

The Implementation of Total Quality Management In China

by

JI SHI

Thesis submitted to the Faculty of the
Virginia Polytechnic Institute and State University
in partial fulfillment of the requirements for the degree of
Master of Science
in
Management Science

APPROVED:


Philip Y. Huang, Chairman


Joanna R. Baker


Loren P. Rees

January, 1993

Blacksburg, Virginia

C.2

LD
5655
V855
1993
S55
C.2

The Implementation of Total Quality Management In China

by

JI SHI

Philip Y. Huang, Chairman

Management Science

(ABSTRACT)

As global competition intensifies, more companies have found that it is imperative to develop quality management systems that will continuously improve the quality of their products, simply in order to survive. Total quality management (TQM), a term widely accepted as a new management philosophy which was developed based on the management practices in Japan, may hold the key to unlock American industries' competitive power. It is understandable that many American managers have embraced TQM with great enthusiasm since the early 1980s. China, on the other hand, adopted a policy of economic "reform and openness" in 1978; the goal of this more "open and reformed" policy was to create a better economic, social, and political environment for its state-run enterprises in order to improve their efficiency. Since then, however, western management systems ---- including total quality management ---- have been introduced to Chinese managers. Realizing the potential of TQM in helping those state-run enterprises, the Chinese government has taken a leading role in promoting the implementation of TQM. Rules and regulations have been instigated to enforce the government's determination to pursue TQM. Moreover, the news media in China has taken an active role

in the process of promoting TQM. Special programs have been produced to raise people's attention to those quality related issues.

Despite the early start and wide support received from the government, media, and industry, the effectiveness of TQM implementation in China's state-run enterprises has been far from satisfactory. Quantity, not quality, is still a main concern of many managers in China. "Shady" products (products of suspect quality) are still sold in the markets. The overall quality level achieved by the Chinese products is clearly below the quality standard set by developed countries. Why have China's state-run enterprises failed to reap the benefits of implementing total quality management?

The main objective of this thesis is to report research that examines the recent history of quality management in China, the national movement toward TQM, the benefits some enterprises have gained since implementing TQM, and the reasons of China's failure to reap TQM's full benefits. It is hoped that the experience of China's TQM implementation can assist other countries in developing a better strategy and to avoid making similar costly mistakes.

Acknowledgements

I would like to thank my chairman and mentor, Dr. Philip Y. Huang, for the endless support, guidance, and patience that he has provided throughout my graduate studies at Virginia Tech. He has contributed with creativity, expertise, and intelligence to the planning of this thesis. Moreover, his gentle personality and meticulous attitude in research set up a good example, which will benefit my personal life.

I would also like to thank Drs. Loren P. Rees and Joanna R. Baker for serving on my committee. They have broadened my knowledge in class, helped me in daily life, and made this thesis a special learning experience.

Finally, I would like to thank my parents for their continual love.

Table of Contents

Introduction	1
Total Quality Management: a Historical Retrospective	5
Quality Management in China: between 1949 and 1978	10
The Inroad Toward Total Quality Management in China: after 1978	14
The Pre-TQM Era	14
The Introduction of Total Quality Management	18
TQM Implementation in Shanghai	21
Preliminary Results of TQM Implementation in China	24
Shanghai No.1 Television Plant	25
Shanghai No.1 Construction Engineering Company	26
Shanghai Diesel Engine Plant	28
Shanghai-Foxboro Co., Ltd	29
Table of Contents	v

Why Have Chinese Industries Failed to Reap the Full Benefits of TQM?	31
The Future Perspectives of TQM Implementation in China	38
Conclusions	44
References	47
Vita	49

Chapter 1

Introduction

In the contest of economic strength among the countries in the world, product quality has emerged as the key factor of winning this contest, and has therefore become a major concern for companies world-wide. Because of the dismantling of trade barriers, market expansion, diversity of consumer demand, and rapid technology development in transportation, communication, and information science, the need for better quality has never been so urgent. In fact, the only viable approach a company can employ to sell its products, enlarge its market share, and remain competitive in the markets is to acquire the capability of producing products with superior quality. Consequently, the contest of economic strength seems to be viewed as a contest of quality.

In the United States, the basic concern in managing a factory in the past was how to lower the production cost. Facing seemingly unlimited demand, the

effective approach to achieve the company's goal of maximizing profit was cost reduction. Quality was not a critical concern and therefore received little or no attention by management. The very term "quality control" and its method of implementation, mainly by inspection, reflected this attitude. Today, the situation is entirely different. Quality has become the leading concern and has thus re-directed and increased the pressure on management.

(China, a developing country with vast territory, a huge population, and abundant resources, has become a major market because of her vigorous economic growth in recent years. Continuing on the steady course of economic "reform and openness,"¹ China does indeed have the potential of becoming a newly industrialized nation and acquiring trading partners world-wide, thus producing an enviable market that no one can ignore.)

For decades, productivity growth in China was hindered by the frequent and interruptive political campaigns such as the ten-year Cultural Revolution,² and the rigid economic central planning system. Since the adoption of the policy of economic "reform and openness" in 1978, the economic policy at the macro level and business management at the micro level have all gone through rapid and profound changes. These changes have, undoubtedly, shifted China from a command economy to a market economy, at least to a certain degree. Total quality management, which was introduced to China also in 1978, has been

¹ "Reform and Openness" refers to the governmental policy issued in 1978 to reverse the previous close-door policy. This policy has greatly reformed China's economic, social, and political systems.

² "Cultural Revolution" was the ten-year turmoil that took place in China between 1966 and 1976.

tested in other countries, including Japan. It offers a better opportunity for a company to gain quality improvement than any other quality control systems. In fact, TQM has been playing a pivotal role in transforming the rigid management system of China's large and medium state-run enterprises.³ It has also helped, as previously mentioned, in speeding up the process of switching China from a command economy to a market economy.

The economic "reform and openness" of China's policy has brought her back to the international arena. More often than ever before, China's enterprises have had to compete in the increasingly competitive international markets. In order to win customers and thus to speed up the pace of economic development, China's enterprises need to focus on quality. It is worthwhile, then, to accumulate and analyze the experiences of implementing total quality management in China's enterprises. Other companies could then take advantage of such experiences in their future implementation of TQM.

Historically speaking, China's import of the Japanese style of Company-Wide Quality Control (CWQC) was even ahead of many of American firm's Total Quality Management (TQM), which has gained enormous popularity among American firms since the mid-1980's. The successes as well as the failures that China's enterprises have experienced since the late 1970's may provide American managers with valuable information about the implementation of

³ The ownership of most enterprises in China belongs to the central government. They are administered by the relevant government agencies. For example, steel plants are under the jurisdiction of the ministry of minerals and mining.

TQM. Furthermore, for those American companies that are doing business with China, it may be important to understand the current status and future perspectives of TQM in China.

The purpose of this thesis is to assess the historical development of TQM, the current status of TQM implementation, and the future of quality management in China. Chapter 2 presents the history of the development of quality management in the United States and its successful implementation in Japan. Chapter 3 describes the economic environment and quality management in China. Chapter 4 explains how and why TQM was introduced and implemented in China. The preliminary results of TQM implementation in China are illustrated via examples in Chapter 5. Chapter 6 provides the possible reasons for China's failing to reap the full benefit of implementing TQM. Chapter 7 presents a set of suggestions that may assist China's successful implementation of TQM. A summary of this research is provided in Chapter 8.

Chapter 2

Total Quality Management: a Historical Retrospective

At the turn of this century, the main issue of managing a manufacturing firm was how to enable workers and machines to process products with higher speed. This was due to limited available production capacity and seemingly unlimited demand in the markets. Consequently, Taylor's scientific management and Ford's assembly line concept had emerged as effective approaches to raising industry's productivity. At that time, quality was considered as a less important issue, in contrast to quantity. Inspection, which essentially separates those products that failed to meet the specifications from those that succeeded, was then a viable approach to ensure quality.

In 1924, Dr. Walter A. Shewhart, who has been considered as the father of statistical quality control (SQC), applied statistical concept in quality control

[18:6-8]. Among many of his innovative ideas, statistical process control (SPC) has extended the focus of quality control from only final inspection to the manufacturing process itself. Using Dr. Shewhart's statistical quality control chart, a trained worker should be able to detect problems in the process before they cause significant damages to products and equipment. His method brought huge profits to military production. During the 1950s, SPC reached its climax in quality management and subsequently was introduced to Japan, along with Shewhart's other great contribution to quality management, the Plan-Do-Check-Act (PDCA) cycle, by quality "guru" Dr. Edwards Deming [19:21].

During the 1960s, American productivity had been rapidly improved and technology advanced with an amazing pace. At the same time, the economies of Germany and Japan, which were literally destroyed by World War II, had recovered remarkably. This higher productivity, advanced technology, added production capacity, as well as the additional factor of better informed consumers had made the market competition keener than ever. Manufacturers painfully found out that they had to focus on product quality in order to win customers. They also found out that traditional quality control relying on final inspection and statistical process control, typically conducted by QC specialists, failed to deal with the root cause of the problems in quality.

In 1961, another American quality guru, A.V. Feigenbaum, published a book entitled **Total Quality Control** [5], that shaped the history of quality control in

Japan and subsequently in the United States and the rest of the world. Contrary to the usual practice of delegating quality responsibility to quality inspection personnel and professional quality controllers with extensive training in statistics, TQC considers the problem of quality assurance as a unified, organic, and integrated whole and therefore needs to be investigated synergistically. In other words, to ensure product quality, functional areas including product design and process engineering are also integral parts of the system. The idea that Feigenbaum promoted in TQC was well embraced by the Japanese. However, they have modified Feigenbaum's TQC concept, as they have done to so many other American ideas. Feigenbaum's main contribution was extending quality responsibility to cover the entire business operation. Nevertheless, these various quality related activities, according to TQC, are basically carried out by specialists, not the line workers. The Japanese, in accordance with their strong belief in workers' capabilities, have integrated Feigenbaum's TQC principle with worker participation. With proper training, workers are not only empowered to make quality related decisions, but are also expected to take responsibility for producing high quality products. Feigenbaum's TQC has thus been transformed to a more powerful system, which the Japanese prefer to label as Company-Wide Quality Control (CWQC) [7,15].

Facing stiff competition from outside, American managers started in the early 1980s to learn the unique approach many Japanese firms employed to improve their product quality. From the popular television program entitled "If Japan

can ..., why can't we? " which was aired in 1980, they have learned, to their surprise, that Japanese quality revolution, which started in the 1950s, was actually initiated by American quality experts such as Dr. Edwards Deming and Joseph Juran [3,4]. Since then, it has become increasingly clear that the traditional American approach of managing only production and ensuring quality through inspection, cannot fit well with the changing business environment. The focus of operations management has consequently been shifted, rightly so, from quantity to quality. Many of the old American ways have been seriously challenged. For example, the cost of quality was traditionally considered as positively related to quality level. In other words, as companies improve the quality level of their products, more inspections are needed. This increased efforts will add costs to the product. However, Deming has shown us through his famous chain of reactions that this relationship may not be true --- because when quality is improved, the changed cost should also include the cost decrease due to less rework and less rejects. Companies in Japan and the United States have proved that the cost of quality does indeed increase as quality level starts to improve, but only to a certain level. Beyond that, the cost of quality will begin to decline, as the quality level continues to improve. This phenomenon is called the Mt. Fuji effect because the shape of the cost curve resembles a mountain.

The new way of improving quality has gone beyond just a technique. It is actually a thought revolution that emphasizes on worker participation, quality at the source, and continuous improvement using Shewhart's Plan-Do-Check-Act

(PDCA) cycle. When this new management philosophy was studied closely by the U.S. Navy, the name, total quality management (TQM), was proposed and subsequently accepted and used by many American managers [19:15]. TQM, despite its origin in manufacturing, has spread into some service industries, such as health care, transportation, and banking. Even today, TQM is still a very popular subject among American managers and believed to be the solution to many managerial problems that have affected our industries' competitiveness.

Chapter 3

Quality Management in China: between 1949 and 1978

Since the late 1970's, China has adopted a policy of economic "reform and openness," which has generated an enormous change in China. It is quite clear that China intends to join the rest of the world and compete in the international markets. As long as China follows her course of "reform and openness," quality management will continue to be an important issue for the industry and government to address. To understand quality management in China, it is imperative for us to review the recent history of China, especially her economic environment and changes in quality management.

Between the founding of the People's Republic of China in 1949 and the time TQM was introduced to China in 1978, quality control in China can be divided into the following different stages:

1. At the beginning, the emphasis of quality control in China's enterprises was on inspection of finished goods. Administratively independent quality control offices were organized. They allowed professionals with extensive training in statistical quality control to handle the setting of quality standards. The inspection was usually conducted by other independent divisions. However, at the same time, there was an emphasis on workers' participation in which they were encouraged to propose solutions to any quality problems.
2. At the second stage of quality control in 1950s, China was heavily influenced by the Commonwealth of Independent States (CIS), the former Soviet Union. China imported a whole set of production techniques and management systems from the former Soviet Union. To ensure product quality, inspection stations were set up at different stages of the production process, from the acceptance of raw materials to shipping.
3. Since 1958, frequent political campaigns in China had disrupted quality control activities. For example, during the campaign of the "Great Leap Forward"⁴ there was a slogan saying that "the land will yield as much as

⁴ "Great Leap Forward" was the national movement began in 1958 with an objective of catching up with the developed countries in a very short period of time. It failed because it did not follow the basic principles of economics.

we dare to reap.”⁵ This belief did a great harm to quality control. Because of the concern of increasing production volume, quality inspection stations were abolished. It created national economic and social chaos in which there were no systems for management, no standards for products, no inspection for quality, no procedures for operation, and no safeguards for security. The function of quality control was very weak. China’s economy was devastated by this “movement.”

4. During the early 1960s, the situation was somewhat improved after some adjustments. While exploring and developing Daqing Oilfield, various factors that would directly affect the quality of the oilfield operation were strictly controlled. Workers were organized into groups to participate in problem solving. A “responsibility system” focusing on quality was adopted to ensure quality and reward achievements. The results of this new system were outstanding. Unfortunately, this positive time did not last long. From 1966 to 1976, the ten-year cultural revolution severely disrupted the progress in quality control. All management systems were viewed as “restrictions and fetters” of capitalism,⁶ and therefore swept away entirely. Production was paralyzed and management was in chaos. Accidents happened frequently and waste of resources was seen everywhere. Product quality fell to the lowest point in the history of China.

⁵ “The Land Will Yield As Much As We Dare to Reap” describes a Chinese belief that the agricultural productivity of the land depends on the individual’s willingness.

⁶ “Capitalist Restrictions and Fetters” is a Chinese expression of the set of western technologies and management systems developed under capitalism.

5. During the few years following the end of the ten-year turmoil in 1976, the economy began to recover through readjustment. In quality control, enterprises began to establish the "responsibility" system for factory directors, the "technical" responsibility system for chief engineers, the "quality" responsibility system for quality professionals, and various management responsibility systems for managers. At the same time, factories resumed and strengthened their inspection activities.

As indicated above, quality control in China remained at the level of traditional thinking. Quality inspection and statistical measurements were the basic means to ensure product quality. Furthermore, quality control activities in China were traditionally contingent upon political factors and thus lacked a continuous and ever-perfecting standard. At one time, quality control took a leading role; but at others, it fell back and received little or no attention. The whole development of quality control had followed a zigzag path. There was apparently a long way for China to move away from traditional practice of quality control toward total quality management.

Chapter 4

The Inroad Toward Total Quality Management in China: after 1978

The Pre-TQM Era

After the end of the ten-year turmoil of the Cultural Revolution, China gradually shifted to the market economy. Economic reform became an important issue. At this time, China started to learn and implement the concept of total quality management (TQM). However, TQM concept was accepted in China only after numerous twists and relapses in trials. A large amount of economic losses have been paid in China while pursuing TQM. Nevertheless, TQM has

helped China to change its management philosophy from one concentrating on short-term profit to a philosophy emphasizing the long-term benefit.

Compared with other developed countries, China's economy has a weaker foundation. China lacks modern technology, high productivity, and effective utilization of resources. Very few of the personnel who are managing enterprises received adequate management training. For a long period of time, these managers managed production rather passively under the direction of the central planning system. They did not have the courage, nor the incentives, nor the ability to make necessary changes that were and are needed for productivity improvement. Moreover, since China has the world's largest population, and since it adopted the closed-door policy for decades under a rigid central planning system, it created a "shortage economy"⁷ that can be characterized as one with commodities lacking not only variety but also quantity to meet the huge demand in the markets. Quality was certainly not a major concern.

Between 1952 and 1978, the total sales of food, clothing, and consumer goods increased at an annual rate of 6% [13]. During this period, there were 77 commodities sold under rationing coupons because of their huge demand. In the 1960's and 1970's, there were the "four main household goods"⁸ with demand so high and supply so low that people described these Chinese products

⁷ The Chinese market is dominated by the suppliers since the demand is much larger than the supply. This is called "Shortage Economy".

⁸ They were the wrist watch, bicycle, sewing machine, and radio in 1970's; and the color television set, refrigerator, video cassette recorder, and washing machine in 1980's.

as "the emperor's daughter who never worries about her marriage."⁹ This phenomenon explains why for quite a while, the main concern of China's production was how to increase production volume, not to improve product quality, as a means of raising profits. Since this period of "quantity first," the issue of quality was once again submerged under the waves of the great demand in the markets.

This situation of volume production for short term profit was worsened by Chinese government's highly concentrated economic planning that actually used production volume as the key indicator of the performance of an enterprise. If the director of an enterprise could fulfill the production quota set by the state, he or she would be praised, rewarded, and honored. Enterprises believed in the creed that "the more one can produce, the more meritorious one could get."¹⁰ Therefore, they developed a wage system that tied employees' income to the quantity of products they produced. Production volume was such a main concern that quality was once again ignored.

Some enterprises were able to sell all their products, increase the output volume, and fulfill the quotas of profit and taxes determined by the state. However, these targets were frequently reached by lowering product quality and hurting the customers. Inferior products would not break managers' "iron

⁹ People describe China's product as the emperor's daughter, because demands are so high, as soon as the product reaches the market, it will be sold right away.

¹⁰ In the past, the reward system in China was based on production quantity. Therefore, it was said that "The More One Can Produce, the More Meritorious One Could Get".

bowl.”¹¹ Consequently, machines were running, employees were paid, and plant managers kept their jobs; the system continued. Nobody took the economic or legal responsibility and everyone could enjoy the “big bowl of rice”¹² as usual. Surplus inventory and rejects were accumulated in the warehouse in a massive scale. It became a monumental task to inventory those unsold or unsellable items in the warehouse from time to time. No one could figure out or care about the cost the enterprises paid to carry such inventory.

The problem of poor quality was so severe that it was frequently used by the customer, who could also be another state-run enterprise, as an excuse to delay or even refuse to pay. Consequently, managing accounts receivable had become a nightmare to managers in state-run enterprises. It created the famous and unique problem of “debt triangle”¹³ in China. Between January and March of 1989, the “debt triangle” among China’s enterprises amounted to RMB 108.5 billion, or approximately \$19.73 billion.¹⁴ Even by the early 1990s, the “debt triangle” still reached over RMB 100 billion, or \$18.18 billion [16].

¹¹ “Iron Bowl” refers to the life time employment system adopted in China since 1950. Such an employment system was described as an iron bowl because it cannot be broken.

¹² “Big Bowl of Rice” is a phenomenon that resulted from the socialist social welfare system. It describes that Chinese employees will receive the same benefit from the government regardless of their performance.

¹³ “Debt Triangle” describes a chain of delaying payments among state-run enterprises owing to the poor quality of products and rigid centrally controlled treasure system.

¹⁴ RMB is the currency unit used in China, also known as yuan. The recent exchange rate was \$1.00 = RMB 5.5.

The Introduction of Total Quality Management

After the ten-year cultural revolution and two-year adjustment period, the Chinese government decided to import western management systems to improve the productivity of China's state-run enterprises. Among those imported management systems is the Company-wide Quality Control¹⁵ that Japanese companies have developed and practiced for quite sometime.

The movement toward TQM in China started in 1978 when Japan's Komatsu provided a seminar on company-wide quality control at Beijing's General Combustion Engine Factory. Numerous managers from factories in Beijing and other cities and provinces attended the seminar. After learning this new management concept, they began to experiment with it in their own factories. Since then, various training classes on total quality management were launched. The Chinese government quickly got involved and dedicated September as their National Quality Month, which was inaugurated in 1978. These activities stirred great interests among the managers. In August 1979, China Quality Control Association, an official organization responsible for implementing TQM in China, was founded. Within a year, branches of China Quality Control Association were established in 14 provinces and 3 special economic zones. Afterwards, other provinces, cities, autonomous regions, and special zones followed suit. Obviously, TQM was promoted by Chinese government,

¹⁵ Similar concept, known as Total Quality Management (TQM), has been adopted among American firms.

from top to bottom, in a planned and organized way during the early stage of TQM movement.

In 1979, TQM was formally promoted in China. The emphasis of promoting TQM at this stage was on the training of basic knowledge including the PDCA cycle, 7-Tool, and statistical process control [7].

In 1980, China began to hold the Annual National Conference on TQM to provide a forum for QC teams to share their experiences. Certificates and awards were given to teams with outstanding achievements. After examination, the China Quality Control Association recommended 400-500 QC teams to be honored at the national level. At the meeting, media provided extensive coverage of the event to help promote the movement to the public. There were several forms of QC teams in Chinese factories, including permanent teams and ad hoc teams organized to solve specific problems. Members of the ad hoc teams were voluntary.

Paralleling the QC teams, many Chinese factories had also established a system entitled "Proposals for Rationalizing Operation." Employees could directly submit proposals to improve or to reform current operating procedures to QC office for consideration. The QC office collected proposals once a month.

On March 10, 1980, the former State Economic Commission promulgated the "Provisional Regulations Concerning TQM in Manufacturing Industries," which contains ten chapters [21]. The objective of these regulations was to provide

the manufacturing industry with guidelines to implement TQM. It was certainly a clear demonstration of the Chinese government's determination to promote TQM in state-run enterprises.

By 1985, over 80% of China's large enterprises were in the process of implementing TQM. TQM offices were established in many factories. They are in charge of the training of company employees so that the employees would take the responsibility when they are empowered to make certain decisions concerning quality improvement. At the same time, plant managers were sent to TQM training courses sponsored by the education division of the corresponding ministries [21].¹⁶

Moreover, China Quality Control Society (CQCS), a semi-official organization responsible for promoting TQM in China, offered lectures on television and published China Quality Control Magazine to disseminate TQM ideas. CQCS has also participated in sponsoring the National Quality Award, similar to the Deming Prize in Japan and the Baldrige Award in the United States. This national award has been given to enterprises producing products with superior quality in two categories: Municipal Award and Ministerial Award [21].

To safeguard the rights of the consumers, China Central Television Station has broadcasted a special program, entitled "International Day of Customers' Rights," on the 15th of March of each year. The focus of the program has been

¹⁶ Chinese state-run enterprises are administered by specific ministries. For example, steel works are typically under the jurisdiction of the Ministry of Minerals and Mining.

on the customers' complaints of poor quality products. Following the broadcasting of this program, various consumers' associations were established in numerous Chinese cities and provinces.

The administrative decrees from the government, the media pressure on the enterprises, and the awakening of customers' quality consciousness have all made the implementation of TQM in China somewhat successful, especially in coastal cities. Confronted with competitive pressures from Japan and other foreign companies in the international markets, plant managers in China's state-run enterprises have become more quality conscious. More and more of them understand and accept such international quality standards as ISO-9000 [6].

TQM Implementation in Shanghai

Shanghai, the largest city in China, has a population of over 14 million. It has traditionally been China's industrial and financial center. Since Shanghai has played a major role in China's quality movement, the rest of this thesis will use it as representative of China. In 1979, six QC teams from Shanghai attended the National Quality Control Conference to share their experiences. The

members of the QC teams were from textile, piano, and other industries. Their achievements received widespread media attention.

The implementation of TQM in Shanghai can be divided into the following three stages:

1. introducing the Chinese translated version of Juran's Quality Control Handbook [8] to the employees;
2. experimenting with TQM in factories such as Shanghai Gaoqiao Chemical Plant and Jiafong Textile Plant in 1980;
3. conducting professional training in 1978 via a television education program on TQM, jointly sponsored by the Shanghai Quality Control Society and the Shanghai Bureau of Labor. It is estimated that about one million people benefited from the broadcasting of this TV training program.

The Shanghai Quality Control Society, founded in 1982, has trained over 80,000 instructors and professionals. Among those trained, 86% received a certificate of qualified standing. The professional magazine, Shanghai Quality [17], published by the society, has had 48 issues and provided an important forum for QC teams to exchange experience and for the government to proclaim quality policy. In March 1991, the Shanghai Quality Training Center, a training institute for staffs and workers, was established to offer various TQM training courses. The center is also responsible for developing TQM curriculum, compiling teaching materials, and administering examinations. From this center, over 100,000 workers and 25,000 administrative personnel were

trained each year. The instructors of the center came from various enterprises in the Shanghai area and from the Shanghai Institute of Economic Management Cadres. Some of the instructors were former plant managers and therefore had extensive management experience. Others have worked for joint ventures or foreign companies as managers.

Chapter 5

Preliminary Results of TQM Implementation in China

With the government as well as the industries emphasizing TQM, many state-run enterprises have already gained significant benefits from implementing TQM. Unfortunately, there is a lack of aggregated statistics that can help us to objectively assess the positive results received at those state-run enterprises. It is therefore difficult to provide a generalized assessment of TQM implementation in China. However, information supplied by individual firms may help us piece together the overall picture. The following are several plants, located in Shanghai area, that are quite successful in implementing TQM [6,20]:

1. Shanghai No.1 Television Plant,
2. Shanghai No.1 Construction Engineering Co.,

3. Shanghai Diesel Engine Plant, and
4. Shanghai-Foxboro Co., Ltd.

A brief explanation of their implementation experiences and some preliminary results are provided in the following sections. These actual cases can provide us with a glimpse of the results of China's quality movement.

Shanghai No.1 Television Plant

This is the largest TV producer in Shanghai which had a capacity of producing 500,000 sets annually, before its TQM implementation. When TQM was introduced to China, Shanghai TV's employees reached a general consensus that this plant should seize the right timing to pursue TQM because, on the one hand, it conforms to the national policy, and on the other hand, it will raise their productivity through better cooperation among employees. The plant imported a color TV production line with an annual capacity of 200,000 sets.

To implement TQM, as Kauro Ishikawa indicated, the first step should be training. Shanghai TV established training courses at different levels: middle management, researchers, designers, engineers, and manufacturing personnel. In addition to training, close examination of equipment and management methods was thought to be crucial to rationalizing production operation. The

plant therefore conducted technical analyses including: product variety, production flow, and testing equipment and data.

As improvements were made, the plant was able to shorten the disparity in production techniques. Furthermore, the plant established departments of special equipment, economic cooperation, and sales services. A research institute was further established to improve the design capability of the plant's personnel. To localize the production, the plant managed to raise the rate of local contents to 92%. As a result of TQM implementation, seven key processes have reached a higher level of productivity. In fact, the production capacity has been improved by 50%, to reach an annual rate of 1,000,000 sets. The plant has also built up a service network of more than 1,000 points in China. These improvements helped the plant to win the National QC Award.

Shanghai No.1 Construction Engineering Company

Shanghai No.1 Construction Engineering Co. (SN1CEC) is among the largest construction engineering firms in China. Shanghai Portman Business Center, supported by the investment of an American firm, Portman Co., and designed by a Japanese firm, Tasima, was built by SN1CEC. This construction project has been considered to be a highly successful engineering project. The fol-

lowing comments made by famous professionals can testify to this achievement [20]:

1. Mr. Portman (an American business man): the construction quality of Shanghai Portman Business Center can be compared with that of similar buildings in the U.S.;
2. Mr. Nikaido (a Japanese chief architect): Shanghai Portman Business Center ranks among the highest construction quality in the world;
3. Canadian Delegation of Architects: Shanghai Portman Business Center entirely has the ability to compete in the world market.

The excellent performance that Shanghai Construction Engineering has achieved is rooted in its belief in TQM management philosophy. In SN1CEC, quality has always been considered as "job one." Every employee in the company participates in the process of optimizing construction organization and design. QC groups are responsible for solving major problems. All procedures are under the control of management rules, which are integrated into management software and hardware. For instance, SN1CEC collects opinions from employees and users. The architects and workers are then provided with the useful information to improve their processes. SN1CEC also uses quality veto rights and quality awards as the major elements of its quality responsibility system. It enforces closer process control by utilizing the method of acceptance inspection on all items. TQM education, along with other technical training, is regarded as the fundamental training subjects for all employees.

Shanghai Diesel Engine Plant

Shanghai Diesel Engine Plant (SDEP) exports products to more than 40 countries and regions. It manufactures 135 kinds of products and occupies 70% of the domestic market. Shanghai Diesel Engine Plant supplies accessory parts to more than 100 enterprises.

SDEP's strategy, which helps it create superior products every year, is to rely on total quality management to improve product quality and process efficiency. SDEP always emphasizes the customers' needs, which is considered as the credo of SDEP. They adopt a series steps to reach it. For example, they conduct technical training at middle and higher levels. They also train group leaders so that they can effectively lead the team to continuously improve the process. In order to gain market share, they develop new products by advanced technology and improve old models based upon the information collected from the market place.

To ensure product quality, Shanghai Diesel Engine Plant instigates a strict quality management system, which focuses on process quality. The plant produces the main parts of the diesel engine, but imports small components.

Their management focuses on key manufacturing processes and stresses work place management. Employees are trained to solve even major technical problems and to follow up on the development of new technology and new equipment. Service on the products they sold is continually being perfected. They set up maintenance centers, train technical personnel for other countries, pass on knowledge of how to use engines, and visit customers, among other procedures. All these innovations and processes have helped Shanghai Diesel Engine to gain a larger market share.

Shanghai-Foxboro Co., Ltd

ISO 9000, a set of international standards for establishing and maintaining a quality management system, conformed with the principle of TQM. This certificate of quality has become not only a prerequisite of conducting international trade with European Community members, but also a management tool to pursue continuous improvement. Just like their American counterparts, China's enterprises are also aware of the importance of this quality certificate. Shanghai-Foxboro Co., Ltd (SFCL) was the first Chinese based firm to receive this certificate [6].

Shanghai-Foxboro began its operations in 1983. It was one of the first high-tech joint ventures between Shanghai Instrument and Electronic Import-Export Co. and Foxboro, Co., an American firm in Massachusetts. SFCL manufactures automation instruments and systems. Most of its products are sold to Chinese enterprises, and 20% of its output is exported throughout the world. From the beginning, SFCL put a high priority on setting strict quality standards for all of its products. SFCL's successful implementation of these quality standards has ensured that its products remain competitive in the world market. By 1991, the US parent company requested all Foxboro subsidiaries go a step further, to acquire ISO 9000. SFCL started its journey of acquiring ISO 9000. In SFCL, every employee knows that he or she plays a key role in implementing this world-class quality system. The ISO certification process has improved the work ethics of SFCL employees and the service they provide to customers. They have kept on auditing, both internally and externally. In December 1991, SFCL received ISO certificates (one in English and the other in Chinese). This quality certificate makes SFCL's products more competitive and also improves China's quality image in the international market place.

Chapter 6

Why Have Chinese Industries Failed to Reap the Full Benefits of TQM?

It has been over a decade since China first imported and promoted nationwide the concepts of total quality management. However, the effect of China's TQM implementation has been far from satisfactory. One frequently heard comment is that the disadvantages of TQM implementation has outweighed its advantages. While it is true that significant progress has been made in commodities such as color television sets, refrigerators, automobiles, steel, generators, aerospace products, and micro-electronics, product quality as a whole is still trailing behind the world standard. For example, the State Council of China pointed out in February 1991 that "the phenomenon of inferior product quality is so serious that it has become the impediment of China's industrial development." By the end of 1990, in 25% of the more than 70 cities in China, the

quality level of products was either unstable or deteriorating. The results of a recent survey of China's enterprises have indicated that losses caused by inferior products resulting from faulty production processes account for 10% to 15% of the total product value, This alone caused economic losses of over RMB 100 billion (\$18.18 billion) a year [9]. According to a random sampling study, only 75% of China's industrial products passed quality inspection. Among those, 25% were rated as superior quality products. While 98% of the randomly sampled products manufactured by the developed countries, such as the United States and Japan, passed the quality inspection, only 55% of the sampled domestic products can meet the standard [9]. Moreover, another survey of large and medium size Chinese enterprises indicated that 58.8% of their products sold well in the domestic markets. For those exported products, 51% sold well and 25% competed favorably in the international markets. Among the 60,000 new products developed in China each year, 3.5% attained international standards [9]. One estimate indicates that the actual quality level of Chinese products lags behind that of the developed countries by 10-20 years, or maybe even more [2]. In addition to the frank acknowledgement of the quality problem by the government, Chinese consumers also registered their complaints about products' inferior quality. Between 1985 and 1990, the number of complaints received by the China Consumers Association had increased sharply from 8,000 to 285,000. Complaints about the quality of product ranked the first and accounted for 75% of all complaints [10]. Considering the fact that there were many consumers who did not want to waste their time and energy appealing, the figure could be even higher.

The following are the possible reasons for China's failing to gain the expected benefits from implementing TQM:

1. **The weak foundation of China's economy:** The manufacturing processes employed by Chinese enterprises cannot cope with the quality standards set by TQM. In quality-related areas such as measurement systems, information systems, reward systems, quality responsibility systems, and quality veto right, Chinese enterprises are far from meeting the rigorous requirements of TQM. These problems can be attributed to the backward management system that has been developed since China started central economic planning. At present, and in the foreseeable future, China's economic development is not in balance.

There are great disparities in development among various geographical regions, various economic sectors, and various industries. China does have advanced enterprises equipped with modern facilities, but at the same time, she also possesses backward enterprises with obsolete equipment and old fashioned management. The economy of those provinces and cities on the east coast is relatively better developed. But even in the advanced industrial city of Shanghai, old machines dating back to the beginning of this century are still running in some textile mills. In the wide inland and bordering territory, "local protectionism"¹⁷ has been quite pop-

¹⁷ Many local governments have adopted a policy of protecting their markets from the influx of products manufactured by factories located in those relatively more developed coastal cities and provinces.

ular because of the relatively backward economy. Since their own enterprises are the economic backbones in these areas, local governments have tried their best to protect their products regardless of their inferior quality.

For example, in many places, outside products are prohibited from entering the local market, in spite of their superior quality. However, local products are granted quality certificates by local government (as opposed to the approved national system), and forced into the market, disregarding and despite of their true quality level. The local government will exercise their influences and appeal to the concerned units so that the quality problems found by inspection can be concealed. This loophole in China's unique economic environment takes away the necessary pressures as well as the adequate motivations for those inefficient enterprises to improve the quality of their inferior products.

2. At the macro level, for a long period of time, China's economic development has placed more emphasis on quantity than quality. In some backward regions, the local governments are concerned only about revenue increases. Many have blindly started construction projects and built factories, totally ignored the market demand. Production capacity was expanded without any consideration of quality. In one province, hundreds

These local governments have established numerous trading blocks that will limit the access of their markets. This practice is called **local protectionism**.

of refrigerator plants were built and rushed into mass production. In another province, five hundred breweries were set up in just a few years. Even in a small town situated in a rural area, there were several beer breweries. These scattered and small scale plants lack not only sufficient capital and technical personnel but also quality consciousness. It has never occurred to neither the enterprises nor the local governments that quality is an important issue.

3. Total quality management, a new way of managing an operation system, cannot have a solid foundation in China unless her production systems can be modernized, which of course will take time. However, the situation in China is that there has been much lip service about TQM but not many fundamental changes, as required by TQM. An order from the central government will certainly generate unified action in the whole country. Plant managers will declare their position of supporting TQM resolutely in various meetings, but will not willingly spare their time on implementing the basic changes. Furthermore, since China adopted the so called "economic responsibility system," plant managers have now been serving 3-6 years' terms, which promotes the behavior of focusing on the "short term" performance. What the president of an enterprise considers as its higher priority task is to fulfill the economic responsibility --- a target set by the government --- in his term of office. This responsibility also includes improving the welfare of the employees, which will certainly win him the

popularity votes and honors from the government, without considering any economic consequences. As to those activities that will not generate short term benefits, the management will not grant them high priority even if they can assist the enterprise in becoming more competitive in the long run. This typical behavior has severely hindered the improvement of manufacturing systems which requires long-term, cumulative, and persistent efforts.

4. In China, the government regulations on quality control are imperfect. Under these quality regulations, TQM has become a rigid formality, rather than a practical management philosophy. The government has instituted regulations concerning quality control like "Quality Law." Though laws such as the "Measurement Law" and "Standardization Law," have been in existence, citizens do not abide by and the governments do not strictly enforce these laws. The authorities cannot rely on legislations to promote TQM, since most of the plant managers do not have a clear understanding of the implications of TQM and its related regulations. For example, in Hefei, the capital city of Anhui Province, a plant that manufactures water-heating apparatus was aware that a product without safety devices should not be produced or sold, according to the law. However, this plant ignored the regulations and kept on producing and selling their products. Because of this unsafe practice, five consumers lost their lives. Fortunately, the fifth

death was revealed by the media. The director of the plant was dismissed [14].

When problems were brought to the attention of the plant managers in 29 factories that were responsible for producing products with inferior quality, only one admitted that he was aware that this misconduct was subject to penalty, while the others claimed to have no such knowledge. Not a single manager, then, "knew" that producing inferior goods can become a criminal offense [12]. To reduce cost and increase profit, some enterprises manufactured inferior goods intentionally and paid rebates to promote the sale of their poor quality products. On the contrary, quality products cannot sell well in China because no rebates are given to the buyers. The law of "survival of the fittest" seems to be reversed in China. Even if inferior goods were detected, the penalty of several hundred yuans is too nominal to discourage those who made a fortune from producing inferior products.

The above four points are sufficient to explain that even though a number of decrees and regulations in promoting TQM were promulgated by the Chinese government;¹⁸ numerous quality conferences, big or small, were held; many foreign experts on TQM were invited to give lectures; "Quality Month" was inaugurated; and national "Quality Awards" were given, inferior products did not disappear from China.

¹⁸ Since 1979, 135 administrative decrees and documents concerning technical surveillance, approved by the State Council, have been issued.

Chapter 7

The Future Perspectives of TQM Implementation in China

As China continues her course of "deepening the reform and openness," market economy has taken root in China. Consumer demand has increased sharply in recent years. In 1988, the purchasing power of Chinese consumers was 4.4 times of that in 1978. It is only natural that the consumers' tastes have also been raised to a much higher level. In fact, consumers have used the quality standards of imported goods from developed countries to demand a higher quality standard for local manufacturers. Moreover, the competition in the international markets has generated a tremendous pressure for enterprises in China to improve. The demand for better quality in domestic and international markets constitutes a sharp contrast to the current status of Chinese products.

The Chinese government is fully aware of the urgency of solving the problems of product quality. The "Ten-thousand-kilometer Tour of Quality Investigation," a special monthly television program on quality related issues, which has been aired since October 1991, is a serious effort to attract the entire country's attention to the urgency of quality improvement. This quality program was directly developed by the State Council, which mobilized 30 primary news agencies and other prominent medias in various provinces and cities. The steering committee of this TV program established a television reporting group of 16 members, equipped with 4 vehicles for news gathering and relaying. The group toured 6,000 kilometers and acrossed 8 provinces, broadcasting interviews and photographs immediately after collection. The scope of the products investigated includes raw materials, household goods, large generators, electric appliances, gas water-heaters, food and beverages, cosmetics, furnitures, medicine, injectors, medical apparatus, cigarettes and liquor, houses, and others. This program explores those products which consumers expressed great dissatisfaction with. Serious quality problems found in Qiangli Beer, Qingdao Whisky, and Changbaishan Grape Wine, produced by three famous breweries in Guangdong, Shangdong, and Jilin provinces, were revealed to the public on TV. This report resulted in an immediate production stoppage in these breweries that shocked the industry and created a chain of reactions ---- perhaps the most important being management paying closer attention to quality problems.

However, this program is at best an external surveillance of quality problems. As Mr. Chu Yuli, the Director of the State Technical Surveillance Bureau of China, once said, "relying entirely on the news media to scrutinize the industry is not a permanent solution. We must depend on behavior modification" [1]. He advocated early promulgation of "Quality Law."

Basically, this behavior modification can only be made if the Chinese government continues her policy on "reform and openness." The government's direct interference in the operations in China's enterprises must give way to regulations and controls. The Government needs to transform enterprises' operation systems and push them to adjust to market economy and become independent. Only then will the management take product quality as their immediate concern for survival, and thus have the incentives and motivations to seriously implement TQM.

For changing Chinese managers' behavior, the following steps will have to be taken:

1. The more effective approach to arouse management's attention on quality is to provide them with incentives. Since most of China's enterprises are state-owned, managers usually don't have the need to continuously improve. Without changing the current enterprises' ownership system, total quality management cannot be implemented successfully. China should

study the privatization programs in Eastern Europe and develop an effective program for her enterprises.

2. Shenzhen Special Economic Zone, located in south coast of Guangdong Province, has quickly become the most developed area in China. Its double digit economic growth has caught the attention of the rest of China. For this reason, the government should take advantage of the situation and use this special economic zone as an example to demonstrate the significant and long-term impact of TQM on quality and competitiveness.
3. Quality control must be incorporated into the legal system. In this respect, China can learn from the experience of developed countries using regulations to restrain industries and to ensure product quality. As stated in the U.S. Uniform Product Liability Code, "claims of product liability refer to any injury caused by the manufacturing, producing, making, constructing, composing, assembling, designing, prescribing, preparing, installing, experimenting, warning, instructing, selling, packaging, storing, and labelling of the product concerned that brings about claims or lawsuit" [21]. China should also institute a law to protect consumers by prescribing the specific rights of the consumers and the related systems of indemnity, lawsuit, and arbitration. The law should also prescribe the specific duties of the state and local governments, responsible departments, and enterprises in protecting consumers' interests. Lastly, it should prescribe the specific liabilities and penalties undertaken by the manufacturers of inferior products.

4. Strengthen the "quality responsibility" system and administrative surveillance. Severely suppress illegal activities in producing and selling inferior products. Punish according to law and regulations the concerned individuals and enterprises. Subject those who ignore or forget moral principles for the sight of profit alone to such heavy penalties that they will be bankrupted. For those who do not obey the law, or trifle with the law, or do not enforce the law (do not punish the illegal activities), the government must hold them responsible, with strict and severe consequences.

5. Stop the local economic protectionism. The authorities of production and distribution enterprises should strengthen their management, strictly enforcing the standard of production and service. The reward system should be linked to the quality of goods. Inferior products should not be allowed to enter the consumer markets.

6. Urge the consumers to take part in social surveillance of product quality. Chinese consumers are still lacking in quality consciousness. According to a survey conducted by the China Consumers Society, for a loss of RMB 100, 37.5% of the buyers "will demand return or exchange of goods. [However, they] will do nothing if their demands are not satisfied" [11].

After the broadcasting of the "Ten-thousand-kilometer Tour of Quality Investigation," the quality consciousness of the Chinese consumers has been awakened. If this trend can be followed continuously, China should have a much better internal as well as external environment in which to seriously and effectively implement the concept of TQM for her enterprises. In the future, Chinese consumers may not only refuse to buy, but also expose "shady" products manufactured by irresponsible enterprises. A social surveillance system including the media must be established to let quality consciousness go deep into the heart of the consumer.

Chapter 8

Conclusions

Implementing TQM has been a significant progress in China. It provides an opportunity for China to bring her economy closer to the world markets. So far, China has relied on the government to champion the quality revolution. This top down approach did generate some preliminary effects, but there is obviously a long way to go before China can reap the full benefits of TQM. Because of the negligence of quality in a rigid planned economy that lasted for decades, the shortage economy, the imbalanced economic development in different regions, the imperfect legal system, and the weak foundation in manufacturing technology, the implementation of TQM in China has experienced tremendous difficulties and setbacks. There is a significant gap in the overall quality of the non-exported Chinese-made products and those of the developed countries such as the United States and Japan.

China's continual pursuit of "deepening the reform and openness" and the rapid development of a market economy have provided the government, and the enterprises as well, substantial pressure to implement TQM. The "Ten-thousand-kilometer Tour of Quality Investigation" developed by China's State Council took advantage of the power of the media to expose the severe quality problems. It has been a successful initial attempt to attract the whole nation's attention on quality issues.

The key to the successful implementation of TQM in China lies in empowering the enterprises to make their operational decisions. The enterprises will also have to make necessary changes in their management system in order to compete favorably in the markets. As soon as the enterprises realize that they will have to be responsible for competing in the free markets, they will quickly establish the linkage between quality and survival.

Total quality management is a new way of managing an enterprise, requiring not only organizational changes but also a thought revolution. Although there is an urgent need at present to institute and perfect a series of quality related legislation, it is also critical for management to realize that TQM may provide a needed survival tool. What the government can or should do is, on the one hand, provide the industry with conducive environment to improve quality, and, on the other hand, provide the consumers with adequate protection through proper legislations.

Given that China's economic reform and openness is irreversible, it is realistic to be optimistic that TQM will have widespread implementation. With much hard work and closer cooperation among the government, enterprises, and consumers, China will eventually attain the goal and reap the long term benefits of implementing total quality management.

References

1. China Construction Material News, Beijing, China, April 4, 1992.
2. Chinese Youth News, Beijing, China, May 1, 1991.
3. Deming, W. Edwards, Out of the Crisis, Cambridge, Mass.: MIT Center for Advanced Engineering Study, 1986.
4. Dobyms, Lloyd and Clare Crawford-Mason, Quality or Else: the Revolution in World Business, Boston, Mass.: Houghton, Mifflin Company, 1991.
5. Feigenbaum, Armand V., Total Quality Control, New York: McGraw-Hill, Inc., 1983.
6. Haderar, E., "Setting Tough Standards," The China Business Review, Vol.20, No.1 (January-February 1993), pp.34-36.
7. Ishikawa, Kaoru, What is Total Quality Control? Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1985.
8. Juran, Joseph M., Quality Control Handbook, New York: McGraw-Hill, 1951.
9. People's Daily, Beijing, China, February 10, 1991.

10. People's Daily, Beijing, China, March 1, 1991.
11. People's Daily, Beijing, China, March 7, 1991.
12. People's Daily, Beijing, China, May 19, 1992.
13. People's Daily, Beijing, China, May 27, 1992.
14. Press and Publication News, Beijing, China, June 6, 1992.
15. Sakurai, Michiharu, and Huang, Philip, "Japan's Productivity Growth: A Managerial and Accounting Analysis," Industrial Management, Vol.26, No.5 (September-October 1984), pp. 11-18.
16. Shanghai Economy, Shanghai, China, No.6, 1991.
17. Shanghai Quality, Shanghai, China: Shanghai Quality Control Society.
18. Walton, Mary, The Deming Management Method, New York: The Putnam Publishing Group, 1986.
19. Walton, Mary, Deming Management Method at work, New York: The Putnam Publishing Group, 1990.
20. Xia, Zhenfan, Contemporary Enterprise Management Diagnosis, Shanghai, China: Shanghai People's Publishing House, 1990.
21. Yue, Zhijian, Chinese Quality Control, ed., Shanghai, China: Chinese Finance and Economic Publishing House, 1989, pp.30-35.

VITA

Ji Shi was born on January 21 1966, in Shanghai, China. From 1973 to 1984 she first attended Jian Xiang Primary School and then Shanghai No.2 High School. In her primary and high school years, she was the three-time champion of the Eastern China Composition Contest. Before receiving the bachelor degree in economics from Fudan University in 1988, she obtained the Outstanding Student Award and a gold medal in a swimming contest in Shanghai.

From 1988 to 1991 Ms. Shi was employed by the division of economic news at Shanghai Television Station. During those three years as a reporter and editor, she produced hundreds of special television programs; interviewed politicians, industrialists and scholars; and developed data bank for the division. Her performance earned her Outstanding News Production Award in 1988, 1989 and 1990. Moreover, she won the First Prize in the 1990 Singing Contest sponsored by Shanghai Reports' Association.

In August 1991, Ms. Shi came to Virginia Tech as a graduate student. Since then, she has been a member of the master program in the Department of Management Science, serving as a graduate assistant, and working on her thesis since August 1992. She is a member of the Institute of Management Sciences, the American production and Inventory Control Society, and the Gamma Beta Phi National Honor Society.

