a single building.

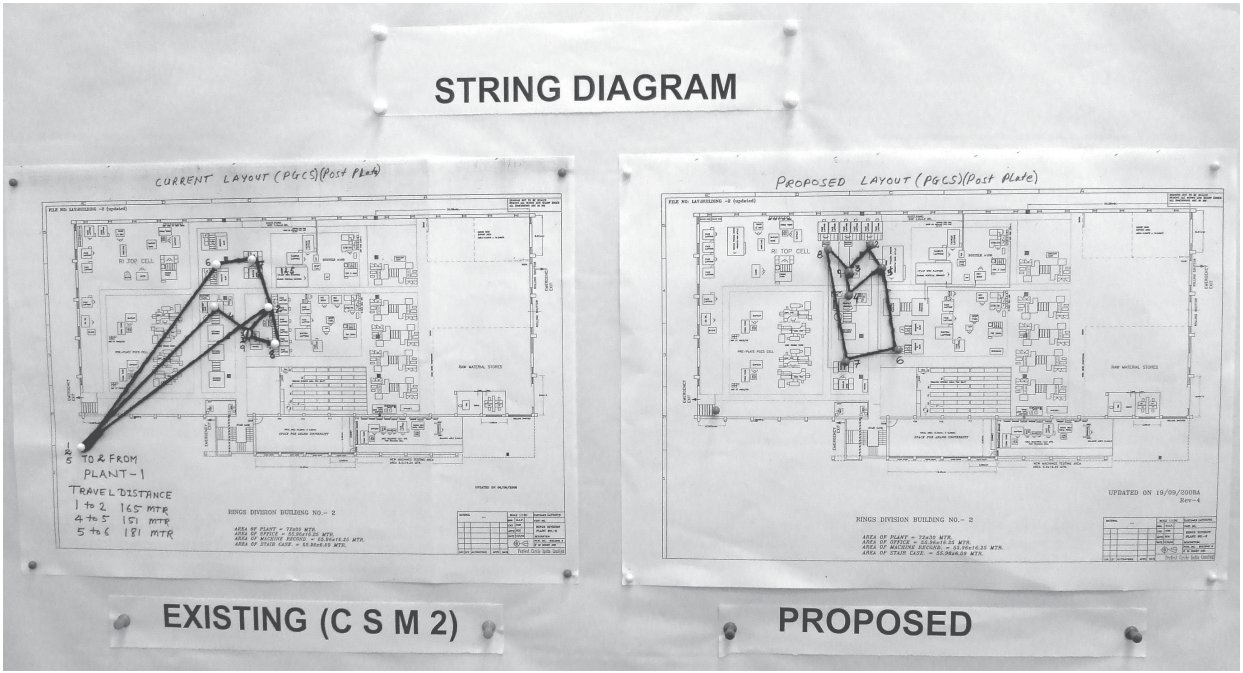


Figure 2.4: Diagrams using a floor plan, yarn, and push pins that measure the distance through a series of machines: on the left is the current state map after the first round of machine relocations, where one machine in the flow is in another building (note the pin at the bottom left on the floor plan); on the right is the proposed state diagram after the future move of a grinding machine in another building to this building.

- At one point as we walked, Mr. Korde referred to the "seven wastes" (of Shigeo Shingo) and Perfect Circle's approaches to eliminating them:
  1. Overproduction — use of value stream mapping with a *kanban* between steps of a process to control inventory levels
  2. Transportation — relocation of machines (as already discussed)
  3. Unnecessary inventory — balance "man and machine"
  4. Inappropriate processing — eliminate it
  5. Waiting — reduce set up time
  6. Excess motion — only a few modest efforts to date; need to do a comprehensive ergonomic study and decide on an action plan
  7. Defects — correct the wrong action
- Continuous improvement was how they learned — over many projects.

Of his participation in VLFM and the improvements in his factory, Mr. Korde expressed great happiness. He is proud to be part of the VLFM community. He is pleased to be passing on what he has learned to Perfect Circle's employees and suppliers. He has a dream of happy customers, happy employees, and a new search for excellence. All in all, Mr. Korde and his subordinates were visibly enthusiastic about what they are doing.

2.2 Godrej

Godrej is a large (approaching $2 billion in annual turnover) company that is in a number of businesses.[34] The company has a long history,[35] having been founded in 1897. Jamshyd N. Godrej is the current chairman and is personally involved with VLFM.

Godrej's use of the VLFM program is a story of management development — a story in three parts. As you will see, the company increases the amount it gets out of the program by the amount it puts into the program.

G. Sunderraman's journey and involvement with VLFM

On September 24, 2008, I talked to G. Sunderraman, Vice President Corporate Development, of Godrej & Boyce Manufacturing Co. Ltd. We first met in the CII Excellence Centre on Godrej's Pirojshanagar campus in the Vikhroli part of northeastern Mumbai.

G. Sunderraman did his pre-college schooling in Gujarat and went on to receive an electrical engineering degree from IIT Madras. After university, he took a job at GEC India (then a subsidiary of GE in the UK). From there he took an MBA from the prestigious Indian Institute of Management Ahmedabad, and then took a job with Godrej where he had been 27 years (to the day) on the day we talked. He spent five years in sales and marketing which included market planning and starting and managing a sales branch in the northeast of the country. Next he shifted to manufacturing where he was a deputy plant head.

However, Mr. Sunderraman became interested in quality, and in 1988 started getting involved in the early stages of the quality movement in India and with CII where he met Sarita Nagpal in 1989. He moved out of his position in manufacturing in 1990 and took a position driving quality

in Godrej and reporting to Jamshyd Godrej, managing director of the company, company and Mr. Kalwachia, the then head of human resources. At first Mr. Sunderraman's quality position mostly included grass roots TQM training and awareness. In 1994 his purview expanded to include manufacturing quality. Because Godrej's appliance business was a joint venture with GE at the time, they were involved with 6 Sigma, the balanced scorecard, etc., which Mr. Sunderraman learned.

In 1998 Mr. Sunderraman took over the lead of purchasing where he was involved with the entire supply and logistics chains.

In 2004, Mr. Sunderraman participated as an individual (Godrej did not participate as a company) in Shoji Shiba's learning community activities (page 64). He thereafter initiated corporate innovation initiative in 2006. Consequently, he encouraged Godrej's corporate involvement when the VLFM activity started.

A few months later, Mr. Sunderraman and Sarita Nagpal were discussing the possible locations of the Opportunity A administrative and classroom activities, and Jamshyd Godrej said to do it at the existing CII Excellence Centre on the company's Pirojshanagar campus. Shoji Shiba and Mr. Sunderraman specified how to renovate a wing of five classrooms to be outfitted with floor-to-ceiling white walls for posting group work. They also specified carpeted floors in the class rooms for sitting on the floor during group work and a polished corridor floor and cubby holes for shoes with the idea that shoes would be removed as a sign of respect for this learning area. Mr. Sunderraman was closely involved throughout the 3–4 month renovation effort. The results can be seen in Figures 1.5 and 1.6.

When the first instance of VLFM Opportunity A was gearing up, Mr. Sunderraman was asked to be the director of Module 3 on product development. He also helped with Module 1 in which the basic tools such as the Five Step Discovery Process are learned. He also used his business contacts to help find other people to help with Opportunity A. He estimates that last year he spent 20–25 percent of his time on VLFM. This year Mr. Sunderraman has taken more responsibility for Module 1, and on the day I talked to him he was doing the detailed preparation for the upcoming session of Module 3.

Throughout all this activity with Shoji Shiba's learning communities and VLFM, Mr. Sunderraman is finding he himself is changing, for example, his ideas and thinking on leadership and his approach to product innovation, using Concept Engineering, the Five Step Discovery Process, etc. (as well as tools from other sources). Mr. Sunderraman believes that a significant benefit to Godrej of his participation with VLFM is his personal development, as will be illustrated below.

Godrej's use of VLFM for management development

Godrej had eight participants in the 2007–2008 session of Opportunity A: two people from the Appliances Division, two people from the Storage Solutions Division, two people from the Interior (furniture) Division, and two people from the Precision Engineering Systems Division. The company now has 14 participants in the 2008–2009 session of Opportunity A: three

from the Furniture Division, three from the Precision Engineering Division, two from the Appliances Division, two from the Locks Division, two from the Storage Solutions Division, and two from the Tool Room Division.

G. Sunderraman provided three examples of the benefit to Godrej of these people participating in Opportunity A.

Example 1. Since participating in Opportunity A, the then head of one of the Appliance Division's manufacturing units, Mr. K.K. Saraf, has been placed in a position where he influences all three manufacturing units, their vendors, and product integration. He pushes the frontiers of quality and the frontiers of supplier development. He provides guidance to people in a plant who are doing V-Mapping, thus bringing this and other tools from VLFM to people in Godrej who themselves did not attend VLFM.

Mr. Saraf's replacement as the head of that Appliance Division's manufacturing unit is in the second batch of Opportunity A, and now both of them can drive value stream engineering in the unit.

Example 2. The manufacturing head, Mr. P. Balasubramanian, of Godrej's storage solutions division (e.g., warehouse storage racks, handling equipment, etc.) was in Batch 1, as was Mr. G. Ramanathan, Mr. Balasubramanian's head of quality. Mr. Balasubramanian is now driving value stream engineering and plant reconfiguration to improve throughput in his plant.

This division has two more people in Batch 2 which soon will give them four people in the division with VLFM training. Their goal is to move from a turnover of Rs. 150 crore to Rs. 400 crore.

The storage system for each customer is different. Thus, in addition to doing value stream engineering on their own processes, they must understand the value stream of each customer (in effect doing a value stream engineering project for each customer) in order to deliver the appropriate storage system. All in all, they need to do value stream engineering for their own plant, for their project delivery process, and for the customer's value stream. With regard to their own plant, they expect to have a new layout by December 2008.

Mr. Sunderraman says of Mr. Balasubramanian and his participation in VLFM, "It released the potential of the business." The business has now made a profit for the first time and forecasts an increased profit next year. Mr. Balasubramanian himself is deputy director of Module 1 and Module 2 for Batch 2 of Opportunity A.

Example 3. The head of a manufacturing section of the Furniture Division was in Batch 1. The division has lots of products, lots of product changes, low volume for each product, etc., so their process flow must be efficient. With the new knowledge from VLFM coming into the division, the division's managers are now attacking the efficiency issues with new insight.

As mentioned, Godrej had six people in Batch 1, and they now have 14 people in Batch 2. Each division that participated in the first batch has two or three people in the second batch in order to provide continuity and increase critical mass in a division. They also have people from two additional di-

visions in Batch 2 — the Locks Division and the Tool Room Division. The general manager of Research and Development is also in Batch 2.

Godjeg could only have so many people in Batch 2, and there was competition among the division heads for positions in Batch 2. I asked Mr. Sunderraman who makes the decision about who attends VLFM. He said he makes suggestions to the business heads and the head of human resources, plus the business heads have their own views about who should attend. Ultimately a list of participants is drawn up, and Mr. Godrej understands and endorses that list.

Mr. Sunderraman states that VLFM gives them a common language and set of methods, provides an improved model of leadership behavior, and increases management motivation. It also provides an approach that can be trained downward and also implicitly provides training to the division heads, going upward.

Godrej's innovation initiative

Later during our talk, Mr. Sunderraman took me to see Godrej's main show room on the campus and to see the on-going innovation work posted in his office and in the room they call their "innovation centre." At the centre, Mr. Sunderraman also introduced me to Mayur Rathod, Deputy Manager - Innovation, Appliances Division.

Mr. Sunderraman made the point that they they add insight and methods from other sources to what they learn from VLFM. For instance, they worked with Clayton Christensen and his consulting group, Innosight. Shoji Shiba first directed Mr. Sunderraman to Christensen's work on destructive technologies.[36] Godrej also learnt from workshop conducted by IDEO. These methods from other sources appear compatible, even synergistic, with the methods Godrej has learned from VLFM.

Mr. Sunderraman's corporate innovation initiative started with asking Clayton Christensen and his consulting group to develop a set of approximately 20 destructive innovation ideas — business or technology ideas that, if implemented, could fundamentally change a business and likely disrupt existing markets. A smaller expert team reduced the 20 ideas to 8, and of these Mr. Godrej picked four for attempted implementation. Mr. Sunderraman was assigned to bring these initiatives to fruition.

Mr. Sunderraman provided me with descriptions of two of these initiatives.

One initiative. Mr. Sunderraman states that only 16 percent of the population of India own a refrigerator. The basic range of refrigerator prices and sizes go from Rs. 7,000 price (something like $175) for a 175 liter capacity unit to Rs. 11,000 for a 250 liter unit. The minimum size and price of refrigerator in a typical product line is Rs. 6,500 for a 100 liter unit. Most people cannot afford the minimum price or the electric power cost of operating such a refrigerator, and they also don't have floor space for a typical refrigerator. There is a market for second hand refrigerators of the 175 liter size at a second hand price of Rs. 2500, but even then the cost of electricity and the space taken are issues.

Furthermore, when the product development team from Godrej looked into such second hand refrigerators in the small (oftentimes makeshift) houses in Indian villages, most of the 175 liter capacity was unused. The family might have a couple of small bowls of food left over from the previous meal, a few water bottles, and two or three other small containers. They might only use a few tens of liters of the refrigerator's available capacity, and they don't typically use the ice making capability of the refrigerator.

The idea of this initiative is to provide a small (essentially portable) 30/45 liter capacity refrigerator to sell for Rs. 3350–3800. The problem with conventional refrigerator cooling systems (compressors, condensers and evaporators) is that they cost a minimum to Rs. 2,000; thus, the envisioned small refrigerator is cooled by thermoelectric means. (This technology has previously been used in high end car cooling systems and for picnic coolers.) The outside dimensions of the refrigerator are about .9m wide (with carrying handles), .6m deep, and .6m high. It runs on an uninterruptible power supply (i.e., battery power) with a power cord to plug it into the electrical grid.

As with the other initiatives, the development of this idea used the tools taught in VLFM, for example, the Five Step Discovery Process and V-Mapping. However, the members of Mr. Sunderraman's small team have not attended the VLFM course. Mr. Sunderraman teaches them the methods and guides their use of the methods until team members are fully capable with the methods. In this way, the VLFM teachings are being diffused into others in Godrej.

As with the VLFM methods, both Clayton Christensen's group and IDEO encourage going out to see and talk to the real potential users to find the needs they may not know they have and to test product concepts resulting from these needs. In particular, IDEO makes enormous use of photos of the potential customer environment and product use.

Team leader Sanjay Lonial and his team members, who are developing this initiative, visited typical villages where the small refrigerator might be sold, to observe things prior to and after prototype units were available. Among other analysis tools, they created charts like that shown in Figure 2.5. The chart in the figure looks a lot like the Five Step Discovery Process charts; however, it also includes photographic images to help the team understand the context of the labels on the chart. The intermixing of a conventional chart and the photos can be seen better in Figure 2.6.

Of the work they are doing, Mr. Sunderraman says, "Are we using the VLFM methods perfectly as taught by VLFM? No. But we live VLFM."

The team led by Mr. Lonial for this initiative is using the value stream engineering methods (learned by Mr. Sunderraman from VLFM) in two ways, neither of which is the way the Anand companies (page 32), for instance, use the methods to improve *existing* factory processes. First, the team creates the future value stream map for the future solution. Second, the team creates the value stream map for actually distributing (i.e., selling) the product.

They do not plan to sell these small refrigerators through the normal

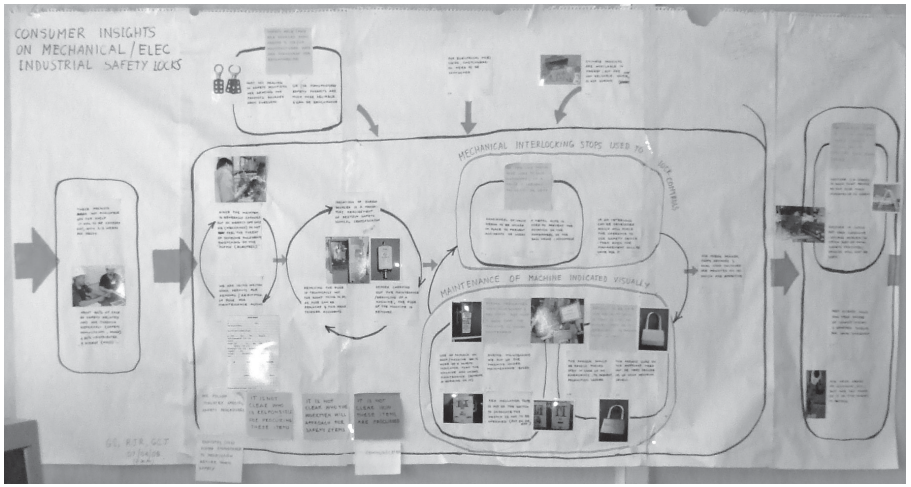


Figure 2.5: Combining 5SDP and IDEO's concept of using photos extensively.

Figure 2.6: A closer view.

Figure 2.7: Village demonstration stand.

large urban appliance sales channels, as those channels are not oriented to villagers who might buy the small refrigerators. Instead, they are creating an entirely new channel. They envision a woman of the village demonstrating the refrigerator on a small stand (see Figure 2.7) with a shelf on which to set one of the small refrigerators and an umbrella to keep off the sun. They are investigating sources of micro-finance to allow villagers to go into this refrigerator selling business. Thus, Godrej hopes not only to sell villagers small refrigerators that improve their lifestyle, but also to improve the livelihoods of some villagers.

The product is being launched in February 2009.

Another initiative. On September 25, Mr. Sunderraman introduced me to Manoj Rathi, an innovation team leader in Gogrej's Interio (i.e., furniture) division. For 13 or 14 years Mr. Rathi had been working for Godrej in sales in Gujarat state. The company posted the job of leading this innovation effort, Mr. Rathi applied, and he was accepted for the position and moved to Mumbai with his wife and children.

The Interio division historically has made office furniture, both off-the-shelf and custom, but made only off-the-shelf furniture for residential use. The market for off-the-shelf residential furniture is small compared with the market for custom furniture. For instance, the off-the-shelf market is Rs. 3,000 crore while the custom market is Rs. 14,000 crore.

Today a person wanting customer furniture for his or her home has "five points of pain," as Mr. Rathi discovered using the VLFM methods, e.g., 5SDP, MPM, etc., methods he learned from Mr. Sunderraman who also guided him in their initial use. The points of pain are:

- finding a good carpenter
- budget and delivery time escalation after the carpenter has been selected based on his quote
- seeing a selection of design materials
- the possibility of the carpenter using materials of lesser quality than he quoted
- envisioning the finished product and its placement in the house

The day I interviewed Mr. Rathi, he was the sole member of his team, but two more people were to join his team the following month.

The customer residential furniture business they envision will be based on standard manufactured components that are on display in regional design studios. The studios will be franchised. Each studio will have examples of available materials, images of the finished furniture constructed from the components, and a system for envisioning various configurations of the furniture in the customer's home. A designer will reside in the studio to help the customers.

They also envision creating a network of qualified carpenters and less skill assemblers affiliated with each design studio. The assemblers will do the routine work of assembling the components into a "custom" piece of furniture, and the carpenters will do the actual custom installations. Godrej and the design studios will provide tools, jigs, and training to carpenters and assemblers. Thus, in addition to removing the five pain points for customers, they will also improve the lives of the carpenters who are expected to earn three times as much as they do now and who are usually not comfortable with the business as opposed to craft part of making furniture.

Godrej has 14 percent of the market today and, by discovering the unmet, unspoken, and probably unimagined needs of the customers, they hope to gain a much large share of the market. They are planning a pilot program in 15 of Godrej-owned apartment buildings in December 2008.

Mr. Sunderraman concluded this visit with Mr. Rahhi by making that point that, "VLFM lives in Godrej by moving from person to person and not only in the Godrej people who have themselves attended VLFM."

2.3 Sona Koyo Steering Systems Limited

Sona Koyo Steering Systems Limited is a joint venture of the Sona Group of India[37] and Koyo Seiko Company (now JTEKT Corporation) of Japan, a global technology leader in steering systems and drive line products. At this time, the company has a turnover of Rs. 8,300 million (about US $200 million).

The company has been following the TQM practices since 1998. In 2003, Sona Koyo was awarded the Deming Prize. It was recipient of the JIPM TPM Excellence Award in 2007. In 2004, the company was a founding member of Shoji Shiba's Learning Community for Breakthrough Management (page 64). As a member of this community, the company developed several "Real Change Leaders" (RCLs) who developed skills in applying breakthrough management principles. The company was involved

in the initiation of the VLFM program and provides support by being on the VLFM Board; two of company's RCLs were Module Directors for two modules during the first batch of Opportunity A.[38]

Sona Koyo sent ten participants from four divisions of the Sona group to the 2007–2008 session of Opportunity A, and it has five participants from four divisions in the 2008–2009 session.

The two improvement stories in this subsection were forwarded to me by Kiran Deshmukh. He is the Deputy Managing Director of Sona Koyo and himself was a participant in Shoji Shiba's learning community activities. I was unable to meet personally with him during my September 2008 trip to India, but Mr. Deshmukh and I had met face-to-face and spent several days together in May of 2007 at a workshop organized by Shoji Shiba in Fayence, France.

Story from Sona Koyo Steering Systems Ltd. Gurgaon Plant

The September 8, 2008, write-up from which I derived this subsection was done by Mr. Manoj Kumar Sharma, who participated in Batch 1. The write-up begins with the following statement.

> Recently, due to huge attrition of engineers and supervisors, as a result of general surge in Indian economy, the company faced severe crunch of trained middle managers. When commodity prices spiraled upwards in an unprecedented way, the company needed to achieve big cost reductions in its operations. Mobilizing a young team of engineers for applying the Japanese cost reduction practices became a challenge for the management. By diffusing the knowledge obtained by a few young leaders who had undergone the VLFM program, the company was able to achieve drastic cost reductions in a very short time.

Over the past two years, commodity prices have increased by 40–60 percent, and fuel prices have followed a similarly steep curve. Because of these cost increases and the rapid increase in competition in the Indian market, a tremendous decline in market prices is happening (30–40 percent over five years for some product lines), and there is great need for cost reduction. However, the required level of cost reduction is much more than normal incremental improvement activities can produce. Thus Sona Koyo must decrease manufacturing costs, even though they are not a large proportion of the price.

From the company's conveniently timed participation in VLFM, the participants came to understand the importance of optimizing the entire supply chain of a manufacturing process. The participants learned the basics of TPS from Professor Furuhashi in Module 2, in particular the concept of waste elimination; and in Module 5B they saw the practical application of aspects of TPS in a Toyota Industries plant in Japan.

In July 2008, Sona Koyo designed a waste elimination program, using VLFM's principle of 30 percent theory and 70 percent practice. Six groups of 10 engineers were given training in waste elimination with relevant examples, followed by practice sessions on selected assembly lines where each engineer was asked to observe opportunities for eliminating waste.

The practice sessions were repeated three times — until everyone was able to observe one waste per two minutes. With this training and skill in hand, each of the 60 engineers was given the target of identifying and eliminating at least one waste per week.

A total target was set of eliminating 720 wastes in three months. From July through September, 648 opportunities were observed and corrective *Kaizen* efforts initiated. About 35 percent of the discovered waste came from excess operations, another 35 percent came from defects, and the remaining 30 percent came roughly equally from eliminating wastes in inventory, transportation, waiting, and motion (the case study made no mention of waste from over production).

An example of removing waiting time involved line-balancing among seven pieces of equipment and reducing the number of operators from four to three. Two examples of removal of excess operation were (1) using one paste-on sticker where previously two were used, and (2) switching from manually cutting a piece of wire from a roll to using an automatic wire cutting machine (developed in house) to cut the piece of wire from the roll.

A third example of removal of excess operation is shown in Figure 2.8. There are ten threaded holes in a machined casting. The customer, a car maker, puts bolts in the holes while assembling a gear on it. To make 100 percent sure that the customer's assembly operator does not have trouble while assembling the bolts, Sona Koyo needs to check the quality of the threads of every hole. As shown on the left side of the figure, they previously did this inspection by actually tightening ten bolts in the ten holes and then removing them before shipment of the machined casting to the customer. Screwing and unscrewing was done by a pneumatic wrench with a hex nut socket fitting. But the operation was cumbersome because, after screwing in the bolts, the operator had to change the direction of the pneumatic wrench to unscrew the bolts. The new process on the right side of the figure uses threaded studs with a hex (Allen) socket *within* the circumference of the stud. With this arrangement the studs can be driven all the way through the threaded holes using an Allen key and fall into a pan below from where they can be collected for reuse. Thus, the two operations of screwing and unscrewing have been replaced by just one operation of screwing.

The results of the wasted elimination effort were fast and dramatic. Over the period of three months (from July–September 2008), Rs. 1.47 million in inventory carrying costs were eliminated. Motion was reduced by 1,135 meters. Waiting was reduced by almost 800 minutes. Operation time was reduced by 83 hours. Transportation was reduced by 79 kilometers. And 186 defects were removed.

The success story concludes:

> All the *Kaizens* were carried out by 60 engineers, 90 percent of whom had less than two years of industrial experience. In monetary terms, these savings amount to an annualized gain of Rs. 9.9 million, which is about 2 percent of the annual manufacturing cost. By continuing this process, it is expected that manufacturing cost can be brought down by at least 8 percent in a year's time. As engineers practice and attain higher skills, the benefits are expected to be even greater.

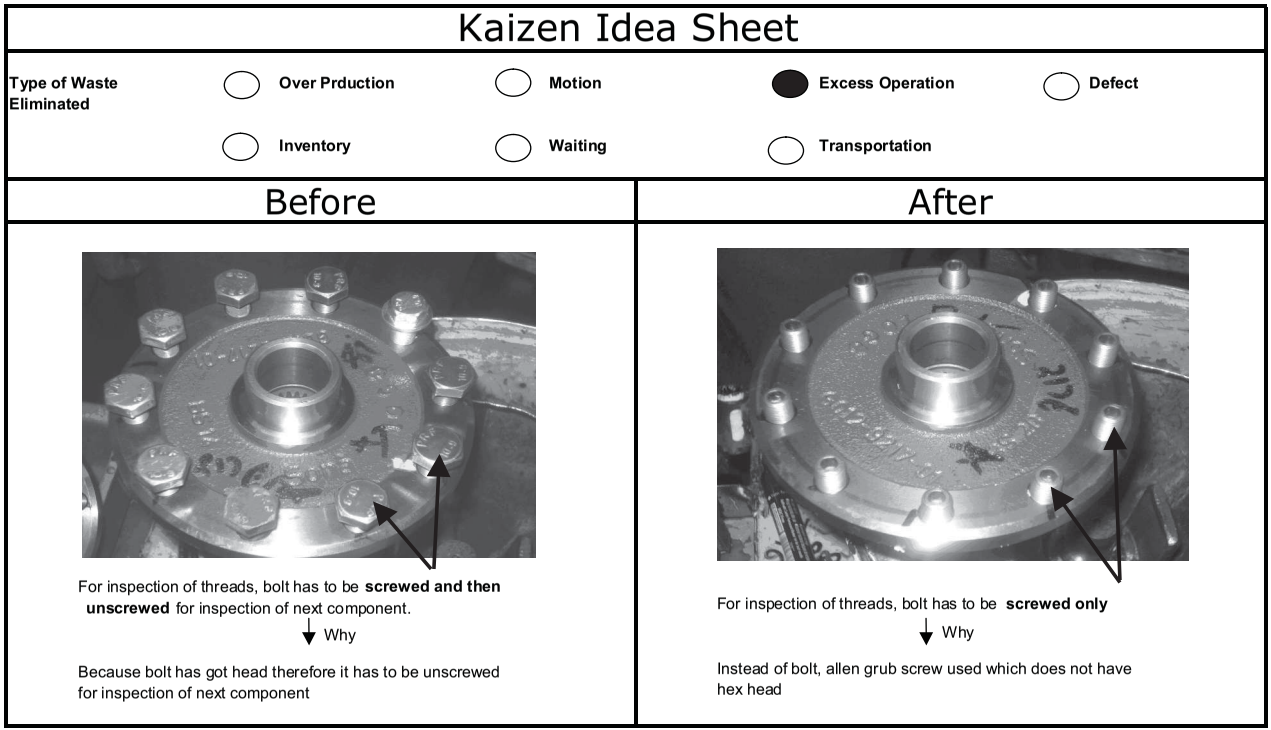


Figure 2.8: A example *Kaizen* summary for removal of excess operation.

Story from Sona Okegawa Precision Forgings Limited

Sona Okegawa Precision Forgings Limited[39] is a joint venture with Mitsubishi Materials Corporation. The write-up of September 22, 2008, from which I derived this subsection was done by Mr. Vikram Verma and Mr. Munish Sapra who participated in Batch 1 of Opportunity A.

Mr. Verma and Mr. Sapra mentioned three areas where Sona Okegawa has benefitted from their participation in VLFM.

The participants heard about and saw the Toyota Production System in use via the lectures and plant visits. They began understanding and using the methods of TPS (from April 9, 2008), and they have developed a road map for challenging the TPS Excellence Award by 2010. They have started with such basic practices as the 5Ss and a safety responsibility distribution map, and these fundamental steps have been diffused across their shop floor. They have also begun horizontal deployment of TPS in their European company.

They are using the methods relating to new product development that they learned in VLFM to increase business by adding a new product and process for a transmission speed gear. They anticipate a business increase of more than Rs. 2 million. They also plan to forward integrate from parts to the aggregated parts in the assembly of differentials, anticipating improving yields by 20 percent and a consequent more-than-four-fold financial improvement.

In what they call the "synergy" area, they were impressed with the goal-setting exercise they did in VLFM, and have been using that technique to create a vision "to be the worlds largest Bevel Gear manufacturer." To this end they are working to acquire companies and create joint ventures that take advantage of European technology, Japanese operations, and Indian management to create combined sales more than an order of magnitude greater than they could achieve alone.

Chapter 3

Indian Precursors to VLFM

The figure on the overside of this page (drawn for me by Dr. Sarita Nagpal) summarizes the history of quality activities in India, focusing on those activities with which the Confederation of Indian Industry has been involved. It will be useful for readers to refer to this figure as they read this chapter and refer back to Chapter 1, in order to keep the chronology straight.

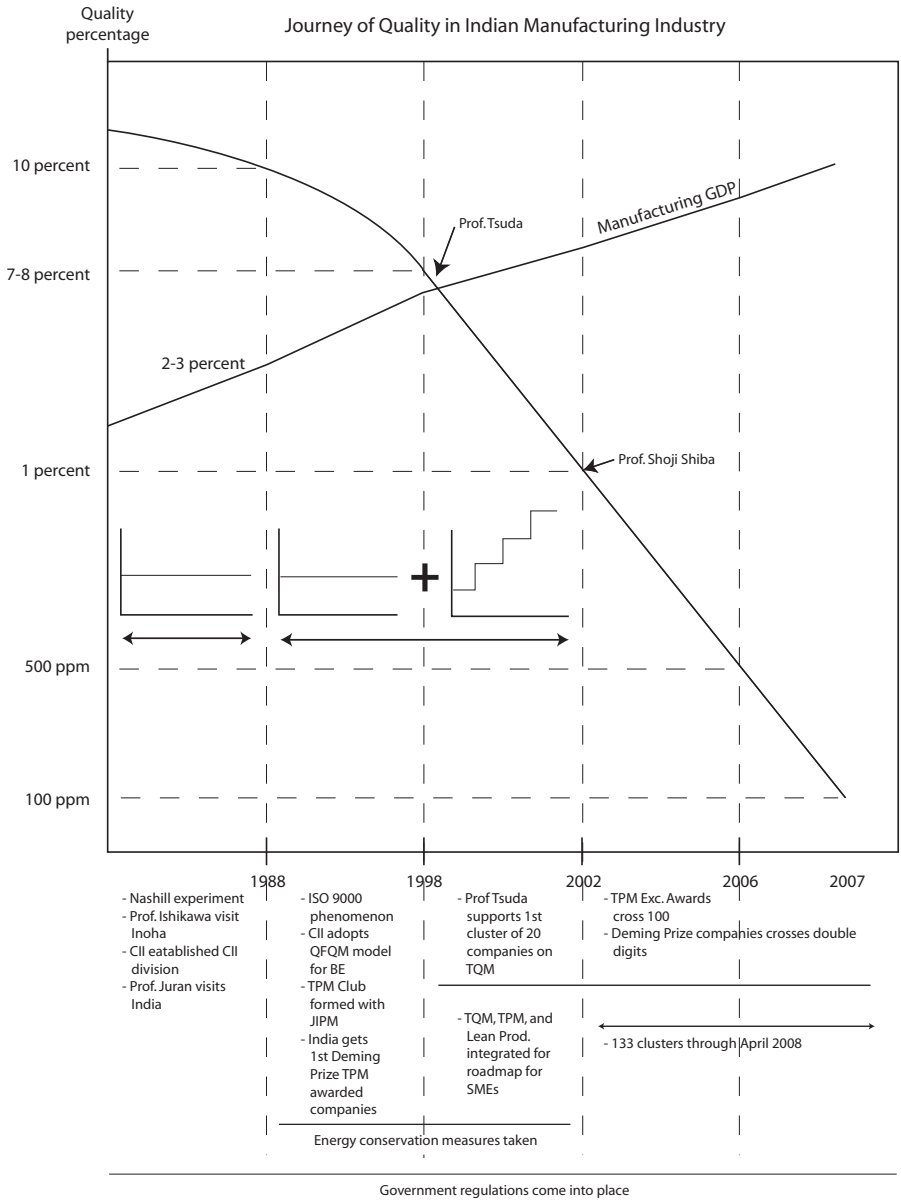
Other sketches of the history of the quality movement in India, from the point of view of a particular company, can be found in a 2007 conference presentation by Surinder Kapur[40] and a 2008 speech by Kiran Deshmukh.[26]

3.1 History of CII's quality journey

The Confederation of Indian Industry (CII) was founded in 1895 by five engineering firms, all members of the Bengal Chamber of Commerce and Industry. CII's original name was the Engineering and Iron Trades Association. Over the century the organization had several additional name changes before becoming CII in 1992. CII is "a non-government, not-for-profit, industry-led and industry-managed organization, playing a proactive role in Indias development process. The organization works to create and sustain an environment conducive to the growth of industry in India, partnering industry and government alike through advisory and consultative processes."[41]

According to its *Annual Review 07/08*, CII has over 7,000 members companies, approximately five dozen offices of various types in India, eight overseas offices, and partnerships or affiliations with many other organizations in many other countries. CII has activities in dozens (perhaps hundreds) of areas. Quality is only one of many CII activities.

My primary source for the story of CII's quality journey by Dr. Sarita Nagpal. I interviewed her on May 4, 2008, at the Hilton Houston hotel, the conference hotel for the 2008 world conference of the American Society for Quality, at which Dr. Nagpal and Shoji Shiba were giving a presentation on CII's VLFM program.



Dr. Nagpal's background

Dr. Nagpal graduated from the Indian Institute of Technology in physics in 1976. She married in 1979, and received a PhD in electrical engineering in 1982, working with semiconductors, etc.

Her first job out of university was teaching at an engineering college in Pune. Then she obtained a job with Schlumberger working to develop

software and electronics for oil exploration, and she and her husband (who also found a job there) lived in the middle east for three years. She took this job because of the excitement of the work.

When she had her first child, Dr. Nagpal and her husband returned to India where she taught computers and electronics part-time at St. Xaviers in Kolkata. But with two young children, Dr. Nagpal and her husband moved to Delhi where her parents could provide support in raising her children. Dr. Nagpal exhibits pride in India's system of close family ties and indicates that she and her husband still live upstairs in a house where her parents live downstairs, and her husband's parents live across the street. Her children are grown now (one is about to marry and the other us studying in the United Kingdom), but she notes that her parents need her now.

Dr. Nagpal joined CII in October 1989, with the title of "engineer," which pleased her since she saw herself as an engineer. However, she quickly learned that it was hard for an "engineer" to make contact with senior managers of CII companies, and her title was changed to "councilor" in 1990. A councilor is a consultant, trainer, diagnostician, etc. She was promoted to senior councilor in 1996, and principle councilor in 2000. All this time she was working in the quality area, that is, TQM. With the mindset of an engineer, she felt, "God, give me more problems so I can solve them."

In 2006 she was moved out of the quality area and put in charge of CII's activities with small and medium enterprizes. In 2007 she moved into her current position as Deputy Director General, making her the number 2 person in CII.

Dr. Nagpal says, proudly, "Nothing like CII exists anywhere else in the world."

Japan and CII's initial involvement with quality

With so many regional offices, the activities of each office are driven by the interests of the people from the member companies involved with that office. In 1982 the office for the Nashik district in Maharashtra state had a subcommittee on productivity, which considered issues relating to labor law, among other things. Mr. Janak Mehta was chairman of the subcommittee, and he had a connection to Japan, knew of JUSE, and obtained some of the JUSE books. He along with 15 or 16 other people decided to study these books and meet monthly to share experiences. They would read of a methodology in the books, go back to their companies to try the method, and report back to each other at the monthly meetings. Mr. Mehta took minutes at the monthly meetings. In this way they figured out the methods and how to apply them, and at the end of a year they had 13 success stories.

CII became more generally aware of these successful activities and created a seminar which was given successfully around the country and eventually in Dehli. As Dr. Nagpal describes CII, this is a typical approach. When something seems to be working somewhere within CII, it is formalized a bit and spread throughout the organization.

Dr. V. Krishnamurthy eventually became aware of these successful sto-

ries based on Japanese methods. Dr. Krishnamurthy was chairman of SAIL (Steel Authority of India Ltd.) and also chairman of Maruti Suzuki Ltd. (a joint venture for making automobiles); both of these are large successful companies. When Dr. Krishnamurthy saw these success stories, he told CII's director general, Mr. Tarun Das, that CII needed to take up these approaches in a big way. Mr. Das in turn asked Dr. Krishnamuthy what CII should do.

The answer came in 1986 when CII invited Joseph Juran, W. Edwards Deming, and Kaoru Ishikawa to visit India. Juran and Ishikawa answered the call. (Deming didn't visit, which was OK with CII because some CII people who had heard Deming in the United Kingdom felt that aspects of his approach, e.g., "abolish performances reviews," were too radical to be acceptable to CEOs of Indian companies.)

CII did not tie in with the Juran Institute because of its expensive license fees. However, the QUIMPRO Consultancy in Mumbai did create ties with the Juran Institute and in that way Juran's methods are available to Indian companies. This is another typical CII approach; CII doesn't feel it has to do everything itself, and it or its member companies can be involved with competing methods.

When Professor Ishikawa visited in 1986, he gave a CII lecture and visited several companies. He gave three principles:

1. TQM has to be institutionalized with its own experts, that is, in a way unique to CII and to CII's member companies.
2. Every year CII should organize a mission of 20–30 Indian CEOs to visit Japan for two weeks (this annual mission continues to this day).
3. Within one or two years, after CII and its companies themselves had sufficient time to become familiar with the Japanese methods, JUSE would bring a two week train-the-trainer seminar to India to facilitate the transfer of its intellectual property. This happened a year or so later (although the Japanese documents were not so user friendly for Indian readers).

In keeping with Professor Ishikawa's first principle, CII decided around 1986 that it should have a quality division to benefit the 3,000 or 4,000 members it had at the time. CII advertised to hire people to work in this quality division and hired Mr. Mehta. In time CII also hired two other people and then Dr. Nagpal in 1989.

Either Professor Ishikawa or Mr. Mehta suggested a two level structure for the Quality Division. The "National Committee" would consist of CEOs, and the "Technical Committee" would consist of quality managers. Professor Ishikawa's "operating guidelines" were also to have activities in four areas:

1. training and counseling
2. recognition of companies
3. publications
4. application research (what works and what does not work, and their own knowhow)

At some point, Professor Ishikawa visited one or more of the TVS group

of companies and was asked by the CEO to help them. Professor Ishikawa sent three experts to help. Professor Kurahara taught Hoshin Planning (also known as Hoshin Kanri), and Professor Miyuchi taught QC Circles and Daily Work Management; but Professor Kurahara died and Professor Miyuchi got old. This left the third professor, Professor Tsuda, helping over the long run (page 61).

ISO standards

When Dr. Nagpal was hired in 1989, her first day on the job was in a lead auditor course.

In 1988 the ISO standards came into being, and CII understood that it needed to work in this area. It contacted the Bureau Veritas Quality International (BVQI) and Batalers groups in the United Kingdom, and CII people began to train as auditors. Until 1991 or 1992, BVQI and Batalers continued to help with the audits in India; but in time CII was certified by the International Register of Certificated Auditors and was able to do audits independent of other auditing organizations.

In 1992 Sundrum Fasteners (a TVS company) was the first Indian company to be ISO 9000 certified. The company's CEO, Mr. Suresh Krishna, received the company certificate in front of 200 other CEOs. From there, Mr. Krishna and the always influential Dr. Krishnamurthy promoted the importance of ISO 9000 certification to the rest of Indian industry.

The ISO work was good for CII's quality division. The division was highly visible and had good financial margins, for a CII activity. Also, ISO 900 certification is a problem with a clear process; it does not have the problem of more vague situations which make a company happy when you can help but they are unhappy when you cannot help.

Next steps

As Dr. Nagpal worked with companies doing ISO audits, its crossed her mind that just getting certified for ISO 9000 probably didn't lead to being a world class company. She read a lot about quality and knew something more than ISO 9000 was going on in TVS Motors with Professor Tsuda's help. It was also clear that China, Korea, and other Asian countries were rising as competitive forces.

In 1990–1992 the division addressed Professor Ishikawa's fourth operating guideline and did its first applications research. The Steel Authority (SAIL) and Dr. Krishnamurthy had made a deal with Westinghouse to use its documentation. The connection with Westinghouse led to a big change at SAIL, although not one that involved CII. In turn, CII tried to make a deal with Westinghouse, but that did not come to fruition. So instead the Technical Committee began work creating their own modules, and Dr. Nagpal had the job of leading that effort. They created seven modules, titled as follows:

- Introduction to TQM
- Problem Solving
- Listening to Voice of Customer, QFD

- Process Management
- Vendor Development
- Sales and After Sales Services
- Interactive Skills.

Dr. Nagpal notes that she personally learned much through her involvement in this activity.

In 1992 Mr. Mehta left the Quality Division to pursue quality consulting privately, and this was a big change for the division. But they decided to keep pushing even without Mr. Mehta and, looking for other things they might do, focused on quality awards (the second of Professor Ishikawa's operating guidelines) and certified training programs. After investigating possibilities for affiliating with JUSE in Japan or the Malcolm Baldrige Award in the United States (there were no practical possibilities), CII made the decision to tie up with the European Foundation for Quality Management (EFQM). The EFQM was willing to license the award and transfer the knowhow over a one-year transition period. Mr. Kakkar (Principal Counselor & Head, Institute of Quality, Bangalore, CII) emphasized within CII what came to be named the CII EXIM[42] Award for Business Excellence." Today CII has 70–80 applications a year for this award.

In addition to its ISO audit and CII EXIM Award activities, CII companies also became involved with TPM (Total Productive Maintenance). Mr. Suresh Krishna took the lead and his company, Sundram Fastners Ltd. (part of the TVS group), received the TPM Excellence Aware from JIPM (Japan Institute of Plant Maintence, part of the Japan Management Association, a parallel organization to JUSE). Also, the AV Birla Group of companies in India set up its first unit in Thailand and, in time, JIPM was invited to come and give a presentation. This excited (the late) Mr. Aditya Birla, who was then Group Chairman. Also, Mr. Yamaguchi from JIPM was teaching TPM. In 1995 Vikram Cements received the TPM award, and in 1998 Sundram Fastners received the award (Toyota pushed TPM with all its vendors). At this time, Mr. Suresh Krishna told CII, "you must set up a TPM Club." (As mentioned already, this was a common CII approach; when something good was happening, it facilitated interaction about the good thing with its members.) The TPM Club was organized in 1998; and, as of April of 2008, 132 Indian companies have won some level of TPM award. In parallel, the companies' plants showed major results.

In 1995, Mr. Das made the decision to create four centers of excellence. According to Dr. Nagpal,

> Centres of Excellence are focused on "building compeititiveness through services that add value to CII members." These centres have a focus on areas such as Quality, Green Business, Sustainable Development, SME competitiveness, Manufacturing, Water, etc. They usually have professional in these areas working for them, like I worked in Institute of Quality for 18 years as a Quality Professional.

One of these centers was the Institute of Quality which was planned in 1995, came into existence in 2000, and out of which the CII EXIM Award is managed.

The division started a newsletter in 1998.

Incidentally, as early as 1992 or 1993, Professor Shoji Shiba visited India at the suggestion of Ray Stata, who knew Professor Shiba well from his work at MIT and with the CQM in the United States (page 83). Mr. Stata was on the board of Crompton Greaves with Mr. K.K. Nohria. Mr. Nohria's son, Professor Nitin Noria, was also at MIT at the time. Mr. Nohria was the chairman of the National Committee on Quality and arranged for Profesor Shiba to give a four-day seminar in Bangalor. Professor Shiba also brought awareness of his book, *A New American TQM*[43] to India.

Dr. Nagpal was not present for this seminar, but she heard good things about it. She thought that CII needed to be involved with someone who knew what companies needed if there was to be more impact on the country, and she wanted to meet Professor Shiba. Consequently, she visited him in the United States (in Cambridge, Massachusetts, the location of MIT) in 1995, 1997, and 1999, each time asking him to come to India. In each case Professor Shiba had a reason why he could not come (e.g., maybe the key types of people such as Tom Lee and Ray Stata were not available, or maybe there was no place like MIT), but he never really said, "no."

3.2 Cluster activities

Professor Tsuda and Sundaram Clayton

Starting in 1987, Sundaram Clayton Ltd. that is part of the TVS group of companies implemented TQM.[44] Between then and 1998 when the company was awarded the Deming Prize, Sundaram Clayton phased in its TQM program:

1987–1990 TQM introduction phase: TQM training, education, cultural change, and communication channel; total employee involvement; TQM promotion office; restructuring of manufacturing

1990–1994 TQM promotion phase: policy management introduction; new product development process; restructure quality control functions; cell manufacturing

1994–1998 TQM deployment phase: emphasis on daily management activities; TQM extended to encompass venders; five-year planning

For the later part of this period, Professor Yoshikazu Tsuda, a Japanese Union of Scientists and Engineers councillor and member of the Deming Prize Committee, had been advising Sundaram Clayton on its TQM implementation. With the Deming Prize under its belt, TVS let Professor Tusda become more visible to the rest of Indian industry, and he gave a public presentation. He spoke on accountability, authority, responsibility, etc.

As a result, Dr. Nagpal asked Professor Tsuda what the rest of Indian industry should be doing. He said she should find 15 medium sized companies which were not competitors, and he would work with them. Professor Tsuda wanted faster progress than the six years it had taken for him to help a TVS company reach a Deming Prize level of quality, and he thought this could happen if a group of companies worked together sharing methods and experiences with each other. Also, a group of companies could

share the cost of his fees (expensive for a single Indian company) across the group. As part of this plan, Professor Tsuda also agreed to train CII councilors.

Although Dr. Nagpal was not sure what Professor Tsuda would be teaching, she went to Maruti Udyog Ltd. and asked if they could find 15 other companies that would participate with Professor Tsuda and do what he asked without argument. This was the beginning of what came to be called "cluster" activities which in retrospect was what they had been seeking since Professor Ishikawa's visit years before.

Professor Tsuda's cluster activities

There was a long history of cluster-like activities in India, i.e., of geographically close companies related in various ways working together to improve the overall capabilities of the entire connected group of companies.

Professor Tsuda set up two clusters distinct from the traditional cluster formats (the following text is taken verbatim from pages 11–13 of an unpublished document[45]):

1. The object was . . . improving firm-level competitiveness rather than the competitiveness of the cluster as a whole. The aim was to create a group of companies who would become leaders in their business through acquiring certain unique competitiveness characteristics. Starting from excellent shopfloor practices to unique business strategies, a journal was developed amongst these companies. This was the common vision of Professor Tsuda and the companies.
2. All cluster companies were from the same industry sector (auto components) and were suppliers to Maruti Udyog Ltd.
3. The firms were geographically dispersed with a hub around the National Capital Region of Delhi in northern India and another around Chennai in the southern region.
4. The clusters were formed in order to undergo a common learning process, learn from each other's experiences, and develop concepts in relation to the requirements of each firm. The clusters were thus much small in size than traditional industrial clusters. Each cluster considers of 8–12 enterprises.
5. The time period for the shared learning of these clusters was over three years at the end of which Professor Tsuda announced the closure of the cluster programme.
6. The learning format was [that] Professor Tsuda visited India once every six months, conducted factory visits, review progress, and guide the companies toward the next step. Representative for each of the cluster companies accompanied Professor Tsuda in those two weeks and the visit would end with a Common Day when the Professor would sum up his findings and give directions for the next six months. Representative of the firms handling those specific topics which were to be actioned met once a month to share their experiences. Each company also appointed a TQM coordinator for the programme and he attended all the meetings. CII counselors accompanies Professor Tsuda and facilitated the monthly review meetings along with a representative from Maruti Udyog Ltd.

Professor Tsuda had three principles in mind as he established the cluster process (the following text is taken verbatim from pages 13–14 of an unpublished document[45]):

1. TQM can be learnt only through practice and not through training programmes and seminars on quality. . .
2. TQM can be learnt through "mutual sharing and learning". . .
3. TQM can be introduced in a company where there is a strong commitment by the top management to building in-house competence in all aspects of business. . .

Led by Dr. K. Kumar, Maruti Udyog Ltd. pulled together 20 companies to participate in the two clusters — companies which were not competitors, which might be geographically distributed, and which had top management which was deeply committed. CII also provided key support to the on-going cluster activities.

I do not have the space here to summarize the three year journey of these clusters and the related activities in the participating companies. I can only hope that the draft book from which I drew the immediately above quotations[45] is published soon. Professor Tsuda's approach to help the participating companies learn and effectively use TQM is highly educational, as are the case studies from each participating company.

Professor Tsuda ends his involvement

Over time the cluster activities moved from having all companies share equally (because none was much better than others) to a point where some companies had advanced faster than others and were giving more than they were receiving, which was out of keeping with Professor Tsuda's ideals, and he announced cessation of the clusters with which he was involved.

Pages 109–110 of the unpublished document[45] conclude:

> . . . after three years of instruction from Prof. Tsuda, the cluster was disbanded. However, that was not the end of the story for the member companies. These all went on to achieve considerable success in their chosen fields, with breakthrough impact on [various] dimensions of their operations. . . .
>
> Each of the companies continues to follow the path laid out by Prof. Tsuda. . .
>
> For CII, which coordinated the entire cluster learning process, Prof. Tsuda's concepts became the base for an entirely new set of activities. . . .

Many Indian companies continue to like the cluster concept — "groups of companies that work and learn together for the purpose of improving their performance through mutual sharing and learning," and many other cluster activities have come into being. Today there are 133 cross-sector clusters impacting 1,500 small and medium companies (particular in the auto components area). For example, in Mohali and Gurgaon there were mixed industry clusters, in Indore and Bhopal there was a light engineering cluster, and in Dibrugarh there was a tea gardens cluster. Within a cluster it is typical for cluster members to visit one member's facilities one month and another member's the next month. An effort is made not to have direct competitors within the same cluster, although the tea-gardens

cluster appears to be an exception.

These clusters are supported in total by six associations (CII and five others, such as the Auto Components Association). In particular, the auto components industry converted Professor Tsuda's methods into a road map of steps that a company could follow to achieve a Deming Prize level of quality (whether or not the company challenged the actual award).

A number of the companies participating in the cluster activities also became charter participants in the learning community and VLFM activities described in the next section and in Chapters 1–2.

3.3 Learning Communities

The learning community (LC) activity was initiated by the Confederation of Indian Industry in 2004. The LC was an extension of the cluster concept that CII had initiated in the early 1980s along with Maruti Udyog Ltd.; as described in the previous section (page 61). This additional cluster concept was for cluster members to get together and learn from each other and by visiting each other's companies.

As already described in section 1.5 (page 28), Dr. Surinder Kapur, Chairman of Sona Koyo, and Dr. Sarita Nagpal worked along with Shoji Shiba to get a group of six companies together for the first LC. A goal was to gather like-minded companies so that they would be more open to learning from each other.

There were two LCs between 2004 and 2006. The first LC began in July 2004 and involved Sona Koyo, TechNova Imaging Systems, Ucal Fuel and Brakes India. The second LC began in November 2005 and consisted of two companies from the Anand Group, Ashok Leyland, and Samtel Color. Additionally, G. Sunderraman of Godrej participated in one of the LCs as an individual (there were no other individual participants).

The LC participants received knowledge in various formats: a top management seminar and a real change leaders (RCLs) workshop, mutual visits amongst the members companies with Shoji Shiba helping participants understand the essence of what they were seeing, individual visits, and a CEO workshop. I will describe the content of the first LC in some detail; the second LC had a similar format and content.

LC structure and content

Shoji Shiba does not believe in teaching but in thinking together, sharing ideas, building skills to see the future, and charting out a breakthrough strategy. The participating companies were encouraged to chart out their strategies which they shared with Shoji Shiba and with each other. The companies applied the breakthrough management tools developed by Shoji Shiba.[1] Feedback from other LC members helped provide companies with an outside view, and the companies were able to bring out new products, expand or capture new markets, and develop new business models.

The first meeting of the LC was a five day programme followed by a one-day mutual visit to Sona Koyo. The group comprised the CEO, the business head, and at least 3–4 other members from each member company. The focus of the workshop was on understanding breakthrough skills and application of the concept.

Another 5-day workshop and a mutual visit to TechNova Imaging System followed in October 2004. During these five days 3–4 Real Change Leaders from each member company were trained on use of the breakthrough methods and tools as well as to listen to the voice of the employees. The members of the LC met with each other, between the focused inputs provided by Shoji Shiba, to learn from each other.

In February 2005, an effort of individual company diagnosis was undertaken, and feedback for taking more strategic actions was given to the companies. During this workshop there was also a mutual visit to Ucal Fuel Systems. Once again 2–3 persons from each company joined this workshop. A manual was also prepared on the "Five Step Discovery Process."[21]

In May 2005, the 3–5 people from each LC companies visited France for 8 days. They visited the FAVI and Sanden companies to learn from companies with different cultures and businesses. The idea was to visit a company with a view to developing one's own action plans.

In July 2005, Shoji Shiba and Dr. Nagpal visited each of the companies for a diagnostic session to enable the companies to improve the quality of their action plans. A workshop to help RCLs make more effective action plans and a training program on concept engineering were also organized. These enabled the participants to build skills on "understanding the latent needs of customers and defining requirements for attractive and must-be quality." A mutual visit to Brakes India Foundry was also part of this intervention.

LC results

Through the LC, a group of 17 breakthrough leaders (Real Change Leaders) were created. These breakthrough leaders were able to achieve successes in three areas:

1. Breakthrough on the shop floor
    - 50 percent cost reduction in manufacturing
    - 30 percent improvement in productivity
    - improvement in 5S levels[46]
    - an eye for the periphery (page 147 of *Breakthrough Management*[1])
    - energy cost reduction by 50 percent
2. Breakthrough in R&D processes
    - organization structure
    - new product launch
    - new product development for launch in the future (first time anywhere in the world)

- competence building for exploiting intellectual property rights

3. Breakthrough in business strategy

    - new business
    - decisions on collaboration
    - product mix strategy
    - absorption of new technology process

The first LC was formally closed in August 2005 with an interactive session of the CEOs and real change leaders led by Shoji Shiba.

Five documents were created during the LC activity.[21,47–50] In particular, after nearly two years of intensive practical use of the *Five Step Discovery Process* for creating breakthrough and innovation with several senior managers in India, Shoji Shiba strongly felt the necessity of a new manual. This new manual[50] included more real examples and practical guidance in areas where people previously stumbled in applying 5SDP.

Also, as the LC activities were ending, the *Breakthrough Management* book, that had been influenced by Shoji Shiba's work with the LCs, was published.[1]

The two illustrations shown in Figure 3.1 (from page 6 of *Breakthrough Management: The Indian Way*[47] summarize the approach described in this section.

LC impact on VLFM

When the LC was launched, many of the member companies were struggling to find a new direction. Shoji Shiba provided guidance to these companies at the opportune time. The results of the Learning Communities were very encouraging. Having achieved success in two LCs, it was felt that something had to be done at the national level. Dr. Abdul Kalam, the then President of India, had also requested that Shoji Shiba do something for India at the national level. This provided the impetus to start the VLFM Program.

The LC activities had substantial impact on the VLFM program described in Chapters 1 and 2. To look at it another way, the VLFM program actually emerged from the LC activities and has received complete support from the members of the LC community. In the give-give spirit of the learning communities, various member of the LC community contributed to the development of the VLFM program.

Sona Group. Chairman Kapur was responsible for the VLFM program taking shape in its initial phase and also organized meetings for between Shoji Shiba and Dr. V. Krishnamurthy, Chairman of NMCC. Dr. Kapur also designated Dinesh Sharma to be a member of the Core Group that was responsible for the development of the VLFM program. Sona Group provided two module directors for VLFM Batch 1 — Kiran Deshmukh and Dinesh Sharma. The Sona Group also nominated 10 participants to Batch 1 of the VLFM program.

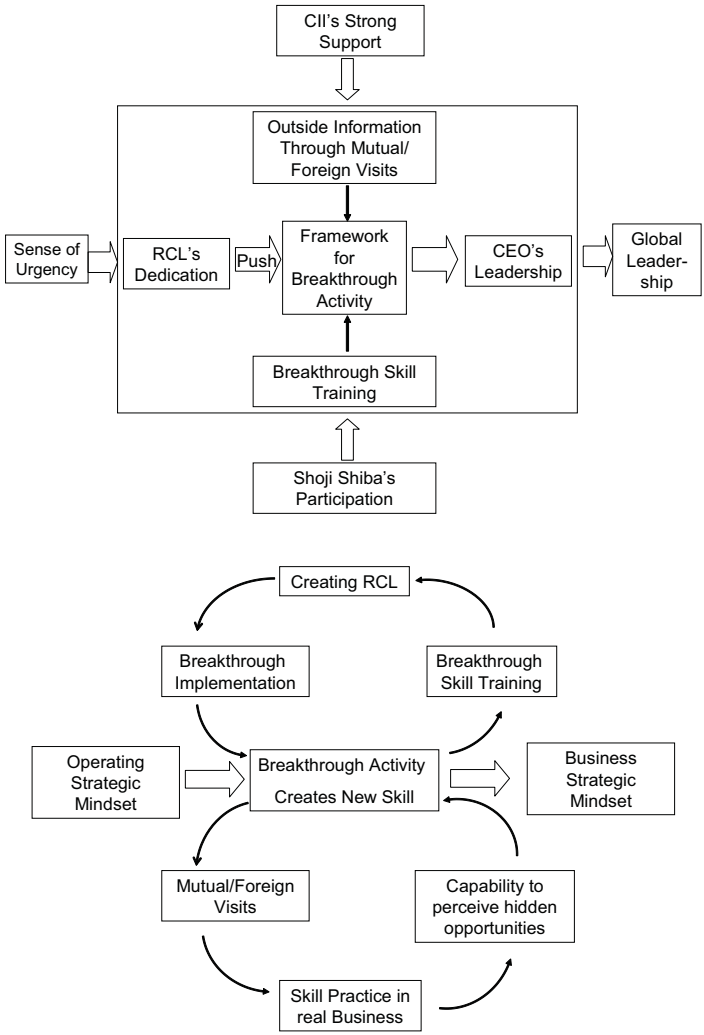


Figure 3.1: Models for LCs.

Godrej Group. Since both Mr. Godrej and Mr. Sunderraman were aware of Shoji Shiba's methodologies, it was easier to get their support for the VLFM program. Godrej provided the CII Center of Excellence premises to conduct the program and support to construct the VLFM classroom. The Godrej group nominated 6 participants to Batch 1 of the VLFM program.

Anand Group. During the development phase of VLFM, Anand provided insights into the needs of the industry through a day long workshop. The group provide one module director for Batch 1 of Opportunity A. It nominated 6 participants to the program.

TechNova. This group also provided insights into the needs of the industry through during the day long workshop during the development phase of VLFM. The group also nominated two participants to the program.

Ucal Fuel. Dr. V. Krishnamurthy is also Chairman of Ucal Fuel Systems. As chairman of Ucal, as chairman of NMCC, and with prior knowledge of Shoji Shiba's methodologies, he was also aware of and helped make clear the needs of India's manufacturing sector. He fully supported the VLFM program, and Ucal also nominated two participants.

While the detailed curriculum for Opportunity A was developed during Batch 1, going into Batch 1 the organizers had a tentative plan in place for every module, based partly on what was learned during the LCs. Of course, as Batch 1 progressed and more was learned, changes were made.

Part II

A broader story

Chapter 4

Example learning communities in Japan and the US

This chapter describes four learning communities outside of India: Toyota, JUSE, LFM, and CQM.

These learning communities are important for two reasons. First, they have directly or indirectly influenced the Indian activities described in the previous chapters, particularly VLFM. Second, by looking at a broader set of learning communities, we can draw better conclusions about learning communities in general as I begin to do in Chapter 5.

Of course, this is not a complete list of other learning communities. I have limited myself to those I know.

4.1 Toyota

I begin these descriptions of activities outside of India with mention of Toyota and the Toyota Production Systems (TPS). They have had import to CII's VLFM program as well as having enormous impact on the world at large. Although there is not an explicit learning community, a sort of implicit learning community for TPS does exist.

The Toyota Production System was developed by Toyota after WWII in parallel with, and independently of, the JUSE activities described in the next section.[51] There are various good references to the history of Toyota.[52–55] A particular good summary is presented in Chapter 2 of Liker's book[55] from which I drew a good bit of what I describe here.

According to Toyota's company website, the company was founded in 1867. (Toyota's founding predates by nearly 30 years the founding of CII in 1895.) In 1894, under the direction of Sakichi Toyoda, the company began to manufacture power looms and later automatic looms, and the company was then known as Toyota Automatic Loom Works. (A part of Toyota continues to this day to make and sell weaving machines.) Sakichi Toyoda was renowned engineer and inventor in his time, admiring of the methods of earlier inventors, and with his own strong belief in hands-on, practical experimentation on the shop floor.

By the 1930s, Sakichi Toyoda anticipated the importance of moving into

the automotive business, understanding that weaving machines would not be the growth business of the future. Sakichi Toyoda had made sure his son Kiichiro Toyoda was excellently educated and trained (also with a hands-on, shop-floor mentality — Gemba spirit), and gave him the job of setting up Toyota Motor Company. The Japanese government encouraged Toyota's new business thrust, particularly to begin making engines and trucks.

Kiichiro Toyoda studied the mass production methods of Henry Ford. In particular, he went on a benchmarking tour in the United States to Ford plants, which he saw talked more about continuous flow methods than actually using them. However, while in the United States he was inspired by the system of restocking used by the Piggly Wiggly grocery stores (Piggly Wiggly had patented the concept of a self-service grocery store in 1917), and he added the just-in-time concept to Toyota's tool kit. Just as important, Kiichiro Toyoda continued the Gemba spirit of his father; and the hands-on, experiment-on-the-shop-floor culture developed in Toyota's weaving machine business was carried over to its automotive business.

In time Kiichiro Toyoda gave his younger cousin Eiji Toyoda the assignment to research improved methods of production. In the family tradition, Eiji Toyoda had a hands-on, experiment-yourself-on-the-shop-floor philosophy.

Then WWII intervened. After WWII Toyota was allowed by the American occupiers to return to its automotive business for peacetime applications. In time Eiji Toyoda became president of Toyota and went on another benchmarking trip to the United States. Upon his return he gave Taiichi Ohno the assignment to make Toyota's manufacturing productivity match Ford's. Taiichi Ohno, working under the auspices of Eiji Toyoda, is often thought of as the father of TPS. Of course, many others have contributed to the development of the system over the years.

Taiichi Ohno also toured the Ford plants in the United States, and he read about Ford's philosophy of continuous flow. As Eiji Toyoda had seen before, Taiichi Ohno saw that Ford's approach in practice was not so relevant to Toyota because its efficiency was based on mass production in a large scale context, and Toyota was a relatively small scale manufacturer. Taiichi Ohno also studied the ideas of Deming including statistical process control, the concept that there are internal as well as external customers ("the next process is the customer"), and PDCA.

Like the Toyoda family members already mentioned, Taiichi Ohno was a hand's-on, Gemba-spirit innovator. With the assignment to match Ford's level of efficiency (but not necessarily to copy its approach), with his Gemba experiment approach to innovation, and with many internally and externally developed concepts to draw on, he guided the development of TPS.

For some years, TPS was not well-known, but Toyota's approach allowed them to recover more quickly from the oil shock of 1973 which caught the government's attention, and the government instituted a series of seminars introducing TPS to a broader community and its practice and reputation began to spread.

A widely available contemporary description of TPS may be found in Jeffrey K. Liker's book, *The Toyota Way — Fourteen Principles from the*

World's Greatest Manufacturer.[55] The fourteen principles Liker describes (Table 4.1) are better than any summary I could invent for this short book. (Liker's book is excellent; *buy it if you do not already have it*. However, if you cannot get a copy of the book, Google for "TPS 14 principles", and you will find a number of useful summaries.)

Table 4.1: Fourteen principles of TPS as summarized in Liker's book.

1.	Base your management decisions on a long-term philosophy, even at the expense of short term profits
2.	Create continuous process flow to bring problems to the surface
3.	Use "pull" systems to avoid overproduction
4.	Level out the workload (*Heijunka*)
5.	Build a culture of stopping to fix problems, to get quality right the first time (*Jidoka*)
6.	Standardize tasks are the foundation for continuous improvement and employee empowerment.
7.	Use visual control so no problems are hidden
8.	Use only reliable, thoroughly tested technology that serves your people and processes
9.	Grow leaders who thoroughly understand the work, live the philosophy, and teach it to others.
10.	Develop exceptional people and teams who follow your company's philosophy.
11.	Respect your extended network of partners and suppliers by challenging them and helping them to improve.
12.	Go and see for yourself to thoroughly understand the situation (*Gemba*)
13.	Make decisions slowly and by consensus, thoroughly considering all options; implement decisions rapidly.
14.	Become a learning organization through relentless reflection (*Hansei*) and continuous improvement (*Kaizen*)/

Toyota received the Deming Prize in 1965. (When I asked Shoji Shiba about this, given that I thought the prize is largely for quality, he stated[51] that Toyota uses two parallel systems for shop floor improvement, one for quality improvement and one for flow improvement, and that the Deming Prize deals with excellence in both of these areas.)

Toyota and TPS originally were story of a learning community only in an implicit and unstructured sense. TPS has been widely popularized, and thus copied, through the writings of authors such as Shigeo Shingo,[56] James Womack, Daniel Jones, and Daniel Roos,[57] Steven Spear and Kent Bowen,[58] and Jeffrey Liker,[55] and by consulting companies that proffer expertise with TPS or Lean Manufacturing. Takeyuki Furuhashi comes to CII's VLFM program from an organization named Chu-san-ren. It is a non-profit organization to diffuse TPS to companies located in the Nagoya region of Japan, where Toyota located.

However, over time Toyota and TPS have become a more explicit learning community. There is a learning community within Toyota. Toyota itself receives many visitors who want to learn about the Toyota system, and Toyota has been supportive of the U.S. academics who have written the books mentioned in the previously paragraph. Finally, I understand

that Toyota set up a training school for TPS in the United States, open to everyone including competitors.

4.2 JUSE

History

The Union of Japanese Scientists and Engineers (JUSE) was established in 1946.[59] There were three objectives leading to JUSE's formation:

- to contribute to the development of industry, post World War II
- to diffuse the importance of science and engineering to society at large
- to promote the status of engineers

In the beginning, JUSE had government support and funding and set up research projects (again to move things along after WWII) in five areas: a steel division, an electricity division, an aluminum refining division, a division relating to copper refining and manufacturing items made from copper, and (starting last) an activity relating to factory management (or quality control).

While the factory management activity started last, in August 1948, it became the biggest part of JUSE. Its SQC (statistical quality control) group was started in November of 1948, with running seminars on SQC as one of its key purposes.

However, even before the seminar activity started, a subcommittee was established, named the "K Committee" because its chairman was Professor Tatsuo Kawada of the Tokyo Institute of Technology. The K Committee's mission was to survey relevant research, to study and advance academic research, and to publish a nearly academic journal. The resulting journal was the *Reports of Statistical Application of Research, JUSE*. It was first published in 1951, in English so that the results of Japanese quality research could be seen in other countries. This notable journal continued to be published until 1994 — for over 40 years — and was often cited in international journals.

A quality control research group was also established early on. It consisted of a dozen or more people from academia, five people from industry, and four people from government research institutes. All were engineers. This was a unique cooperation at the time (and still is to some extent). Shoji Shiba speculates that such cooperation among people from academia, industry, and government institutes was possible because they knew each other from engineers schools and the engineering community.

The SQC seminar started in September 1949 with all participants coming from industry. This was a basic seminar consisting of three components:

1. a theoretical and conceptual component — this was derived from a translation of the US military standard for quality control
2. a statistical and math component — tools to support implementation of the standard
3. examples

Additionally, after starting the seminars, the group started publication of the monthly journal *Quality Control*, in Japanese, to show the theory and application of SQC with the purpose of sensitizing CEOs and top managers about quality and encouraging them to develop quality professionals.

JUSE next invited W. Edwards Deming, Joseph Juran, and others to visit Japan, and many JUSE committees traveled outside Japan. Contact with Deming was made when one of the Japanese professors wrote asking Deming for a nice comment on *Quality Control* magazine.

Dr. Deming first arrived in Japan in June of 1950 and gave an 8-day seminar. Dr. Deming also introduced JUSE to many quality researchers in the United States. All this activity with Dr. Deming resulted in the Deming Prize being established the following year. (Perhaps Dr. Deming also donated his fee for his seminar back to JUSE, further increasing his veneration by JUSE.)

The first Deming Prize was given in 1951. The prize was administered by two committees: a governing board consisting of four academic members, five industry members, and three government research institute members; and a selection committee consisting of four people from academia, two from government, and four from industry.

Incidentally, one of the industry members of the original governing board was a senior manager from the Nikkei newspaper, and in 1954 the newspaper company established the Nikkei QC Literature Prize. At the time, the Nikkei newspaper was focused on a narrow aspect of the financial world; today it is Japan's most influential newspaper (in business and beyond), which is perhaps most attributable to it better positioning its editorial focus on the right place in contemporary Japanese culture than its rivals did.

Quality Circles are one of JUSE's most successful examples of societal learning. Shop floor foremen requested an easier-to-read journal than *Quality Control*. Thus, on April 25, 1962, a monthly magazine called *Shop Floor and Quality Control* was created aimed at shop floor supervisors and QC Circle leaders and members. Again, three groups of people participated in creation of this journal — six from academia, 13 from industry, and two from government research institutes. Dr. Kaoru Ishikawa was leader of the editorial board.

In the first issue of *Shop Floor and Quality Control*, Dr. Ishikawa wrote, "It is good to set up a QC Circle and to read the magazine together and discuss quality problems on the shop floor." Thus, QC Circles originally were a sort of study group of shop floor workers who met regularly. Once such a group applied some of the quality methods and had its own case study, it sent the case study to the magazine. QC Circles were a big breakthrough. Dr. Ishikawa had found a way to mobilize the masses.

A second breakthrough was creation of a QC Circle registration system. QC Circles within companies were registered with JUSE. This created relationships outside the division and company.

Shoji Shiba speculates that perhaps the idea behind such mobilization was a concept that has been used over time by a variety groups — political,

religious, etc. — trying to expand their influence in the world: this is the concept of small groups of people getting together to read and discuss the philosophy being pushed and to network between small groups.[60] Shoji Shiba says that certainly it was "common sense" in Japan at the time to use this method.

A third breakthrough was creation of a promotion organization for QC Circles in each prefecture in Japan. Each prefecture has one academic person to guide and act as a technical resource for QC Circles in companies within the region. This created a cross-company common culture. This academic person also provided insight about QC Circle promotion to factory managers.

Such connections among companies in a prefecture led to committees being set up involving companies in the prefecture. These committees tended to work at two levels (a dual approach): the managers talked to each other; and the shop floor people talked to each other and promoted quality methods together. The latter was a breakthrough — for shop floor people to be able to talk with people outside the company. Another dual, mentioned already, is the collaboration of academics with the industry managers. The QC Circle system did not have any formal research — knowhow was primarily accumulated through experience. However, the system did include a strong benchmarking component, which itself is a kind of research for improved methods. The QC Circle system also included extensive publication of how-to methods to a big population.

JUSE started another activity — a high level rather that QC Circle level activity — after the 1964 summer Olympic Games in Tokyo. Major business growth seemed likely to happen, and it became more important to synchronize JUSE activities with business activities. Thus, Professors Shigeru Mizuno, Kaoru Ishikawa, and Tetsuichi Asaka initiated the Quality Control Symposium to take place twice a year and to anticipate business needs.

The symposiums take place over two and one-half days and three nights, with all participants in residence together. The participants include senior executives responsible for quality in their companies, change agents who actually facilitate quality throughout their companies, academics studying quality and the academic leaders of Japanese quality, and people from government research institutes. The goal of each symposium is to be proactive — to anticipate what is next. Symposium speakers are selected to present something important and relevant to the future; speakers come both from top management in industry and from academia. From these meetings a consensus is developed about areas where new work (e.g., research) needs to be done.

The various JUSE activities just described had several things in common. First, there was always participation from academia, industry, and government research institutes. Second, there was always research being done, in some form. Third, there was always publication, with the publications' editorial boards becoming a key element in the move from theory to application.

JUSE succeeded in promoting research because it facilitated research committees that include people from academia in addition to industry. There seem to be two reasons why such participation was possible in Japan in contrast to some other countries and organizations:

- In Japan there was a greater bond among engineers across the engineering fields than in the United States. There were not so many engineering schools (only eight or 10 immediately after WWII, and of these only three or four were major schools). Thus, engineers were more likely to know each other from school. Also, especially from the schools with lower status, engineers try to help each other. In general, wherever engineers work, they tend to work together or be supportive of each other.
- The leaders of JUSE explicitly tried to recruit academic people, for example Professor Kawada taught mathematical statistics was an actuary. In the early days of JUSE there were no specific departments of quality in universities. Participation in a JUSE committee was a way for a person interested in quality or statistics applied to quality to work with others who were also interested. Professor Ishikawa was a professor of chemical engineering, and Professor Kondo was a professor of metallurgy. There is also a possibility that some of these professors were not going to be as successful in their own academic fields and gain the respect there that they instead gained doing more interdisciplinary work with industry.

JUSE tried to use a structure and approach for Operations Research (OR) similar to that used for quality. However, the OR effort did not meet with the same success as the quality efforts. There was a smaller population of OR experts available to JUSE. The OR professors were more oriented to their own specific disciplines (and were less interested in the interdisciplinary world of quality), and they had their own departments where they could flourish professionally. Also, the practical Gemba world is perhaps not all that tractable to the mathematical methods of OR people.

Japanese model for societal diffusion

By the early 1990s, when *A New American TQM* was published, Chapter 16 described Japan's explicit and highly effective system for societal networking. The system had found three elements necessary for successful societal diffusion of TQM: (1) an infrastructure to support networking; (2) openness with real cases; and (3) change agents (or catalysts).[61]

Infrastructure for Networking. The Japanese identified six elements of the infrastructure for networking (Figure 4.1): (i) national promotional organizations, (ii) training, (iii) knowledge dissemination, (iv) societal promotion activities, (v) national standard certification, and (vi) development of new methods.

To support quality improvement, government and semiprivate *national*

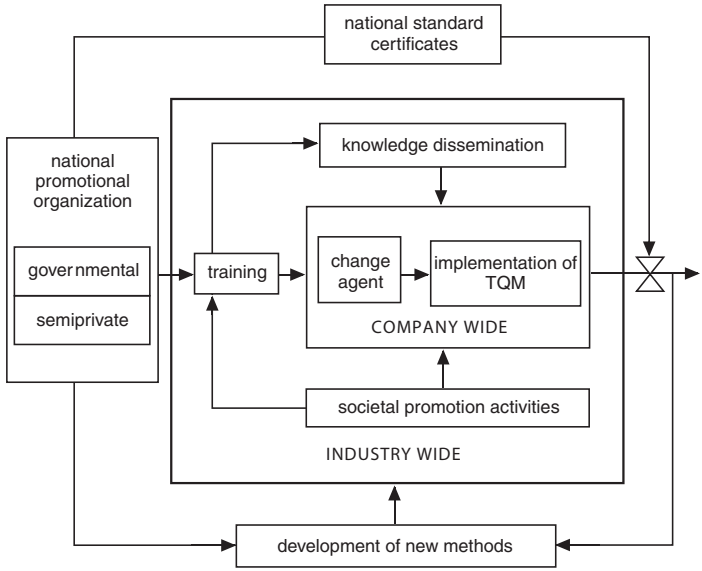


Figure 4.1: Infrastructure for Networking.

promotional organizations developed in Japan. The national government organizations are involved in standardization and sometimes in certification of quality. Building on the activities of the government organization, which provide some of the basics, the semiprivate national promotional organizations — JUSE and JSA (the Japanese Standards Association) — do the follow-on work. JSA and JUSE are highly effective organizations with a long-range perspective, and they tend to be neither as rigid as government organizations nor as shortsighted as commercial private consulting organizations.

Japan's *national training infrastructure* includes instruction in various skills for a variety of target students, from CEOs to line workers, from engineers to administrators. Training is a means of mutual learning among companies, in which knowledgable instructors from one company teach people from many others. One of the most important roles of the semiprivate national promotional organizations is education and training. JUSE's courses, for instance, are the source of quality instruction for many different organizations. This particularly helps the diffusion of TQM. Many companies find it less expensive to get training from JUSE, with its 2,000 collaborators (committees of people from industry and universities who develop course curricula and teach the courses), than to create their own training activities. In the late 1980s, JUSE offered 270 courses to 33,500 people per year in Tokyo and Osaka, and JSA offered 250 courses to 15,000 people per year in 58 smaller cities.

Knowledge dissemination includes publishing cases, instructional material, and research in books and periodicals for a variety of audiences. It also includes holding conventions and other events on quality. Within a quality culture where companies share information about their TQM suc-

cesses and failures, such dissemination activities are an important means of mutual learning among companies. Especially in the early years of the Japanese push for quality improvement (before quality became a popular subject), JUSE and JSA were a primary source of journals, magazines, and books related to quality. For example, JUSE publishes three monthly journals, including *QC Circle*, which has a monthly circulation of 170,000. Furthermore, between 1960 and 1985, about half of all quality control books published were publications of JUSE or JSA. Knowledge dissemination includes more than just publishing activities. Each of the nine national districts for QC circles has a chapter that holds local conventions, mutual visits, study meetings, and discussions.

Japan has many types of *societal promotion activities*. These activities increase social awareness of quality, and they transfer quality techniques to different levels of company hierarchy and to different types and styles of industries (e.g., mass production, one-piece manufacturing, chemical industry). Examples of these activities are quality days, quality month (November), and quality awards. For instance, one of the major societal promotions in Japan is the Deming Prize for "Nationwide Promotion and Dissemination of TQC."

National standard certificates are issued by the government certifying that a given product meets certain quality specifications. Japanese Industrial Standards (JIS) are the province of the JIS Committee. To earn the right to display the JIS mark on its products, a company must standardize its manufacturing processes and allow its quality control levels to be examined and certified. By 1993, about 11,000 plants in Japan had passed JIS inspection.

The national infrastructure of societal networking provides a mechanism for the *development of new methods*, and JUSE and JSA have invested heavily in the development of new quality methods. Once there is consensus on where new methods are needed, JUSE follows a sequence of steps in the development of new methods. First, the JUSE Research Group regularly researches a new method. A symposium introduces the new method to a larger population. When the method has come into practical use with real case studies, a seminar is held. These steps were followed, for example, when the 7 management and planning tools[62] were developed in the 1970s.

Openness with Real Cases. The second of the three elements necessary for successful societal diffusion and networking is sharing actual cases. Developing the methods of organizational change and improvement is a societal experiment. After one organization has success with a method, the method must be diffused. Therefore, companies must be open with real cases. Real cases means detailed processes of quality practices, such as improvement activities, or of quality assurance systems. This policy of openness applies not only to documents and presentations but also to demonstrations of their use in practice.

In Japan, companies demonstrate they have no secrets in the know-how of quality improvement by distributing a wide range of information and success stories. For example, 33 books on quality were published by

JUSE in 1988. Two-thirds of them dealt with concrete examples and case studies rather than with theoretical work.

Another mechanism for diffusion of real cases and success stories in Japan is Quality Month. For example, the schedule and activities for Quality Month in November 1988 included presentation of 250 actual cases in five different quality conferences — one for foremen, one for managers, one for top management, one on TQC in the service industry, and the Deming Prize Ceremony.

Change Agents (or Catalysts). The third key factor for successful societal diffusion and networking is the use of change agents (also shown in Figure 4.1). Revolution from insiders is difficult because the revolution represents a paradigm change for the organization. Strong change agents from outside often play a necessary role in thought revolutions.[63] If they have sufficient knowledge and personality or prestige, and the necessary sense of mission, change agents serve as catalysts for change. From the Japanese point of view, some consultants have difficulty serving as change agents because they lack the necessary sense of mission.

Deming and Juran had the necessary qualifications, so in 1950 and 1954 they served as national change agents for quality in Japan.

4.3 MIT LFM

In the late 1980s, people at MIT became concerned about the declining fortunes of U.S. industry in the face of international competition, especially from Japan. As a result, MIT faculty members and others undertook a significant research project on how the United States might improve productivity. The MIT Commission on Industrial Productivity was formed in 1987, did an extensive study, and presented MIT with a set of recommendations for follow-up. In 1989 the results of the commission's study were published in the book *Made in America*.[64] As the book said, "*Made in America* identifies what is best and worth replicating in American industrial practice and sets out five national priorities for regaining the productive edge." This book got much attention in the United States and was translated into a number of languages and widely read in countries around the world, including Japan.[65]

Closely connected with the Made in America activity was another MIT step aimed at the effort to address the competitive situation of U.S. industry. In 1988 MIT started a program known as Leaders for Manufacturing (LFM). Eleven of the most well-known U.S. manufacturing companies initially joined with MIT to sponsor the LFM program, and as of 2006 there were 23 partner companies.

According to Professor Steve Graves,[66]

> [T]he creation of LFM can be viewed as having emanated from [the Made in America study]. It was certainly a next step. Three of the four key principals for LFM were part of the commission that wrote the book — Kent Bowen, Gerry Wilson (dean of engineering) and Lester Thurow, soon-to-be dean of management."

Professor Richard Lester, a named co-author of *Made in America* expanded on this:[67]

> The two activities — Made in America and LFM — got their starts at around the same time, and because there was overlap in personnel it's difficult to disentangle the chronology. What is definitely true is that both activities were motivated by the same general set of conditions in the economy at that time (mid-1980s).
>
> The deans of the engineering school and management schools — Gerry Wilson and Lester Thurow — were both members of the Productivity Commission which produced the *Made in America* book, as were John Deutch and Paul Gray (MIT provost and president respectively at the time). Gerry and Lester were prime movers in getting LFM going. And Kent Bowen, one of the two founding co-directors of LFM. . . , was also a member of the Made in America Commission. So the work of the Commission undoubtedly influenced the early efforts of MIT leaders to define and shape the LFM program. And I think it also likely that the publication of *Made in America* — which attracted quite a lot of attention in industry and government circles both domestically and overseas — helped convince potential LFM partners in industry that MIT was in fact quite serious about re-engaging with manufacturing issues.

MIT's LFM graduate program is oriented to engineering graduates with a few years' experience in industry or in the military. Each June an LFM class starts and participates in the program essentially full time until graduating in May two years later. The first summer the 50 or so LFM class members take the same five courses to get them on a common footing, as many have never taken management or business courses before. During the first school year, the LFM students take classes at both the MIT business school and in an engineering department. During the second summer and first term of the second school year, LFM students do an internship in industry, primarily with LFM partner companies; and during the second term of the second school year they attend more business school and engineering department classes and write a thesis. They graduate with a Master of Science degree in their engineering specialty as well as an MBA. The LFM training is designed to develop future leaders of industry (hence the program name) and future CEOs.

Participants want different things out of the program. Many are trying to take a step from being individual contributors in an engineering area to becoming manufacturing managers. Others already work in manufacturing but also want to move into management. Participants coming out of the military sometimes use the program as a step to civilian life and a transition from the military to industry. With only about 50 positions in each class, admission to the program is highly competitive. Nominally, all participants are interested in a future in manufacturing, and most graduates of the program initially do go to manufacturing companies.

LFM is highly regarded and has been copied at other universities such like Stanford, Northwestern, McGill, and Penn State. The MIT LFM program itself is involved in conjunction with Shanghai Jiao Tong University in creating the China Leaders for Manufacturing program.

With many hundreds of graduates since its founding, LFM has had im-

pact in the industrial recovery of a variety of U.S. companies. For example, LFM students and graduates have contributed to Boeing's 737 moving line production, General Motors' lean production, and Dell's supply chain revolution. Intel is the number one recruiter of LFM graduates.

The LFM program has always involved partner companies and thus has always worked on closing the gap between university and industry. Partner companies influence the direction of the LFM curriculum and are directly helped through their participation in the program. LFM graduate Earl Jones suggested to us some of the ways LFM partner companies benefit:[68]

- Companies are in a special position for recruiting LFM graduates.
- Companies have access to professors and research.
- More generally, a certain vitality of ideas comes from staying close to academia.
- In many cases companies receive considerable return from the internship work itself.
- The partner companies that benefit most look at LFM as a strategic human leadership pipeline, and the LFM networks within partner companies can be transformational.

As the LFM program has continued, it has evolved into a lifelong learning community for its alumni. The connection with LFM and with other LFM participants is not over when a participant graduates from the program. The alumni part of the LFM website[69] says the following:

> After commencement, LFM graduates become part of an extended community of LFM alumni that offers networking opportunities and events that span a lifetime and the globe. LFM alumni provide information and support for each other throughout their careers.

Not only is there an LFM alumni website for networking; some companies with lots of LFM alumni have internal LFM networks. Twice a month a seminar by a faculty member, an alumnus of the LFM program, or an LFM sponsor company is broadcast over the Web. An LFM alumni council helps shape the direction of the LFM program and community, encouraging relevance in a changing world. An annual LFM alumni conference offers two days of speakers, workshops, and networking. And there are regional and informal get-togethers and networking opportunities as well.

Once upon a time, individual learning might have been sufficient for dealing with routine business activities. But today, a (virtual) community may be needed to generate the necessary future knowledge for success. Even very smart and very highly trained individuals may find they need outside help. In the case of the LFM lifelong learning community, everyone is smart and highly trained — it may be said to be a community or partnership of the elite. Such elite communities may be essential to share and create future knowledge.

Figure 4.2 is one way to look at MIT LFM's "community for future knowledge."

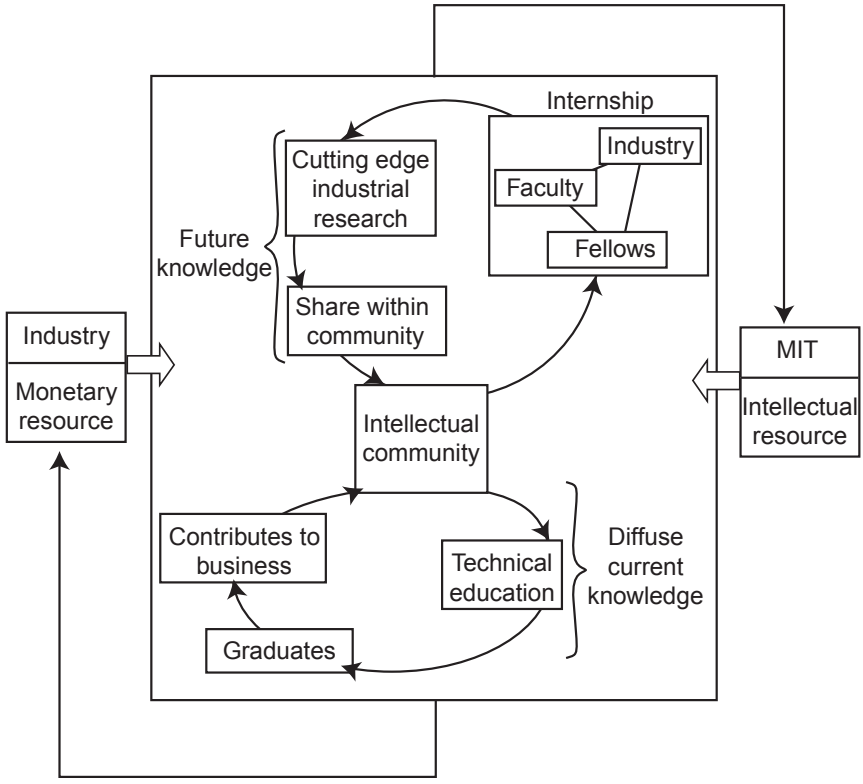


Figure 4.2: MIT-LFM community.

4.4 Center for Quality of Management

This section provides a sketch of the history of the CQM, emphasizing the various triggers and principles involved in its founding, decade of success, and final years. This section is a bit long because I know this case study best.[70]

Formation

In early 1990, seven well-known 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 decide to implement TQM. With few exceptions, the seven companies that formed the CQM were all suffering from the economic slowdown that began in the late 1980s. Also, the CEOs of several of the companies had personally visited Japan and observed its business practices. At least one of the CEOs had lived in Japan, most had divisions in Japan and traveled to Japan frequently, and some had studied Japan's business practices through trade association committees on international competitiveness. Furthermore, several of these CEOs were regularly in contact

with each other through existing business associations, such as the Massachusetts High Technology Council. Thus, business crisis and awareness of TQM as practiced in Japan motivated these CEOs to practice TQM.

The availability of three key individuals also made formation of the CQM possible. Ray Stata, founder of of Analog Devices, was — and is — a well known figure in the Massachusetts high technology community, had influence with other CEOs, and was personally inclined to seek improved business methods.[71] Thomas Lee had been a noted engineer at General Electric who had retired from a senior executive position at General Electric to become a professor at MIT where he directed a research laboratory. He was then invited to serve as director of the International Institute for Applied Systems Analysis (IIASA) based in Austria where he had met TQM expert Shoji Shiba. Upon completing his tour of duty at IIASA, Tom Lee returned to MIT as a professor emeritus with with a mission to help improve business practice in the United States, his adopted country. He was one of the lead faculty from the engineering school involved from the beginning in creating MIT's LFM program (see page 80). Steve Graves senses that Tom Lee was quite influential with the Gerry Wilson, MIT's Dean of Engineering, who was strong advocate for program and also was quite influential with Kent Bowen, one of the original co-directors of the program. Steve Graves continues,[72]

> Once the program started Tom and I ran the pro seminar for LFM's first couple of years. Tom invited (amongst others) Shoji Shoji to LFM initially as a pro-seminar speaker. After this initial visit, [Shoji's offering] expanded into a mini class and then eventually into the TQM [course for LFM students during their first summer in the program].

Tom Lee introduced Shoji Shiba to Ray Stata and other Boston-area CEOs, and in November 1989 arranged for Shoji Shiba to give a seminar at MIT that several of Boston-area CEOs attended.

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

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

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

Having decided to form the CQM, the founding CEOs needed a plan for the CQM's functions and operations, and they needed a joint under-

standing of what TQM was. To this end, a five-week design study took place in March and April of 1990, led by Shoji Shiba. Except for three people from MIT, the design study participants were senior line managers or senior quality staff members — two each from five of the original seven CQM companies. The study team was cross-functional, intercompany, and international. (I was a member of this design team.)

First year

Much activity happened in the CQM's first year including several seminars about companies with leading edge TQM practices, a translation of a book,[73] one day introductory courses, development of several tool manuals, and development of a six-day course attended by 48 executives of CQM companies.

The 6 Day Course on TQM for senior managers was a particularly noteworthy achievement of 1990. The course was developed by Shoji Shiba with help from the CQM design team, and it was taught by Shoji Shiba. Several CEOs and their direct reports attended the course, which included much group work with TQM tools and a number of case studies presented by CEOs, senior managers, and members of the design team. Another member of the design team and I 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. The course notes ultimately were turned into the book, *A New American TQM*.[43]

The design team members work with Shoji Shiba and experience in planning and initiating the CQM created a network of noble-minded real change leaders for the member companies and the CQM.

Key elements

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

Organizations, not individuals, were members of the CQM. It was not a professional society. The first criterion for membership in the CQM was active participation of the most senior manager (CEO or CEO-equivalent) who is committed to leading the organizational change and improvement efforts in his or her organization. The other criterion for membership was that the CQM member be willing to share actual case studies, good and bad.

Another key element of the CQM approach was 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.

Other elements of the CQM approach were the adoption of a common language and baseline approach to facilitate shared learning opportunities

(in particular, the vocabulary and methods of the book, *A New American TQM*, were selected); and members provided an "improvement culture" to each other and society at large.

1991–1998 Activities

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

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

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

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

As CEOs in other geographic regions heard about the CQM, groups of those CEOs wanted their companies to be part of the CQM. In this way, CQM chapters were established in Louisville, Cincinnati, western Europe and Finland, and on the west coast of the United States.

From the beginning, one of the CQM's aspirations was to develop improved, advanced methods, moving beyond what was copied from Japanese TQM. Thus, in 1994, the CQM formally changed its name from Center for

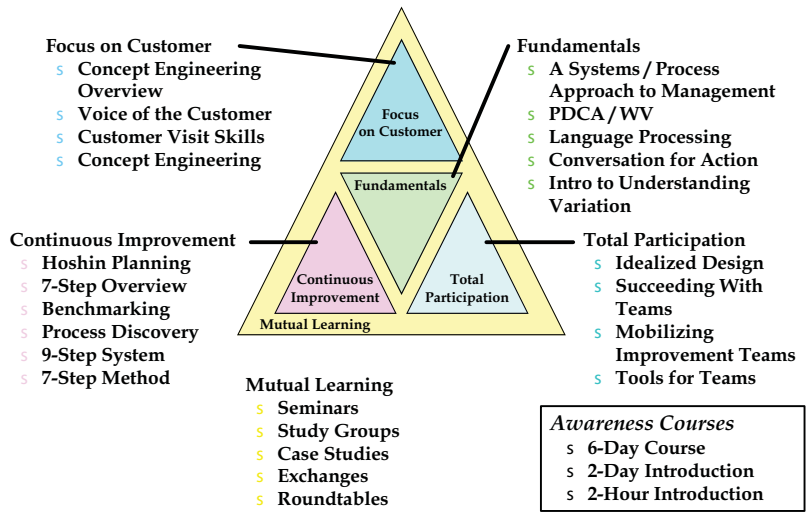


Figure 4.3: CQM Curriculum Roadmap.

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.

Also from the beginning, the spectrum of CQM activities had fallen into three categories:

- Education — either resulting from research efforts or developed in member companies and contributed to the CQM (the CQM's 1999 offerings are shown in Figure 4.3)
- Networking — a yearly seminar series, roundtable meetings in functional areas; inter-company exchanges of visits; inter-company participation on improvement teams; publication of books, manuals, and the *Journal of the CQM*; and case studies, etc. "published" on the CQM's public or member-only website.
- Research — from the beginning the people from CQM member companies worked together to learn, exchange, and develop new methods to add to the basic set of methods in the areas of the four revolutions from the first edition of this book. Guiding these efforts were several principles:
  - Look for weaknesses in their current management systems.
  - Don't be bound to a single "school" or discipline.[74]
  - 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.

  Over the CQM's existence, various combinations of CQM members worked in a variety of areas. In each case, six to a dozen people periodically met, studied, and synthesized for periods ranging from a few months to a year or more. Many research reports and documents were prepared;[14,75–83] other research activities were described in seminars and other non-print forums.

While it was not one of the fundamental legs of the CQM's three-legged stool of education, networking, and research, the CQM also had a significant documentation activity: four books,[14,43,84,85] nine step-by-step manuals,[76,86–93] and publication of the *Journal of the Center for Quality of Management* for eleven years totaling 29 issues.

More fundamental transitions

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

- Japan began to have economic trouble and the dot-com boom started in the United States. U.S. business executives (not necessarily within the CQM member companies) came to believe that the United States'

entrepreneurial approach was superior to the Japanese methods of TQM for achieving business success.

- The life cycle of the method known as TQM was declared over in the U.S. business press, and Six Sigma (which Jack Welsh had adopted for General Electric) was declared to be the successor to TQM. Other methods were also significantly adopted as successors to TQM including lean production (based on the Toyota Production System).
- The existing CQM member companies began to ask, "What is next?"

Nonetheless, the CQM top management reacted by refusing to drop TQM as one fad to be replaced by another fad. Rather, the CQM (particularly Tom Lee) pushed the idea that each company needs to adopt elements from various methods that are relevant to its situation into a coherent *integrated management system*[85,94] for the particular company.

Also in 1998, CQM founding president (and pro-bono part-time employee) Tom Lee retired, and a new CQM president, Gary Burchill, was appointed. Gary had the difficult task of revitalizing the CQM.

One of Gary's first steps was to bundle together existing individual skill courses into bigger skill sets that allowed better management of processes. Unfortunately, such bundling was received by member companies with a reaction of "So what — that is merely a bit of repackaging."

Soon after his arrival, Gary also embarked on a Concept Engineering effort involving 18 U.S. CEOs and 11 European CEOs of member companies. Gary's CEO survey revealed that in the CEOs' world of 1999 increasingly complex problems (Figure 4.4) had to be handled at lower levels of an organization, increased organizational complexity meant that even relatively simple problems required effort from high in the organization, and new methods and old methods involving more people more often had to be aligned and integrated in pursuit of business purposes, as shown by the cloud shapes in the figure (both off the diagonal and on the diagonal).

Consequently, an R&D effort was carried out (1999–2000) involving four study groups in three of CQM's regional chapters addressing the following topics:

- managing organizational complexity; studied within the Cambridge chapter and resulting in the Four Gears method for leading without authority[95]
- managing problem complexity; also studied within the Cambridge chapter and resulting in the ARMED decision process[96]
- making change commonplace; studied within the Cincinnati chapter and contributing to the Four Gears method and resulting in 7 Infrastructures manual[93]
- creating organizational integrity; studied within the Louisville chapter and contributing to the Four Gears method

A separate study team addressed business alignment with insight from the Discovery Driven Planning methods of McGrath and MacMillan[97] and Hackler;[98] this team created the SCORE method for selecting the right opportunities.[99] Another study team drew heavily on the method of Hatten and Rosenthal[100,101] to produce the CQM's version of the Enterprize Model.[102]

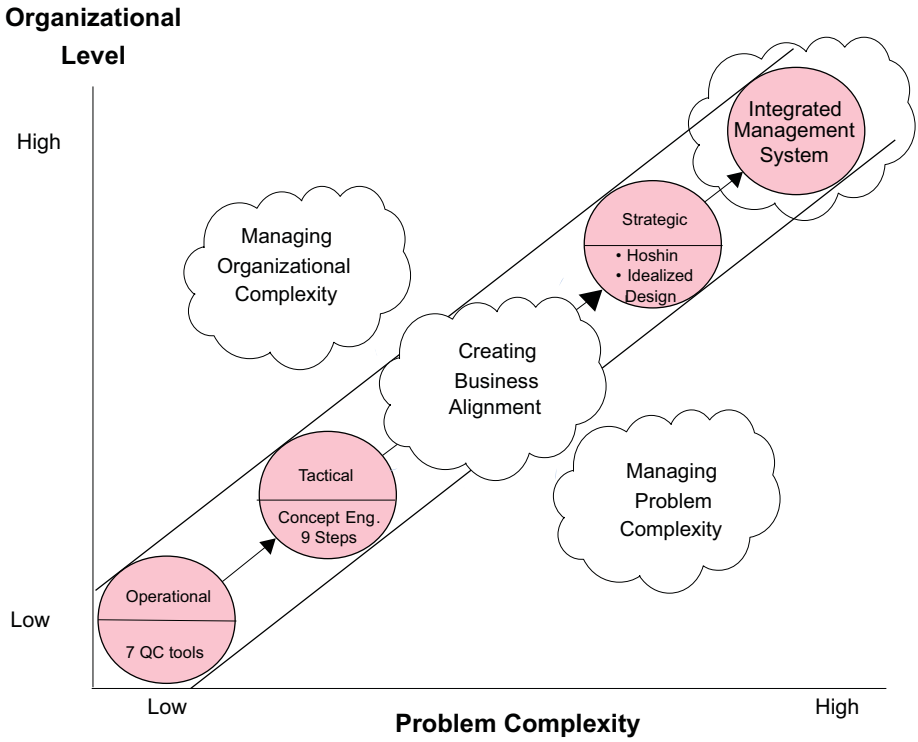


Figure 4.4: Problem Complexity versus Organizational Level.

Four two-day courses were created (the methods also were documented in a special issue of the *Journal of the CQM*[103] that also included case studies). From Gary's point of view, the methods were pragmatic and highly applicable — certainly greater than a 60 percent solution and sometimes an 80 or 90 percent solution. However, the product launch was weak, and over time a number of CQM companies canceled their annual contracts with the CQM. Then, in the third quarter of 2001, 9/11 happened multiplying member uncertainty about spending money with the CQM.

Gary and his team continued to struggle to meet member company needs until in 2003 Gary reduced his CQM commitment to half-time and then left the CQM at the end of 2003 to start his own company (where he applies the CQM methods).

In 2004 a search was undertaken for the appropriate replacement for Gary Burchill as CQM president, and a new president was hired in late 2004 or early 2005.

At some point after joining the CQM, the new president did a financial analysis that convinced her that the CQM was *technically* insolvent even though it was solvent in *practical* terms. The CQM board members were also probably getting tired by this time of their on-going struggle to keep the CQM going. Thus, in 2006, the board began to focus on finding a successor organization to which the CQM intellectual property and member

contracts could be transferred.

Eventually GOAL/QPC acquired the CQM assets and liabilities. The acquiring organization was clearly interested pulling in the member companies of the CQM, and a number of the CQM companies continue to network as the CQM within GOAL/QPC. How well GOAL/QPC is making use of the intellectual content that came from the CQM is unclear to me. GOAL/QPC did restrict the previously freely available archives of the *Journal of the CQM* to be available only to member companies.

Chapter 5

Observations on learning communities

I have now described CII's VLFM learning community (and other CII activities preceding VLFM) and four learning communities from outside of India. In a later edition of this monograph, I intend to go into considerable detail about culture and change, the essence of the activities of each of the described learning organizations, and the creation of a learning community and methods of sustaining a learning community. Present time constraints, however, limit this discussion to what you see below.

The left column of Table 5.1 is a reasonably complete list of the attributes of VLFM Opportunity A. The next four columns indicate how Toyota, JUSE, LFM, and CQM score in these areas. The final column assesses VLFM Opportunity A has progress in each area.

Notes for Table 5.1:

a. LFM creates visible change in companies quite indirectly. Its graduates go to companies and, in time, have effect on the companies.
b. In the early days, Toyota's cross-company efforts were primarily with its suppliers. Later Toyota began interchange with non-supplier companies.
c. CQM had a lot of connections with MIT and MIT's LFM program, but not much active involvement directly in CQM from the faculty. A number of faculty members from other universities used the CQM's manuals, and occasionally an academic gave a presentation at a CQM meeting or (on one occasion) participated in a CQM development project.
d. Most publications about TPS are from people outside of Toyota.
e. LFM operates within MIT, a major research university. The faculty members involved with LFM continue their normal research and publication and teach the new methods to the LFM participants when appropriate. My observations is that LFM itself doesn't do significant amounts of publication. The LFM students may do some research are part of their academic work or part of their internships in industry.

Table 5.1: Correlation between elements of VLFM Opportunity A and other learning organization.

VLFM Opportuniy A component	Toyota	JUSE	LFM	CQM	VLFM Op. A
Based on Gemba	◎	◎	◎	◎	◎
Interdisciplinary	◎	◎	◎	◎	◎
Skill training	◎	◎	○	◎	◎
Involves company top level management	◎	◎	○	◎	◎
Visible changes in companies	◎	◎	○ a.	◎	building
Cross-company	○ b.	◎	○	◎	◎
Industry and academia	╳	◎	◎	△ c.	building
Publications	d.	◎	e.	◎	○
Research	f.	◎	e.	◎	transfer stage
Focused on needs of society, not individuals	g.	h.	i	j	building
Alumni organization	k.	◎	○	l.	building
Developing new leaders for community	◎	m.	n.	△	p.
Adapts to diverging interests of companies	NA	△	NA	╳	p.
Had guru at the beginning	Yes	Yes	Yes	Yes	Yes
Create real change leaders for community	Yes	Yes	o.	Yes	○
Had big concept to start	Yes	Yes	Yes	Yes	Yes

◎ = very high ○ = high △ = low ╳ = none NA = not applicable

Notes a through p are in the main text

f. Toyota's research in the area of operational and quality methods is very hands-on and practical.
g. Toyota is surprisingly interested in the well-being of society, for a for-profit company.
h. JUSE has gone from very high to only high over time.
i. LFM has gone from very high to only high over time (or maybe slightly lower in terms of its initial purpose of helping U.S. industry).
j. CQM started very high, went down to low in its later years, and eventually went out of business as member interests diverged too much.
k. I don't know if Toyota has any sort of alumni organization.
l. Since CQM went out of business, an informal network still exists among a few of the key contributors in the early days of CQM.
m. JUSE started very high and has gone to only high over time.
n. I believe LFM develops new members of its advisory committee from industry over time, and MIT faculty members rotate in and out of LFM teaching as part of their normal changes in academic and teaching interests.

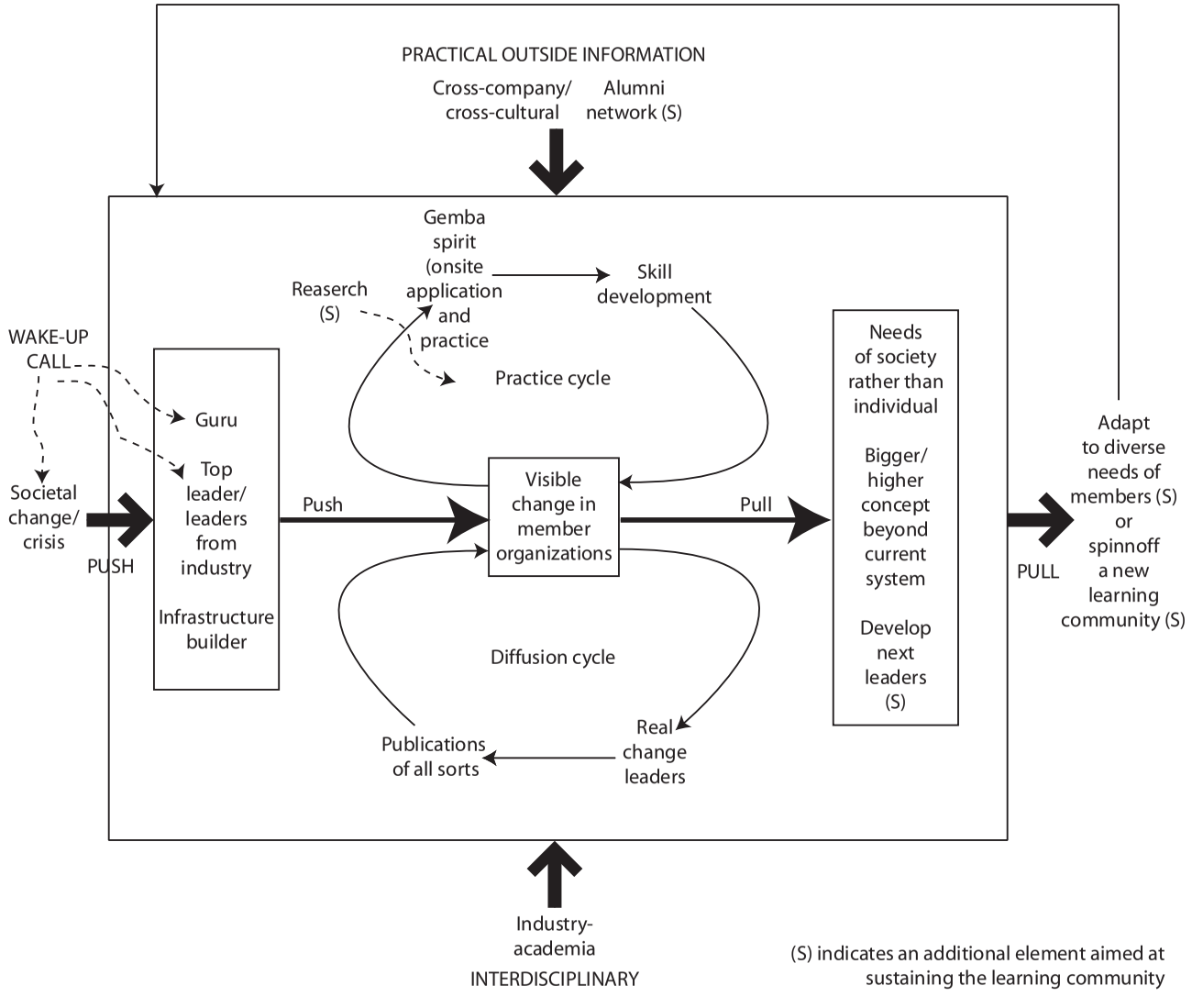


Figure 5.1: Creating (and sustaining) a learning community.

o. LFM creates change leaders to go into industry, not to continue the organization itself. LFM itself is restocked as necessary from the MIT faculty.
p. It is still early days, and VLFM Opportunity A has not yet addressed these issues.

The elements in the left column of Table 5.1 have also been formed into a causal loop for how to create a learning community, as shown in Figure 5.1. This diagram should be relatively self-explanatory. However, I do have a few comments.

As shown at the left side of the diagram, the wake-up call that results in formation of a leaning community typical is stimulated by both an underlying societal change, one or a few company top leaders who recognize the change and the need for a new kind of learning, and a guru who can introduce the new methods. Also, there must be someone who actually organizes the infrastructure for the leaning community. Then there must be other top leaders who decide their companies will also participate in the learning community.

Near the right side of the diagram, there is the pull of a bigger concept and the new needs of society. Here are some examples:

- Toyota's big concept was the move to concern with flow rather than mass production.
- JUSE's big concept was the move from quality control to TQM.
- LFM's big concept was the move from small-m to big-M.
- CQM's big concept was the move from competing companies to collaborating companies.

At the far right of the diagram is the need for the learning community to adapt as, inevitably, the needs of its member companies diverge. The member companies may start with similar noble motives and company needs, but that won't last. Some companies will advance faster than others, and companies that join later may not be as committed to the nobel mission as the original members.

Perhaps a way to adapt can be found that will result in appropriate changes to the learning community. If not, the likely solution is to spin off a new leaning organization that focuses on the common needs and ideals of a new set of companies.

VLFM is at the right time and in the right place. Massive changes are happening in India and the world. Many new visionary leaders will be needed by Indian industry. But people need an opportunity to develop in order to take their place as future visionary leaders. I believe that VLFM's most important contribution is providing opportunities for a new kind of development for conducting business in a new way.

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3. `www.cii.in`
4. `www.vlfm.org`
5. Although I have not used quote marks here, these paragraphs are copied or derived from the CII website[3] and the preface of several VLFM documents; and I have kept their spelling in these near quotes.
6. For your reading convenience, these chapters are posted at `www.walden-family.com/vlfm/breakthrough-1-2.pdf`
7. The economic downturn that became manifest in 2008 and continues into 2009 puts even more pressure on companies to development methods and leaders able to compete in a rapidly changing global business world.
8. Charles H. Fine. *Clock Speed: Winning Industry Control in the Age of Temporary Advantage*. Perseus Books, Reading, MA, 1998.
9. Emails of October 24–25, 2008.
10. Gemba refers to the manufacturing floor. The concept is that engineers must go there to understand the problem. The concept has been extended in the context of new product development to visiting the customer's environment.
11. Takeyuki Furuhashi. *Learnings from the Toyota Production System — To Higher Competitive Advantage*. Confederation of Indian Industry, New Delhi, 2007.
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13. Email of October 27, 2008.
14. Shoji Shiba and David Walden. *Four Practical Revolutions in Management: Systems for Creating Unique Organizational Capability*. Productivity Press, Portland, Oregon, 2001. As of February 2009, this book should be available in India from Book World Enterprises, 9, Dr. M.B. Velkar Street, Kalbadevi Road, Mumbai 400002. See also `www.walden-family.com/4prim`

15. According to Shoji Shiba (email of December 4, 2007), this figure (an application of Shiba's WV model) came from Bertrand Jouslin de Noray and others who were meeting regarding the summer camp activities (to be described in a later edition of this book).

16. Another version of this approach is described in Chapter 16 of *Four Practical Revolutions in Management*..[14]

17. VLFM Division, Confederation of Indian Industry. *Review of Visionary Corporate Leaders in Manufacturing VLFM Programme Opportunity A — September 23, 07–March 2, 08*, 2008.

18. Confederation of Indian Industry. *Mission for Innovation Annual Report*, April 24, 2008.

19. As I'll call them — in CII's view, there are only *five* official modules, with the fifth module having two parts, 5A and 5B, and the first module split into two sections.

20. The three icons that Shoji Shiba adopted for his work with Indian managers have certain parallels to the icons he adopted when he began to work in 1990 with managers in the United States and students at MIT: stop I-Already-Know-It, stop Prove-It-To-Me, stop Not-Invented-Here, and stop Not-My-Job. These are described in detail in *Four Practical Revolutions in Management*[14] (pp. 25–26). The reader can work out any parallels between the two sets of icons. The different cultures require different icons, but there are universal tendencies.

21. Shoji Shiba. *The Five Step Discovery Process Manual*. Gurgaon, Haryana, India, February 2005.

22. Email of October 29, 2008, from Kalpana Narain.

23. Class of 2008. brochure available from the VLMP Office, Indian Institute of Management Calcutta.

24. Some of the information in this section comes from the Opportunity D brochure and some comes from a CII press release of October 6, 2008. Other information comes from Kalpana Narain and from CII's working report on the September 26–28 module of the program.

25. W. Chan Kim and Renée Mauborgne. *Blue Ocean Strategy: How to Create Uncontested Market Space and Make Competition Irrelevant*. Harvard Business School Press, Boston, 2005.

26. Kiran Deshmukh. Acceptance speech for his receipt of the Indian Society for Quality 2006 Ashoka Award, December 22 2006. `www.isqnet.org/conference06/kiran.pdf`

27. Email of January 16, 2008.

28. Opportunity A was thus formatted like the CQM's 6 Day Course, but was five times as long. The 6 Day Course (mentioned on page 85) had 3 two-day sessions separated by a month. Half of each two-day session was practice of methods. Between sessions the participants were to do homework applying the methods at work.

29. Opportunity B is actually closer in format to MIT's two-year residential LFM program (described starting on page 80).

30. Also at the annual meeting, the National Manufacturing Competitiveness Council of the Indian government gave Shoji Shiba a letter of appreciation.

31. Which as I write this (September 2008) exists in draft form for use only by the Batch 2 group, and which will be finalized at a later time.

32. www.perfectcircleindia.com

33. Email of October 1, 2008.

34. www.godrej.com

35. www.archives.godrej.com

36. Christensen's ideas put forward in his book *The Innovator's Dilemma* were instrumental in Shoji Shiba's decision to focus on breakthrough management.

37. www.sonagroup.com

38. This paragraph is a slight paraphrase of three paragraphs taken from the Background section of Mr. Manoj Kumar Sharma's case study presented in the following subsection. The following subsection includes a couple of quotes from the case study, and most of the rest of the text of the subsection is strongly derived from the text of the case study.

39. www.sonagroup.com/Sona_okegawa_aboutus.html

40. Surinder Kapur. Manufacturing Innovation as an Engine for India's Growth. In Charles W. Wessner and Sujai J. Shivakumar, editors, *India's Changing Innovation System: Achievements, Challenges, and Opportunities for Cooperation: Report of a Symposium*, pages 67–76, Washington, D.C., 2007. National Academies Press.

41. en.wikipedia.org/wiki/Confederation_of_Indian_Industry

42. Export Import Bank of India.

43. Shoji Shiba, Alan Graham, and David Walden. *A New American TQM: Four Practical Revolutions in Management*. Productivity Press and Center for Quality of Management, Portland, OR, and Cambridge, MA, 1993.

44. The information in this section comes from my May 2008 interview of Sarita Nagpal and CII documents.[45,104]

45. Yoshikazu Tsuda, Dinesh Sharma, and Sarita Nagpal. History of Cluster Activities in India. draft manuscript, April 2008.

46. en.wikipedia.org/wiki/5S_(methodology)

47. Shoji Shiba. *Breakthrough Management: The Indian Way*. Confederation of Indian Industry document, Gurgaon, Haryana, India, February 2005.

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58. Steven Spear and H. Kent Bowen. Decoding the DNA of the Toyota production system. *Harvard Business Review*, 77(5):97–106, September-October 1999.

59. The information in this section is from the JUSE website[105] and from Shoji Shiba's reading and interpretation of a history of JUSE.[106]

60. For instance, I notice this approach being used for Bible study in many U.S. churches. Looking in another direction and from my reading of history, this is an approach Marxist political cells used. Perhaps it is a common sense approach in many cultures for any viewpoint that is being spread.

61. You might substitute "business improvement" or "organizational change" for "TQM" while reading this section. Extended versions of the description may be be found in *A New American TQM*[43] (pp. 510–522) and *Four Practical Revolutions in Management*[14] (pp. 646–654).

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65. This section is derived from *Breakthrough Management*.[1]

66. Email of October 23, 2005.

67. Email of November 15, 2008.

68. Email of October 22, 2005.

69. `lfm.mit.edu/alumni.html`

70. A still more complete version of the story is available in my history of the CQM;[107] the first two-thirds of the story is also in *Four Practical Revolutions in Management*.[14]

71. He had co-authored a book relevant to innovative management practices..[108]

72. Email of November 11, 2008.

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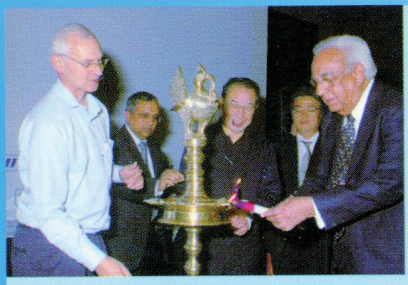

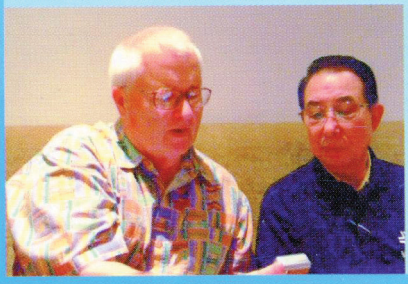


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