Quality Management

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Learning Objectives

After reading this chapter, you will be able to answer the following questions:

- What is quality?
- From a quality perspective, what is the status of Indian industry in the international scenario?
- How can we use quality as a strategic weapon for competitive advantage?
- What are the Japanese models for strategic quality management?
- Are the Indian companies on the right track of strategic quality management to gain competitive advantage over foreign MNCs in the long run?

1

Introduction to Quality Management

On the demand of some major airlines, passenger aircraft manufacturers Boeing and Airbus have recently created aircraft with completely reclining seats in their executive class cabin, allowing the passengers to sleep comfortably just like on a bed. As shown in the photograph above, only infants could earlier enjoy this kind of a privilege.

Introduction

Quality has a longer history in our lives than both cost and productivity, and is the only one of the three that is a common concern of both companies and customers. It is for reasons such as these that quality is regarded as a more 'human' concept than either cost or productivity (Kondo1988).

Quality guru J.M. Juran defined quality as 'fitness for purpose'. Another quality guru—Philip Crosby—defined quality as 'conformance to specifications'. For assessing the quality of a product or service, the criterion of 'fitness for purpose' is a highly subjective term, the interpretation of which may vary from individual to individual. The perception of quality of a product or service from the point of view of a customer may be different from that of the producer. The problem of the producer is aggravated by the fact that the number of customers may be too large, and each one may have a different perception of quality. If a third party such as a quality certification agency has to decide about the quality of the product or service, its perception may be different from those of the customer and the producer.

This criterion of 'fitness for purpose' is perfectly suitable at only one stage of production of a product or service. This is the stage of designing the product or service. The marketing department of the company prepares a product definition document, in which it specifies the expectations and requirements of the customer from the product (here onwards we use the term product for goods as well as services). This document is passed on to the design department, where the designs of the product are prepared keeping in mind the 'fitness for purpose', that is, the expectations or requirements of the customer. The designs so prepared are rated good or bad according to the extent to which these are able to satisfy the requirements mentioned in the product definition document.

In all the subsequent stages such as development, engineering, production, distribution, and after-sales service, quality is measured in terms of 'conformance to specifications'. During the development of the product, various specifications are evolved. These specifications have to be adhered to in all the stages of production in order to achieve the desired quality of the product. Conformance to these specifications can be verified by objective evidence in contrast to the subjective approach of the 'fitness for purpose' criterion.

An explanation as to why quality should have different meanings in different contexts was given by Garvin (1984, 1988). He recognized five approaches to quality:

1. transcendent or innate excellence
2. product-based or the quantity of a desirable attribute which is present
3. user-based in the context of fitness for use
4. manufacturing-based or conformance to specification
5. value-based or satisfaction relative to price

Garvin argued that these meanings can co-exist. Futhermore, it is necessary to change the approach to quality from user-based to product-based as products move from the stage of market research to design, and then from product-based to manufacturing-based as products move from the design stage to manufacture. He also noted that it may be necessary to give quality different meanings in different industries.

The various aspects of quality management have been shown in Fig. 1.1. Quality management starts with the establishment of a strategic quality management system in the organization. A *quality system* is defined as the collection of resources, organization, equipment, people, and procedures which implement the quality policy. The documented quality system sets out, in a formal framework, the basis of control for the critical activities of an organization, which require a systematic approach, that is, quality management. It is necessary to create an awareness of the need to manage quality in the entire organization, and the role of the individual as well as the system in controlling the activities. We shall study, in the subsequent sections of this chapter, how to link quality to the strategic mission of the company, and then evolve a quality policy/vision. Various techniques such as quality function deployment, acceptance sampling, statistical process control (SPC), Taguchi methods, and service quality management (all these topics would be discussed in detail in the subsequent chapters) have to be used to control quality in every sphere of activity in the organization. Total quality management (TQM) is a quality philosophy evolved by quality gurus such as Deming, Juran, Crosby, Feigenbaum, Ishikawa, and Garvin. Using the TQM principles propounded by these gurus, Japanese companies became world leaders in quality products. Six Sigma is the quality philosophy to ensure a reduction of the number of defective products, ideally to zero. This herculean task can be achieved only when each and every employee in the organization has the ability to measure and control quality in his domain of activity. Thus, Six Sigma involves rigorous training of all the employees in the various techniques of quality control. Quality certification bodies such as ISO conduct quality audits (inspection by third party external trained and authorized quality auditors) of the quality system before certifying an organization. It is a requirement of ISO 9000 that an organization seeking ISO certification has to conduct internal quality audits on a regular basis. These audits, also called the first-party audits, can be conducted by the trained employees of the organization to ensure that the quality system is maintained properly. Second-party quality audits may be conducted by an institutional customer of the organization to ensure that the quality standards mentioned in a contract are maintained. There may be some industry-related standards (especially in defence, aerospace, and

nuclear organizations) which may require quality audits from time to time. Two new international quality standards which are industry specific are gaining ground worldwide. One is the capability maturity model (CMM) developed by Carnegie Mellon University, USA, for the software industry, and the other is COPC-2000 developed by a consortium of major multinational companies. Indian software and BPO companies are the foremost in attaining these certifications as these help them to capture the international markets.

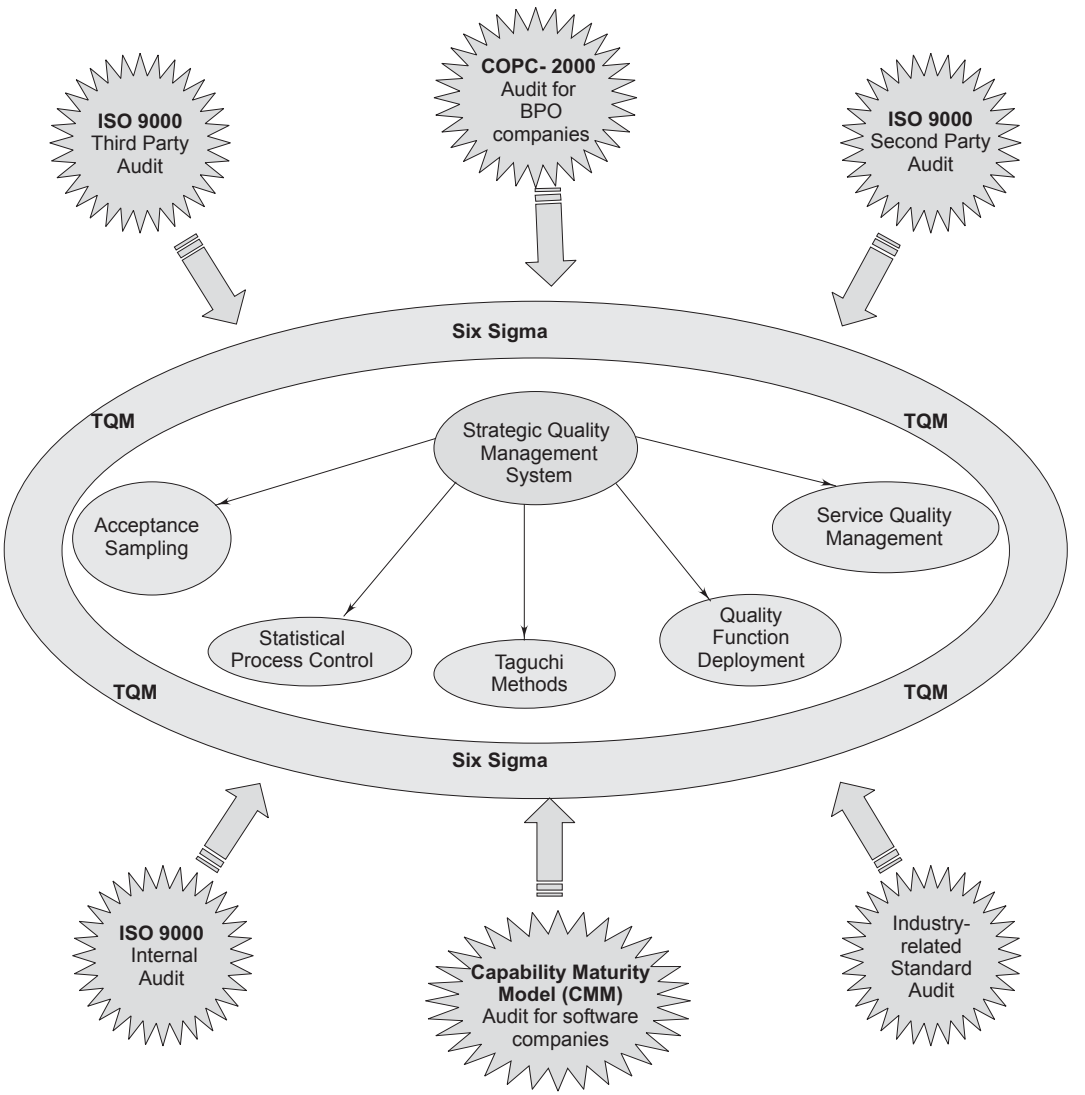


Fig. 1.1 ***Various aspects of quality management***

Akio Morita, Sony Corporation

The following are the excerpts from a speech given by Akio Morita, Chairman of Sony Corporation, to the Japan-America Society in May 1988: *In 1970, my company decided to build a plant in San Diego to manufacture television sets. No Japanese manufacturer had taken this step before and a lot of people thought we were crazy to start manufacturing in the United States, far away from our home base, with high labor costs. At that time, it cost Yen 360 to buy a U.S. dollar. Sure it was expensive to build that factory—we could have built the same factory in Japan for half the cost—and sure it wasn't easy to pay the high wages required by our American employees. But my reasoning then was that if American companies in the United States were producing TV sets with American workers, surely we could do the same, and run a profitable business. It wasn't easy to hire and train American workers, but we were determined to carry through on a course of action that would, however long it took us, make us competitive manufacturers in the United States. So, it was with much dismay that I watched our rival American TV manufacturers leave the United States, one by one, to take their production offshore, in search of cheaper labor.*

My country has learned so much from America. Not only has she given us the very idea of technology, but the idea of quality control is 'American.' The American spirit of challenge and joy in creating something new has inspired us. My country owes much to you. We hope to see a strong America once again. We must find a way the world's first and second most powerful economies can work together for the good of the world economy as a whole.

You need a strong industry.

You need a strong dollar.

We need a strong America.

The world needs a strong America.

Indian Companies Monopolize the Deming Awards in 2003

Professor Robert S. Kaplan (known for developing concepts such as the balanced scorecard and activity-based costing) of Harvard University recently made an observation that Indian firms need to move from being quality driven and must position themselves as strategy focused, to compete in the global business environment. According to him,

> 'Indian firms are good at quality. It's time they embrace strategy. While quality in improvement of products can be measured, strategy deals with abstract and conceptual thinking. A purely low-cost model would not be a sustainable business proposition for Indian firms in the wake of rising competition. Management must focus on developing a strategy, which creates a competitive advantage, and ensure its effective implementation. Strategy must percolate from top to each and every employee. India's intangible skills in terms of creativity and data management are akin to what US possessed and used in 1980s to compete with Japan, which had a more efficient workforce. India may be lacking China's tangible product processes, but it scores in intangible assets.'

India is on the same journey of quality that Japan was after the Second World War. In fact, world-renowned TQM expert, Professor Yasutoshi Washio, has predicted that the quality of Indian manufacturing will overtake that of Japan in 2013. Many Indian companies have got Deming prizes. So far, China has not even entered the Deming radar.

Indian companies seem to be in the favorites list of the Deming Awards of Japan. The 2003 Deming list is nearly monopolized by Indian companies—five out of eight. The other three are also from Asia. The Japanese Union of Scientists and Engineers (JUSE) started the Deming prize in 1951, when Dr Deming donated the earnings from the sale of his papers (the stenographic records of his speeches compiled by JUSE) to JUSE. Initially, this prize was open only to the Japanese industry, but in 1985 it was thrown open to the rest of the world. The prize has three categories. The first category is the Deming Application Prize, which is given to companies or divisions of companies that have enhanced performance through total quality management (TQM) in a given year. The second category is the Deming Prize for Individuals, that is, TQM scholars and practitioners. The third category of the prize is the Quality Control Award for Operations Business Units given out for exceptional implementation of TQM.

The five winners of this prestigious honor in 2003 (termed as the Nobel prize in the world of manufacturing) include Rane Brake Linings, Mahindra & Mahindra (farm equipment and tractor division), Brakes India (foundry division), Sona Koyo Steering Systems, and Grasim Industries (Birla Cellulosic, Kharach unit). While the first four companies got the Deming Application Prize, Grasim Industries' unit got the Quality Control Award for Operations Business Units. It is not just winning a medal. Indian companies have entered the record books. For instance, Mahindra's tractor unit is the first tractor unit in the world to win the Deming. Similarly, Rane Brake Linings became the world's second brake lining manufacturer to become a Deming company. The first one was also an Indian company—TVS group's Sundaram Brake Linings in 2001.

From 1998 onwards, Indian companies started figuring in the Deming prize list, with Sundaram Clayton's brakes division claiming the honour first. Till 2002, the Indian winners belonged to the 27-unit TVS group—Sundaram Brake Linings (2001) and TVS Motor Company (2002).

Apart from Deming, the group outfits have been winning other quality medals. In 2002, Sundaram Clayton's brakes division got the Japan Quality Medal, also awarded by JUSE. TVS Srichakra Tyres has won the Total Productive Maintenance (TPM), Excellence Award—First Category, from the Japanese Institute of Plant Maintenance (JIPM).

It may not be wrong to call the TVS group as the Deming group. The winds of quality excellence are blowing across all the group units, irrespective of their size.

Says V. Narasimhan, Executive Director, Brakes India: 'Our quality manual was written within two years of our start-up'. And that was 22 years ago. Those were the times when a majority of Indian industries was blissfully unaware of various quality and customer satisfaction concepts.

Similarly, Sundaram Brake Linings' quality excellence strategy started 15 years back. The first non-TVS Indian company to figure in the Deming list is Hi Tech Carbon (2002), a part of the $6-billion Aditya Birla group. Like the TVS group, Deming is not new to the Aditya Birla group.

Two of the group's Thailand-based companies (Thai Acrylic Fibre Company and Thai Carbon Black Public Company) have won the prestigious quality award in 2001. Given this position, it is heartening to note that the 2003 Deming list contains non-TVS/Aditya Birla group outfits too.

'We were not pressured by Sundaram Brake Linings or other TVS group companies winning the award. It is just that we wanted to go forward', says S. Sundar Ram, President, Rane Brake Linings.

What is remarkable is that Rane Brake Linings won the award in the shortest time—three years—from the date of starting its TQM practice.

Speaking about the company's pre-Deming days, Ram says: 'We were focusing only on production value. The company had a high level (2.1%) of plant-level rejections and customer returns. There were small individual kaizens (continuous improvement programmes). No systematic initiatives for improvements were in place'.

One may wonder as to how Indian auto ancillaries are increasingly reaching the quality summit. Not long ago, domestic car manufacturers allowed 10% defective parts in supplies. A car normally has around 10,000 parts. In all probability, every car that was rolled out of a factory had some defective parts fitted in, as the production capacity was also low.

Manufacturers have realized that quality actually contributes to the bottom line, in terms of reduction in scrap/waste, inventory turnover, productivity, and lead time to execute an order. The road to success is not smooth. It is really years of hard grind even before the companies think of challenging the award.

Apart from auto ancillaries, other industries are also resorting to TPM, such as manufacturers of cement and condoms. Says J. Srinivasan, Managing Director, TTK LIG, the world's largest condom manufacturing company: 'Our productivity has improved manifold, and waste has come down drastically. There is no company in the world that can meet our production costs now. Today we are catering to the global demand from here.' The company has won the award for TPM Excellence—Second Category from JIPM this year.

While groups such as TVS, Birla, Mahindra, and Rane follow the Japanese quality processes, the $11.21-billion Tata group has its own model—the Tata Business Excellence Model (TBEM)—a derivative of the American Malcolm Baldrige quality model. Tata Quality Management Services (TQMS), an arm of Tata Sons, benchmarks the quality standards and systems to be followed by the Tata companies. The company that excels in various parameters is awarded the JRD QV award, instituted by the group.

The Maruti Factor

Looking back, the quality movement among the domestic auto ancillaries, actually, was initiated by the country's premier car manufacturer, Maruti Udyog, through its cluster approach. Maruti got 11 of its vendors to adhere to quality systems and processes. The idea was to showcase a couple of units so that the others could follow too. Today, the cluster approach is what is being practised to teach small-scale units to adopt quality practices. Many of the auto ancillaries that have won the Deming award are members of the cluster, and some others are in the Deming race. Brakes India's foundry division, a Deming winner this year, is also a cluster member.

With many foreign auto ancillaries setting up shop in India (Korean ancillaries tagged along with Hyundai Motors, and Daewoo Motors and Visteon with Ford Motors), the domestic units had to perforce upgrade themselves to ward off competition within India, and also to take advantage of the export possibilities. Not a day passes without an overseas automobile manufacturer announcing sourcing possibilities from India. However, they have laid down stiff qualifying norms. For instance, Ford Motor Company has mandated that its vendors should be Q1-certified.

What do these awards really signify for the domestic companies? In addition to increased exports, it gives the confidence to go global. After getting the production process right in India, replicating the same in other parts of the globe will not be an issue. Such a trend has already started. Auto ancillary groups such as TVS and Kalyani are putting up and buying out units abroad. Sundaram Fasteners is setting up a high-tensile fastener unit in China, and has announced its intention to buy the UK-based forging company Dana Spicer. Two-wheeler manufacturer TVS Motor Company is planning a unit in Indonesia.

Bharat Forge, the flagship company of the Pune-based Kalyani group, recently acquired Carl Dan Peddinghaus, Germany. In the long run, the positive rub-off of quality awards such as Deming on the Indian industry will be the improvement of the image of the domestic manufacturing sector and the realization of its human resources and capabilities.

From being looked at as the global brain base (many multinational companies are setting up their research and development wings here), India is now seen as a quality manufacturer. A positive image alone will not result in increased foreign investment, thereby making India the production base for global markets, say, like China. Technical capability alone will not attract industrial investments. It is the existence of good infrastructure like roads, ports, power which would entice multinational corporations to set up their shop floors here.

According to industry officials, China may be a volume player, but when it comes to quality engineering products, India is way ahead. Not very long ago, Indians looked at the Japanese products with disdain because of its poor quality. Now the elephant is gathering speed.

Infosys, Wipro, Satyam, I-flex, TCS—all leading Indian software companies—are in the forefront of the quality bandwagon. For most of these software companies, attaining SEI-CMM Level 5 has been considered as the pinnacle in their journey to attain the peak of quality. As of October 2001, India has 32 companies at SEI-CMM Level 5 assessment, while only 58 organizations across the world have acquired such an assessment. The motivation for Indian IT software and services companies to attain SEI-CMM Level 5 assessment dates as far back as 1995, when Motorola's unit in India acquired this certification. The seed of quality was thus sown, and the following years have been that of 'quality transformation'. The quality maturity of the the Indian software industry (or the maturity of Indian software companies from a quality perspective) can be measured from the fact that 201 Indian software companies have already acquired quality certifications, and 64 more companies are in the pipeline.

Quality Management—A Conceptual Framework

According to the Oxford dictionary for the business world, *Quality* is defined as the degree of excellence.

Quality guru J.M. Juran defined quality as:

'Fitness for purpose.'

Quality guru Philip Crosby defined quality as:

'Conformance to specifications.'

Quality Control (QC) is defined as maintaining requisite standards in products or services.

ISO 8402 defines *Quality Control* as:

'The operational techniques and activities that are used to fulfill requirements of quality.'

ISO 8402 defines *Quality Assurance* as:

'All those planned and systematic actions necessary to provide adequate confidence that a product or service will satisfy the given requirements for quality.'

Quality guru A.V. Feigenbaum defines *Total Quality Control* (*TQC*) as:

'Total quality control is an effective system for integrating the quality-development, quality-maintenance, and quality-improvement efforts of the various groups in an organization to enable marketing, engineering, production, and service at the most economical levels which allow for full customer satisfaction.'

Various Dimensions of Quality

Quality should be perceived from the customer's point of view. This is because it is the customer who decides to buy or not to buy a product or service, according to his or her perceptions of quality. Thus, it is important for us to know the various dimensions of

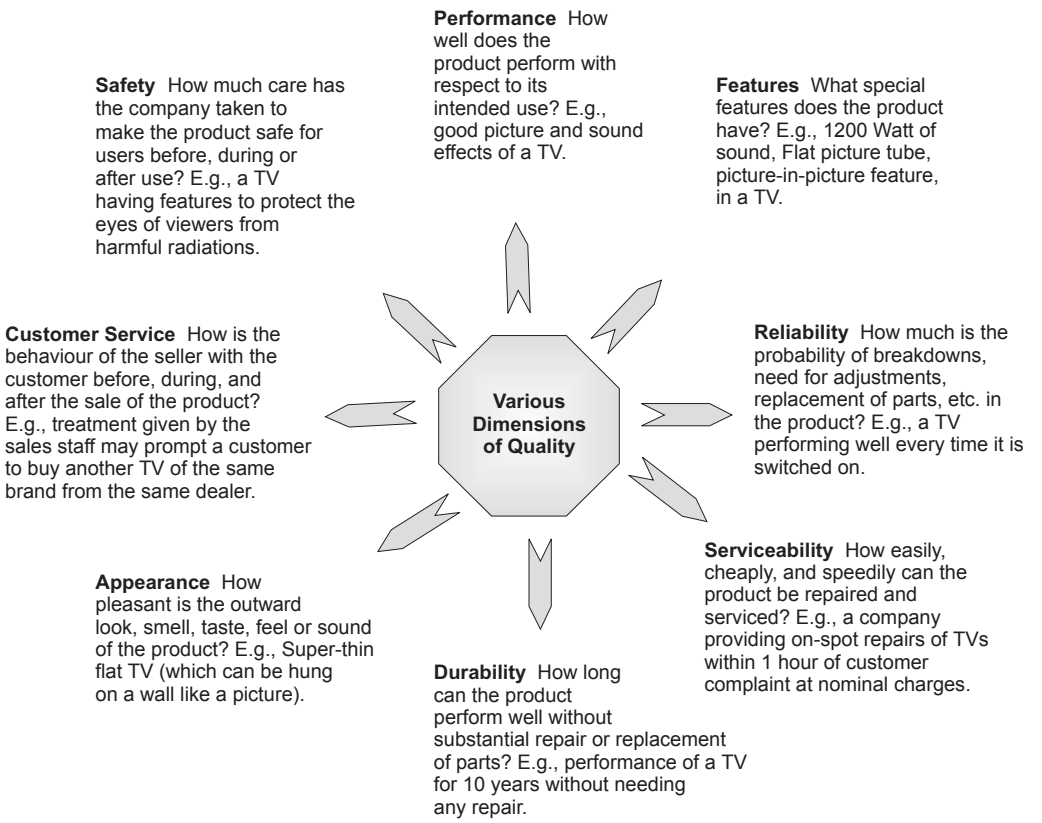


Fig. 1.2 ***Various dimensions of quality***

quality that are considered by a customer in assessing the quality of the product. Fig. 1.2 shows these dimensions of quality.

Garvin (1988, 1990), while focusing on the strategic potential of quality, recognized the eight dimensions of quality, namely, performance, features, reliability, conformance, durability, serviceability, aesthetics, and perceived quality, as the basis for developing strategic options. Companies must decide which subset of these dimensions differentiates their products or services from that of its competitors. Then he introduced the framework of strategic quality management, emphasizing that quality must be defined from the customer's point of view. He further elaborated it by stating that quality should be linked to profitability on both the market and the cost side. It should be linked to the strategic planning process which requires organization-wide commitment. Also, quality should be viewed as a company weapon.

In the face of intense competition today, the most important dimension of quality, which was overlooked so far by many companies, especially in India, is customer service.

In India, the domestic industry can overcome the threat of foreign MNCs by focusing on this aspect of quality. Manufacturing organizations must focus on after-sales service as an important opportunity for making a difference in quality to gain competitive advantage.

Tata Motors' Crash Test Facility

The Indica's safety characteristics are testimony to the quality commitment of Tata Motors, the manufacturer of the car, in providing the best possible protection to those using its vehicles. The entity entrusted with the task of ensuring passenger safety is the company's crash-test facility. Located at Tata Motors' huge plant in Pune, this is the only installation of its kind in the country. 'Right from the beginning, crash testing was identified as one of the critical areas in building a world-class car,' says Anil Kumar, Project Manager (vehicle safety systems) at Tata Motors. As with most components of the car project, Tata Motors took the indigenous road on crash testing, preferring to develop capabilities in-house rather than importing them. 'There were no crash-testing benchmarks in India when we started out; we had to learn everything from scratch' says Kumar. 'We wanted to integrate the facility and modify it as we grew. That's what we have done.' There are two complimentary aspects of crash testing: simulation, through powerful computers and sophisticated software, and the physical crashing of vehicles, at the prototyping stage and, later, off the production line. The philosophy guiding this endeavor is that, in the event of an accident, protecting the passenger becomes paramount. 'The idea is to use every part of the vehicle in some way to save the occupant rather than the vehicle.' The aim is to make sure that the risk of serious injuries and intrusions is controlled. Then come the secondary safety factors, such as doors staying closed during a crash (to prevent passengers from being thrown off), making evacuation easy (doors should not get jammed), ensuring that seats do not get so distorted that removing the passenger from the vehicle becomes difficult, and eliminating the risk of a fire breaking out. 'We optimize the vehicle's structure to make it endure the damage caused by a crash. That way we can protect the car's occupants.' A crucial component in the safety process is crumple zones. These are vacant spaces in the front portion of the car, which act as cushions, where metal parts are supposed to deform and absorb all the kinetic energy of the vehicle. These deformations cannot be allowed to happen in an uncontrolled fashion; they have to happen in the designated areas, which then ensure that the passenger compartment is rigid and stable.

In the case of a side collision, the space between the car's body and the occupant is much less, compared to front and rear collisions. Intrusions here have to be much lower for the same impact. There are metal barriers, or side-intrusion beams, that do the safety job here. Add to this the materials used inside the car. These plastic parts are designed to deform and soften the impact for the occupants, rather than crack up and expose sharp edges. Finding out whether these different attributes will perform efficiently in an accident is the crash-testing facility's responsibility. The actual crashing of a car is spectacular, but it is computer-aided simulation that constitutes the greater, more comprehensive safety effort. Simulating every accident type is impossible, which is why a number of standardized crash tests—based on international classifications and industry practices—are used in the development of the

vehicle. This defines a repeatable way of conducting crashes, so that improvements can be quantified and modifications made. In the simulation phase, extensive use is made of what is known as 'finite element analysis', where the vehicle is broken down into tiny parts, so that the impact of a crash on any given area can be precisely calculated (the Indica model comprises around 2 lakh elements). By the time the car is ready to undergo a physical crash test, engineers have a pretty good idea of what is going to happen. The actual crashing works, in a way, to validate the findings of the simulated collision. For every physical crash test, there are about 30 simulated ones. 'We consciously take decisions to simplify the simulation model in order to reduce the computational time. It takes 12 hours to complete one simulation, and this happens on a multiprocessing machine. A less powerful machine will probably take a week to run such a simulation.' The final product authentication happens with the physical crash test. This is a dramatic affair. The car is backed away from a 116-tonne barrier made of steel and concrete. An electric motor, mounted behind the barrier and controlled digitally, yanks the car down the runway using a steel wire rope. The car hits the barrier at 56 kmph, right after the rope has released it to run free. It takes about 0.2 seconds from the time the car hits the barrier until it stops. This is when seven high-speed cameras, shooting at around 1,000 frames per second, capture the moment for future analysis. These cameras, sometimes placed inside the car, can generate about 200 images each of the crash.

Inside the vehicle there are two crash test dummies, wired with about 50 sensors each to capture the impact of the collision on different parts of the human body. Given that these dummies cost more than Rs 90 lakh each, it is a good thing that they can be used again. The sensors in the dummies measure, among other things, acceleration in various locations (to determine the probability of injury), the amount of force exerted on different body parts during a crash, and how much the chest deflects during a crash. Besides the sensors embedded in the dummies, there are more than 30 other sensors spread out inside the car. The data thus captured is fed into a computer to understand the exact impact of the crash on the car and its dummy occupants. Based on what emerges, the car's safety features are tweaked and improved. The Indica and its siblings have gone through numerous crash tests, simulated and actual, to make driving safer for those using them. Tata Motors has expended considerable effort and resources on this exercise. Nikhil Hariharan, a survivor of a car crash, and many others are proof that this labour has been worth it.

Costs of Quality

Quality is Free is the title of the famous book by quality guru Philip Crosby. On the other hand, quality guru J.M. Juran is known for the concepts propounded by him regarding the costs of quality. Fig. 1.3 shows the four types of costs of quality. It should be emphasized here that there is an inverse relation between the cost of prevention of defects and the other three types of costs. If the money spent on the prevention of defects is increased, usually, the cost of detection of defects, cost of scrap and rework, and cost of warranty claims tends to decrease. Companies such as Motorola, GE, Texas Instruments, etc. have saved billions of dollars by initially incurring a lot of cost for implementing quality philosophies such as Six Sigma for the prevention of defects in

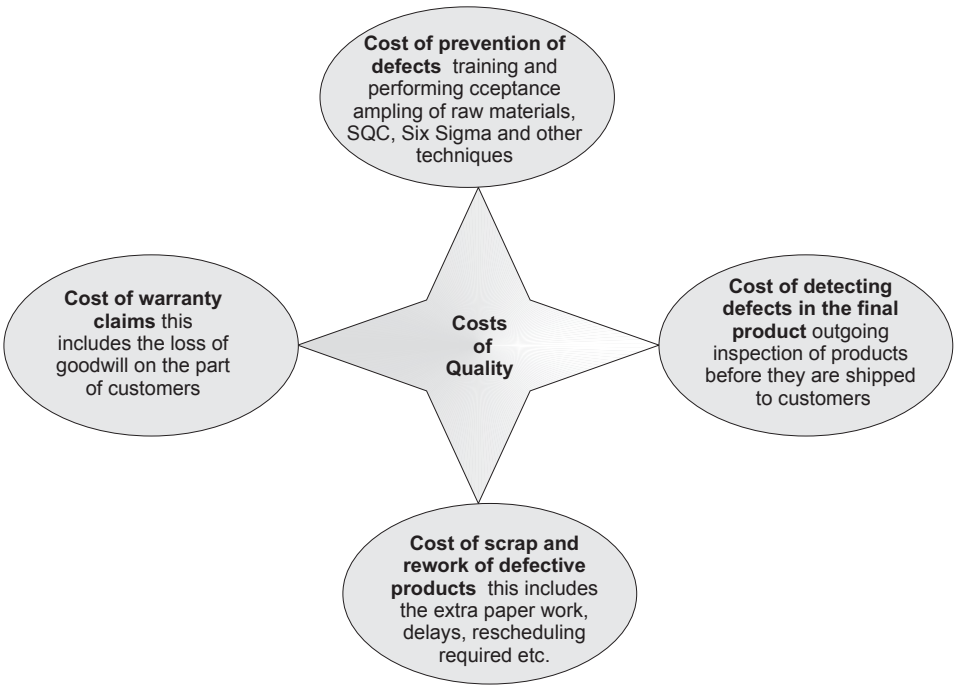


Fig. 1.3 ***Costs of quality***

their products. We shall study, in detail, the various aspects of the cost of quality in Chapter 11: Cost of quality.

Deming's Contribution to Total Quality Management

W. Edwards Deming is the most influential quality guru not only for the Japanese, but also for rest of the world. The only difference is that the world came to know about Deming very late compared to the Japanese, who listened to him carefully, when nobody else was listening, and implemented his concepts to become world leaders in quality. Interestingly, Deming had also worked as an advisor to the first government of free India led by Pt. Jawahar Lal Nehru on sampling techniques for its five-year plans. But India, obviously, found little use of him at that point of time.

Deming was awarded his doctorate in mathematical physics in 1928. He then worked in the US government service for many years, particularly in statistical sampling techniques. He became particularly interested in the work of statistician Walter Shewhart, and believed that his principles could be applied to non-manufacturing processes as well. Deming started to run statistical courses to explain his and Shewhart's methods to engineers, designers, etc., in the US and Canada. In 1943, he published a technical book: *Statistical Adjustment of Data*. After the Second World War, the American

companies were experiencing a boom time because of the large capacities of their plants now available, which were earlier devoted to the war effort. The countries devastated in the war were willing to buy anything, no matter what quality of goods the Americans were ready to supply. The Americans were, thus, not bothered about quality at all at that time. On the other hand, Japanese managers and engineers realized that they required new techniques to build their devastated country and economy fast. They invited Deming for his lectures on statistical quality control. In the early '50s, he lectured to engineers and senior managers throughout Japan, including in his lectures, principles now regarded as part of TQM, or company-wide quality (discussed in detail in Chapter 7: Total Quality Management). Only in the year 1970 did the Americans recognize the efforts of Deming, but it was too late by then, as the Japanese had made inroads into the world markets, and the Americans were facing tough competition from them.

Strategic Quality Management

America's wartime production was quantitatively, qualitatively, and economically very satisfactory, owing partly to the introduction of statistical quality control, which also stimulated technological advances. One might even speculate that the Second World War was won by quality control and by the utilization of modern statistics (Ishikawa, 1985).

Juran's (1991) lessons for developing strategies for world-class quality are:

- implementation of stretch goals and benchmarking
- development of necessary infrastructure
- implementation of multifunctional processes
- demonstrated leadership
- incorporation of quality plans into corporate business plans

Joseph et al. (1999) developed an empirical survey-based instrument for measuring total quality management implementation in manufacturing-based business units in India. This study offers a set of 10 critical factors with a total of 106 operating system elements of quality management as a comprehensive measure of TQM implementation:

1. organizational commitment (OC)
2. human resources management (HRM)
3. supplier integration (SI)
4. quality policy (QP)
5. product design (PD)
6. role of quality department (RQD)
7. quality information systems (QIS)

8. technology utilization (TEC)
9. operating procedures (OPP)
10. training (TRG)

Toyota Camry

When Donald Esmond, Vice President for sales and marketing for Toyota Motor Sales, USA, dresses in the morning for work, he always sticks a couple of little clips in his pocket along with his spare change. One is a zinc-coated clip and the other a painted clip. The zinc-coated clip is used in the old Camry. The other is for the interior door trim panels in the re-designed 1997 Camry. Both served to remind Esmond, a former Ford executive, that one of his main tasks was to 'de-content' the Camry. One Toyota official once described the Camry as being too good for the American market, so the goal was to remove some of the expensive contents without the consumer noticing them. 'The painted clip was the newer clip and it cost less', Esmond says. 'The difference was a nickel a clip. You might say "big deal". But, it was $1.20 in savings per car based on those clips alone.' Toyota re-engineered the bumper, reduced the number of parts, improved the bumper itself, and saved cost in doing so. 'We did that on a number of parts of the car. I used to pull the clips out of my pocket and say, "If this is de-contenting, we're guilty", says Esmond. It paid off. When the car hit showrooms, the price was $1,500 lower than the previous model. Some auto critics decried the 'stripped down' feeling of the new Camry, with its stark instrument panel and plain lines. But customers embraced it. Any internal criticism about the re-designed Camry's plain exterior was deflected handily by executives. 'It may be plain vanilla, but you sell a lot more vanilla than you sell raspberry', Esmond recalls telling critics. Because it's considered Toyota's 'bread-and-butter'car, Esmond told the launch team early on that the 'most important thing was the quality of the vehicle'. Esmond says that, unlike the Taurus team, the Camry team never set a goal to outsell the competitors. Instead, the rallying cry became attention to quality—even in the smallest details. This meant constant contact with the Georgetown, Kentucky, plant where Camry is built. Even top managers were intimately involved with the manufacturing process. The deadlines were inviolable—no exceptions. But 10 days before the fall 1996 launch, it looked like disaster was about to strike. A vendor got a bad batch of plastic, sent it on to the plant where it was used for the new Camry's side-view mirrors. When the cars were inspected, 1,500 of them had mirrors that were pulling away from the sides of the car. Plant officials said they would be four days late in delivering the cars to dealerships.

'I said, 'Wait a minute—our ads are breaking', Esmond recalls. 'I've got eight guys here in my office. We'll fly out and help you redo them and put on parts.' That wasn't necessary. The plant management put pressure on the supplier to work 24 hours a day over the weekend—with line workers brought in on Sunday—and the cars were redone in three days. 'That's the kind of effort that made this thing work', Esmond says. 'Even the suppliers knew our advertising plans. Looking back, the toughest part was the initial meetings', Esmond remembers, 'just trying to get this diverse group to sit down on a regular basis and have everyone buy into the fact that this was part of everybody's job. Once that happened, it just started snowballing.' (Lienert, 1997)

In another empirical study conducted by Mohanty and Lakhe (1998) to identify the critical factors for TQM implementation in the Indian Industry, it was found that 'proactive business orientation' accounted for the highest common variance. Developing a structure of quality planning framework for initiating strategy-focused management actions, having a strong quality improvement infrastructure, an aggressive technology policy, creativity and innovations in product design, and a sound financial status, all relate to such an orientation. A critical look into all these items reveals that they are, in fact, unique resources for a business enterprise. Strong and captive possession of these unique resources by any enterprise will create an asymmetry with reference to others not possessing any such uniqueness. It should be noted that such an asymmetric enterprise will be able to take early competitive advantages, and will continue to maintain the leadership positions in terms of cost, quality, time, product, technology, distribution channel, flexibility, etc.

According to a study by the Massachusetts Institute of Technology (MIT), many businesses have become aware of the fact that, without TQM, the increasing international competition cannot be beaten.

In their book *In Search of Excellence: Lessons from America's Best-run Companies*, Peters and Waterman (1982), found that the most consistent factor among companies they rated as most successful is an obsession with some form of quality, reliability, and/or service. Indeed, quality can be an important part of competitive strategy. Research has shown that companies that furnish quality products can charge more for their products, resulting in higher profit margins. Data shows that improvement in product quality has a stronger relationship to increases in market share than price. More recent experience shows that as quality increases, so does productivity.

The White House Conference on Productivity (1983) noted in its final report that:

Managing the quality dimension of an organization is not generically different from any other aspect of management. It involves the formulation of strategies, setting goals and objectives, developing action plans, implementing plans, and using control systems for monitoring feedback and taking corrective action. If quality is viewed only as a control system, it will never be substantially improved. Quality is not just a control system; quality is a management function.

Increasing foreign competition, customer expectations, government pressures (pollution norms), and in the western world, increases in both the number and the size of penalties in product liability lawsuits have resulted in a strategic orientation towards quality. The top management of companies is, therefore, linking quality closely with profitability and including it in their corporate business plans. They have started valuing quality as a strategic weapon in warding off competition. It is imperative to have a shift in thinking to incorporate quality in the strategic plans. The better a company is able to satisfy the expectations of customers, more would be the profit generated according to the quality perspective.

Paralleling this change is the fact that quality has been redefined as a measure of customer satisfaction over the lifetime of a product. In addition, quality is measured relative to competitors' product offerings, which generates other new perspectives:

- Market research on quality becomes important because it provides information on what customers want, and what competitors are doing.
- Customers view life-cycle costs as more important than initial prices.
- Customer complaints can be employed usefully as a source of information.
- Measures of profitability and organizational effectiveness must place a value on customer loyalty.
- Continuing steps should be considered to match or exceed competitor quality.
- Continuous quality improvement appears to be a better strategy than setting stable quality norms.

The strategic impact of quality is so far-reaching that companies which do not accept quality as the measure against which all corporate efforts are gauged will not be well-positioned in the marketplace of the future. Strategic quality goes beyond competitive advantage through functional excellence. In its fullest form, quality is an entire system of thought. If quality initiatives are going to succeed, they must be implemented organization-wide because all functions are interrelated. A consequence of the need for a company-wide quality initiative is that the formulation of such a strategy must involve all management levels. This new process also changes the nature of the quality professional needed by organizations. Understanding corporate strategic goals becomes more important than possessing technical expertise, and education of the entire staff in the organization becomes necessary.

Improvements in quality will have to be made at every level of the supply chain as various participants co-operate. Volkswagen in Brazil now requires suppliers to install and test parts on the assembly line. Variety Perkins, a diesel engine maker, provides suppliers with daily measurements of their performance. Honda of America Manufacturing asks its suppliers to provide a detailed breakdown of their costs, so it can compare them with those of other suppliers and suggest improvements. Johnson Controls helps each of its key suppliers improve their productivity by assigning an individual employee to serve as a 'champion' for each supplier. Downstream improvements are being made as well, as businesses develop customer-partnering programs to improve packaging, shipping, and even product development.

Five Stages of Quality Culture

The quality culture differs from company to company. In some companies, the quality culture is well developed, while in others the quality culture is very rudimentary. According to Sandholm (1999), five stages of quality culture can be identified.

Dormant stage Within an organization in this stage of culture, there is no evident interest in becoming involved in quality or anything related to quality. The management

thinks that things are fine as they are. Profitability is acceptable and there is no feeling of external threat. This is the stage Western industry was in, until around 1980. A similar situation was faced by the Indian domestic industry, and particularly the public sector enterprises, for a long time during the License Raj.

Awakening stage This is an awakening stage. The situation is not as pleasant as it was during the dormant stage. Conditions have changed radically. Manufacturers in the Western world started facing a type of competition they had not faced before. They started to lose market shares and many companies started incurring losses. The reason was that Japanese competitors were overtaking them in the eyes of the customers. So, the consumers bought Japanese products. This crisis hit the Western world around 1980. This is what the Indian industry faced after liberalization in the 1990s.

Groping stage When a crisis occurs, something has to be done. The question—is what? In this situation, as very few top managers really know exactly how to bring quality into the activities, there is a tendency to go ahead with whatever happens to be the latest fad in management magazines, as well as in conference and seminar invitations. That is to say, there is a culture of relying on trendy methods and approaches. Over the past 20 years, there have been plenty of fads. There is nothing wrong with these methods as such, what is wrong is the way they are applied. They are used as general strategies of improving the performance of the organization in the quality field, without first studying the situation properly.

Action stage Gradually, it dawns that the input applied in the form of trendy methods and approaches has only generated marginal results. It is then that the management realizes that measures of quite a different character are called for. This requires a strategic plan for the development of activities, followed by their implementation.

Maturity stage In a culture of this stage, quality, and consequently, a clear focus on customers is a natural part of the operations. It is integrated into everything that is done in the organization. One might not even use the word quality. Quality is something completely natural, as natural as finance has been for years.

Need for Strategic Quality Management in Developing Countries

Madu (1997) has highlighted the need for strategic quality management in developing countries such as India. According to him, quality is a major factor in achieving competitiveness. With the increased globalization of markets and liberalization of local economies, it has become necessary for businesses all over the world to develop competitive strategies. Such strategies often recognize quality management as their focal point. Businesses in many of the developing economies have often been sheltered from competition through protectionism at home and government intervention in foreign trades. However, the rapid globalization of markets and the gradual acceptance of competition—in other words, free trade, which is healthy to the economy—are making

Ford Taurus

When the Ford Taurus snagged the title of 'Best-selling car in America' away from the Honda Accord in 1992, Detroit reacted as if it had won the World Series or the Super Bowl.

A big brass band was hired to parade down Jefferson Avenue in the heart of the city. Advertising executives started rewriting copy to reflect the honour. And even competitors at General Motors and Chrysler went out of their way to congratulate their counterparts in the Glass House, Ford's Dearborn, Michigan headquarters.

When accountants closed the books in 1992, the results were staggering. Ford had sold 409,751 Tauruses—putting the family sedan up in the pantheon of Ford products, such as the Model T.

More important, the win reverberated through the industry, holding out the promise that Detroit could compete effectively with Japanese manufacturers, who seemed to have little trouble luring away young American car buyers with the promise of high quality, affordable cars. For the next five years, Taurus would retain the title.

'The fact that Taurus could become the No. 1 selling car was super important to all the domestic manufacturers', says Ross Roberts, General Manager of Ford Division. 'We finally were able to demonstrate that the domestic automobile industry could build a car as well as the Japanese, and have the volume. It was a big, big deal to win No. 1 away from Accord.'

However, 1997 was a different story entirely. As early a May, Ford officials were privately conceding that Taurus, which had undergone a radical and highly criticized renovation for the 1996 model year, would lose the coveted title to the newly redesigned Toyota Camry. Like the Accord, the Camry is a Japanese car that is built in America. Ironically, the name Camry is derived from the Japanese word for 'crown'.

'It's one of the most sensitive subjects within the company', said one Ford insider of the impending loss. 'The Taurus has done much worse than anyone of us had dreamed. Camry is clearly No. 1 unless a virus overcomes everyone at the plant.'

The looming defeat stunned even Mary Walton, a Philadelphia writer who had spent two-and-a-half years dogging the Taurus team, from the development of the new Taurus to production at the Atlanta plant, and authored a book about Taurus, *Car: A Drama of the American Workplace*, released last summer.

'The working subtitle for months had been "Making the No. 1 Car in America", Walton said. 'Thank God we didn't do that.'

The Taurus launch team heard the rumblings as far back as 1994 that Toyota might be working furiously to remove costs from the Camry. But they did not pay attention. The team was too busy taking apart the 1992 Camry, which they were using as a benchmark for the new Taurus. Trying to figure out how to match the '92 Camry proved to be one of their major mistakes. Among the improvements needed to come up to Camry's standards were things such as split fold-down rear seats, better seat fabric and construction, and a new turbine fuel pump.

With the upgrades, the variable cost of each new Taurus would increase about $800 above the old Taurus, according to author Mary Walton. Dick Landgraff, who headed the redesign of the Taurus, asked Ford Chairman Red Poling for an extra $700 million to get the job done. To the shock of some co-workers, he got it. That proved to be the worst management decision of all.

'It was a bad decision from a competitive standpoint because they then had to take the price up', Walton says. 'The decision was based on the

presumption—or conviction—that the American car buyer would pay as much for an American car as an import. And they were wrong. No matter how good an American car is, there's a generation of very skeptical car buyers who won't buy anything but an import. Especially one that's not cheaper.'

Price was an issue with the new Taurus and so was styling. Some critics said the oval grille—patterned after the oval Ford logo—on the new Taurus gave the car a 'catfish face'. Long-time Taurus buyers complained that the car felt too small and did not have a smooth enough ride. All these complaints were despite the fact that company insiders said that the redesigned Taurus was the most heavily researched vehicle in Ford history.

'The team felt a little bit burnt from the 1992 Taurus, because we revamped about 60 % of the car, but the style was very, very evolutionary', says Kenneth K. Kohrs, Vice President of Ford's large and luxury car vehicle center. 'In fact, we were criticized in the press about being too conservative—and we lost our way.'

Adds Ross Roberts: 'The redesign of Taurus was the right thing to do. What has hurt the design is the perception of people. They think it's smaller even though it's not. We did a lot of research, but you've got to figure out what you might not have read 100% correctly.' Marketing research for autos is usually completed three to five years in advance, so it is hard for automakers to predict what will be popular when they introduce new models.

Getting serious about making quality job one

For 10 months, they were the dreaded critics with the clipboards. Every day, the three consultants from Process Development Corp., an outside management firm based in Livonia, Michigan, stood in the parking lot of Ford's Atlanta assembly plant in Hapeville, Georgia, waiting to nitpick the Tauruses rolling off the line. To bring in outsiders to analyze an auto factory's day-to-day operations is virtually unheard-of in the industry. But Ford officials say they felt it was the only way to correct quality problems before the cars went into the hands of customers. 'We could go out there literally on an hourly basis and see what they were finding', says Jim Hill, the Atlanta plant manager who has worked for Ford for 32 years. 'We reacted to their reports on a daily basis. The thinking was "let's see if we can fix it immediately". And if we didn't think it was an issue, we ignored it. The biggest benefit is that you're getting a look at a car from an unprejudiced view. And number two, these people are not subject to the pressures my management team could put on my own employees. They were able to look at the cars from a totally neutral position.' Hill says the outsiders triggered 20 to 30 improvements on the Taurus. A greater benefit was the fact that in May, the Atlanta plant, with its capacity to build more than 400 thousand cars a year, won the prestigious J.D. Power and Associates Platinum Award, which is given to the plant that manufactures vehicles with the least problems reported by US consumers. The Ford plant actually tied with Honda's Marysville, Ohio plant, which builds the Taurus competitor Accord, and beat Toyota's Georgetown, Kentucky, plant, which builds the Camry. Even though Georgetown only received a bronze award, it was the fifth time in the past seven years that the Toyota plant had received a J.D. Power assembly plant quality award, and it served to confirm just how consistent Japanese quality has been. Still, the win was quite a coup for Ford. The Atlanta plant had only 51 problems per 100 vehicles, an achievement well below the industry average of 81 for cars. Company officials say current quality levels at the plant are about 45% better than in 1996. (Lienert 1997)

it more difficult to continue to protect local markets. Developing economies must, therefore, adapt to these environmental changes and develop programmes to enable them to compete effectively. Furthermore, many of the developing economies are strapped for foreign exchange and are in dire need of export markets to generate hard currencies. This puts their businesses in direct challenge of being able to market their products and services in foreign markets. With the increased customer awareness, in the West and in industrial and newly industrializing nations, of the importance of quality and the passage and implementation of ISO 9000 series standards, trading with member countries of the European Union (EU) has become very difficult without an ISO certification. Achieving this certification requires developing quality programmes and meeting stringent quality standards. Today's market environment is, therefore, predicated by global rather than local events, and quality management has surfaced as one of the most encompassing factors that influence competitiveness and international trade. Government protectionism has limited impact when market forces are dynamic and under the control of customers.

With the exception of multinational or transnational corporations that have subsidiaries in developing countries, many indigenous corporations in these countries are unable to deal with common causes of variation in quality. Many of these corporations are dependent on the availability of cheap unskilled labour, and lack the financing to purchase modern technologies, let alone upgrade these frequently. With the advent of computer and information technology, we have noticed a rapid proliferation of new technologies. These new technologies offer higher precision, flexibility, little or no inventory, real time information, lower production cost, and, of course, improved quality, among others. These attributes make the company more competitive since the dynamic changes in the marketplace can be easily accommodated. With the impoverished state of many of the developing economies, with their debt ringing in trillions of dollars, they are unable to modernize their factories, frequently support factory improvements, and are clearly unable to keep up with the rapid proliferation of technologies. In addition, since there is often no indigenous technology base, many of these technologies need to be imported, further increasing their debt and cycle of dependence on industrialized nations. However, a balance must be struck if these nations are to break away from their impoverished state and cycle of dependence. The balance should be to prioritize industries, and focus on a few industries where they have the greatest strength and potential in the short run, while effort is made, through research and development, to develop a technology base in the long run. Furthermore, a liberal economic policy must be instituted to attract foreign investment. The presence of foreign investment will generate jobs, revenues, and knowledge and technology transfers. This however, brings another problem. The fact that many developing economies are politically unstable makes them unattractive for foreign investment. Some of these countries are in fact their own nemesis. Leadership is needed at the national level to create an atmosphere

that is conducive and supportive of business operations. Once this exists, there will be foreign investment, which will build the long road to addressing common causes.

Developing economies must start thinking of and developing long-term strategies. Japan's success today did not start overnight. After the Second World War, Japanese products were scorned all over the world for their poor quality. Since 1954, they began a new era with Deming spearheading it to develop a quality strategy. Now, Japan is associated with quality, and is being emulated by everyone. Countries such as Taiwan, now classified as a member of the newly industrializing countries, developed a 20-year strategy to focus on information technology in the twenty-first century. It has also achieved tremendous economic growth. There is a need for national planning and long-term strategies. Developing economies have to also institute a programme to encourage quality improvement, since such efforts help their economy and national productivity. One starting point will be having government agencies responsible for assisting small businesses in developing quality programmes, having national quality awards, and instituting quality awareness week. These efforts will instill in their people the importance of quality and make the work of corporations easier in selling the idea of quality.

The Indian Scenario

The year 1991 brought about a lot of changes in the Indian economy and the overall business environment in the country. During the liberalization process, a lot of foreign multinational corporations (MNCs) started operations in India. Most of these operations were in the form of joint ventures (JVs) with domestic companies. It was not that all the JVs started during the period after 1991 only. Some JVs, such as Maruti-Suzuki, Hero Honda, TVS Suzuki, Escorts Yamaha, etc., had already started in the early and mid-1980s due to the decision of the Indian government to allow the entry of MNCs in selective sectors of the industry. These MNCs could set up JVs with Indian companies only if the Indian company held a majority stake. This condition existed only in the 1980s. After 1991, the government continued more rigorously with its liberalization programme, and we saw most of the earlier restrictions, such as the majority stake of the Indian JV partner, being withdrawn by the government. The MNCs can now set up 100% subsidiaries in India in most of the sectors of economy. This has brought about a lot of competition, especially from the point of view of the domestic industry. It has become a 'do or die' situation for most of the domestic companies, which had been operating, for a long time, in a seller's market of the License Raj. Most of the JVs formed during the 1980s and 1990s have ended with either the MNC taking full control of the venture, or the MNC exiting the JV to set up its separate 100% owned subsidiary in direct competition with the JV. Joint ventures such as Kinetic Honda, Shriram Honda, TVS Suzuki, Escorts Yamaha, etc. are, to name a few, JVs which ended up in this manner. The stake of the Kirloskars in Kirloskar-Toyota JV in India has been reduced

only to 2% from the earlier 26%. TVS and Kinetic deserve special mention because these two companies have ensured that, after the exit of their foreign JV partner, they are able to compete independently. These two companies have evolved an R&D set-up which is capable of generating new models of their products continually. These organizations have taken proper steps to learn the technical expertise of their foreign partners and make it a way of life.

Table 1.1 shows the evolution of TQM-related activities in India and projection for the future given by Mehta (1999). For 35 years after independence, there was a virtual stagnation in the quality movement as business was protected from competition by the government-regulated market using licensing and custom duties as a barrier. The basic technique used for quality was the outdated and reactive approach of inspection, which is like bolting the stable after the horses have fled. This resulted in enormous wastage of resources through the generation of scrap and rework, and the brunt was borne by the customer, for whose protection the laws were made.

This led to a high-cost economy, slow rate of economic growth, growing trade deficit, lower share of the international market, high incremental capital-output ratio, low productivity, poor quality, and hardship for the common man—the consumer. With every crisis, be it war with our neighbours, the oil shock, or internal strife, protectionism grew stronger, others were blamed for the misfortunes, and responsibility disowned.

Phase II, from 1983 to 1994, witnessed the first tentative steps towards relaxing control over the business activity, which resulted in introducing a small degree of competition amongst producers. The economic growth rate picked up, but the focus was on making quick money through a new culture of imported kits. The need for quality improvement was felt and awareness for quality grew. Many companies tried the concept of quality control circles to obtain worker participation; but for want of management involvement, effects were limited. The rate of economic growth picked up, but foreign debt mounted rapidly, leading to loss of economic independence.

Phase III, from 1995 to the present day, witnessed many major policy changes towards deregulation of the economy and growing domestic competition. The rate of economic growth dropped sharply and export growth was slow. In such an environment, quality gained relevance, and the enlightened industry, though small in size, started learning and adapting to new quality technologies.

A few companies started working towards TQM, and a few others focused on development and implementation of quality assurance systems in conformance with the international standard ISO 9000 series. As of December 1998, about 3500 companies have been certified in India and many others are in the process of implementation. This is likely to grow rapidly. There are a small number of companies that have started work on effective utilization of statistical quality control techniques. However, the bulk of the focus continues to be on inspection as a means to achieve quality.

Table 1.1 ***Evolution of TQM-related activities in India and projection for the future***

Changes in social and economic environment	*Development in quality*	*Quality control (QC) tools*	*Quality assurance (QA) systems*	*Change of concepts in policy management*
1947–82 India becomes independent • Regulated economy • Slow rate of economic growth • Very low competition	QC in inspection stage (Identification of defectives)	• Inspection	• Regulation of inspection • Regulation of product audit	
1983–94 • Initial phase of deregulation of economy • Slow growth rate • Imported kits • Emerging domestic competition	• Quality awareness growing • Attempted use of QC circles	• 7 tools of QC	• QA systems • Compliance with ISO 9000 quality system requirements	To attach importance to measures or means in addition to targets
1995–2000 • Transition to open economy • Adequate growth rate of economy • Growing domestic competition • Select international competition	• QC in manufacturing stage (prevention of detectives)	• Various statistical methods • Design of experiments • Quality table • Failure mode effect analysis and fault tree analysis	• Regulation of process control • QC process chart, control chart, and check sheet • Quality tables deploying required qualities	To attach importance to coordination of management of all the divisions in addition to that of each division
2001–07 • Deregulation of economy • High growth of economy • Open competition	• QC in design stage (making new products to satisfy customer requirement)	• Multivariate analysis • Weibull probability paper • 7 management tools	• Quality tables transforming required qualities to design qualities	To attach importance to mid-term and long-term policies in addition to those specified annually
2008– • Self-regulated economy • Total integration with global market (development of technology for new products) • Steady growth of economy	• QC in research stage	• Subsystem in managing research programme using a combination of Q table, process design, and process control	• Regulation of design review	Transition to strategic management of business by the participation of all members and all divisions

The effort on quality improvement will intensify only when it becomes an issue for survival, and that is dependent upon the intensity of fair competition in the market place. In this context, it is high time that the Indian companies follow business strategies of survival and growth to face the threat of competition effectively. We shall first understand how business grand strategies are chosen, and eventually, we shall learn how to integrate quality into these strategies for competitive advantage.

Relationship Between Business Grand Strategy and Functional Strategies

Figure 1.4 shows a schematic diagram of the relationship between business grand strategy and functional strategies. The corporate mission statement of a business house sets out the basic purpose of its various activities. It identifies the scope of the firm in terms of the products /services it deals with, the markets which it operates in, and the technological areas it emphasizes. The corporate mission statement is the statement of the customers' needs to be satisfied by the company, to project a positive image of the company, and act as a guiding philosophy to the company's strategic decision makers.

The external environment of the company comprises various players such as the government, competitors, customers, suppliers, and creditors. The external environment poses threats and offers opportunities to the company from time to time. For example,

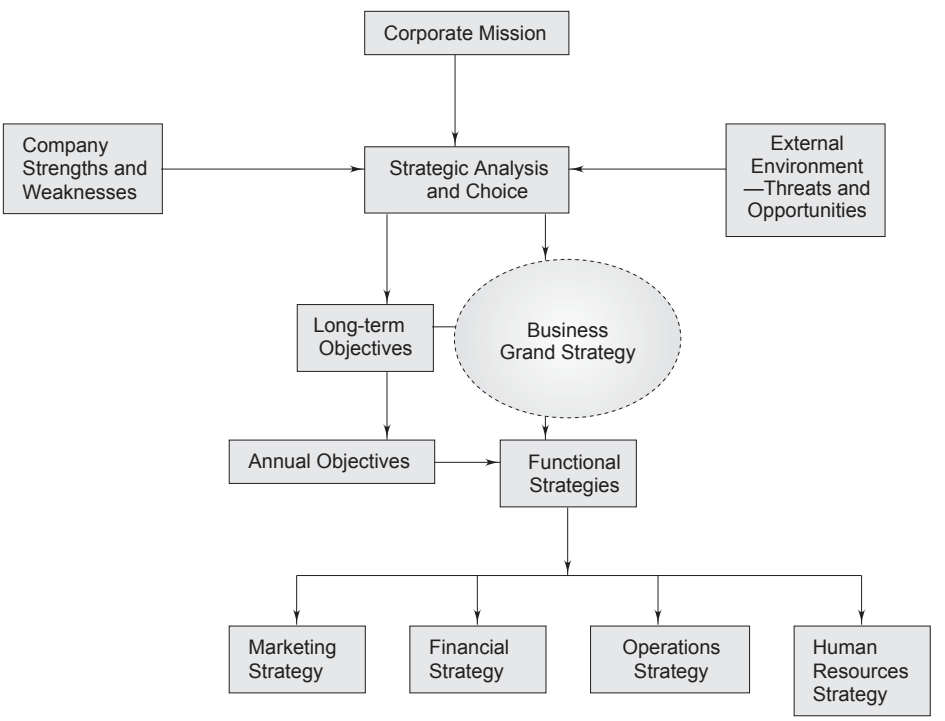


Fig. 1.4 ***Relationship between business grand strategy and functional strategies***

the government may start providing state of the art infrastructure for some selective industry sectors at nominal rates to promote it in some specific regions of the country (such as the software development parks to promote the software industry). The creditors of the company such as banks and financial institutions may start giving loans at lower interest rates to the company, looking at its prosperous prospects in the future. The competitors of the company may have alliances with some foreign multinationals to obtain latest technology that may render the existing production systems of the company obsolete.

The company should identify its competitive strengths and weaknesses to reap maximum advantages of the opportunities offered by the external environment, and to face the threats it poses comfortably. The competitive strengths of a company may be its technological patents obtained over the years due to its R&D efforts, its well-established physical distribution channels, the capital reserves it has accumulated over the years due to sustained profits, etc. The weaknesses of a firm may be its high debt burden, high inventory costs, obsolete technology, poor advertising campaigns, etc.

Strategic analysis and choice means matching the competitive strengths and weaknesses with the opportunities offered and threats posed by the external environment, keeping in view the corporate mission statement. Then, establishing the long-term objectives of the firm and choosing a business grand strategy from a set of various strategic options. The long-term objectives of the firm are the objectives to be achieved normally during the next 5 to 10 years. In some industries, the duration of long-term objectives may be smaller due to the industry being in the evolution or growth stage and thus experiencing unexpected changes in the market because of frequent technological innovations. For example, the computer and information technology industry may have long-term objectives covering a time duration of three years. The long-term objective of a firm may be to achieve market leadership from the current number two position in the market, to double the sales revenues in the coming 5 years with increases in each intervening year, to reduce the overall cost of operations by 30% in the coming five years, etc. The long-term objectives have to be broken down into annual objectives, which are for a one-year duration. For example, the long-term objective of reduction in overall cost of operations by 30% in the coming five years can be broken down into an annual objective of reduction in overall cost of operations every year by 6%. Business grand strategy is a long-term plan of the company that provides the road map of how to move forward on its corporate mission. Each functional department of the company, namely, operations, marketing, finance, and human resources, makes its functional strategies with respect to the business grand strategy and the annual objectives. Operations strategy is the long-term plan of the company for the production/operations function of the company, which provides the road map for what the operations function must do if business grand strategies are to be achieved. Thus, the operations strategy of the company should always be in line with its business

grand strategy. There are various dimensions of operations strategies which may have to be focused upon with respect to a particular grand strategy. Also, there may be some conflicting objectives of the different functional departments of the company. While making the operations strategy for the company, the operations manager has to ensure that it should be supporting the objectives and strategies of other functional departments of the company. There was a time when quality was considered only a part of the operations department, and therefore, quality aspects used to be a part of the operations functional strategy. Not any more, because quality management has become an organizational issue, and this is the essence of total quality management (TQM) and six sigma quality management. Thus, quality finds a place in the mission statement of some companies either explicitly or implicitly. Also, some companies evolve a set of values which strengthen the foundation of the mission of the company. Let us define first the important terms (DeFeo 1999) before taking some examples from the Indian industry.

Vision A desired future state of the organization. Imagination and inspiration are important components of a vision. Typically, a vision can be viewed as the ultimate goal of the organization, one that may take 5 or even 10 years to achieve.

Mission The purpose or reason for the organization's existence, that is, what business it is we are in—what it does and whom it serves.

Values What the organization stands for and believes in. These are the principles to be observed to meet the vision.

Policies A guide to managerial action. An organization may have policies in a number of areas: quality, environment, safety, human resources, etc. These policies guide day-to-day decision-making.

Let us take examples from the Indian industry. In the example of Infosys, the set of values, such as customer delight and pursuit of excellence, accentuate the quality focus of the company. Similarly, Mahindra & Mahindra has explicitly stated its focus on quality in the set of values guiding the mission. Thus, quality has a role to play from the beginning of the strategic management process.

Infosys

Vision: 'To be a globally respected corporation that provides best-of-breed business solutions, leveraging technology, delivered by best-in-class people'.

Mission Statement: 'To achieve our objectives in an environment of fairness, honesty, and courtesy towards our clients, employees, vendors, and society at large.'

The values that drive us: *C-LIFE*

- Customer Delight: A commitment to surpassing our customer expectations.
- Leadership by Example: A commitment to set standards in our business and transactions and be an exemplar for the industry and our own teams.

- Integrity and Transparency: A commitment to be ethical, sincere and open in our dealings.
- Fairness: A commitment to be objective and transaction-oriented, thereby earning trust and respect.
- Pursuit of Excellence: A commitment to strive relentlessly, to constantly improve ourselves, our teams, our services and products so as to become the best.

Hero Group

Vision: 'We, at the Hero Group are continuously striving for synergy between technology, systems and human resources to provide products and services that meet the quality, performance, and price aspirations of the customers. While doing so, we maintain the highest standards of ethics and societal responsibilities, constantly innovate products and processes, and develop teams that keeps the momentum going to take the group to excellence in everything we do.

The Hero Group philosophy: 'To provide excellent transportation to the common man at easily affordable prices and to provide total satisfaction in all its spheres of activity.'

Bajaj Auto Limited

Quality Policy: 'We at Bajaj Auto continue to firmly believe in providing the customer value for money, for years through our products and services. This we shall maintain and improve in our decision-making. Quality, safety, and service will be given as much consideration as productivity, cost, and delivery. Quality shall be built into every aspect of our work life and business operations. Quality improvements and customer satisfaction shall be the responsibility of every employee.

Mahindra & Mahindra

Core Values: Our core values are influenced by our past, tempted by our present and are designed to shape our future. They are an amalgam of what we have been, what we are, and what we want to be. These values are the compass that will guide our actions, both personal and corporate. They are:

- **Good corporate citizenship:** As in the past, we will continue to seek long-term success that is in alignment with our country's needs. We will do this without compromising on ethical business standards.
- **Professionalism:** We have always sought the best people and given them the freedom and the opportunity to grow. We will continue to do so. We will support innovation and well-reasoned risk-taking, but will demand performance.
- **Customer first:** We exist and prosper only because of our customers. We will respond to their changing needs and expectations speedily, courteously and effectively.
- **Quality focus:** Quality is the key to delivering value for money to our customers. We will make quality a driving value in our work, in our products and in our interactions with others. We will do it 'first time right'.
- **Dignity of the individual:** We value individual dignity, uphold the right to express disagreement and respect the time and efforts of others. Through our actions, we nurture fairness, trust and transparency.

Strategic Quality Management (SQM): The Concept

Juran and Gryna (1993) define strategic quality management (SQM) as the process of establishing long-range quality goals and defining the approach to meeting those goals. SQM is developed, implemented, and led by the upper management.

SQM has also been defined as 'the process by which quality management activities focus towards the long range direction and progress of quality enhancement strategies by ensuring the careful formulation through strategic quality planning, proper implementation through vital quality strategies, and continuous evaluation through quality improvement and control'. (Aravidan et al. 1996)

Tummala and Tang (1996) define SQM as 'a comprehensive and strategic framework linking profitability, business objectives, and competitiveness to quality improvement efforts with the aim of harnessing the human, material and information resources organization-wide in continuously improving products or services that will allow the delivery of customer satisfaction.'

Aravidan et al. (1996) conducted a survey of 152 companies, out of which 48 were from India. The rest of the companies were from other parts of the world, including the USA, Europe, Asia, and the Asia-Pacific region. This ensured global coverage of manufacturers and quality management personnel. The results of the survey revealed that no manufacturer was in a position to identify clearly a fully-fledged quality-focused model, which should have been their fundamental requirement in the process of attaining the ultimate goals of TQM. Also, there was a clear indication that manufacturing firms are largely devoid of fundamental TQM imperatives such as quality cost evaluation, zero-defect manufacturing, etc. Moreover, inferences drawn from the respondents of countries other than Japan indicated that manufacturers are attempting to mimic Japanese quality improvement practices, as they believed that all Japanese manufacturing firms follow fully-fledged and flawless TQM. However, the responses from Japan proved that it is a misconception for they, too, experience varying degrees of TQM implementation problems. These inferences led to a conclusion that deciding merely to adopt quality management strategies followed by any Japanese manufacturing firm would prove to be a wrong decision for effecting TQM (see the caselet on *Mitsubishi*, which accentuates this fact). More conclusions from the study are as follows.

- Although modern manufacturing firms are moving towards effecting TQM, they are yet to formulate the concepts of many vital quality strategies that form its foundation.
- The majority of manufacturing firms, including those which have been accredited to ISO 9000 series quality systems standards, are yet to witness even the entry of modern techniques such as quality function deployment. Taguchi's on-line quality control methods, etc., which are imperative in effecting the proposed SQM model. However, quality circle programmes are exceptions to this statement.

- Wrong perceptions dominate the minds of the leaders of manufacturing firms regarding TQM. For example, many manufacturers feel that TQM means merely writing slogans on the walls and investing money in training programmes without any evaluation.
- The statistical techniques and tools that dominate today's manufacturing systems act as hurdles in approaching zero-defect manufacturing because these techniques and tools justify deviation from the target. Though, occasionally, the industrial world has witnessed the application of Taguchi's off-line quality control methods (TOLQC), it has not yet witnessed the benefits of TOLQC methods, which aim continuously towards attaining the target.
- The manufacturing community is yet to realize the importance of quality information management in effecting TQM.
- The prevailing cost-accounting systems do not have proper provisions for quality costing, which acts as a major hurdle in the cost evaluation of TQM practices.
- Since the industrial world has witnessed in the last ten years the proliferation of quality engineering experts with their own distinct methods of preaching, the manufacturers and personnel involved in implementing quality improvement programmes are confused over the methodologies they ought to follow to execute TQM.

Mitsubishi

Mitsubishi Motor Company (MMC) is a part of Japan's largest *keiretsu*—Mitsubishi. The best examples of relationships among companies in Japan are the *keiretsu*—the powerful business groups. There are six main groups in Japan: Mitsui, Mitsubishi, Sumitomo, Fuyo, Sanwa, and Dai-Ichi Kangyo. In addition, large companies become the centre of what are called entrepreneurial *keiretsu*—vertically integrated groups with a dominant manufacturing firm and a network of major suppliers and subcontractors. For example, Toyota, though a member of the Mitsui group, has developed such an extensive network of suppliers and subcontractors that it has become the core company in its own entrepreneurial *keiretsu*. *Keiretsu* companies tend to buy from within their groups, resulting in discrimination against companies outside their group. *Keiretsu* ties between buyers and sellers tend to keep outsiders out and insiders in, not only in Japan, but also in Japanese plants located in other countries. Spirited cars for spirited people—that is how Mitsubishi Motor Company (MMC) boasts about its cars, but incidentally, the spirit of the carmaker itself seems to be in a state of doldrums. The leading Japanese carmaker, which today holds the fourth position in the industry, also has the tag of being the only 'unprofitable carmaker' in Japan. Escalating debts, plunging sales, locked-out manufacturing units, nose diving share prices, and the inflating losses—this is how the once car industry major—Mitsubishi—can be better defined today. Mitsubishi, which posted a profit of $300 million in 2003, has posted a massive loss of Yen 215 billion ($ 1.9 billion) for the fiscal 2004, against its estimated loss of Yen 72 billion during the beginning of 2004. Crisis in the Japanese auto industry is not new; however, the causal factors

for such crises are subject to analysis. Mitsubishi posted its first ever loss of Yen 101.85 billion in the fiscal end of 1998. However, that loss was attributed to the economic crisis in Asia and the industry slump in Japan. Nevertheless, the company-specific causes were realized in 1999. Mitsubishi started getting engulfed in the cobweb of troubles from the beginning of 1999. The troubles, to an extent, can be attributed to the Japanese corporate culture, which generally has a tendency of avoiding unpleasant truths. The defensive, complacent, and squelching nature of Mitsubishi Motor's company managers prevented them from disclosing the serious defects that the vehicles were suffering from. The quality defects of the vehicles were kept concealed for decades to avoid costly product recalls. In the year 2000, Mitsubishi Motors admitted its involvement in a scandal of systematic defect cover-ups spanning decades, resulting in a massive recall of cars in the same year. Mitsubishi Fuso Truck & Bus Corp., which was spun off from the automaker, acknowledged that defects in clutches and other parts had probably been concealed, which resulted in a recall of 1,80,000 trucks. The company, in the beginning of 2004, acknowledged that, in toto, the manufacturing defects affected more than 2,40,000 vehicles. Yuri Kageyama, an auto analyst of the Associated Press, feels, 'Sales in Japan have never recovered after Mitsubishi Motors acknowledged four years ago that it had systematically hidden auto defects for decades. The company recalled millions of vehicles. The automaker had already suffered losses as it struggled to compete with Japanese rivals Toyota Motor Corp. and Honda Motor Co.' These concealments have also resulted in several fatal, life-claiming accidents. In January 2002, a wheel came off a Mitsubishi trailer truck that hit and killed a 29-year-old woman and injured her two young children. This tendency of avoiding unfriendly information about vehicles and the resulting accidents has dragged Mitsubishi into criminal investigations in Japan, which resulted in the arrest of Mitsubishi Motor's executives, including Takashi Usami, former Chairman of Mitsubishi Fuso Truck & Bus Corp., who was Vice-President of MMC at the time of the accident, and Akio Hanawa, former Managing Director of Mitsubishi Motors. Mitsubishi's success in its revival plan would, to a great extent, depend on the company's attention to quality parameters in the days to come. The management of MMC breathed a sigh of relief on 21 May 2004, when it was granted a bailout package of $ 4 billion by the Mitsubishi Group for revitalization of its operations. The automaker has vowed to restructure the company and return to profit making by fiscal 2006.

Five Phases of SQM

The fundamental nature of SQM is to ensure a continuous assessment of internal and external changes with regard to quality, and an adjustment of the competitive approach based on that assessment. Based on this concept, Aravidan et al. (1996) have identified five phases involved in SQM, as depicted in Figure 1.5. As shown, phase I marks the beginning of SQM, during which the quality mission of the firm is established with the involvement of the manufacturer. Phase II passes through the development of a quality profile with the considerations of quality mission and external environment comprising competitors' and customers' perceptions. The end of phase II is marked by the declaration of a quality policy. Phase III is devoted to listing or modifying longterm

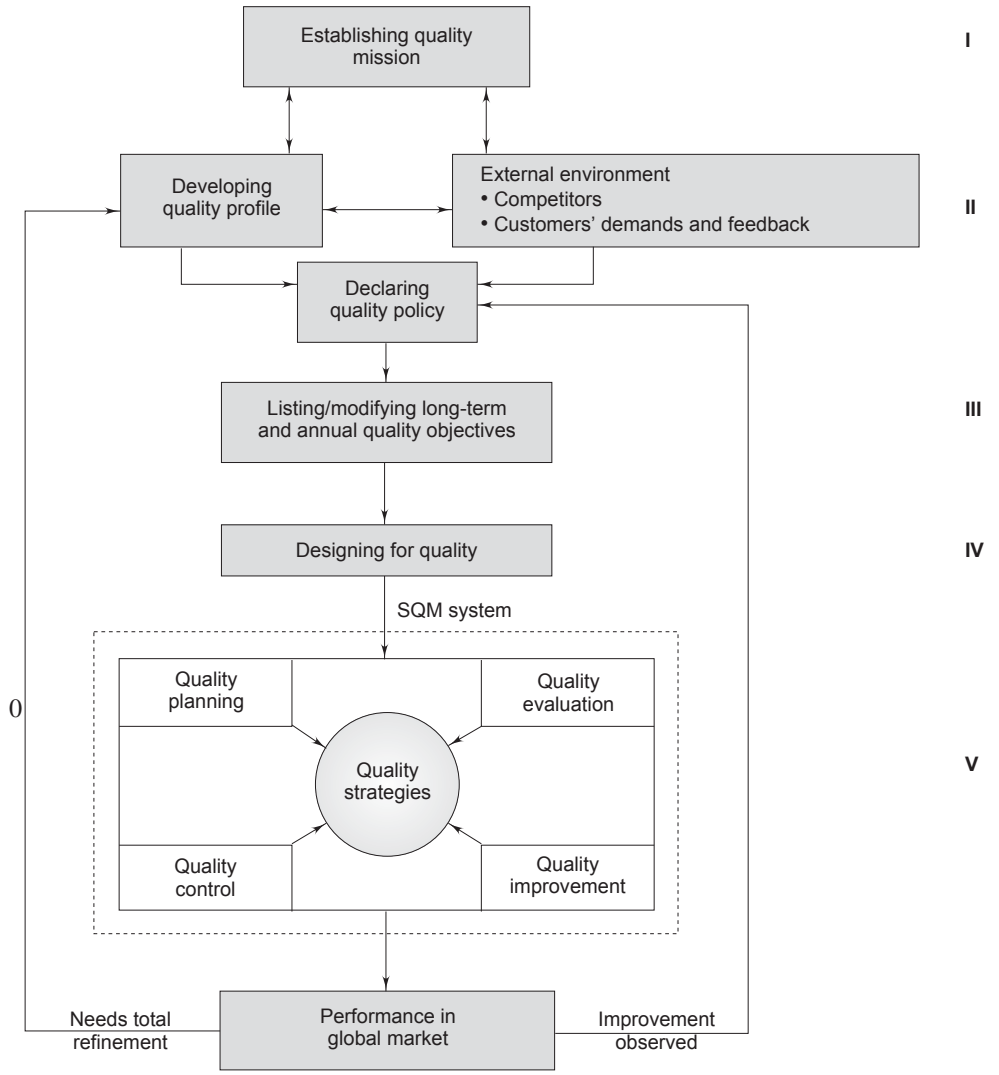


Fig. 1.5 ***Phases of SQM***

and annual quality objectives (also called targets or goals). We shall discuss later in this chapter about using 'benchmarking' as a tool for setting the quality objectives. During phase IV, efforts are made to infuse quality at the design stage. Phase V constitutes the development of the SQM system, which signifies the whole process of SQM. The results obtained after phase V are compared with the desired performance at the global level. The outcome of this comparison determines the need for further refinement of the SQM process presently being followed. The practices followed during phases I to III are analogous to that of modern strategic management.

Quality policy is a broad guideline to action. It is a statement of principles, which would be in line with the company mission and values. A procedure outlines how a given policy would be accomplished. For example, the quality policy of a company may state that the company has to achieve the world benchmarks in its key processes. The procedures would describe the key processes and how these would be improvised to achieve the world benchmarks.

Tata Business Excellence Model (TBEM)

To help achieve the group objective of enhancing the Tata brand equity, a division of Tata Sons, Tata Quality Management Services (TQMS)—has been entrusted with the objective of ensuring that Tata companies achieve well-defined levels of business excellence, using the Tata Business Excellence Model (TBEM) framework.

TQMS has the mandate of institutionalizing the TBEM within the companies that sign the Tata brand equity and business promotion agreement. The TQMS mandate includes setting up of standards of business excellence using the TBEM framework and assisting group companies in achieving the set standards.

TQMS's four approaches The four approaches of TQMS are as follows.

Assurance To assure that Tata companies achieve well-defined levels of business excellence using the TBEM framework, it has installed processes that help individual companies to move towards this goal.

Assessment To meet the objectives set for achieving the minimum standard of 500 points and in order to drive business excellence in a structured manner, companies need to do a detailed periodical assessment to see where they stand in their journey to excellence. This exercise provides them with specific directions for improvement, encouraging them to meet the standard of 500 points.

Assistance To facilitate learning and sharing, and to provide training, TQMS is involved with various activities, ranging from group-level initiatives to company-specific facilitation through progress reviews and regular advice. These include group-level initiatives to create forums for learning and sharing of good practices, and consulting on specific initiatives, such as the 'balanced scorecard' and other relevant areas that meet the TBEM requirements.

Award The perennial journey of excellence is visible through recognition. The JRD QV Award is administered by TQMS to accord recognition to Tata companies that achieve specified standards of business excellence. Group companies are recognized on 29 July, the birth anniversary of J.R.D Tata.

The JRD Tata quality value award Jehangir Ratanji Dadabhoy Tata, or JRD, as he was more popularly known in business circles, guided the destiny of India's largest

business house for well over half a century. Over the years that he was at the helm of affairs of the group, JRD Tata helped establish many new enterprises.

He was always conscious of the importance of quality, and ensured that this quality consciousness pervaded all the organizations that belonged to the Tata Group. He was proud that the companies within the group were known, domestically and internationally, for the quality of their products and services.

As a tribute to his quest for perfection in every sphere of activity, the JRD Tata Quality Value Award was instituted in his memory.

The JRD QV Award is modeled on the lines of the Malcolm Baldrige National Quality Award, integrating beneficial attributes from other national quality awards. The award recognizes a company within the Tata Group that excels in quality management and the achievement of the highest levels of quality.

This is an annual award presented to the winning company on July 29, the birth anniversary of Mr JRD Tata.

The objectives of the award This award is given to group companies in order to

- create awareness about the importance and value of quality and the need for total customer satisfaction in all areas of operations of companies in the Tata group, and
- to achieve and sustain continuous excellence, and consequently, leadership in the marketplace through perfection and the achievement of quality which will be recognized as being the best and ahead of competition.

All Tata group companies are encouraged to volunteer for evaluation for the award. They are categorised into three sectors—manufacturing, service, and small business (employee size less than 500).

The companies have to apply to the awards committee by way of a written response, limited to a maximum of 75 pages, to the various requirements of the criteria laid down for the award. This has to be done by the last week of February each year.

The evaluation process The applications received are evaluated by a 'core group'. This group may visit the companies being evaluated to verify the accuracy of the applications, clarify points of uncertainty, and investigate areas of functioning that may be difficult to illustrate in the application. The evaluation is also based on a point system across various parameters such as leadership, planning, strategy, human resource management, and process management.

The shortlist of companies prepared by this core group is then evaluated by an 'apex group' headed by the chairman of Tata Sons. From this evaluation, the winners for the gold and silver medal are chosen. The winning companies are presented the award at a glittering ceremony on the birth anniversary of JRD Tata.

Hoshin Kanri, the Japanese SQM Model

The Japanese translation of hoshin kanri is as follows:
ho—method
shin—shiny metal showing direction
kanri—planning

A useful interpretation of the literal translation is that hoshin kanri is a methodology for setting strategic direction. It is also known as hoshin planning, policy management, and policy deployment.

Bridgestone Tyre Company, Japan, which won the Deming Application Prize in 1968, made strenuous efforts to rotate the plan—do—check—act cycle with the participation of all employees. Annual priority implementation items relating to cross-functional management areas such as quality assurance and profit management were determined in accordance with the annual policies of managers within the regular organization, and were implemented by the relevant departments within that organization. Senior managers conducted diagnoses in order to check how this was being done, examined the results achieved, and identified any problems associated with it, and assisted in setting and fine-tuning policy. The company termed this approach 'hoshin kanri'. Hoshin kanri subsequently spread rapidly to many other companies.

Hoshin kanri is also effective in motivating employees. In hoshin kanri, annual policies are decided after the top management's policy proposals have been reviewed and revised by a large number of middle managers. Sometimes, even QC circle leaders are involved in this process. The discussion process that takes place before policy is finally decided is known 'catch-ball', since the policy 'ball' is thrown back and forth between top and middle managers before a final decision is made. The aim of this process of 'catch-ball' is to convert mandatory objectives set by senior management into the employees' own self-set targets.

In hoshin kanri, the process known as 'catchball' is practised at the deployment stage. Although the ways in which it is done differ slightly from company to company, it usually takes the following form. To begin with, the company's top management works out the company's draft policy for the following fiscal year. For this, it takes into consideration the control items of individual directors, reflections on the past year based on the results of internal QC audits carried out by senior managers, forecasts and aspirations for the next year and for the medium to long-term, and the company's basic philosophy. This draft policy is then discussed in each division of the company by the division's director, along with the divisional manager, department managers, and so on. Based on these discussions, each division draws up its own policy proposal, modifying the company's draft policy as necessary. The divisional draft proposal is then discussed in each department of the division by the department manager, section managers, and (if necessary) sub-section managers, and each department formulates

its own revised policy proposal. This departmental proposal is then discussed and modified in each of the department's sections by the section manager, sub-section managers, team leaders, and so on. After the opinions of as many people as possible, right down to the front line, have been incorporated in this way, the information is fed back up through the hierarchy to the top management, and the company's policy for the forthcoming year is finally decided on after further discussion and revision as needed.

As described here, in 'catch-ball', the policy proposals for each of the company's divisions are repeatedly reviewed, starting at the highest management level in the division and, in principle, going down to lower levels. Meanwhile, the top management's cross-functional policy proposals, such as those for quality assurance, profit control, and so on, are discussed right across the company's organization chart by all relevant divisions, and the forthcoming year's policy for the entire company is decided after the top management has taken into account the feedback from these discussions. Why do companies expend so much time and effort on 'catch-ball'? It is because the discussion that takes place among the people taking part at the various different levels of the organization deepens their understanding of the policies and enables them to think about both the 'necessity' and the 'possibility' of the proposed targets. Through this process, companies hope to effect a qualitative change in top-down mandatory targets, turning them into bottom-up voluntary targets.

Since the time hoshin kanri first appeared in the late 1960s, it has been a system of management in which the annual policy set by a company is passed down through the organization and implemented across all departments and functions in this system. The results are checked by means of individual managers' control items established during the policy deployment phase and internal QC audits by top managers, corrective action is taken as necessary, and the results are reflected in the following year's policy. It subsequently became clear that this approach was an effective method of strengthening corporate internal environments as part of company-wide quality control (CWQC). It was also recognized that hoshin kanri is an important strategy for allowing companies' top managers to exercise leadership of their CWQC programs. Since that time, many companies have made active efforts to link their annual policies firmly to their three-to-five year medium to long-term policies.

Setting quality targets (objectives or goals) Targets can be placed into two categories —intermediate and final. Final targets are the ultimate values that we hope to attain. In the case of defects, for example, this would be zero. They can be described as markers that show us where we should direct our energies. It is important, from the standpoint of good teamwork, for everyone involved to have the same final targets in mind. Once the final targets have been established, we must decide how far to proceed in their direction within a certain time period; in other words, we must set up intermediate

targets. These might coincide with the annual targets set under hoshin kanri. Such intermediate targets are milestones on the path to the attainment of the final targets. We should set breakthrough targets for these intermediate targets. If we set targets that can be achieved merely by doing what was done in the past, people will tend to think that, since it lies within the range of present dispersion anyway, it can be achieved without doing anything. Such targets will not create any motivation. Conversely, setting breakthrough targets that cannot be achieved by just carrying on as usual is an effective way of motivating people.

Top-down and bottom-up deployment styles Let us take examples of the successful deployment of targets by the top-down and bottom-up approaches. The first is an example of the top-down approach (see the caselet on Matsushita Electric). Next is a successful example of the bottom-up approach (see the caselet on Bando Chemicals Company, Japan). The reason for the success achieved in the first example was probably that Konosuke Matsushita's words were the first real source of motivation for the people involved, and made them feel that they really had to pull out all the stops. For a company's top manager to be able to motivate their people in this way, he/she has to be highly respected. In the second example, the factory manager respected the results of the discussions and investigations carried out in individual workplaces, and set the monthly targets without using coercion to raise them artificially. The reason why this approach succeeded was probably because it motivated everyone by making them feel that they were trusted and, therefore, had to do everything they could to repay that trust.

Matsushita Electric Company

Matsushita Electric Industries' Car Radio Division received a demand from one of its customers for a 10 % price reduction. The division manager and his staff put their heads together to try to meet this request but, after much discussion, reached the conclusion that they would be unable to achieve such a large price cut, even by implementing all the cost reductions they could think of. They therefore decided to tell the customer that they could not meet the demand. The company's chairman, Konosuke Matsushita, happened to be visiting the division at that time on other business, and the situation was explained to him. After hearing the explanation, he said, 'Whenever we receive a demand for a price reduction from our customers, it is our practice at Matsushita to work out how we can achieve an even greater cost reduction—in this case 15%. Please think about this again'. After receiving this instruction from their company's founder, everyone involved started investigating the possibility of reducing costs even more thoroughly and eventually succeeded in cutting them by 13%. When this success was announced to him, Matsushita reportedly made a personal visit to the automobile company that had requested the price reduction and said, 'Thanks to your request for a 10% price reduction, my company has succeeded in reducing its costs by 13%. We are extremely grateful to you'.

Bando Chemical Company, Japan

Bando Chemical Company owned the Nankai factory that specialized in making V-belts. For a long time, this factory had been implementing the top-down type of planning, in which production was carried out in accordance with targets set by the factory manager. The factory's monthly cumulative total production used to drop further and further below target in the first part of each month and then begin to approach the target from the middle of the month. It ended every month a few % below the target. After much investigation and deliberation, this factory decided to change its system for setting the monthly production quotas. Under the new system, the factory manager would first propose the draft monthly production target and explain carefully why it was necessary to achieve that target. The proposal would then be thoroughly discussed by the people in the workplace. When this system was first implemented and individual values determined as a result of the discussion were collated, the final value turned out to be lower than that originally proposed by the factory manager. When such a discrepancy exists, we often try to eliminate it by forcing the people in the workplace to raise the targets they have come up with in order to meet the originally proposed value. This factory took a different approach. Since the people on the shop floor had taken such trouble to discuss the proposals, it was decided to trust their commitment and enthusiasm, and leave the total arrived at as the official monthly production target. A curious thing happened when the setting of targets was changed from top-down to bottom-up in this way. The sag in the monthly cumulative total production graph occurring at the beginning and middle of the month disappeared, and the production proceeded more or less in accordance with the target line. Also, the monthly target was consistently achieved. Another interesting thing was that, though the target value established as a result of discussion in individual workplaces started out slightly below the factory manager's proposed target, it increased month by month, and at the end of six months, it was approximately 20% higher than the factory manager's proposal, a result originally thought to be out of the question.

Top management internal QC audit The senior managers of the company must check whether the QC activities are proceeding according to the plan and whether the planned quality is actually being achieved, and take corrective action, as necessary. This activity clarifies the specific control items to be attended to by managers at every level and makes it possible to monitor the results achieved concretely and easily, and uncover any outstanding problems.

These internal QC audits (the term internal signifies that it is an audit by the organization on itself) performed by top managers themselves enable them to systematically review the situation in their company's factories, branch offices, sales centres, and so on. Getting close to the facts in this way may lead them to reflect on their own performance. At the same time, an audit gives the people being audited a chance to review their own daily work and organize their thoughts about it. These kinds of audits also create opportunities for achieving better mutual understanding and human relations. These valuable benefits are difficult to obtain through the usual daily

meetings and reports. The method of performing these internal audits would be explained in Chapter 5: Quality Standards and Business Excellence Models.

Good organizations such as Procter & Gamble, NEC Japan, Komatsu, Unilever Personal Products, Hewlett-Packard, Rank Xerox, and Florida Power & Light attain much success in developing, communicating, and reviewing strategic plans at levels within their organizations by using a structured strategic planning process. This is sometimes termed quality policy deployment and is defined by Rank Xerox as:

> A key process [through] which Rank Xerox can articulate and communicate the Vision, Mission, Goals and Vital Few Programmes to all employees. It provides answers to the two questions. What do we need to do? and how are we going to do it? (Zairi 1994)
>
> The [strategic quality] plans generally stop at setting goals and objectives and developing budgets. They do not realistically address implementation issues or deployment of the plan throughout the organization. Even in companies with a fairly well developed planning process, failure to realistically consider implementation issues is common, and is a key reason the planning process is ineffective. (Easton 1993)

Benchmarking

Successful companies in every industry engage in a variety of practices which lead to achievement of high-level performance. Benchmarking is one of the most recent methodologies that has emerged in corporate attempts to gain and maintain competitive advantage. Benchmarking provides a clear signal of success or failure. In the competitive arena of the 2000s, benchmarking has become one of the most popular tools of business management, particularly in the Indian industry. Benchmarking is an effective tool which helps organizations to create quality targets in the strategic quality management process.

Despite its popularity, benchmarking still occupies an uncomfortable seat within management theory. For instance, while for many it has become a tool for continuous improvement, yet for a small but significant few, it continues to constitute yet another management fad. Nevertheless, it cannot be denied that benchmarking has become a widely used tool in business practice. Ernst and Young with the American Quality Foundation conducted a study among key US industry sectors (computers, automobiles, banks, and hospitals), and found that 31% of businesses regularly benchmarked their products and services, and only 7% of the companies reported never having used benchmarking

While benchmarking has become commonplace, it nevertheless remains a relatively recent phenomenon. The Japanese are generally given credit for inventing the concept through their practice of sending managers to visit a wide range of companies as a way to understand and learn good business practices. Taichi Ohno, for instance, tells how Toyota adopted a new inventory system after a visit to a US supermarket in 1956. Ohno spent his time studying and learning about the supermarket's inventory replenishment system. From his observations of supermarket shelf stocking, he subsequently developed

the concept of JIT. What the supermarket visit did was to provide Ohno with an example of an enabling process from which he derived the Kanban system.

Beyond the Japanese, Xerox is often most closely associated with developing and promoting the modern conception of benchmarking. The often-told story of how Xerox managed to bridge the performance gap between itself and Japanese competitors such as Canon, has become part of common folklore. Xerox began its journey of benchmarking when it sent a project team to learn from its Japanese joint-venture partner, Fuji-Xerox. By learning good practices from the Japanese, Xerox was able to secure significant improvements in the quality, costs, and time to market. In fact, Xerox's systematic approach of learning and codification of practice from its affiliate Fuji-Xerox led to the boom in the popularity of the term benchmarking.

Benchmarking Defined

Without doubt, the central essence of benchmarking is about learning how to improve business activity, processes, and management. However, benchmarking as a term has been used widely to refer to many different activities. Reference to the wide variation in commonly used definitions serves to highlight the diversity:

> 'Benchmarking is systematic and continuous measurement process: a process of continuously measuring and comparing an organization's business processes against process leaders anywhere in the world to gain information which will help the organization to take action to improve its performance.'

There are other ways of capturing key facets of the concept. We note three (see also Fig. 1.6):

- an enabling aspect
- an assessment aspect
- an outcomes aspect

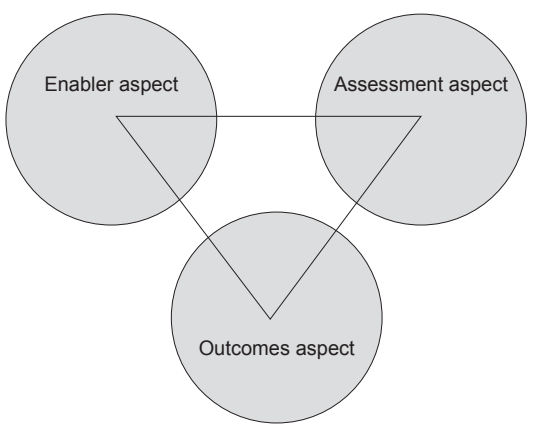


Fig. 1.6 ***The benchmarking triangle***

The assessment aspect is the easiest and the most commonly referred to aspect. It captures measurement through comparative assessment of the firm's performance. Assessment through best practice benchmarks serves to identify the 'gap', the size of which is indicative of the potential (indeed the necessity) for progress, if the company is to be successful in the long term.

The enabling aspect relates to understanding the theory that lies behind high performing processes and activities that is, it is about learning about the practices (or activities) which lead to process performance. It is this deeper level of learning and understanding that lays the foundation that enables continuous improvement.

The outcomes aspect involves being able to utilize the learning (gained through mastery of the enabling aspect) within the firm itself. This requires successfully transferring the best practice. It is essentially about implementing best practice in-house. Often, adoption of best practice requires adaptation of the 'enabling practices' to the context and culture of the indigenous organization. Obviously, it is only by virtue of successful implementation of best practices within the company that performance outcomes can be achieved.

Varieties of Benchmarking

There exist numerous varieties of benchmarking. A few are highlighted below:

Internal benchmarking involves measurement and comparison of activities, functions, and processes within the same organization.

External benchmarking involves comparison of similar operations, systems, processes with external organizations.

Competitive benchmarking involves comparisons between similar functions and activities with those of direct competitors, in order to catch up or surpass competitor performance.

Industry benchmarking involves comparisons with a group larger than the direct competitor (i.e., other organizational players such as suppliers, distributors, customers, etc.).

Generic benchmarking (sometimes also referred to as functional benchmarking) here, comparison is not restricted to any one industry or market. The search is for general best practices which are common across industry sectors/markets. The word 'generic' is indicative of the meaning 'without a brand'. This notion of 'lack of specificity' or 'brand applicability' focuses attention on excellence, irrespective of the type of organization or industry.

Process benchmarking involves comparisons between discrete work processes and systems.

Performance benchmarking involves comparison and scrutiny of performance attributes such as price, time to market, reliability, robustness, etc.

Strategic benchmarking involves benchmarking at a higher level than operational. In particular, it seeks to address strategic issues or processes. Because of this, it has also sometimes been referred to as core competence benchmarking.

The Process of Benchmarking

The process of making a comparison involves focusing on the issue of how learning can be systematically incorporated into the organization. Watson (1993) highlights that the process of benchmarking involves asking four key questions (see Fig. 1.7):

1. What should *we* benchmark?
2. Whom should *we* benchmark?
3. How do *we* perform the process?
4. How do *they* perform the process?

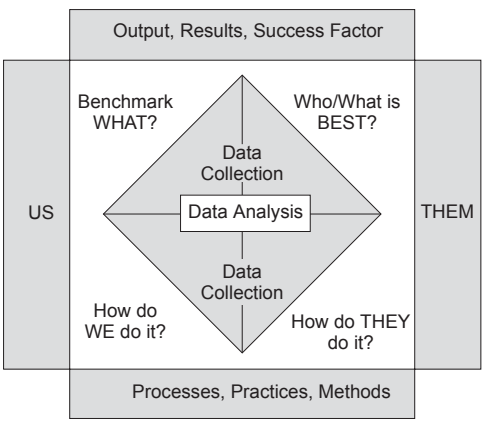
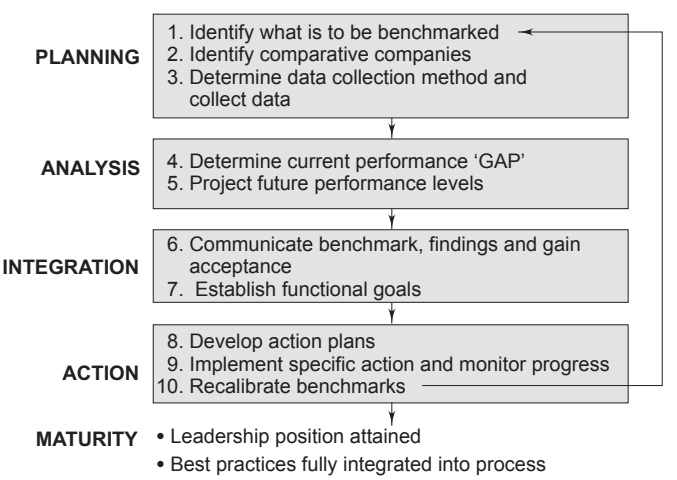


Fig. 1.7 ***The benchmarking template***

These four questions formed the basis on which Boeing, Digital Equipment Company, Motorola, and Xerox jointly developed a benchmarking template.



Source: Camp 1989

Fig. 1.8 ***Xerox's benchmarking process steps***

This type of template can be decomposed into a sequential form of actions to be undertaken. One of the most widely cited methodologies of the process of benchmarking is the one utilized by Xerox (see Fig. 1.8).

Integrated Approach to Benchmarking

According to Ahmed and Rafiq (1998), there is a need to dovetail different tools and techniques to create an integrated approach to benchmarking. It is only by adopting an integrated approach to benchmarking that companies can climb the mountain of sustained improvement. There are a number of common frameworks which may fit together in an integrated fashion to build a holistic approach to benchmarking:

- EFQM business excellence model
- balanced scorecard
- service quality (SERVQUAL) framework
- gap analysis techniques
- quality function deployment (QFD)

European Foundation for Quality Management (EFQM) Model

The EFQM model, sometimes referred to as the European Quality Award (EQA) model (see Fig. 1.9), is premised on the broad principle that:

'Customer satisfaction, people (employee) satisfaction and impact on society are achieved through leadership driving policy and strategy, people management, resources and processes, leading ultimately to excellence in business results'.

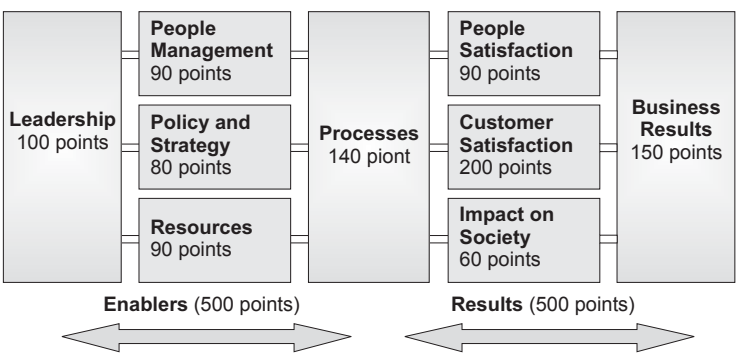


Fig. 1.9 ***The European quality model***

The EFQM framework consists of nine elements that are broken into two categories, namely, enablers and results. As a tool for self-assessment, the model allocates 1,000 points among the nine elements, of which 500 points are allocated to enablers and 500 to results. The enabler elements are concerned with how the organization approaches the criteria of each element. Two aspects are examined: the approach (the effectiveness and appropriateness of a particular technique, activity, or practice), and deployment (the extent to which the practice is being used throughout the organization).

The results elements are concerned with what the organization has achieved, and is likely to achieve. The assessment of the results criteria is based on first, the degree of excellence in the results (positive trend performance), and secondly, the scope (the extent to which results are being achieved and the degree to which they address all relevant facets of the criteria).

According to the EFQM, using the EQA model allows companies to achieve a comprehensive, systematic, and regular review of the organization. In particular, use of self-assessment facilitates the identification of areas of strengths and areas for improvement (AFIs).

Balanced Scorecard

The balanced scorecard methodology (see Fig. 1.10) emerged from the study 'Measuring Performance in the Organisation of the Future' conducted in the early 1990s, sponsored by the Nolan Norton Institute (the research arm of KPMG). The study was motivated by the belief that existing performance measurements, which tended to rely heavily on financial accounting measures, were rapidly reaching a point of obsolescence. From a yearlong study, Kaplan and Norton (1992) developed a framework for integration and performance measurement which included incorporated strategic, operational, and financial measures. According to Kaplan and Norton (1992):

> Managers should not have to choose between financial and operational measures. No single measure can provide a clear performance target or focus attention on the critical areas of business. Managers want a balanced presentation of both financial and operational measures.

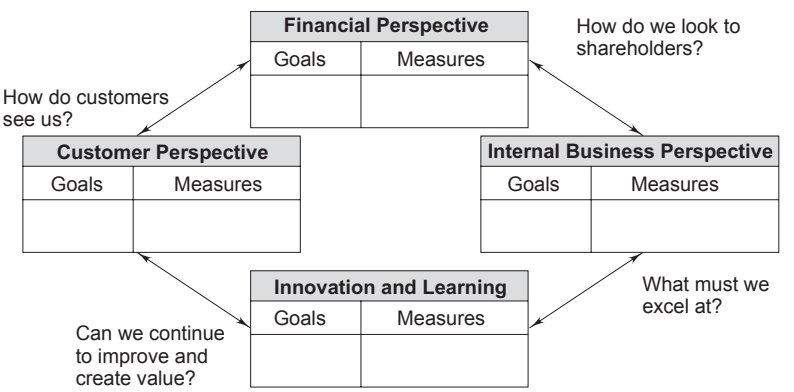


Fig. 1.10 ***The balanced scorecard***

The balanced scorecard provides answers to four basic questions:

1. How do customers see us? (customer perspective)
2. What must we excel at? (internal perspective)
3. Can we continue to improve and create value? (innovative and learning perspective)
4. How do we look to shareholders? (financial perspective)

From the financial perspective, the scorecard helps in systematic scrutiny of key financial criteria that the company must achieve to maintain its standing in the corporate world. The customer perspective aids the process of translating strategic statements to specific measures that really matter to the customer, such as quality and delivery time. The internal perspectives focus attention on critical internal operations that are needed to satisfy customer requirements and help in identifying and building the necessary competencies for competitive success. The innovation perspective emphasises the need to look further into the future, thereby helping to break away from a short-term focus.

The scorecard works via a process in which managers for each of the above perspectives set goals, and specific measures for each are stipulated in order to achieve each goal. In this manner, high-level goals are cascaded downwards into the organization through a process of tight specification while utilizing a consensus approach. The scorecard, in this way, helps to translate and implement strategy. The strategic linkages enable the scorecard measure to be tied together in a series of cause and effect relationships. The scorecard thus can be used not only to clarify and communicate strategy, but also to manage strategy. The advantages of the scorecard are that, in a single report, it presents many of the seemingly disparate elements of a company's agenda. It also helps prevent sub-optimization by forcing managers to consider all operational measures at the same time.

Gap Analysis

Implicit within the benchmarking paradigm is the notion of gap analysis, namely, the difference between the organization and a best practice company, or the specific stated aim. Comparisons made within benchmarking are often about understanding the gap. Indeed, many of the tools of benchmarking produce as an outcome a gap analysis. For example, self-assessment, such as that described by the EQA model, leads to the production of trend data regarding where the company is, where it is moving, and whether it is moving in a direction towards attaining its overall stated goals.

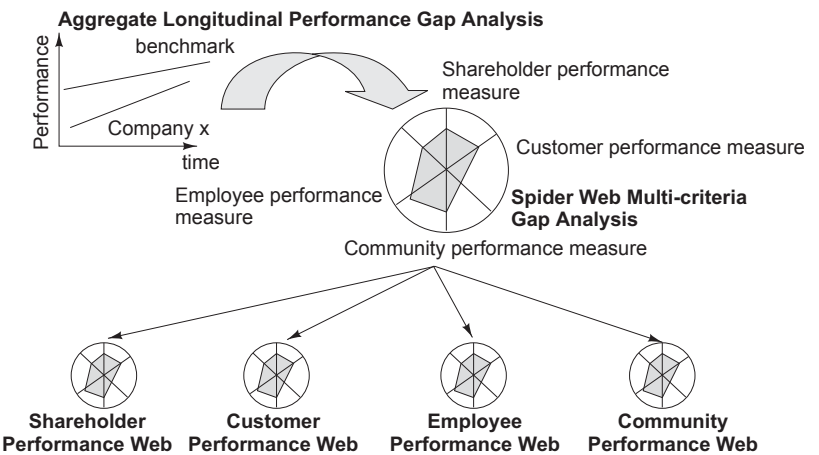


Fig. 1.11 ***Gap analysis methodologies***

Making comparisons with the best or stated aims allows companies to assess the nature of the leap that they have to make in order to catch up with or surpass world-class competitors. Analysis of gaps from base (current performance level) to benchmark (current performance level of the best company) helps companies to prioritize resource allocation (Balm 1996). Often, the type of gap analysis that is conducted is unidimensional (see Fig. 1.11). This form of analysis has the advantage of facilitating easy monitoring of trends over time. However, this form of gap analysis often misses out the complex trade-offs that exist within business. In order to do an effective gap analysis which captures the true level of complexity, it is necessary to simultaneously consider multiple gaps. A complementary framework to the unidimensional gap analysis technique is the spider-web diagram. The spider-web diagram can show at a glance multiple targets and gaps, and thus captures trade-offs that occur between goals and their achievement in terms of resource allocation. The spider-web diagrams can be used at multiple hierarchical levels to pictorially display the gaps. For instance, a gap analysis could be done for multiple stakeholders whose interests are measured along different dimensions (see Fig. 1.11 and Table 1.2).

Table 1.2 ***Measures for various stakeholders***

Stakeholder group	*Primary measures*	*Secondary measures*
Shareholders	Return on shareholders investment	• revenue growth • expense growth • productivity • capital ratios • liquidity ratios • asset use ratios
Customers	Customer satisfaction Quality of service	• customer surveys for different product/markets
Employees	Employee commitment Employee competence Employee productivity	• employee opinion survey • employee competence index • financial ratios of employee costs by different classifications
Community	Public image	• external surveys • internal measures

It is obvious from the discussion presented in this section that there is a close inter-linkage between gap analysis and the concept of the balanced scorecard. The data resulting from a balanced card approach can be fed into a gap analysis spider map. This type of spider-web gap analysis can be further supplemented by techniques such as force field analysis, which can be used to highlight barriers resulting in the identified gaps. The force field analysis can then be used to initiate the development of plans to

overcome the gaps. This creates feedback into the high-level strategic planning process of the balanced scorecard, and thereby serves to close the loop of self-improvement.

The other benchmarking technique, namely, the service quality (SERVQUAL) framework, has been discussed in detail in Chapter 10: Service Quality Management. Quality Function Deployment (QFD) has been discussed at length in Chapter 2.

Toyota Culture of Stopping to Fix Problems

Russ Scaffede had worked for decades for General Motors and had learned the golden rule of automotive engine production—never shut down the assembly plant! He joined the first American power train plant of Toyota in Georgetown, Kentucky. Within one month of his joining, his boss called him up and told him that he had noticed Scaffede had not shut down the assembly plant even once in a whole month. Scaffede took it as a compliment and replied, 'Yes sir, we had a great month, sir. I think you will be pleased to see more months like this.' The reply of his boss came as a shock to him:

'Rus-san, you do not understand. If you are not shutting down the assembly plant, it means that you have no problems. All manufacturing plants have problems. So, you must be hiding your problems. Please take out some inventory so the problems surface. You will shut down the assembly plant, but you will also continue to solve your problems and make even better-quality engines more efficiently.'

At Toyota and other Japanese plants, there are ambulance-like flashlights with in-built sirens called the andon at every workstation. Whenever a worker finds a problem or abnormality, he puts the andon on. The conveyor of the assembly line stops, and the team leader rushes to the site where problem has occurred to find the root cause of the problem. After the problem is fixed, the assembly line is restarted. Despite the fact that Toyota plants are not run 100% of the time, these are ranked among the most productive plants in the auto industry. This is because Toyota's concept of productivity is long-term. If you keep on accumulating the problems for the sake of running the plant 100% of the time, it will lead to nonconformities in the final product, resulting in rework or scrap leading to less actual productivity.

Many American companies initially misunderstood the concept of andon and the line stoppages. At Toyota, when the andon is put on by a worker, the line does not stop until the vehicle moves to the next workstation zone. There are around 20 seconds available for the team leader to reach the site and fix the problem. If the problem is simple enough to be solved during this short time, the team leader corrects it and puts the andon switch off, so that the line stoppage does not occur at all. If the problem is complex, the line stops after this duration. In fact, many American companies were not aware that the Toyota assembly line is divided into many segments of workstations, with small buffers of cars in between. When the line stops at a particular segment, the rest of the line keeps on moving and thus, the work continues at the rest of the plant. The next line segment will keep on working for the next seven to ten minutes, after which it stops. Therefore, the team leader gets ample time to sort out the problem before the next segment stops. Rarely the production stops at the whole plant. Probably, the lack of this concept at the American plants led to the workers being hesitant to stop the line as it would actually stop the whole line. This method ensures getting quality right the first time. (Liker 2004)

Summary

Quality has been defined by Juran as 'fitness for use', while Crosby defines it as 'conformance to specifications'. The first definition is appropriate at the design stage of the product, while the second one is suitable for all the remaining stages of production, up to post sales service. A customer perceives various dimensions of quality—performance, features, reliability, serviceability, durability, aesthetic sense, customer service, and safety. Quality has four types of costs associated with it—cost of prevention of defects, cost of detecting defects before delivery to the customer, cost of scrap/rework, and cost of warranty claims. The first type of cost is inversely proportional to the other three types of costs. Quality gurus such as Deming, Juran, Crosby, Feigenbaum, Ishikawa, and Garvin propounded various theories of total quality management. The Japanese gained competitive advantage by applying the concepts understood by them during the lectures of Deming and Juran in Japan during the 1950s. American companies suffered serious setbacks in competition with the Japanese companies in the 1970s and 80s' in their home turf and elsewhere. Later on, some American companies such as Motorola, GE, Texas Instruments, Eastman Kodak, etc. popularized the six-sigma quality management originally pioneered by Motorola.

It has now been well established that, in the current competitive scenario, the companies need a strategic approach to quality management in order to survive and grow in the market place. The Japanese have been using their model of strategic quality management called the Hoshin Kanri since the 1970s. This kind of an approach is very much required by the companies in the developing countries, where, due to the scarcity of infrastructure, competing with the foreign multinationals becomes difficult. The Indian companies have fought like gallant warriors so far against the foreign multinationals by understanding the strategic importance of quality. Quality now finds a place in the corporate mission statements of most of the multinational as well as Indian corporations. Quality policies should be evolved for the companies keeping in view the mission statement. Also, quality targets (objectives or goals) must be established for the corporate house as well as various SBUs/departments. Benchmarking is a useful tool to arrive at meaningful quality targets. It is the identification of best practice organizations and comparing their key processes with that of the concerned organization. In this way, the gaps identified have to be bridged in the long run by adapting the best practices in the processes.

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Keywords

Quality It is defined as both 'fitness for purpose' and 'conformance to specifications'.

Corporate mission statement The corporate mission statement of a business house sets out the basic purpose of its various activities. It identifies the scope of the firm in terms of the products/services it deals in, the markets in which it operates, and technological areas it emphasises.

Strategic quality management It is defined as 'a comprehensive and strategic framework linking profitability, business objectives, and competitiveness to quality improvement efforts with the aim of harnessing the human, material, and information resources organization-wide in continuously improving products or services that will allow the delivery of customer satisfaction.'

Hoshin Kanri A useful interpretation of the literal translation is that hoshin kanri is a methodology for setting strategic direction.

Benchmarking It is a systematic and continuous measurement process: a process of continuously measuring and comparing an organization's business processes against process leaders anywhere in the world to gain information that will help the organization to take action to improve its performance.

Internal benchmarking It involves measurement and comparison of activities, functions, and processes within the same organization.

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CASE STUDY

Mahindra & Mahindra

It is 7:00 a.m. and the siren sounds high at Kandivli (a suburb of North Mumbai) plant of Mahindra & Mahindra's (M&M) Tractor division, signaling the starting time of the morning shift. Hardly any workers have turned up. Reporting late on duty is a norm for the workers here. Seldom does the morning shift start before 7:30 a.m. During the day shift, it was an ominous scene to find workers stretching out under the trees and relaxing during the working hours. The union leaders hung around the factory without doing any work at all. A few days back, the workers in the night shift had beaten up a milkman for creating a lot of noise in the wee hours of the morning and thus, disturbing their sleep during their working hours. Things were worse at the other plant of M&M in Nagpur. But this was all in the 1980s. M&M has come a long way since then—it has won the most coveted Deming prize for quality, and started a farming equipment assembling plant in the USA. After the huge success there, the company opened a second assembly plant and a distribution centre in Georgia. Now, the company is in the process of establishing assembling units in Canada to locally produce and market a range of low horsepower cab tractors with features such as AC heater (keeping in view the cold weather conditions for the farmers there), personal stereo, and even a sun roof. It has also acquired Jiangling Tractors in China, which it would use to develop low cost products suited to plough deeper into the US farm equipment market. Now, the fourth-largest tractor company in the world, M&M, has four tractor plants in India (Mumbai, Nagpur, Rudrapur in Uttranchal, and Jaipur). It has been maintaining its market leadership for the past two decades. During the late 1980s, the company tried to apply TQM concepts such as quality circles without getting any success. M&M was the market leader in the tractors segment at that time, but in view of the looming multinational threat in the near future, its internal situation was very fragile. During 1990–94, the company started the use of statistical process control and tried to perform business process reengineering. Its journey towards the Deming prize was initiated in 1994, with the appointment of Prof. Yasutoshi Washio, a Japanese expert, in the implementation of the Deming guidelines. The same year, the company was rechristened M&M Farm Equipment Sector (FES).

Initially, Prof. Washio was skeptical about the Indian companies and workers. He felt that the Indian companies are more like the American companies, which feel that results are important. On the other hand, for the Japanese, the process is more important. Moreover, he had serious doubts about the attitude of the Indian workers with respect to teamwork—a Deming prerequisite—as he felt that Indians were individualistic. He was proved wrong by the M&M workers. In his own words, 'The Indians can be good team workers, much better than the young in Japan today and, in that sense, perhaps, Deming is better suited to Indian companies'. In the initial few years of interaction with the management of FES, Washio found himself isolated due to disagreements on various fronts. Washio had major difficulties in making most of the Indian companies understand the importance of implementation over creating a perfect framework. In his own words, 'Indians are very good with framework and the big picture, but are poor with implementation. The kaizen is weak.' Kaizen means gradual, orderly, and continuous improvement in work processes. It took a while for Washio to make the FES personnel understand that good kaizen hinges on implementation, so there is no need to spend too much time creating a perfect framework. Once you start implementing these, the rest will happen automatically. The FES created a team to implement the Deming guidelines. The team identified eleven key areas to be fulfilled:

1. top management leadership and involvement
2. creating and maintaining TQM frameworks
3. quality assurance
4. management systems
5. human resource development
6. effective utilization of resources
7. understanding TQM concepts and values
8. use of scientific methods
9. organizational power
10. relationship with stakeholders
11. enabling of unique TQM activities

In addition, there is another Deming must-do: eliminate dependence on inspection to achieve quality by building quality into the product in the first place. The system at FES earlier was that at the end of the assembly process or at the customer's place, there used to be a final inspection. If a product showed serious flaws then, it was sent again to the shop floor. This wasted a lot of time and effort, and it did not add to the improvement in the quality of the manufactured product. In order to change this system, computers were installed on the shop floor for showing the standard operating procedure (SOP) of a particular process to make the workers understand the various steps in a process. This reduces the chances of human error and acts as a natural check. At the end of every complete process, a check is performed by a trained worker, who also follows an SOP. Employee involvement is the first step in ensuring the success of any quality initiative. At FES, the workers would dictate terms to the shift supervisors by saying that they would not do different tasks on many machines. The management took time to convince them by giving them examples such as: if your wife can do multiple tasks of cleaning the house, feeding the children, and washing the clothes, why can't you do the same? The workers were explained the multinational threats looming large. They were told that, if they did not mend their ways, the company might shut down the factory, or even worse, a multinational may take it over and would invariably lay off all the problem-creating workers. Examples of companies shut down in Mumbai due to the changed scenario were given. The entire programme was termed 'Ashwamedh' and analogies were drawn from mythology and the current competitive situation. This brought a complete transformation in the workforce that was now willing to perform multiple tasks, double their productivity, and maintain shift discipline by reporting on time. The workers were informed by the management about every difficulty faced by the company in beating the competition in the marketplace. Some of the workers were sent with the marketing staff to meet the farmers using the company's products and facing problems. This was called 'Operation *Hamla*'. The workers came back chastised and sobered when they realized that a small mistake on the shop floor could cost a farmer his season's crop. The company even sent some of the union leaders for short training courses in the USA and UK.

This sustained effort on part of the company has paid rich dividends. Costs are down by 15% and the market share has risen by one per cent to 27.3% (10% higher than its closest competitor), despite an overall decline in the tractor demand. The break-even point for a new model of a tractor has decreased to 30,000–32,000 from the 54,000 tractors three years ago. The worker productivity levels have increased by 100%. Tractor exports from the company have increased 100% over the past 10 years, with 70% to the USA alone. The quality of tractors has improved drastically with the number of complaints per 1000 tractors dropping from 228 to 90. The rejection rate for components bought from vendors, rejection and rework in machining, and rejection at final testing have all been brought down to near zero levels. FES has introduced 15 new models in accordance with the requirements in the international markets. The journey to world-class quality is not over yet. The company now aims at matching the world benchmarks in productivity and quality to establish a cost leadership in the Indian industry.

1. If you were a part of the top management at M&M FES, how would you have involved the workers in the Deming programme?
2. Do you think that M&M FES has a strategic quality management system in place?
3. How important is the role of top leadership in the success of a quality improvement programme? Discuss in the context of M&M FES.

Concept Review Questions

1. Define quality, quality assurance, and total quality control (TQC).
2. What are the various dimensions of quality?
3. Explain the various types of costs of quality. What is the relationship between these costs?
4. What is strategic quality management (SQM)? How is it defined?
5. Using a schematic diagram, explain the five phases of SQM.
6. Explain the five stages of quality culture. In which stage do you think does the Indian industry fit in under the current scenario?
7. What are the typical characteristics of Hoshin Kanri? Explain the top-down and bottom-up deployment methods in Hoshin Kanri.
8. What is benchmarking? How did this concept evolve?
9. Explain the benchmarking triangle. What are the different varieties of benchmarking?
10. How is benchmarking performed? Explain the benchmarking template and the various steps in this process.
11. Write short notes on the following benchmarking tools:
    (a) EFQM Model (b) Balanced Scorecard (c) Gap Analysis

Project Assignments

1. Browse the websites of any five companies (national or international) having an explicit mention of quality in their mission, vision, values, and/or philosophy.
2. Conduct an empirical survey of companies in your city to find out the number of companies having a strategic focus to quality management.