Figure 11.11a. PROCESS IMPROVEMENT STRATEGIES: Japanese Management

EM8301: The Wall Street Journal, April 29, 1983, pages 1, 23

Factory Magic: In a Plant in Memphis, Sharp of Japan Shows How to Attain Quality, Instill Familial Feeling

Sharp Electronics Unit Cuts Defects by Pushing Hard Its Workers and Suppliers

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MEMPHIS, Tenn. – When word spread that Sharp Corp. of Japan was planning to build an electronics factory here, a lot of people thought the Japanese were making a big mistake.

After all, RCA Corp. had built a TV plant in Memphis in 1966 – and shut it down five years later. That facility had suffered just about every labor and management affliction imaginable: wildcat strikes, union-authorized strikes, apparent sabotage of the product and a series of layoffs that took the payroll from a peak of 4,200 workers down to 1,600. At times, so many hundreds of defective TV sets clogged the assembly-line aisles that technicians had difficulty repairing them. Finally, RCA pulled the plug, shipped most of the machinery and work off to Taiwan and left the Memphis labor force with a black eye.

Yet Sharp came here anyway. "People said it was labor problems that caused RCA to close," says Paul Hagusa, the president of Sharp Manufacturing Co. of America, "but we didn't think so. We felt it was RCA's lack of quality in the product."

Success Story

Sharp not only has proved the skeptics wrong but has also vindicated the city's work force. Despite some problems with labor unions, its 500,000-square-foot plant has, in the past four years, rolled out a million color-television sets and a million microwave ovens. It has done so with U.S. labor (all the assembly-line workers and 85% of the managers are American) and with mostly American components (U.S. companies supply 70% of the TV parts and 75% of the microwave parts). Productivity has reached 90% of that in Sharp's Japanese plants, and the defect level is low. The plant has toughed out the recession without reducing its output of about 30,000 TV sets and 30,000 ovens a a month (except for a slight dip in 1981), without layoffs and without losing its profitability.

Best of all, Sharp products shipped from Memphis get high marks for quality and durability from consumer groups.

The Japanese company's remarkable success – on the banks of the Mississippi River – can't be attributed to special machinery or automation: American competitors use the same equipment. Nor can it be attributed to employees who sing the company song every morning, dress neatly in company garb, exercise in unison or eat sushi; they don't.

So, what's Sharp's secret?

The assembly-line workers themselves credit the Japanese style of management. At its core, it demands very hard work and an obsession with quality, an obsession with making every seam weld and switch of the product perfect. A Sharp manager agrees, saying: "It's not what we do, but how well we do it. It's the constant striving for excellence."

Twist of Fate

The leader in that drive for excellence, Mr. Hagusa (pronounced huh-GOO-sah), came to his position in Memphis through a full twist of fate. A teen-ager during World War II, he worked in an aircraft plant in Osaka, his hometown, and once, running to work during an air raid, barely escaped death as an American bomb glanced off a trolley-car cable and bounced to a harmless stop just yards away from him. After the war, he became a houseboy to an American Army officer and converted to Catholicism, taking the Christian name Paul. Later, he graduated from engineering school and began his lifelong career with Sharp.

Now, Mr. Hagusa, a small man whose feet just reach the floor as he settles into an American-sized chair, considers his job "a great mission," one that he hopes will ease trade tensions between the U.S. and Japan. And he clearly is presiding at a junction of two cultures.

His office is decorated with a vase of silk cherry blossoms, an ornate samurai helmet and a glowering portrait of Tokuji Hayakawa, the company's founder. But despite his weak English, Mr. Hagusa has learned to live with American customs. ("Shake hand is not so bad, but hug?" he says, wrinkling his face in distaste.) At the height of last year's Christmas party, Mr. Hagusa raised cheers among the employees by declaring, "There are two things I've learned since coming to America: how to wreck cars and how to drink Jack Daniel's."

Labor Lessons

He also has learned about American labor unions. In October 1980, the National Labor Relations Board charged Sharp with interrogating employees about their union sentiments, threatening to move the plant if employees voted union, suggesting that certain employees quit rather than support a union, telling employees they could be "nailed to the wall" for distributing union literature, and other offenses. In a settlement in August 1981, the company agreed to post in the plant notices promising not to harass employees involved with the union. Last month, Sharp and the International Brotherhood of Electrical Workers, which the employees had voted to represent them, agreed on a contract.

Michael D. Lucas, a union organizer, doesn't place full blame for the contention on the Japanese management. "They aren't any more familiar with American labor law than you or I are familiar with Japanese labor law," he says, adding that the company was led into the litigation by its law firm. "Japanese management is finally getting the idea that we aren't the devils in disguise they were led to believe we were," he remarks.

But the most important lesson learned by Mr. Hagusa has been how little most American companies know about achieving quality. "The most important path to quality," he says through an interpreter, "is that employees feel that they are of one family, playing an important role in the company."

How is a familial feeling instilled? "There must be a change in the way that management in the U.S. treats its employees," he says. "Otherwise, it is difficult for employees to respond" as the Japanese do.

"In America, when sales drop, the first thing American management in general thinks of is laying off employees. In Japan, it is the last resort," he says. Japanese companies cut costs elsewhere, he adds, or temporarily shift production employees into sales even though "they may not be as efficient as experienced sales people."

With their jobs assured, workers – in Japan, at least – feel a responsibility to put the company before all else. "In Japan, an employee tries to work his lifetime with the company he chooses. So he does not put much importance in his personal interests," Mr. Hagusa says. "In Japan, they say, 'Job first, family life comes second.'"

For himself, he says, "I don't work to live, I live to work."

This strong work ethic is apparent at the Sharp plant in Memphis. "The Japanese work much more than we do – telexing home to

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Japan, checking up on us," says Kevin Hignight, an engineer at the plant. "They work to seven or eight every night and on Saturday mornings. They seem to like it."

And they push the U.S. workers relentlessly. "You won't see people sitting around on the loading docks," says Milton Kee, the company's American manager of quality control. "Everyone here has a job, and they're expected to do it. There are no excuses." He adds:

"I've never worked so hard in my life. It's been hard on me, it's been hard on the other employees, and it probably always will be hard. But I've had 17 years in manufacturing, and the last three have taught me more than all the previous 14."

'They're Training Me'

Fred Haynes, another engineer, agrees. "It's a tough place to work," he says. "They keep trying to get a little more out of you. They keep going deeper, demanding better quality from you. They're training me ..... In a way, I'm a Japanese engineer, learning to relate to American companies." Then he concedes, "I think it's real good."

However, not everyone is willing to live under Sharp's ever-tightening standards. When Sharp first asked American suppliers to submit their materials to Sharp engineers in Japan for inspection, almost all failed. Some vendors, exasperated, quit the bidding.

During Sharp's first year here, the Japanese dominance stirred up tension in the plant, too. "They were here to duplicate the plant in Japan," one worker says, "and there was only one way to do things – their way." Especially during that first year, there were some difficult meetings between the Japanese and the Americans. With American suggestions carrying little weight with Japanese management, "it was sometimes humiliating," one American manager recalls.

Much of that has passed. "They had to learn about us as people first, before they could trust us," one worker says. "Now, I feel they respect us."

The Americans, in turn, express respect for the Japanese, especially for their attention to detail. Although many of the Japanese didn't know English when they arrived four years ago, "they're even starting to correct our grammar and spelling," one American worker boasts.

Going by the Book

In the Spartan concrete-block office of Joe Scott, the production manager for Sharp's microwave ovens, a sign on the wall reads, "Do it right – the first time." But good intentions and hard work alone don't account for Sharp's quality. Another factor is found in a thick book on Mr. Scott's desk. In the book are line graphs that meticulously track the pulse of the assembly lines through information collected from a data sheet attached to each oven. "We let the data tell us what we need to know to correct a problem," he explains. "We don't use personal opinions or emotions.

Although Sharp has been able to track and improve the level of quality in its own plant, it has found it much more difficult to persuade its 70 U.S. suppliers to do so, too. "We're trying to convince vendors that quality actually reduces their costs," Mr. Scott says.

At a recent meeting of vendors, Edward Cox, Sharp's TV set production manager, explained "Practise Sincerity and Creativity," Sharp's oft-repeated business creed. "As for sincerity, we expect you to send us 100% quality parts," and precisely on schedule, he said. "As for creativity, we expect you to participate in quality improvements."

'Report Cards'

Suppliers got "report cards" evaluating the quality of their materials, their prices, promptness of delivery and other factors. Sixteen vendors received 100% quality rating; 15 others also got A's with 95% to 99%; 18 got B's with 85% to 94%; nine got C's with 75% to 84%; and three got D's with 65% to 74%. There weren't any F's.

"We did about as well as I always did in school, a strong C," says Jeff Talbot, vice-president of Talbot Industries Inc., a Neosho, Mo., supplier of wire racks for Sharp's microwave ovens. Mr. Talbot blames his 84% rating on a few bad shipments when Talbot Industries started its first run eight months ago. "Sharp does a first-piece inspection with every shipment, and if it doesn't measure out exactly, then the whole shipment is no good," he says. "Other companies would say, 'Well, it doesn't exactly meet our tolerances, but we can use it.' But at Sharp, if it's wrong, it's wrong."

Next year, he says, with a bit of disbelief in his voice, Sharp expects his company to reach 97%. "It's not going to be easy," he concedes. "If we can cut our in-house rejection down from a high of 12% to 1% or 2% and then make sure we don't send them over 1% defects, that will be the proof of the pudding."

At the head of the class with a 100% rating was, not surprisingly, Tabuchi Electric Co. of America, a Japanese supplier of transformers that followed Sharp to America and set up a plant employing 150 persons in Jackson, Tenn. "We are of the same mind," says Itaru Nakagawa, the director of sales and planning. "Not only with Sharp but with our other customers, we have very eager communications. Even if the customer hasn't rejected this time, even if there is but a little possibility of rejection, we will know at the meeting and correct it."

However, Mr. Nakagawa says his performance must be improved. "Their (Sharp's) objective is that they don't need to inspect our product at all," he says. "It's an objective that is very hard to approach."

Being tough is only half the formula for getting quality. The other half is making suppliers also feel a part of the family, Mr. Hagusa says. Indeed, once a supplier begins working with Sharp and shows willingness to improve, the relationship can last a long time.

"We'd really have to step all over our toes to get thrown out of here," says Mr. Talbot, the maker of microwave wire racks. "They'd give us every consideration under the sun because we have done a good job." Adds Mr. Hignight, the Sharp engineer, "If the company has a problem, we can telex Japan to see if they've solved that problem in the past. Our job actually is to help the vendors get their rejection rates down so they can make some money."

Richard Hollington, vice-president of Bryan Custom Plastics Inc., which sells about half a million plastic pieces for Sharp TVs each year, says, "They demand jewelry. There just is not any comparison between the quality Sharp demands and that demanded by RCA and Zenith."

But at the same time, "they helped us with our quality-control layout and training," Mr. Hollington says. "They developed hourly audits of our assembly line to isolate problems sooner."

Like a score of other vendors, Mr. Hollington has been called before Sharp's quality-improvement committee, a body formed two years ago to help vendors. "It's not a hell-raising session at all," he says. "They are providing us with the expertise of their top management. At American companies, if they find a problem in your product, it's your problem. At Sharp, we work it out together."

On a recent day, one of Sharp's "quality circles" is meeting. Led by a trained leader, Sharp's quality circles "brainstorm" ideas, select a problem to be solved and then collect data on the problem. Later, the problem and possibly a solution are presented to Mr. Hagusa and other members of management.

Two Innovations

At one table, five microwave assembly workers are discussing one worker's innovation: a metal dowel that fits into the center hole of a five-hole microwave-oven bracket. "I saw that people were having trouble lining up the holes," says Randy Howle, "but if someone before them had put in the center screw, the person didn't have a problem." So Mr. Howle developed the metal dowel, which, when slipped into the middle hole, aligns the bracket while the other four holes are screwed down.

At another table, a group of employees is discussing a second innovation: a plastic table top with countersunk holes in which to

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Figure 11.11a. PROCESS IMPROVEMENT STRATEGIES: Japanese Management (continued 1)

stand screws. The device makes the screws simple to pick up and keeps them from rolling off the table and on to the floor. As a result, productivity has improved by seven units a day, the circle leader says.

However, Sharp doesn't expect a dollar payback from the circles, which meet on company time. Instead, a manager explains, the circles are a "human-relations program."

That comment harks back to a remark by Mr. Hagusa:

"Once there was a time when the Americans had very efficient machines and equipment, and Japan did not. At that time – regardless of the workers – those with the most modern machines had the competitive advantage." But now, he says, one country soon has the same machinery as another. "So, what makes the difference today," he says, is "the quality of the people."

The quite lengthy article reprinted above in 9 columns over three sides of this Figure illustrates a number of important differences between the Japanese approach to manufacturing and what has traditionally been done in North America. The following summary, in the order in which the matters occur in the article, can act as a study guide to the lessons to be learned from the Japanese; it also provides an introduction to some of the ideas of *Total Quality Management.* [When available, relevant succinct quotations from the article are given *in italics* at the ends of some of the points.]

* Labour unrest and poor quality products may both be symptomatic of company organizational problems; such problems are almost always a consequence of improper management processes or practices. [Column 1]

* The high quality now commonly associated with Japanese goods, and the high productivity, *can* be (largely) achieved under suitable management by North American workers using generally available machinery and components. [Columns 1 and 2]
  - This same point is made by Box and Bisgaard on the overleaf side (page 11.18) of Figure 11.4a.
    - *So, what's Sharp's secret? The assembly-line workers themselves credit the Japanese style of management.* [Column 2]
    - *So what makes the difference today is the quality of the people.* [Column 9]

* There need to be responsibilities of both employers to their employees and of employees to their employer, and it is vital to build an environment in which both can flourish to the mutual advantage of each group and the benefit of the company as a whole. [Columns 3 and 4]
  - Such a state of affairs is what Deming refers to as *a win-win situation*, in contrast to adversarial bargaining where one side 'wins' at the expense of the other's 'loss'.

* Hard work is one inescapable requirement for industrial (*any* worthwhile?) 'success'. [Columns 3-4]
  - *I don't work to live, I live to work.* [Column 3]
  - *They work to seven or eight every night and on Saturday mornings. They seem to like it.* [Column 4]

* There needs to be an obsession with quality and unremitting efforts to keep on improving it, with the emphasis on the *process*; *i.e.*, a constant striving for excellence or (unattainable?) 'perfection'. [Columns 2, 4, 5 and 6]
  - This obsession is also clear from the video *Japanese Control Chart*, described in Figure 11.25; the topic can be pursued further at the Audiovisual Centre (E2 1309) in the 60-minute film *Passsion for Excellence* [#F86 803] although, because this is a film rather than a video, the *instructor* has to make the AV booking.
  - Off-shoots of this obsession are strict adherence to standards or specifications, a refusal to compromise, and an unwillingness to be satisfied with present accomplishments. [Columns 5 and 6]
    - *It's not what we do, but how well we do it. It's the constant striving for excellence.* [Column 2]
    - *Other companies would say, 'Well, it doesn't exactly meet our tolerances, but we can use it'. But at Sharp, if it's wrong, it's wrong.* [Column 5]
    - *They keep trying to get a little more out of you. They keep going deeper, demanding better quality from you.* [Column 4]

* A proper record of data relating to past improvements and problem solutions can be a valuable resource for maintaining these two activities on an efficient and effective basis. [Column 5]
  - *If the company has a problem, we can telex Japan to see if they've solved that problem in the past.* [Column 6]

* Problem solving must be based on relevant and timely *data*, not on personal opinion or emotion. [Column 5]
  - *Line graphs ... meticulously track the pulse of the assembly lines through information collected from a data sheet attached to each oven.* [Columns 4-5]
  - *We let the data tell us what we need to know to correct a problem.* [Column 5]
  - *They developed hourly audits of our assembly line to isolate problems sooner.* [Column 6]

* It is mutually advantageous to build long-term *cooperative* relationships with suppliers (or vendors); the open communication that is part of such relationships helps to anticipate difficulties *before* they become significant problems. [Column 6]
  - *Our job actually is to help the vendors get their rejection rates down so they can make some money.* [Column 6]
  - *They developed hourly audits of our assembly line to isolate problems sooner.* [Column 6]

(*continued overleaf*)

- *They are providing us with the expertise of their top management.* [Column 6]
- *At American companies, if they find a problem in your product, it's your problem. At Sharp, we work it out together.* [Column 6]

∗ People (*e.g.*, on the shop floor) who work with a process are usually the most knowledgeable about it and so they can be a vital source of ideas about how to improve the process. [Columns 6-7]

○ The majority of process improvements are small and unspectacular, but the cumulative effect of many of them may outweigh the gains from the occasional major 'breakthrough'; North American culture tends to overemphasize the latter at the expense of the former (*e.g.*, in baseball vernacular, singles *vs* home runs).

○ In the video *Designing Industrial Experiments: Part 1. Quality and the Art of Discovery*, described in Figure 11.17, Professor George Box suggests that many (industrial) problems are relatively easy to solve and so are well within the creative capacity and resources of a substantial fraction of the work force; by contrast, problems whose solution requires 'expert' attention and appreciable resources are considerably *less* common.

∗ Quality circles [Columns 6-8], instituted here because of their obvious contribution to Japanese industrial success, have often had much less impact in North American managed companies; this is a reminder that cultural differences between North America and Japan may mean we need creative adaptation, rather than unthinking adoption, of Japanese industrial methods. We must also try to ensure that what we do is properly *managed*.

○ The information generated by brainstorming [Column 6] can often be effectively systematized, as a prelude to further analysis, by means of *cause-and-effect diagram(s)*.

Three other comments are:

- The article reprinted in this Figure was written over 10 years ago and yet from the 1990 editorial in *Science*, reprinted in Figure 11.4a, it seems that, since the early 1980s, the Japanese have only moved *further* ahead. The sobering conclusion is that, despite the unequivocal demonstration of the effectiveness of Japanese methods of manufacturing, North American industry as a whole is slow in learning the necessary lessons; a relevant maxim is: *it's simple but it isn't easy*.
  - *But the most important lesson learned by Mr. Hagusa has been how little most American companies know about achieving quality.* [Column 3]
  - *We're trying to convince vendors that quality actually reduces their costs.* [Column 5]
- The *absence* of any discussion in the article of process or product *design* should *not* be taken as indicating lack of importance of this matter; in fact, design in all its aspects is an *essential* part of *any* successful industrial strategy (*e.g.*, see Figure 11.2).
- The article is concerned with manufacturing, but an obsession with quality is equally important in *service* industries, although some modification of implementation strategies may be needed, taking into account the history and current 'culture' of the particular organization.