Basic Course on Quality Management (working title)

Unit 1: Introduction to Quality

Learning objectives :

By the end of this Unit, you should be able to:

- *Understand the different definitions of quality*
- *Recognise the dimensions of quality and identify the quality characteristics of a product or a service*
- *Recognize some hurdles for quality*
- *Appreciate the evolution in the practice to achieve quality*
- *Understand the four components of quality management*

1. Introduction

Quality is not only the first of the key performance objectives but unarguably the most important, as it can provide an organization with a sustainable competitive advantage for its products. Quality of goods or quality of service is most often how customers judge an organization. However, it is not only external customers' perceptions but internal customers as well, and perceptions change with time!

To be successful today, organizations must be committed to never-ending improvement in order to stay ahead of the competition. Yet this continuous improvement and quest for excellence is no longer confined to a single organization but to every organization along a supply chain.

Enterprises are no longer in a 'sellers' market' where their manufacturing capacity and not the capacity of their markets was the limiting factor for their success. Today, market capacity has become smaller than production capacity and the arrival of company-wide and worldwide networks of information systems has reduced the cycle times for business transactions. The customer is no longer an object, but a subject. Enterprises are in a buyer's market where the customer is king. An enterprise exists because of its customers.

Globalization and the increasing participation of emerging economies in world trade have resulted in virtually any customer being able to source worldwide, and high quality is often the most important factor used to differentiate between competing suppliers and supply chains.

2. What is quality?

Quality has been given several definitions. A few are given below:

- "fitness for use" (Juran);
- "conformance with specified requirements" (Crosby);
- "meeting and exceeding customer requirements" (Deming);
- "good value for money";

- “consistently good products”;
- “zero defect”.

An Internet search will provide you with further insight into the meaning of quality. For the *Oxford English Dictionary*, quality is “the standard of something as measured against other things of a similar kind; the degree of excellence of something”. The *Business Dictionary* defines manufacturing-related quality – our main focus here – as “a measure of excellence or state of being free from defects, deficiencies and significant variations, brought about by the strict and consistent adherence to measurable and verifiable standards to achieve uniformity of output that satisfies specific customer or user requirements”. Finally, ISO 9000 defines quality simply as:

“***the degree to which a set of inherent characteristics fulfils requirements***”.

These requirements are the needs or expectations, generally implied or obligatory, of interested parties such as customers, suppliers and society.

For us, the quality of a product or service depends on an exchange between two persons, one supplying the product or service and the other receiving the product or service. The supplier and the customer can have different views on what quality is and this may lead to misunderstandings and disputes. In that sense, quality can be understood as “the conformance with customers’ requirements or fitness for purpose”. It can also be said that quality is what brings the customer back.

The first point to note is that it is the customer who defines whether a product is fit for use or not. If the characteristics of a product or service do not match those required by the customer, it will not be a quality product for the latter. For example, a limousine with high gas consumption will not be a quality product for someone looking for a small car with low gas consumption. A supplier can prepare specifications for his/her product based on what is perceived as the requirements of customers and manufacture products conforming to those specifications. However, if the conforming products are found to be unfit for use by the users, they would be considered defective products; in this case, the specifications have failed to take fully into account the needs of the consumers. This brings us to the adage that the customer is king. Quality is not absolute but relative. A product may be of good quality for someone, but of poor quality for someone else. For instance, one person may be comfortable with high-heeled shoes while another may prefer flat shoes. As pointed out by Snyder, quality is all about the customer’s perception of excellence and our response to that perception. It is measured solely by its utility to one audience – the customer.

The second point to note is that customers’ requirements change over time as purchasing power increases or as more innovative products are made available on the market. A customer who was satisfied with a black-and-white television set in the past now goes for a colour television set with a flat screen.

Quality or fitness for purpose is usually defined by quality of design and quality of conformance. However, for products with a long life such as computers and refrigerators, which require after-sales service, there are two other parameters. These are the availability for use (the product should not break down often and should work for a reasonable period before breaking down again) and field service, which should be prompt and performed with integrity by competent personnel.

When talking about quality, the term ‘grade’ comes to mind; it is defined in ISO 9000 as the “category or rank given to different quality requirements for products, processes or systems having the same functional use”. Some examples are the class of airline ticket and category of hotel in a hotel guide.

3. The characteristics and dimensions of quality

The customer’s needs and expectations are expressed in terms of parameters or characteristics of a product. These characteristics vary from product to product. The following are some of the examples of characteristics of different products:

Product	Characteristics
Fresh fruits and vegetables	'Free from damage caused by pest' 'Free from abnormal external moisture' 'Free from foreign smell and/or taste' 'Uniformity of size', etc.
Coffee beans	'Free from extraneous matter, live pest and mould'. 'Fully conforms to sample' 'Uniform quality throughout the entire shipment' 'Be clean in the cup, i.e. 'free from obnoxious flavour'
Processed food	'Flavour' 'Aroma' Texture 'mouth feel' 'Nutritional Value' Microbial Safety' (food safety characteristic)
Leather & Leather products	'Colour fastness to dry and wet rubbing' 'Moisture content' 'Good adhesive strength of joints' 'Good workmanship' 'Hexavalent Chromium within limits prescribed'

Quality has therefore many dimensions and these have been defined by Garvin (1987) as follows:

- Performance, which refers to a product's main operating characteristics, i.e. it does what it is intended to do as indicated on the box;
- Features, which are extras (tangible or intangible) that supplement the main characteristics, e.g. after sales service or guarantees ;
- Reliability, which reflects the probability that a product will continue to function well and not fail within a specified period of time;
- Conformance, which is the degree to which a product's design and operating characteristics meet established standards;
- Durability, which is the amount of use before the product deteriorates;
- Serviceability, which is dependent on the service team's speed, courtesy, competence and the product's ease of repair;
- Aesthetics, which is linked to appearance and impression;
- Perceived quality, which is linked to the reputation of the brand.

redo

The ISO 9000 definition of quality, i.e. “degree to which a set of inherent characteristics fulfils requirements”’, is equally applicable to a service. While it is easy to define and measure the characteristics of a hardware item, the service being an intangible item is difficult to define and measure. Parasuraman, Zeithaml and Berry (1988) have defined the following generally acceptable service characteristics and have given them the acronym RATER:

- Responsiveness: willingness and/or readiness of employees to help customers and to provide prompt service, timeliness of service.
- Assurance: knowledge and courtesy of your employees and their ability to convey trust and confidence, viz. competence, trustworthiness, inspiring confidence.
- Tangibles: physical appearance of the service such as facilities, tools, equipment, appearance of servicing personnel and communication materials.
- Empathy: provision of caring, individualized attention to the customer, giving the customer information in a language he or she understands, understanding the customer’s specific needs.
- Reliability: the ability to perform the promised service dependably and accurately, e.g. performing the service right the first time, giving accurate information in the billing.

The individual dimensions or characteristics of quality are not necessarily distinct. Depending on the product or service, situation, and type of contract or specification several or all of the above dimensions may be interdependent. The above dimensions may not constitute a complete list of relevant dimensions; however taking them into consideration should provide us with a better understanding of the concept of quality. What other dimensions can you think of?

4. Hurdles for quality

Many times you miss due attention to quality while carrying out your business activities due to many misconceptions. For example:

- You are satisfied with the way you have been running your business since you are also making reasonably good profit.
- You may have a tendency to procure raw material and other supplies at the lowest price without paying due attention to the quality parameters.
- You have more faith on the end of the line inspection for checking quality of the product rather than having a system of producing ‘right first time’ i.e. preventing defects.

- You may have a tendency to use low-paid employees, who may not have the required skills and are asked to meet the production targets. This means that you focus more on 'quantity' rather than 'quantity with right quality'.
- Many times you may agree with your customers to deliver the product in a given time without being sure that you can meet the deadline.
- Process steps being followed by you may not be correct or may not be adding value to the product. Similarly your system for controlling quality may not be standardized and may change from person to person.
- You believe in 'crisis management' or 'fire fighting' which means that you fight the problems such as machine breakdown, rejection of product after inspection, customer complaint etc. as they arise and do the same thing again when the same problem arises. This means you do not attack the cause of the problem which results in the same problem appearing again and again. This is an expensive way of managing your business.

- You may have a misconception that all quality-related problems originate on the production floor and the quality control person or inspector is responsible for this. On the contrary, Japanese industry, which is famous for its quality revolution since the early 1950s', has concluded that:

  ☞ 40% quality problems are caused due to poor product design or specifications of the product not being clear before starting the production

  ☞ 30% quality problems are caused due to wrong or effective materials purchased from suppliers

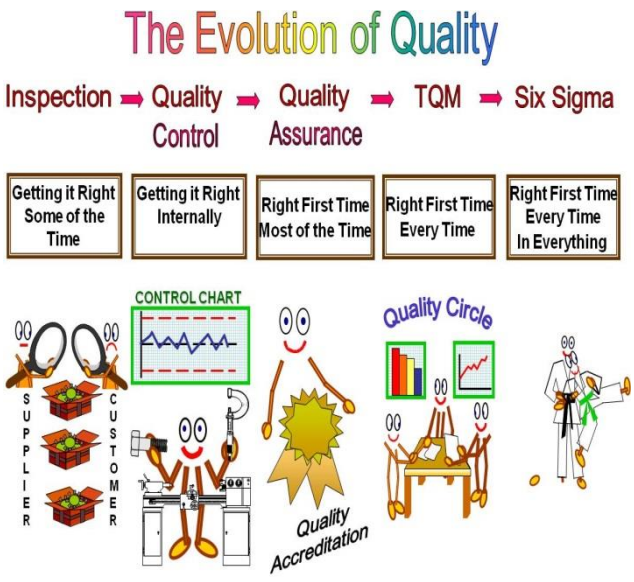
  ☞ Remaining 30% quality problems are due to errors made during the manufacturing process. This may be due to lack of proper instructions to workers, machines not working well, measuring instruments not being accurate, mishandling the product, operator not performing the required controls on the process, etc.

Dr. Juran, the famous quality guru, said that quality cannot happen by chance. If it has to happen, then one should practice quality control and before that, do the quality planning and after quality control, think about quality improvement. This is called 'Juran Trilogy' for quality. The Japanese followed him and other quality gurus and became leaders in quality for various products and even challenged western countries both in quality and pricing.

> Quality is never an accident; it is always the result of intelligent effort.
>
> *John Ruskin*

5. The Evolution of Quality

Written quality specifications and measurements can be traced back to the Egyptians and Babylonians. However, the past 80 years have seen unprecedented developments and changes in quality systems, quality requirements and the measurement of quality.



> Whenever you do a thing, act as if all the world were watching.
> Thomas Jefferson.

Prior to World War II, inspection was the usual method of attempting to ensure that an organization received or despatched goods of reasonable quality. WWII saw a period of scarce resources, and so quality control became important in order to conserve resources and to use them wisely.

The growth of world trade became a major impetus for the development of quality assurance systems. These developed worldwide until they were brought together under the international umbrella of ISO 9000.

The1980s witnessed the growth of competition amongst businesses with quality as the key means to securing a sustainable competitive advantage. Pressure for improved quality was confined not only to manufactured goods, but to services as well.

Total Quality Management (TQM) and *Continuous Improvement (CI)* flourished during this period.

TQM embraces an entire organisation and makes use of *quality circles*: small teams of employees who – by using problem-solving techniques and innovation – plan and implement measures to increase productivity by improving quality and decreasing costs.

The growth of TQM continued into the 1990s and has now evolved into *Six Sigma Quality* – the logical extension of TQM. *Sigma* (σ) is a statistical symbol for *standard deviation*, indicating how far a given process deviates from the average (or mean). Six sigma means "beyond six standard deviations", and thus means that there is only a small deviation from perfection, i.e. only 3.42 defects per million items (a yield of 99.9997%).

6. Quality Management and its four components

The term 'quality management' (QM) is defined in ISO 9000 as :

"***coordinated activities to direct and control an organization with regard to quality***".

To direct and control an organization, its management should first set out its quality policy and related quality objectives and then specify activities related to quality planning, quality control, quality assurance and quality improvement.

The objective of QM is to ensure that all company-wide activities necessary for enhancing the satisfaction of customers and other stakeholders are carried out effectively and efficiently. QM focuses not only on product/service quality but also on the means for achieving it.

The four components of QM are briefly explained below.

a. Quality Planning (QP)

Quality Planning is “a part of quality management focused on setting quality objectives and specifying necessary operational processes and related resources to fulfil quality objectives.” (ISO 9000:2005 3.2.9)

QP is a systematic process that translates quality policy into measurable objectives and requirements and lays down a sequence of steps for realizing them within a specified time frame. The results of QP are presented, for use by all concerned, in the form of a quality plan, a document specifying which procedures and associated resources will be applied by whom and when. Such quality plans are prepared separately for specific processes, products or contracts.

b. Quality Control (QC)

Quality Control is “a part of quality management focused on fulfilling quality requirements.” (ISO 9000:2005 3.2.10)

QC helps in evaluating the actual operating performance of the process and product and, after comparing actual performance with planned targets, it prompts action on the deviations found, if any.

QC is a shop-floor and online activity that requires adequate resources, including skilled people, firstly to control the processes and then to carry out timely corrections when process and/or product parameters go beyond prescribed limits.

c. Quality Assurance (QA)

Quality Assurance is “a part of quality management focused on providing confidence that quality requirements will be fulfilled.” (ISO 9000:2005 3.2.11)

Both customers and management have a need for an assurance of quality because they are not in a position to oversee operations themselves.

QA activities establish the extent to which quality will be, is being or has been fulfilled. The means to provide the assurance need to be built into the process, such as documenting control plans, documenting specifications, defining responsibilities, providing resources, performing quality audits, maintaining records, reporting reviews. QA is more comprehensive than QC, which is part of it.

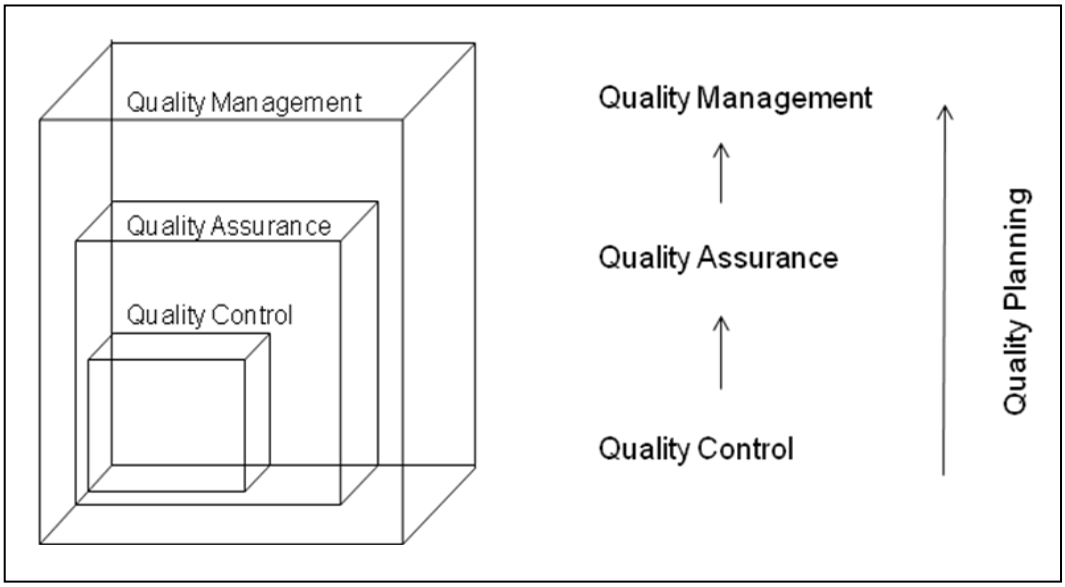
d. Quality Improvement (QI)

Quality improvement is “a part of quality management focused on increasing the ability to fulfil quality requirements.” (ISO 9000:2005 3.2.12)

Remaining static at whatever level you have reached is not an option if your organization is to survive. To maintain your performance and your position in the market, you will have to carry out quality improvement activities on a continual basis. Such improvement activities include refining the existing methods, modifying processes first to reduce variations and second to yield more and more by consuming less and less resources. If you want to have a breakthrough, this will often require new methods, techniques, technologies, processes.

The figure below shows the evolution from quality control to quality management.

Conceptualization of quality management as defined in ISO 9000:2005



Source: S.C. Arora, India.

The illustration shows that quality control (QC) is the core activity within QM. When you carry out QC within a defined system, you have upgraded your QC to quality assurance (QA). If you then continue carrying out quality improvement activities based on the analysis of the data resulting from the measurement of processes/product as well as of data on customer feedback, you have moved towards QM. In that sense, quality planning remains an integral part of all steps in quality management.

To put it simply, the four components of QM mean:

- Quality planning – Can we make it OK?
- Quality control – Are we making it OK?
- Quality assurance – Will we continue making it OK?
- Quality improvement – Could we make it better?

Quality control, being the core activity of quality management, should be established first by an organization. It will, inter alia, require the availability of equipment and machines of the requisite capability, skilled persons, accurate measuring instruments and basic support services. Without these, it will not be possible to exercise proper quality control and then to move towards quality assurance and quality management.

7. The triple role along the supply chain within the organization

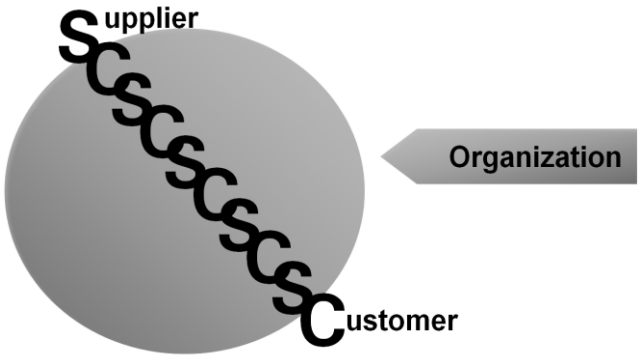
Everyone in an organization can be seen in a triple role, i.e., as a customer, a processor and a supplier.

Quality is meeting customer expectations and is achieved by coordinating and managing many interrelated activities, market research, design, purchasing, production, testing, inspection, packaging and shipping. As pointed out by John Ruskin (1819-1900): “Quality is never an accident; it is always the result of intelligent effort.” To meet the expectations of our customers, we must obtain the product specifications from these customers, and produce and supply according to these specifications. Managing this supplier-customer interface is a key element in managing quality.

We have a tendency to view suppliers and customers as being external to our organization. Suppliers provide us with raw materials, spare parts and information, and customers purchase our products and services. We tend to forget that we also have suppliers and customers inside our organization. For example, the marketing department identifies the characteristics demanded by users. Now acting as a supplier, the marketing department communicates this information to the design department, which is its internal customer. The design department, taking on the role of processor, prepares specifications based on this information, and passes the completed specifications on to the production department, its internal customer. Here the design department acts as supplier to the production department. In this example, the design department has performed a triple role, acting as customer, processor and supplier in turn.

The concept of 'triple role' is evident in the process approach in quality management. An activity that uses resources and is managed in order to convert inputs into outputs can be considered a process. Inputs are provided by a supplier to a customer who transforms these inputs into outputs to be given to another customer. Transformation of the inputs into outputs is done by the former customer acting as a processor. The figure below illustrates the supplier-customer chain:

Supplier-customer chain



Source: Oakland (2003), adapted

All organizations have what is known as quality chains of customers and suppliers. It is important to ensure that these quality chains are not broken at any point so that the expectations of the customer can be met. Otherwise, the organization will be faced with customers irritated by the delivery of a defective product or service because of a failure at one of the quality chains. For example, if you ordered a vegetarian meal for a flight through your travel agent and he did not communicate this to the airline, you will not get your special meal and the air hostess will have to put up with your displeasure.

At each supplier-customer interface in the organization, it is important to agree on the requirements as there is no point in receiving products that are not fit for use. This will ensure that proper inputs are received for processing, which should then be carried out in such a way as to keep variation in the process to a minimum. The outputs should match the specifications agreed with the next customer. At each interface, customers should refuse to accept nonconforming products, which should be sent back to the suppliers. This will give a message that only conforming products are accepted, reduce waste, and minimize customer complaints and product recalls. The 'triple role' concept will promote a culture of making the product right the first time and every time.

Ideally, each person in the organization should adopt the 'triple role' concept, identify his/her suppliers and customers, take ownership of his/her process, and reduce variation in the process to a minimum.

As a customer, ask questions such as:

- Who are my immediate suppliers?
- Have I communicated my real requirements to them?

- Have I agreed the manner of checking the conformity of their inputs with them?

As a supplier, ask questions such as:

- Who are my immediate customers?
- Have they communicated their real requirements to me?
- Have they agreed with me the manner of checking the conformity of my outputs to them?

As a processor, ask questions such as:

- Is my process capable of meeting the requirements of my immediate customers?
- If not, how can my process be improved to meet these requirements?

An organization has to put its own house in order first by consolidating its quality chains of internal suppliers and customers before involving its external suppliers and customers in the concept of the 'triple role'. Creating a culture that promotes the concept will establish an environment of trust between internal suppliers and customers. Successful internal supplier and customer quality chains will lead to successful external supplier and customer interfaces. In such an environment, there will be constant and immediate feedback resulting in reduction of waste, improved customer satisfaction and continual improvement of processes.

8. Conclusion

Quality means providing products and services that do what they are supposed to do to your customers, whether they are internal to the organisation or external. To ensure quality of your supplies, it is essential to:

- Clearly understand the requirements of your customer/market.
- Review the above and examine your ability to meet the customer requirements as well as any regulatory requirements.
- If you think it will not be possible to fulfil all that the customer has asked for, then resolve the same with the customer upfront i.e. before accepting the order and agree on what you can reasonably give.
- Deliver the product/service as promised without any deviation.

A customer will be satisfied if you deliver the product conforming to his/her needs and expectations and certainly you also need to deliver the product within the agreed time and price.

In the marketplace, the winners will be those who can give products or services that are better (in terms of quality), cheaper (in terms of costs) and supplied more efficiently (delivered in time or provided with a timely after-sales service). If customers are not satisfied, they can always buy from another supplier. In this sense, therefore, quality is the core task of a business. It is not optional. It is essential for survival.

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Unit 2. Evolution of quality management

1. The Quality Gurus

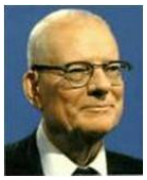
No book on quality management would be complete without some discussion about the contribution made by the "quality gurus". Quality Management has been blessed by the work of these visionaries: collectively, they have made a massive and immeasurable impact, and should take most of the credit for what has become a quality revolution, rather than just an evolution!

a) Walter Shewhart (1891 – 1967)

Walter Shewhart is regarded as the grandfather of *Total Quality Management*. He invented *control charts*, one of the seven fundamental tools of quality control. In addition, he developed the *Learning and Improvement Cycle – PDCA (Plan, Do, Check, Act)* – that was later popularized by Deming in Japan and became known as the *Deming Wheel* (see below).

The PDCA wheel forms the basis of continuous improvement, which subsequently evolved into TQM, benchmarking and more recently into Six Sigma quality.

b) W. Edwards Deming (1900 – 1993)



Of all the visionaries in quality, none has had more impact than W. Edwards Deming. His message of a new philosophy of quality was initially ignored by the West, but was embraced by Japan. At the time, he was helping to rebuild Japan's industries after the second world war. The Japanese honoured his achievements by naming their highest quality award "The Deming Prize".

Deming stressed the *reduction in variation* as a critical factor in quality improvement, and advocated collaboration with suppliers to improve quality and reduce costs using *statistical process control (SPC)* whenever possible.

Deming's greatest contribution is in his *14 Points*, which sums up his philosophy of quality management (see section 2 of this unit).

c) Joseph Juran

Joseph Juran considered quality as "fitness for use", and described quality management as a trilogy consisting of:

- quality planning
- quality control
- quality improvement

Juran also emphasized that management must be committed to continuous improvement. He estimated that about 80% of quality defects could be controlled by management!

d) Armand Feigenbaum

Armand Feigenbaum initiated the concept of *Total Quality Control*, i.e. that quality is a *total* effort that requires the participation of everyone in the organization. He also emphasized that the customer defines quality.

Feigenbaum first described the concept of quality costs in 1956. He defined the costs of quality and categorized them as the cost of failure (internal and external), the cost of appraisal and the cost of prevention.

e) Philip Crosby

Philip Crosby popularized many of the concepts and techniques developed by Shewhart, Deming, Juran, Feigenbaum, Ishikawa and Taguchi (see below). Crosby is perhaps best known for the many phrases that he coined, e.g. “The Quest for Zero Defects”, “Quality is Free” and “Right First Time, Every Time”.

In 1979 he published his book *Quality is Free*[1] where he argued that the costs of poor quality are so great that the efforts to improve quality will more than pay for themselves and thus there will be net gains for the organization. In other words, the costs of poor quality are substantially greater than the costs of prevention.

Crosby’s four absolutes of quality management are:

- Quality is conformance to requirements, not goodness (goodness is subjective while conformance to requirements is objective and measurable).
- The system for causing quality is prevention, not appraisal (appraisal is reactive while prevention is proactive).
- The performance standard for quality is zero defects.
- The measurement of quality is the price of non-conformance.

f) Kaoru Ishikawa

Kaoru Ishikawa made several significant key contributions that include *quality circles* – where employees work in product / process improvement groups – and the *cause-and-effect (or fish) diagram* for problem solving.

He provided tremendous insight into quality with his 1985 interpretation: *"Narrowly interpreted, quality means quality of product. Broadly interpreted , quality means quality of work, quality of service, quality of information, quality of process, quality of division, quality of people (including workers, engineers, managers and executives), quality of systems, quality of company, quality of objectives, etc. "*

g) Genechi Taguchi

Genechi Taguchi argued that the cost of quality is the cost of variation, thus emphasizing the need to minimize this variation. He developed a formula for determining the cost to society of poor quality: the *Taguchi Loss Function*.

[1] Crosby, P.B.(1979) *Quality is Free*. McGraw-Hill, Boston

h) Masaaki Imai[2]

Masaaki Imai should take credit for popularizing the Japanese concept of *kaizen* (continuous improvement) throughout the world. Kaizen is the most critical element of TQM.

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There is a common theme which threads through the work of all these gurus: *continuous improvement* and *total quality*.

2. Applying Deming's 14 points

Quality has to be built into every level of an enterprise and become part of everything it does. Quality is essential for the success of any organisation, from answering the phone to manufacturing products and serving the end customer. Before, companies were usually satisfied with focusing their quality efforts on the production process alone since competitive pressures were much lower. Now with globalisation and modern technology, competition has become so fierce and quality is often thought to start and end with the customer, and all points leading to and from the customer must aim for high-quality service and interaction. Deming has contributed to this new thinking. His book "Out of the Crisis" summarized his famous 14-point management philosophy which was developed by Deming after a thorough study of highly successful companies. These 14 points have become a reference for quality transformation and they apply to any type and size of business: service, manufacturing, small, large enterprises, and even a one-man company

Deming's 14 Points	Application to an organization
1. Create constancy of Purpose	• Develop a vision and commitment to quality for the long term.
2. Adopt the new Philosophy	• Change to a new system of management that recognizes the crucial importance of quality and the need for ongoing improvement. • Create cross-functional teams (Quality Circles) for problem solving and continuous improvement. • Train everyone in the new philosophy.
3. Cease dependence on mass inspection	• Build quality into the product. • Use quality control tools to achieve this. Improve quality of inputs and processes. • Staff must be responsible for their work.
4. End the practice of awarding business on the basis of price	• Implement supplier evaluation and accreditation systems, which incorporate quality, delivery, technology as well as price. • Collaborate with a reduced number of suppliers.
5. Improve constantly and forever the system of production and service	• Improve quality and increase productivity (by increasing output and reducing costs): cross-functional teams are one of the main drivers for ongoing improvements.
6. Institute training on the job for all staff	• Implement ongoing training programmes for all staff with the emphasis on quality.
7. Institute leadership	• Managers must lead and provide the foundation for continuous improvement and teamwork.

[2] Imai, M.(1986) *Kaizen: The Key to Japan's Competitive Success*. Random House

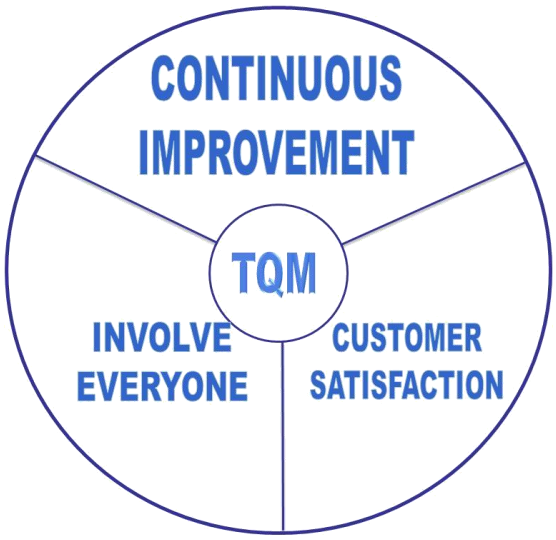
8. Drive out fear	• Do not blame staff for management problems. Most problems are due to poor management and poor systems.
9. Break down organizational barriers	• Encourage the formation of cross-functional teams to break down barriers within and between organizations (supply chain management).
10. Eliminate slogans and posters etc.	• Rather provide staff with the necessary training and equipment to do the job!
11. Eliminate numerical quotas	• Eliminate quotas, work standards etc. that conflict and interfere with quality goals.
12. Give people pride in their job	• Remove barriers and recognize the contribution of staff: systems make it possible, but people make it happen.
13. Institute education & self-improvement programmes	• Emphasize the need for ongoing education and training for ALL staff. • Encourage increasing professionalism by motivating staff to obtain professional qualifications.
14. Put everyone to work to achieve the above	• Create the vision, appropriate structures and goals to be a successful and respected organization.

Adapted from: Deming, W. Edwards. Quality, Productivity and Competitive Position, MIT, 1979.

3. TQM wheel

Total Quality Management is a philosophy that involves everyone in an organization in pursuing the long-term goal of satisfying customers by continuously improving quality. There are three key elements that underpin TQM (the so-called *TQM Wheel*): Customer Satisfaction, Total Involvement in TQM by all staff (employee empowerment) and Continuous Improvement:

The TQM Wheel



***Total Quality Management** is a comprehensive, structured and organisation-wide approach to management that uses continuous feedback to achieve excellence of quality in producing and delivering goods & services, and in so doing providing full value to customers.*

TQM is no short-term quick fix for an ailing business organization. It has to be a strategic decision to adopt TQM, and it involves total commitment – especially by top management who must become leaders in the process. It also requires substantial resources.

As Deming said, quality is everyone's responsibility. Involving everyone in an organisation in TQM requires considerable training. Staff must be encouraged to work in teams, e.g. *quality circles*, for it is these small teams that make many of the improvements that can enhance both quality and productivity whilst simultaneously reducing costs.

Customer satisfaction refers to *both* external and internal customers. Satisfying internal customers could range from providing accurate and timely financial data to all departments, to the provision of good quality meals in the staff canteen.

> Quality is everyone's responsibility.
> *W. E. Deming*

TQM is both a quest and a philosophy:

- ...where quality becomes a way of life
- ...where everyone in the organization is actively involved in pursuing continuous improvement
- ...where every activity, process and product is a target for improvement in order to achieve ongoing customer satisfaction

TQM places strong focus on process measurement and controls as means of continuous improvement. Enterprises are sets of processes. Processes are value chains serving the customer. The degree to which these value chains can satisfy their customers determines the success and survival of enterprises. It is important to assess the health of a process and this can be done using four indicators : DCQE representing :

- Delivrables : the process' contribution to the next one;
- Cost : the cost required to produce the deliverables;
- Quality : the degree of conformity to customers' requirements;
- Education: the knowledge level of the process performers (Gower, 1997).

Healthy processes make for a healthy enterprise. TQM is therefore the set of tools to do this job well. It is quite challenging to apply as it is very demanding in terms of attention to detail, persistence and the personal involvement of managers in details. Those who do not invest enough energy and focus will find TQM too slow and ineffective.

In the global marketplace a major characteristic that will distinguish those organizations that are successful will be the quality of leadership, management, employees, work processes, product, and service. This means that products must not only meet customer and community needs for value, they must be provided in a continuously improving, timely, cost-effective, innovative, and productive way.

TQM has never been static. It has continuously evolved over the last half of the twentieth century. Today, two of the most effective and popular "new" management models are Lean and Six Sigma. Both of these models utilise the basic TQM elements and add on some extra refinements to achieve a more robust and powerful system for customer-focused product and service excellence that focuses on optimizing costs and profits.

4. Continuous improvement (PDCA Cycle)

Continuous Improvement (*kaizen*) is the nucleus and foundation of TQM. The concept of continuous improvement developed from the Shewhart Cycle or Deming Wheel, and involves a continually evolving cycle of incremental improvements over time.

The essence of continuous improvement lies in employees' involvement. This happens when they improve their process, product or services by applying their creative faculties on their work related problems and routine jobs.

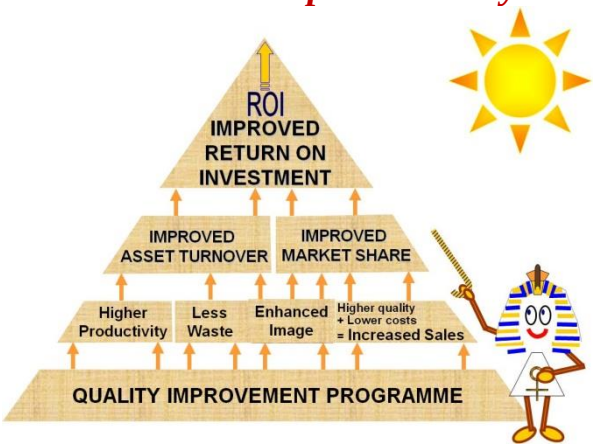
Use is often made of quality circles or small cross-functional teams (also known as process improvement teams) to pinpoint areas / processes for improvement and to implement and then monitor these improvements using the PDCA cycle:

The P-D-C-A Cycle

- ***Plan*****:** Examine existing operations, select the process for improvement, collect information, consider alternatives and plan improvement(s).
- ***Do*****:** Implement the plan and collect relevant performance data.
- ***Check*****:** Analyze the performance data, to establish if the predicted improvement was achieved.
- ***Act*****:** If the desired level of improvement is reached, implement and monitor the improved process. If not, take necessary actions.

The benefits of Continuous Improvement are illustrated in the following figure:

The Continuous Improvement Pyramid



5. Standardization of quality

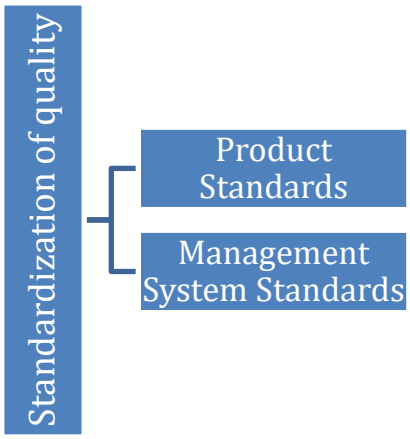
Standards are now increasingly being used as a tool for quality. Indeed, quality is the conformance to certain specifications established by the company, the client or any other body. The "specifications" are established in product standards or other normative documents. A standard can be defined as a document that provides requirements, specifications, guidelines or characteristics

that can be used consistently to ensure that materials, products, processes and services are fit for their purpose.

National standards bodies have been set up in many countries to formulate these normative documents or standards. Many of these standards are specifications for products, processes or systems. To be able to access a particular market would most probably require the compliance to the standards specified by the client and even by the regulatory authorities of the country. Standards are usually voluntary in nature, but where they can be used to protect the health, safety and environment, they can become mandatory under the various legislations enforced by the authorities of a country.

Standards for certain building materials like steel bars and cement are mandatory in many countries as such products can affect the safety of buildings. This is also the case for children's toys since the latter should not present any danger to the kids. The case of food poisoning has been very common in the recent past and in many countries standards on food hygiene or even food products have become mandatory to ensure a better protection of the health of the population.

Moreover, many buyers, including retailers now require their suppliers to demonstrate they are able to ensure consistency of the quality level of their products or services. This demands the suppliers to implement a management system which can ensure the consistency in the level of quality. In this context, standards have been established on requirements for a quality management system, which can help an enterprise to ensure consistency or even continuous improvement of the quality level.



The International Organization for Standardization (ISO) has published an international standard ISO 9001:2008 on 'Quality Management Systems – Requirements'. This standard, if implemented effectively by a supplier, will provide the necessary confidence that the latter can consistently provide goods and services that meet the needs and expectations of the client and also comply with applicable regulations. The requirements of ISO 9001 cover a wide range of topics, including the supplier's top management commitment to quality, its customer focus, adequacy of its resources, employee competence, process management (for production, service delivery and relevant administrative and support processes), quality planning, product design, review of incoming orders, purchasing, monitoring and measurement of its processes and products, calibration of measuring equipment, processes to resolve customer complaints, corrective/preventive actions and a requirement to drive continual improvement of the system. There is also a requirement for the supplier to monitor customer perceptions about the quality of the goods and services it provides.

6. Conclusion

In this unit, we have seen the part played by the different quality gurus in the evolution of quality management. Deming's 14-point management philosophy, the Total Quality Management philosophy as well as the TQM wheel and the continuous improvement cycle have also been presented. The use of standards for ensuring consistency of quality has also been indicated.

Quality management today is based not only on meeting customer expectations and regulatory requirements, but also on continuous improvement, involving everyone in the organisation. As Philip Crosby said, quality is the result of a carefully constructed cultural environment. It has to be the fabric of the organisation, not part of the fabric.

Unit 3. Cost Benefits from Quality

Introduction

There is a general misconception that that quality cost more. In fact poor quality can really end up costing more. It can certainly make a company out of business. Nevertheless, it is generally agreed that quality requires efforts and certain resources. But these can only be considered as wise and good investments.

> Quality is remembered long after the price is forgotten.
> Gucci Family Slogan

The poor quality things are what cost money. It may cost $1 to prevent a problem, $10 to find it, and more than $100 to fix it. This equation does not include the less tangible costs associated with poor quality like the damage to the image of the company.

Consequences of poor quality

Poor quality means that a product has unintentionally reached your customer with some defects, imperfection or contamination or you made some errors in service delivery. This will have some setbacks for your business and will certainly involve extra costs to you covering the following:

> Quality isn't something that can be argued into an article or promised into it. It must be put there. If it isn't put there, the finest sales talk in the world won't act as a substitute.
> C. G. Campbell

- Loss of time and efforts you spent firstly in making a defective product and then additional effort and resources you had to put in reprocessing the same to make it OK.
- The next loss is the time and effort spent by you on recalling the product from the customer. (This will only happen when you yourself come to know that by mistake a defective product has been sent to the customer).
- If the customer finds the product not conforming and makes a complaint, then it will further require your time and effort in resolving the complaint to the satisfaction of the customer.
- The next biggest loss will be if the customer remains dissatisfied and stops doing business with you.

It is likely that you may not realize the implications of costs associated with the above and keep on incurring losses which will ultimately affect your profitability. These losses can be considerably reduced if you detect the defects or defective product at the earliest. The best is if you can produce defect-free products, i.e. produce not only “right first time”’ but also “in time” which will require some effort on your part, including practicing a quality control system.

Produce ‘right first time’ and ‘in time’

The Cost of Quality

You, as owner of an export business, wish to have a reasonable return on your investment, i.e. you should be able to make a profit. This will require managing your business well and reducing costs wherever possible. Further for satisfying your customer you should meet customer requirements and deliver product at the right price and in time.

While you cannot avoid costs of labour, materials, facilities/machines, etc., you can certainly prevent the costs incurred on detection and removal of errors/defects during production. It is you who will pay for detection and removal of errors. As said earlier, if you can eliminate or reduce these errors/defects, you will certainly earn more profit.

Cost of quality has two components such as good amount spent (prevention and appraisal costs) and unnecessary amount spent (failure costs, both internal and external).

- ***Prevention cost****:* This is the money spent by you to prevent defects. This comprises, for instance, the cost of establishing your quality control system, including the cost of preparing quality guidelines, preparing procedures/instructions and training your employees on the use of these procedures, etc.
- ***Appraisal cost***: This is the money you will spend on testing, inspection and examination of your product to assess whether it has fulfilled quality requirements. This includes, for example, the wages of your quality control personnel, the cost of testing your product, the cost of maintaining and calibrating your instruments, the fee paid to an external inspection agency if hired, etc.

It is you who will pay for detection and removal of errors/defects. If you can eliminate or reduce these errors/defects, you will certainly earn more profit

- ***Cost of internal failure****:* This cost will result from the failure of product at your end to meet quality requirements prior to delivery to your customer. It covers, for example, cost spent by you on reprocessing, rework, re-testing or scrapping your products, etc.
- ***Cost of external failure***: This is the cost incurred by you due to failure of your product to meet quality requirements after delivery. It includes many items such as repair, warranties and returns of your product or the cost of recalling your product from the market or liability costs to you if any, etc. The major part of this cost to you is if you lose your goodwill or lose a customer.

The above cost of correcting internal and external failures moves exponentially. For example, if the defect arises and is detected and corrected by the worker who is responsible for that step, minimum cost of correction would be involved (say 1 USD). But this cost of correction will jump exponentially by ten times (i.e. 10 USD) if the defect is detected and corrected at a step after some additional processing on the product had been carried out.

The worst is if the defect goes unnoticed to the customer. Then, you will either recall the product or resolve the customer complaint when it arises. Now the cost involved will be 100 times than that spent in correcting the defect at first step itself (i.e. 100 USD). If it so happens that the customer becomes highly dissatisfied with your performance and stops doing business with you, then this will be the greatest loss.

You should either prevent the defect from occurring or correct it at the earliest. This way you will reduce your losses and thus increase profit. (i.e. 'A stitch in time saves nine')

The lesson learnt is that you should either prevent the defect from occurring or correct it at the earliest. This way you will reduce your losses and thus increase profit. (This will remind you of the age old saying *'A stitch in time saves nine'*).

Quality-related costs are generally thought to account for 10 to 20% of a company's total cost. Unfortunately, these costs are not normally known to you under traditional accounting methods. If they did, you would be paying equally serious attention to quality like to other management areas. You should, therefore, measure quality in monetary terms so that its impact can be communicated to all concerned in terms of 'money language', which everyone understands very well.

A typical distribution of quality costs is:

- Prevention: 5% of total quality-related costs;
- Appraisal: 30% of total quality-related costs;

One dollar extra spent on prevention can save 10 dollars of appraisal cost and 100 dollars of failure cost.

- Failures: 65% of total quality-related costs.

If you spend little extra on prevention, both appraisal and failure costs can be considerably reduced, thus generating larger profits for you from the same sales turnover. If you have an effective quality control system it will provide you adequate opportunities to reduce your quality costs and thus increase your profits even without increasing your sales

The rule 1:10:100 also applies here. This means that one dollar extra spent by you on prevention can save you 10 dollars of appraisal cost and 100 dollars of failure cost. Unfortunately like others you may also be spending heavily on internal and external failures but are shy to spend more on prevention and appraisal matters.

Like others you may also have an opinion that quality-related costs happen only in the production area. The reason for this is that quality-related costs are most visible to you here. But they are equally significant in other areas, including purchasing, marketing, design, etc.

Costs incurred for non-value adding activities

In addition to quality costs stated above, there may be many other unnecessary costs which you may be incurring to perform such activities, which are firstly not necessary as they do not add value, but will certainly add cost to you, and may affect the quality of product as well. These are called non–value adding activities such as:

- **Transport**: Sometimes you may handle goods from one place to another unnecessarily. For example shifting something farther than necessary or temporarily stocking/stacking/moving material, etc. This leads to waste of your time and energy. The reason for this could be the poor layout of your production activities, lack of good housekeeping practices at your work place, etc. (discussed in Unit 4 - Japanese 5S of this Manual).
- **Inventories**: You may be piling up 'raw materials', 'semi-finished products' and 'finished product' inventories which are not immediately needed. Such excess inventories add to your cost of operation by blocking your extra money and also needing increased transportation, storage and handling on your part. Sometimes you may have to scrap excess inventories due to limited shelf life (especially food products, chemicals, rubber items, etc.). The other reason for you to scrap them could be the change of design of the product due to market demand. The cause of this could be lack of knowledge on your part on proper inventory control.

Reduce:
- *Inventories*
- *Motion*
- *Waiting*
- *Over production*
- *Over Processing*
- *Defects*
- *Skills mismatch*

- **Motion**: Your employees may be making unnecessary movements while working. For example, a worker may be doing unnecessary body movements as material needed is kept too far, etc. The cause of this may also be poor layout of your machines, materials, etc.
- **Waiting**: For example, your machines or materials keep waiting for a worker or a worker keeps waiting for material from the previous process step. Other examples are workers waiting for information/instructions, customer waiting for completion of service or completion of paper work, etc. This requires proper balancing of workload on your part.
- **Over production**: You may be manufacturing more than immediately required. For example you produce extra since you have idle human power, or you had procured more than needed raw materials whose shelf life is going to end soon. This will be a loss if later on the excess quantity produced cannot be sold in the market or your

customer does not repeat the order which you had anticipated earlier. This requires accurate forecasting of demand and proper production planning at your end.

- **Over Processing**: You may be performing process steps which are actually not needed or demanded by the customer/market. For example you may be excessively checking your product, you may be manufacturing the product with tighter tolerances than demanded by the customer, you may be over finishing the surface of the product or you may be doing excessive packaging of your product than needed, etc. This requires a review of each step of the process and streamlining or eliminating unnecessary steps if any at your end.

> There is nothing so useless as doing efficiently that which should not be done at all.
> Peter Drucker

- **Skills mismatch**: You may be using a higher skilled worker for a simple work or deputing an unskilled worker to a job which requires a trained/skilled worker. Reason for this could be that you may not have workers with required skills or you may not be providing training to your employees before new job allocation to them.

It is quite likely that knowingly or unknowingly, the above non-value adding activities may be happening in your company. If that is the case, you may be losing 5 to 30% of your sales turnover in performing these activities. Further, these activities also have an impact on quality. In fact the first six activities may involve additional/unwanted handling of product which may deteriorate the product quality. You should make efforts to firstly identify which of the above activities are most common in your company and then take action to reduce or eliminate them.

From the list of non-value adding activities, what are those which you think most often happen in your company and then make a plan to reduce or eliminate them?

The benefits of higher quality

Unarguably, one of the most important factors influencing a business organization's ability to compete is the quality of its products compared to those of its competitors. The benefits of high quality are indeed extensive and significant:

- Higher quality than that of its competitors can result in an organization achieving top prices for its goods and / or services. Customers are often prepared to pay a price premium for the "best in class".

- Higher quality often leads to repeat business – an organization's products change from being mere *order qualifiers* to becoming *order winners*. This often results in the development of long-term customer relationships and customer loyalty.

- Higher quality frequently results in increased productivity and the lowering of costs, which in turn can translate into increasing market share.

- Higher quality boosts the image of an organization and its brands, and enhances its reputation both at home and abroad.

- Higher quality affects staff morale. People like to work for a winning company with a good reputation.

- Higher quality reduces risks relating to, e.g. safety and health, leading to fewer complaints and recalls, and thus reducing liability and insurance costs.

- Higher quality can result in increased revenues, higher profits, and increased benefits for all stakeholders: owners / shareholders, employees and the community.

On the other hand, as indicated above, poor quality can have very serious consequences for a business:

- Lower productivity and increased costs.
- Warranty / guarantee costs and product liability claims.
- Loss of business, loss of market share, falling reputation, and eventually threats to survival.

Conclusion

This unit has provided an overview of the consequences of poor quality, the costs implications of quality, the costs due to non-value adding activities and the benefits of higher quality.

To achieve higher quality, it may require some prevention and appraisal costs, which are in fact investment for reducing failure costs and eventually reducing total costs. Higher quality may enable the company to sell at a higher price since the bitterness of poor quality for the consumer remains long after low pricing is forgotten!

Quality is one of the most important strategies for competitiveness and for market access. Good management of quality costs is essential for the effectiveness of this strategy.

Unit 4. Some good quality practices and tools

1. Introduction

If better is possible, good is not enough! Indeed, what is good and accepted by consumers today will no longer be so in a near future simply because technology advances at great speed and the taste and preferences of consumers are also changing. On the other hand, globalisation is making competition fiercer for enterprises. It is really a buyers' market and the adage that the customer is king is more than ever valid. So to face competition, an enterprise is deemed to continuously improve its performance. In this unit, some good quality practices and tools commonly used by successful organisations are presented.

2. Kaizen

Kaizen was created in Japan following World War II. The word Kaizen means "continuous improvement". It comes from the Japanese words "kai" which means "change" or "to correct" and "zen" which means "good". It is a system of continuous small improvements in everything an enterprise does. The improvement can be in quality, technology, processes, company culture, productivity, safety and leadership.

If better is possible, good is not enough!

Kaizen involves every employee - from upper management to the cleaning personnel. Everyone is encouraged to come up with small improvement suggestions on a regular basis. This is not a once a month activity, but a continuous one. Certain Japanese companies, such as Toyota and Canon, receive some 60 to 70 written suggestions from each employee in one year and these are shared and implemented. These suggestions are not usually ideas for major changes, but they do contribute in making little changes on a regular basis: always improving quality, productivity and safety while reducing waste.

Suggestions are not limited to any specific area such as production or marketing. They concern any area where improvements can be made. The Kaizen philosophy is well in line with the adage "If better is possible, good is not enough" because your competitor will eventually find a better way of doing things to get you out of the market.

Kaizen in Japan is a system of improvement that applies equally to both home and business life. It is also applied to social activities. Kaizen has indeed contributed to the success of many Japanese companies. Quality circles, Just-in-time delivery, Kanban and 5S are included within the Kaizen system of running an enterprise.

Setting standards and then continually improving those standards is an important element of Kaizen. In this context, necessary resources like training, materials and supervision are needed for employees to achieve the higher standards and maintain their ability to meet these standards on an on-going basis.

The benefits of Kaizen should not be underestimated. The continual small improvements add up to major benefits. They result in improved productivity, better safety, improved quality, lower costs, faster delivery, and greater customer satisfaction. Kaizen also results in higher employee morale and job satisfaction, and lower turn-over since work is seen to be easier and more enjoyable. Employees feel they are valued as their suggestions are considered and implemented.

Kaizen gives immediate results. Many managers think that improvement can only be done through large capital intensive investment. This is not always true. We can always do better with we have. All we need is to focus on creative thinking trying to solve many small problems, which will eventually contribute in making a significant difference. Larger capital projects may still be needed, but the practice of Kaizen will even improve the processes needed for running such projects, reducing waste.

For many enterprises, Kaizen would involve a significant change in the corporate culture. This is essential. It would require a change in attitude for all employees from top management down to new recruits. Employees will have to practice Kaizen, not because of management request, but because they want it and they know its importance for them and for the enterprise.

The role of management is important for Kaizen as any other initiative. Employee training and communication is critical. Together with that, management direct involvement is crucial. It would be useful for managers to spend some time on the shop floor working with employees to help and encourage them to develop suggestions. Managers should also ensure employees see their suggestions acted on immediately. Suggestions should be implemented as far as possible on the same day. Employees should be kept informed about the outcome of their suggestions.

Problems should be seen as opportunities to learn and to improve.

Employees should see problems as opportunities to learn and should welcome them because they give them confidence and ensure promotion. Sometimes, the fear of making mistakes is a hindrance. Employees should realise that if they stumble, it is to learn in the end the secret of a more perfect walking.

3. Quality circles

What is a Quality Circle?

It is a volunteer working group of 3 to 10 persons, belonging to the same work unit, section or division who meet regularly to solve problems encountered in their work. Quality circles are known under different names by different enterprises, e.g. Work Improvement Teams, Progress Teams, etc. However, the principle is the same for all of these: Employees are those who know more about problems in their work area and therefore can help in solving these problems and make improvements.

Quality circles were first started in Japan in 1962 by Kaoru Ishikawa. The movement in Japan was coordinated by the Japanese Union of Scientists and Engineers (JUSE). The first circles were established at the Nippon Wireless and Telegraph Company but then spread to more than 35 other companies in the first year. By 1980 it was claimed that there were more than one million quality circles in Japan. The use of this tool quickly spread to many East Asian countries. It was claimed that there were more than 20 million quality circles in China at one time. Today, quality circles are being implemented in many countries in the world and they are not limited to the manufacturing sector. In India, quality circles are implemented in the education sector and the Quality Circle Forum of India (QCFI) is promoting such activities.

Different tools are used by quality circles to solve problems and these include data gathering tools such as Check Sheets, graphical tools like histograms, frequency diagrams and pie charts, the Ishikawa or Fishbone diagram to identify causes of a problem, the Pareto Chart to set priorities and the PDCA approach for continuous improvement.

Because of its social focus, a quality circle will not only improve the performance of an organisation, but also motivate and enrich the work lives of fellow employees. A typical quality circle will display a good approach to:

- Analysing the context of a problem and its situation;
- Defining exactly what the problem is and the relationship between its component parts;
- Defining and measuring the impact of a given problem;
- Identifying the real causes, ensuring that solutions effectively address the problem;
- Understand the quality objectives; and
- Provide a solution to a given problem.

The types of problems that can be solved by quality circles

Not all problems can be solved by quality circles, e.g. compensation problems can be solved by management and the trade union. Issues that are generally addressed by quality circles in enterprises include improving occupational health and safety, improving product design, and improving manufacturing process. Typical examples of problems that are commonly addressed by quality circles are :

Quality problems
⇒ Reduce percentage of defects ;
⇒ Reduce internal and external customer complaints ;
⇒ Improve customer service.

Delivery problems:
⇒ Reduce delivery delay ;
⇒ Increase daily production ;
⇒ Reduce spare parts inventory ;
⇒ Ensure better delivery by sub-contractors.

Morale problems
⇒ Reduce absenteeism ;
⇒ Improve attractiveness of work place ;
⇒ Improve skills and confidence of personnel;
⇒ Improve participation in training sessions.

Cost problems
⇒ Reduce waste of resources (human and material) ;
⇒ Reduce the deterioration of tools and machines.

Safety problems
⇒ Take better precaution when working on machines ;
⇒ Reduce slippage risk on the shop floor ;
⇒ Reduce the risk of road accidents ;
⇒ Reduce the risk of food poisoning.

Who participate in a quality circle?

- Three to ten employees working in the same unit and having volunteered to participate in the quality circle;
- The Head of the section should normally lead;
- Other persons (expert, representative of management or personnel section, etc.) who can contribute may also participate in one or several meetings according to the agenda set.

Who does what?

- The members of the quality circle express themselves, chose a particular problem, analyse the problem, propose a solution and do the necessary follow up ;
- The leader of the quality circle trains and chairs the work team, ensures liaison with management, other services and the experts consulted. He/she participates in meetings of leaders of quality circles ;
- Management assists the leader and members of the quality circle and takes into consideration and solves issues brought up the quality circle, but outside the latter's scope of actions ;
- Management may recruit a facilitator who sees to it that quality circles are well operational and effective. The facilitator should solve any conflict among quality circles or with the hierarchy and assists those which are having any difficulty ;
- The functional services provide necessary information for the work of quality circles and may even participate in certain tasks and in the application of the chosen solutions ;
- A steering committee comprising the Managing Director and other Directors as well as a representative of the trade union has the responsibility to supervise the functioning of quality circles operating in an enterprise.

How does a quality circle function?

A quality circle meets periodically: one to two hours per week or fortnight at the place of work and during the working hours. If for certain reasons they are held outside working hours, employees have to be remunerated as such. Notes of meeting are taken and 3 copies are produced : one for the quality circle, a second for the facilitator and a third for immediate supervisor of the Head of the Unit. The notes of meeting is a follow up tool for those who have a copy.

The problem solving method used has four steps:

⇒ **Expression phase:** Problems encountered by the team are discussed. This phase is divided into three steps:

- ☞ Making an inventory of the problems encountered ;
- ☞ Classifying the problems;
- ☞ Setting priorities among the issues to be addressed.

⇒ **Analysis phase** : The analysis of the various factors and causes of the problem leads to the presentation of a diagnosis.

⇒ **Problem resolution phase** : This phase proceeds according to the following process:

- ☞ Find ideas for solutions and actions options ;
- ☞ Classify and analyse these ideas, assess their relevance to the problem concerned;
- ☞ Define two or three possible solutions, develop and compare, assess the costs and consequences, advantages and disadvantages ;
- ☞ Propose the retained solution, accompanied by an implementation plan and the budget.

⇒ **Implementation and monitoring phase**: The solution is presented to management which accepts and takes all necessary measures for the implementation. The quality circle follows up and monitors the implementation and the results obtained. This allows to compare the actual outcome with what was planned. The circle may also engage, if necessary, corrective or complementary actions and possibly generalize the solution in coordination with the concerned sections or functions.

What are the benefits of implementing quality circles in an enterprise?

⇒ Improvement of the quality of products and services ;
⇒ Reduction of costs and improvement of productivity ;
⇒ Improvement in work flow (industrial and administrative) ;
⇒ Improvement in work environment, including human relationship ;
⇒ Improvement in flow of information and internal communication ;
⇒ Development of personal skills and creating opportunities for personal development by using intelligence, initiative, imagination and personal responsibility;
⇒ Improvement of staff involvement and commitment.

A few points to consider when conducting quality circles

- Begin the activity of the quality circle with a simple project, whose success will give confidence to members;
- Always speak with facts and figures to support;
- Treat everyone with respect and consideration, without blaming anyone;
- work in teams to solve problems with the participation of everyone;
- Seek the assistance of the management and employees of other departments of the company, if necessary

The art of management is not to pass ideas of leaders to the hands of the workers, but, instead, is the art of tapping all the enterprise intelligence for the benefit of all. The most important asset of an enterprise is its employees. To be competitive, the company needs a committed staff, but not a commitment to instructions. It needs high-performance teams. Management must share the adventure with those directly involved in the production, sale, service, who have good opinions, ideas and suggestions based on their daily work.

4. Good housekeeping practices (Japanese 5S)

The Japanese 5S is a good housekeeping tool which is described by five Japanese words, Seiri, Seiton, Seiso, Seiketsu and Shitsuke. The use of this tool was started in 1972 by Henry Ford in the United States as the CANDO programme: Cleaning up, Arranging, Neatness, Discipline and Ongoing improvement. The technique was popularized as 'Japanese 5S' in 1980 by Hiroyuki Hirano.

You may be thinking that 'housekeeping' is simple work and that you are already doing it. Yes, it is simple, but if it is carried out systematically, it produces results in the long term and may save you money.

The Japanese 5S consists of the following steps:

The five steps of Japanese 5S

Seiri *Sort*	*Distinguish* between necessary and unnecessary items. *Remove* the latter.
Seiton *Set in order*	*Enforce the dictum* 'a place for everything and everything in its place'.
Seiso *Shine*	*Clean up* the workplace and look for ways to keep it clean.
Seiketsu *Standardize*	*Maintain* and monitor adherence to the first three Ss.
Shitsuke *Sustain*	*Follow the rule* to keep the workplace 5S-right. Hold the gain.

Source: S.C. Arora, India.

Each step is briefly explained below. Suggested methods, examples of actions to be taken and the benefits of each step are also outlined.

1st S : SEIRI – SORT

This means distinguishing between or sorting out wanted and unwanted items at the workplace and removing unwanted items.

Suggested method and examples:

- You first decide what is necessary and what is unnecessary (unnecessary items may be found on the floor, in shelves, within lockers, in the storehouse, on the stairs, roofs, notice boards, etc).
- You should put a red tag on unnecessary items and keep them in a separate area.
- You may discard or throw away items that have not been used in the past year. Things used once in 6 to 12 months may be stored at a distance from the work station, and things used more than once a month should be available at a central point in the workplace.
- It will be good to keep things used hourly/everyday/once a week near the work station; some items may be worn by or kept in the pocket of, your workers at the work station.

Benefits of SEIRI:

- Useful floor space is saved; the time searching for tools, materials and papers is reduced; work flow is improved; the inventory cost of unnecessary items is cut.

2nd S : SEITON – SET IN ORDER

While Seiri helps in determining which items are needed, Seiton enables one to decide how they are to be kept. You arrange items in such a manner that they are easy to use, labelling them so that they are easy to find and put back. In effect, Seiton demands that there be a place for everything necessary and that everything should be in its place. Seiton puts an end to 'homeless' items.

Suggested method and examples:

- You first identify the right places for everything and put all materials and equipment at the places allocated to them with proper labels and signs. For example, you could draw outlines on tool boards, making it easy to see where each tool belongs.
- You could use floor paint marking to define working areas, paths, entrances, exits, safety equipment, cart or trolley locations, and colour coding for pipelines for steam, water, gas, drainage.
- You should display clearly written warnings, messages, instructions at proper places at the right heights. You can also use alerts or indicators to prevent out-of-stock positions.

Benefits of SEITON:

- It becomes easy to keep and take out things; you make fewer mistakes; searching time is reduced; the work environment is safer.

3rd S : SEISO – SHINE

This means removing dirt, stains, filth, soot and dust from the work area. It includes cleaning and caring for equipment and facilities and inspecting them for abnormalities.

Suggested methods and examples:

- Decide on cleaning points, order of cleaning, type of cleaning, cleaning aids required; display cleaning schedule; during cleaning look out for defective conditions (loose bolts, vibrations, excessive noise, high temperatures, fallen tools) and correct them.

Benefits of SEISO:

- The workplace becomes free of dirt and stains which is the starting point for quality; equipment life is prolonged; the number of breakdowns falls and accidents are prevented.

4th S : SEIKETSU – STANDARDIZE

Seiri, Seiton and Seiso are easy to do once but they are very difficult to maintain because they call for a systematization of practices. This means ensuring that whatever level of cleanliness and orderliness has been achieved, it should be maintained. This requires the development of a work structure that will support the new practices and turn them into habits.

Suggested methods and examples:

- Everyone in your company should use the same names for items, the same sizes, shapes and colours for signals, floor markings, etc. To achieve this, you could write guidelines for the first 3Ss and carry out periodic evaluations with the aid of checklists.

Benefits of SEIKETSU:

- Activities are simplified; consistency in work practices increases; mistakes are avoided.

5th S : SHITSUKE – SUSTAIN

Sustain also means 'discipline'. It denotes your commitment to maintaining orderliness and to practice the first 3S as a way of life. It requires your employees to show a positive interest in, and overcome their resistance to, change. For this, you should create awareness and publicize the first 3S.

Suggested methods/examples:

- Use 5S news releases, posters, slogans, etc. Your management should support Shitsuke by providing resources and leadership and you should reward and recognize the best performers.

Benefits of SHITSUKE:

- Promotes the habit of complying with workplace rules and procedures, creates a healthy atmosphere and a good workplace.

Before starting quality control activities, it is crucial first to set your housekeeping in order. Systematic housekeeping is the foundation for quality control.

5. The seven basic quality tools

In 1950, on the invitation of the Japanese Union of Scientists and Engineers (JUSE), legendary American quality guru W. Edwards Deming trained hundreds of Japanese engineers, managers and scholars in statistical process control. During his lectures, Deming would emphasize the importance of what he called the "basic tool" for quality control. Later on Kaoru Ishikawa (later known as Japanese forefather of quality), inspired by Deming's lectures, formalized the Seven Basic Tools of Quality Control.

Ishikawa, a Japanese quality guru, believed that 95% of a company's problems could be solved by using the seven QC tools.

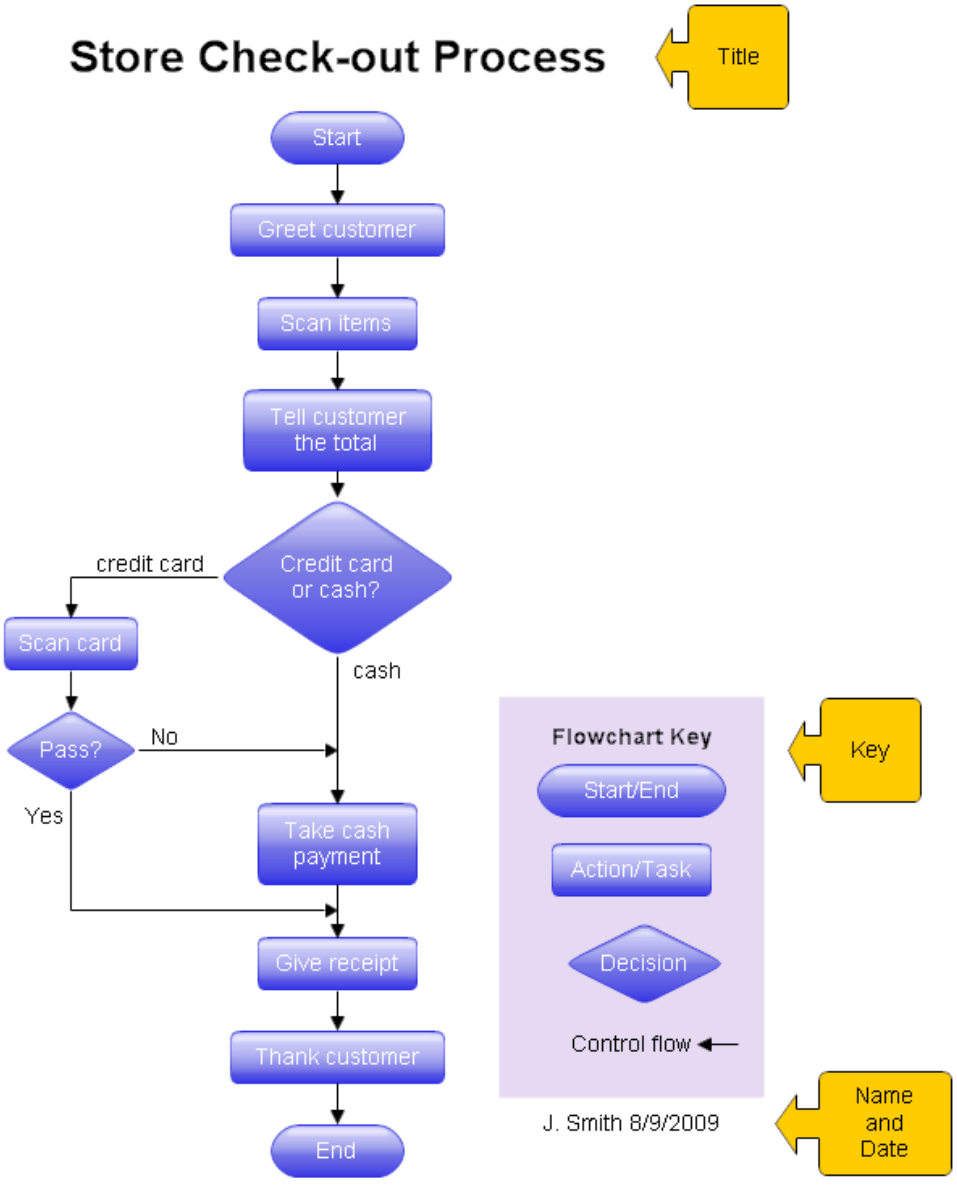
Ishikawa believed that 95% of a company's problems could be solved by using these seven tools and that, with the exception of Control Charts; these tools could easily be taught to any member of the organization. Their ease-of-use combined with their graphical nature makes statistical analysis easier for you to understand and apply them. These seven tools are:

1. Process Flow Chart
2. Check Sheet
3. Histograms
4. Pareto Analysis
5. Cause and Effect Diagram
6. Scatter Diagram
7. Control Charts

Process Flow Chart

A flowchart is a visual and sometimes detailed representation of the sequence of operations that make up a process and the relationship between them. It is often the first tool to be employed in continuous improvement as it enables one to understand the process and to identify where problems occur. Flowcharts make use commonly of three symbols in their construction: a rectangle represents an operation or procedure, a diamond represents a decision point in the process and arrows show the direction of flow.

An example of a flowchart is given in the figure below.



Check sheet

Check Sheet or Tally Chart is a simple device on which data is collected by putting a ‘mark’ against pre decided items of measurement. The purpose for which the data are collected should always be clear to you. For example check sheet can be used to track events by factors like timeliness (in time, one day late, two days late etc), reasons of failure (defects like damage of fruit caused by pest, presence of external moisture, size not uniform etc.),

number of customer complaints each day etc. An example of check sheet for recording telephone interruptions is shown below.

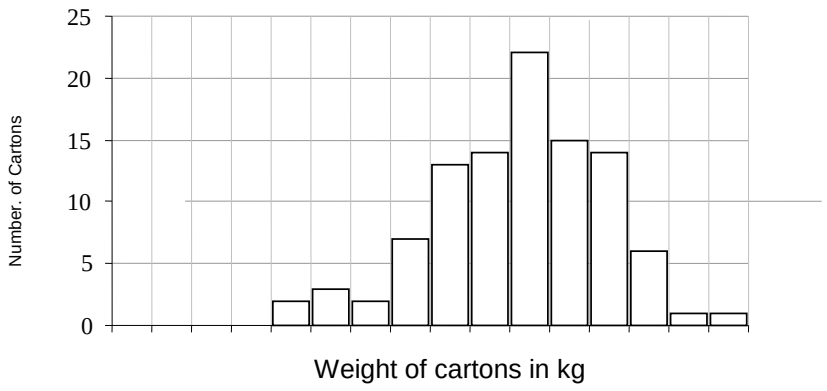
Telephone Interruptions

Reason	Day					
	Mon	Tues	Wed	Thurs	Fri	Total
Wrong number	𝍸	||	|	𝍸	𝍸 ||	20
Info request	||	||	||	||	||	10
Boss	𝍸	||	𝍸 ||	|	||||	19
Total	12	6	10	8	13	49

Check sheet for telephone interruptions in a week

Histograms

A histogram is a graphical display of tabulated frequencies, which are shown as bars. It illustrates what proportion of cases fall into each of several categories. A histogram differs from a bar chart in that it is the area, not the height, of the bar that denotes the value—a crucial distinction when the categories are not of uniform width. The categories are usually specified as non-overlapping intervals of a variable. The bars must be adjacent. The figure below is an example of a histogram.



Histogram

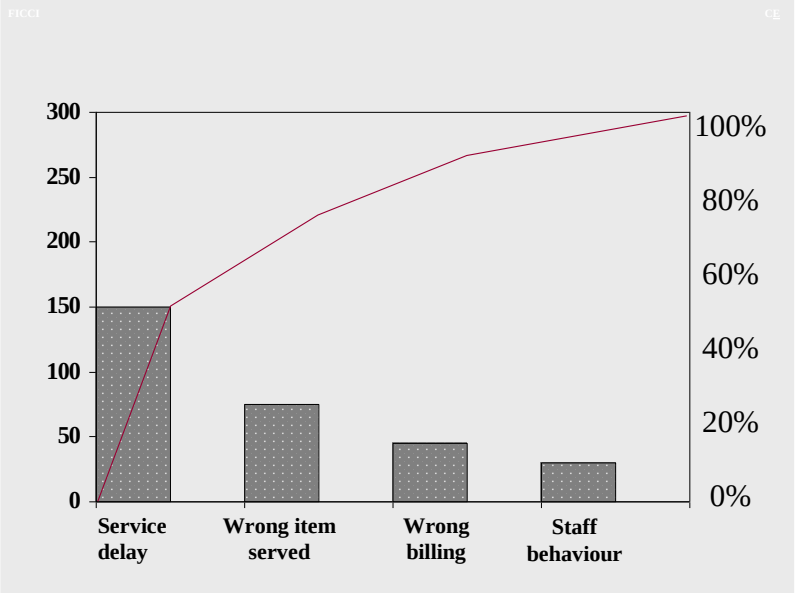
Pareto Analysis

Juran identified the phenomenon of the vital few and trivial many as a “universal” rule, applicable to many fields. He applied it in tackling quality problems and named it the Pareto Principle, after Vilfredo Pareto, an Italian economist. In a study of the Italian economy, Pareto had found that 80% of the wealth was held by 20% of the people. One of the names of this tool is also ‘80-20 Rule’ indicating that 80% of the problems stem from 20% of the causes. It helps to identify the most important areas to work with to solve problems. It is a bar graph and a line chart which shows which factors are more significant. The bar graph lists in descending order the problems affecting a process. The line chart accumulates the percentage of the total number of occurrences for each problem area.

For example the complaint data of a restaurant which is trying to analyze and prioritize the complaints received from its customers is shown in the table below. The Pareto diagram from this data is shown in the figure below.

One of the names of this tool is also '80-20 Rule' indicating that 80% of the problems stem from 20% of the causes. It helps to identify the most important areas to work with to solve problems.

Type of Complaints	Number	%	Cumulative%
Service delay	150	50	50
Wrong items served	75	25	75
Wrong billing	45	15	90
Staff behaviour	30	10	100
Total	300	100	



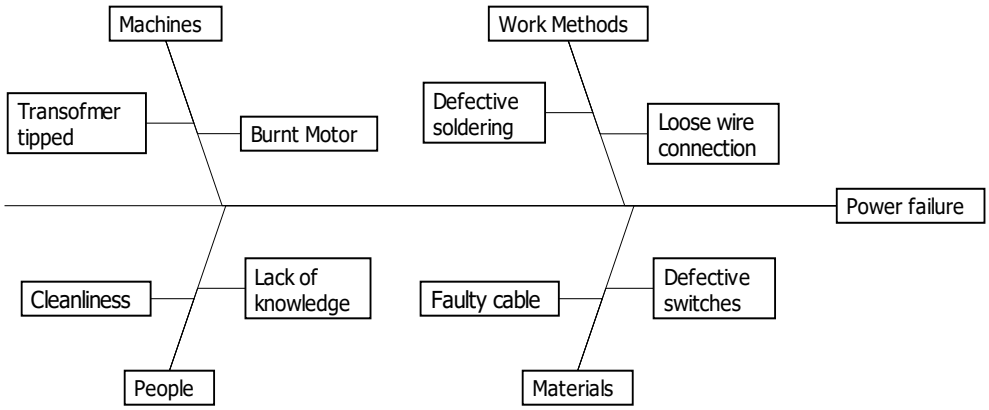
Pareto analysis of complaints received in a restaurant

The above analysis shows that 75% of total customer complaints are related 'to service delays' and 'wrong items served'. Based on this finding, the restaurant can use cause and effect diagram to figure out the root cause of these two major problems (see next tool).

Cause and effect diagram

This diagram represents the relationship between a problem and its potential causes. It is also known as fishbone or Ishikawa diagram. It deals only with factors, not quantities.

For preparing a fishbone diagram all the causes relating to a problem are collated through brainstorming amongst concerned persons. The problem is written on the horizontal arrow. All the listed causes through brainstorming are classified by themes (Human, Material, Machine, Methods etc). Each theme represents a diagonal attached to the spine of the diagram. Individual causes are listed along the diagonal. For example, the figure below shows a cause and effect diagram of factors effecting power failure.

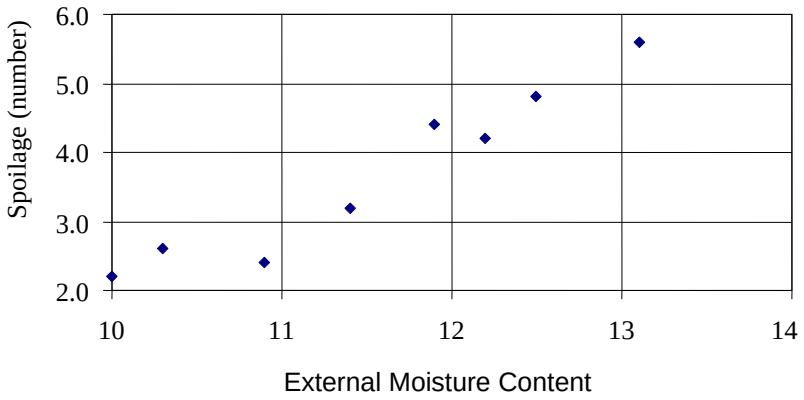


Cause and effect diagram for Power Failure

Scatter Diagram

A scatter diagram is used for studying the possible relationship between one variable and another. This can be used to test the possible cause and effect relationship. It does not prove that one variable causes the other, but it does make it clear whether a relationship exists and the nature of strength of the relationship.

Usually the horizontal axis in the scatter diagram is the one over which you have control. Each data point as observed is plotted and then look at the pattern. More closely the dots group along an axis, the stronger the correlation. More scattered they are, the weaker the correlation. The next figure shows an example scatter diagram showing positive relationship. In this diagram the x axis for example could be external moisture content in fresh fruit and the y axis, the number of spoilt fruits after a certain period.



Scatter diagram – Positive relationship

Control Charts

Control charts are pictures of variations found in a process. The data of measurement or observations are plotted on graphs against time. These charts comprise of two lines called UCL (upper control limit) and LCL (lower control limit). These are not the same as specification tolerances. If the results of measurements exceed these limits, then the 'cause' needs to be investigated and action taken on it immediately. For reducing variations found in the process, fundamental changes would be needed in methods, machines or materials or other factors.

Control charts can be plotted for variable or continuous data (like weight of bag, temperature of a cold storage, time of baking, speed of a conveyor, etc.). Control chart for variables consist of mean and range chart (see figure below).

Control charts can also be plotted for attributes or discrete data (such as number of defects found in a lot, number of cracks in a piece, number of missing stitches in a leather purse, % delays in shipments or % delays in responding to customer complaints, etc.). In case of such attributes data two most popular charts are control chart for number of defective items in a lot known as 'np – chart' and proportion of defective items known as 'p chart'.

Control charts help to monitor and control quality by acting as a set of process "traffic lights" and are valuable in all types of activities.

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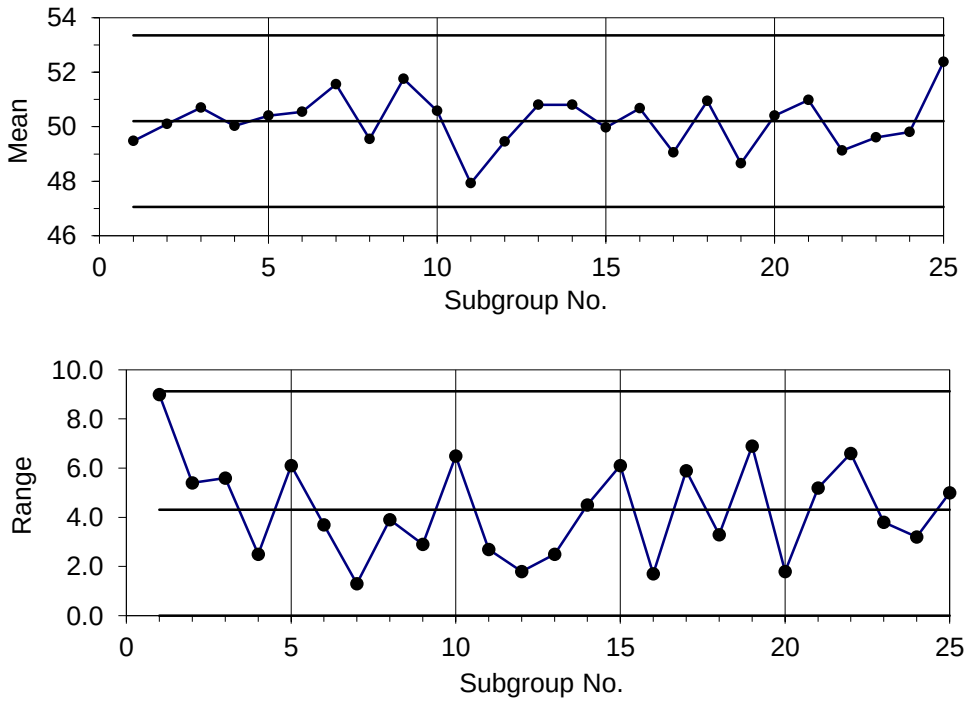


Mean and Range chart

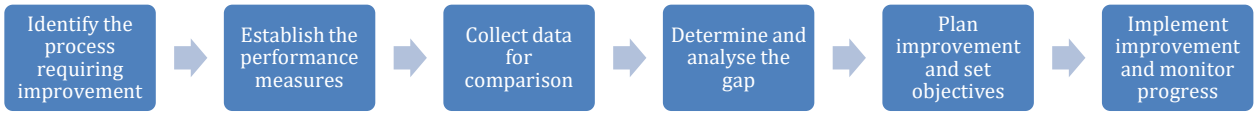
6. Benchmarking

Benchmarking is looking for *best practices* that will bring about superior performance by learning from others. This is the essence of continuous improvement – making small incremental improvements over time on the never-ending journey towards excellence. Xerox Corporation developed *competitive benchmarking* in order to retain and improve its market share in a very competitive market.

Definition: Benchmarking is a systematic procedure that compares an organization's processes or products against those of competitors *as well as* industry leaders in order to identify gaps and areas for improvement.

It involves the identification, adaptation and implementation of processes and procedures (or practices) in all aspects of business that are used by world leading organizations in order to improve overall performance and to maintain the drive for continuous improvement. Benchmarking involves asking "How are we doing compared to other organizations?"

The steps to be followed during the benchmarking process are given below.



7. Business process re-engineering

But sometimes small continuous improvement (kaizen) is not enough - these small incremental improvements can reach their limit and then a major change is required to enhance performance e.g. new capital equipment to improve both quality and output. Business Process Re-engineering (BPR) is a breakthrough strategy. Its originators, Michael Hammer and James Champy define BPR as follows:

Definition : Business Process Re-engineering is the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance such as cost, quality, service and speed.

BPR comprises five major steps which managers should follow:

- Refocus organisation values on customer needs;
- Redesign core processes, often using information technology to enable improvements;
- Reorganize a business into cross-functional teams with end-to-end responsibility for a process;
- Rethink basic organizational and people issues;
- Improve business processes across the organisation.

BPR is used to improve performance substantially on key processes that impact on customers. BPR can reduce costs and cycle time by eliminating unproductive activities. Reorganisation by teams decreases the need for management layers, accelerates information flows, and eliminates the errors and rework caused by multiple handoffs. BPR improves quality by reducing the fragmentation of work and establishing clear ownership of processes. Workers gain responsibility for their output and can measure their performance based on prompt feedback.

8. Just In Time (JIT)

Inventory can be considered as waste since it incurs storage costs and there may be deterioration of quality. The Just-in-Time inventory system aims at having the right material, at the right time, at the right place, and in the exact amount.

JIT is a ‘pull’ system of production, so actual orders provide a signal for when a product should be manufactured. Demand-pull enables a firm to produce only what is required, in the correct quantity and at the correct time. This means that stock levels of raw materials, components, work in progress and finished goods can be kept to a minimum. This requires a carefully planned scheduling and flow of resources through the production process. New SCM and CRM softwares can now be used to improve communication on work flow with suppliers and customers.

Supplies are delivered right to the production line only when they are needed. For example, a car manufacturing plant might receive exactly the right number and type of tyres for one day’s production, and the supplier would be expected to deliver them to the correct loading bay on the production line within a very narrow time slot.

JIT has several advantages:

- Reduce stock holding means a reduction in storage space which saves rent and insurance costs;

- Reduce working capital is tied up in stock;
- Reduce likelihood of stock perishing, becoming obsolete or out of date;
- Avoid the build-up of unsold finished product that can occur with sudden changes in demand;
- Reduce time spent on checking and re-working the product of others as the emphasis is on getting the work right first time

9. Conclusion

In this unit, we have looked at some of the good quality practices and tools that are used by enterprises to improve their performance both in terms of quality and productivity. These tools included Kaizen, quality circles, Japanese 5S, the basic seven quality tools, benchmarking, business process re-engineering and the Just in Time system.

It is to pointed out the tools described in this unit will only be useful and effective if there is adequate management commitment to provide necessary support to the implementation of the related activities. The attitude of the employees is also important and management has to create the necessary environment to motivate them and inspire them to contribute their full potential to continuous improvement. We should not forget that employees are the most important asset of any organisation and successful companies are those that know how to nurture interdependent and interpersonal relationships.

Unit 5

Defining and communicating requirements to suppliers

Introduction

A supplier has to understand that his/her product (including service) will have to meet the requirements of his/her target market for its acceptance on that market. The requirements may be those of the clients, the consumers and those of the government of the country.

Many suppliers develop their own specifications or standards for their products based on an existing standard or on the market requirements. Some suppliers may even exceed these requirements to differentiate their offer from others' and win a competitive advantage.

On the other side, buyers may require that the products supplied to them comply with certain national, regional or international standards. Some buyers have developed their own specifications or standards which are imposed on their suppliers.

Products that can have impact on health, safety, security and on the environment are usually controlled by the government regulatory bodies. The government usually intervenes on the market through technical regulations and sanitary/phytosanitary (SPS) measures to ensure the health of the population, protection of plants, animals and environment, safety, security, consumer protection and fair trade. Therefore, any supplier of such products will have to ensure compliance with the relevant technical regulations and SPS measures over and above any additional requirements of its customer.

What is a standard

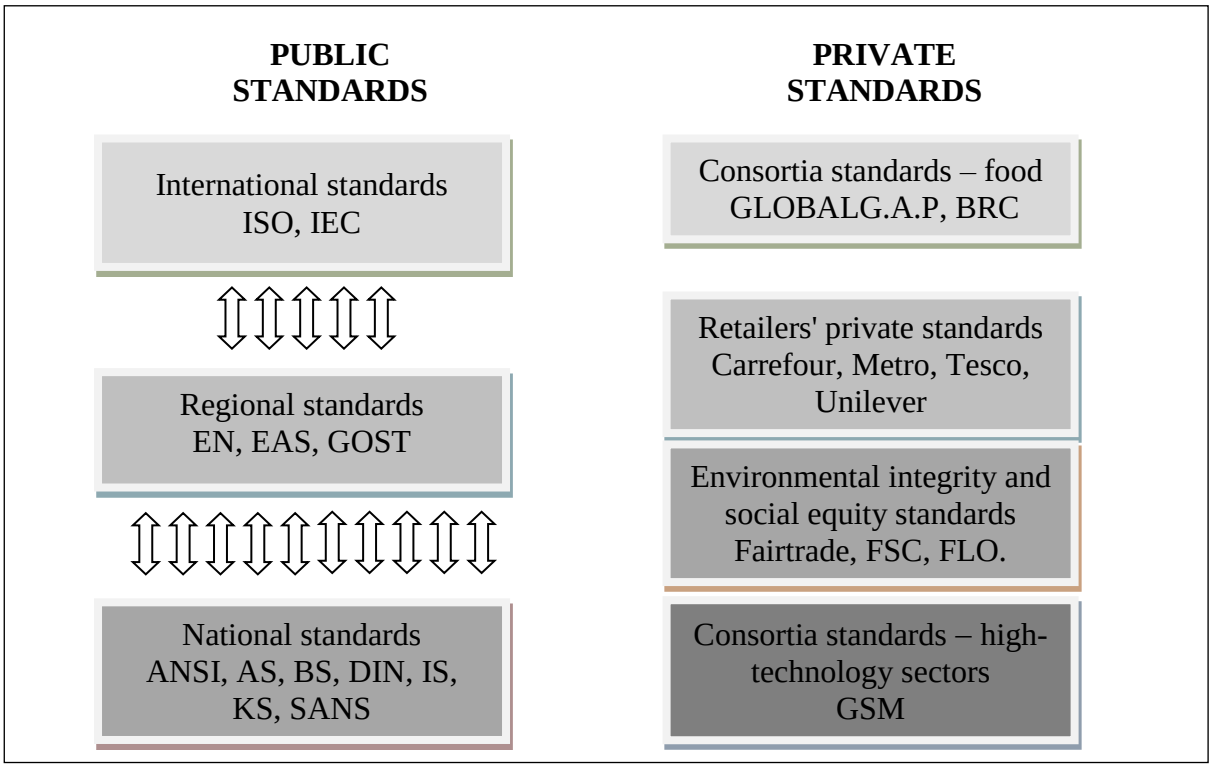
A standard is a document that pins down the characteristics of a product or a service. These characteristics may cover design, weight, size, performance, environmental requirements, interoperability, materials, production process or service delivery or even the protocols that allow computers or mobile phones to connect to each other. The standard may include or deal exclusively with terminology, symbols, packaging, marking or labelling requirements as they apply to a product, process or production method.

Standards can be categorized as public standards and private standards. Public standards are developed and published by recognized organizations, usually standardization organizations. This takes place at the international, regional and national levels. The figure below cites examples of public and private standards at the various levels.

When public standards are developed, the needs and wishes of many stakeholders are taken into consideration, i.e. they are developed with consensus principles in mind. This implies that the standards will make the same demands on all suppliers and on all consumers, and that externalities such as health, safety and environmental considerations have been considered.

Among the typical international standards are those published by the International Organization for Standardization (ISO), the International Electrotechnical Commission (IEC), the International Telecommunication Union (ITU), the Codex Alimentarius Commission (CAC), the World Organisation for Animal Health (OIE), the International Plant Protection Convention (IPPC) and others. Probably the best known regional standards are the harmonized standards (EN) of the European Union, but there are other standards such as the State Standards (GOST) of the States of the former Soviet Union and the East African Community standards (EAS).

Diversity of standards



Source: Martin Kellermann, South Africa.

National standards are published by more than 150 countries worldwide, and are far too numerous to list here. Among the typical national standards are those of the American National Standards Institute (ANSI), the Australian Standards (AS), British Standards (BS), the standards of the German Institute for Standardization (DIN), Indian Standards (IS), Korean Industrial Standards (KS) and South African National Standards (SANS). It is difficult to quantify the number of public standards in the world, but Perinorm, a bibliographic database, for example, has a list of more than 700,000 standards, which covers only the most important public standards. Hence, public standards are everywhere in today's world, defining much of the way people, products and processes interact with each other and with their environment.

Standards are developed by technical committees established by national standards bodies, regional and international standardization organizations, representing all the stakeholders. The way in which standards are developed is guided by ISO/IEC Directives and by the requirements of Annex 3 of the WTO Agreement on Technical Barriers to Trade (TBT) (see section 11). National technical committees are useful vehicles for ensuring that the interests of the suppliers are considered, but it means that such suppliers have to become members of the committees and actively participate in their proceedings. The same applies to regional and international technical committees.

Standards are available from national standards bodies, or direct from the international organizations mentioned above. They are in the form of hard copies or are in electronic format, either as a CD-ROM or as PDF files accessible online. Standards developed by ISO and IEC are subject to copyright, and have to be purchased. This is also true of most national standards, even those that are adopted from international or regional standards. Other international standards, i.e. those from CAC, OIML and similar intergovernmental organizations, are obtainable free from the respective website.

What are private standards

Many standards are developed outside the auspices of national, regional, and international standards bodies. The reasons for the development of these standards are many and varied.

Organizations such as major retail chains apply detailed requirements to the products they wish to trade in, the oil industry operates worldwide on similar technical requirements and the vehicle manufacturers of the United States developed common standards for the supply of certain parts (i.e. SAE standards, SAE being the Society of Automotive Engineers). Suppliers band together to gain market advantages in supplying products with similar technology. For instance, the music CD was a joint Philips-Sony standard, and the GSM standards (Global System for Mobile Communications) for mobile phones are agreed to by a few manufacturers. These standards are generally known as private standards. Some private standards eventually end up as public standards if their growing market relevance warrants it, or the marketing advantage is no longer an issue for the originators.

Private standards are developed by specific non-government groupings, i.e. sectoral organizations including non-governmental organizations, consortia, certification bodies or major retailers. Private standards are generally geared to meet the needs of those who develop and publish them and are not intended for mandatory application by the government. Private standards usually require certification of suppliers. However, the decision by a supplier to obtain certification is always a business decision, depending on whether it will be profitable to do so.

Private standards can be loosely divided into four groups:

- **Consortia standards in the food and horticulture domains** : Examples are the European Retailer Group's good agricultural practice (GLOBALG.A.P.) and the British Retail Consortium (BRC) standards. They are important because the European Union is one of the largest importers of food in the world. These standards have been developed by consortia of European and British retailers that wish to ensure that their suppliers meet all the regulatory food safety requirements, as well as the additional requirements set by the retail organizations themselves, including social accountability. For these standards, sophisticated certification systems have been established and if you wish to export food and horticultural products to EU, certification may help you to gain market share or increase profitability. Certification, however, is not cheap, nor is it mandatory. Deciding to seek it is a pure business decision based on the level of competitiveness that the exporter wishes to achieve.

- **Retailers' private standards** : Sometimes called niche standards, retailers' private standards have a huge impact on suppliers to the large multinational retail chains such as Carrefour, Metro, Tesco, Unilever and Wal-Mart. These companies have developed their own standards for agricultural produce and processed food for competitive or brand protection purposes; they may expand their standards into other areas in the future.

  They apply highly detailed standards to their purchases for a number of reasons. Among these are: to ensure that products coming from suppliers are in the form that will minimize costs and maximize their profits; to ensure that they are selling only products that conform with official requirements (public standards, technical regulations and SPS measures); to minimize their liability for legal action by dissatisfied customers; to ensure that products conform with the ethical views of their clients on matters such as animal welfare and environmental protection; and to persuade customers that the goods being offered for sale are better because they are safer or of higher quality as a consequence of the use of private standards.

  If a supplier wishes to provide products to these major retail organizations, then these products will have to comply with niche standard requirements. The impact of such niche standards on trade can be enormous. On a positive note, these retail organizations frequently provide substantial support to SMEs in meeting their standards. However, fulfilling the requirements of one purchaser may not guarantee that the requirements of other purchasers will be met.

- **Standards related to environmental integrity and social equity**: Private standards are important in the more developed markets where many consumers are concerned about issues such as child labour, environmental protection, fair trade, genetically modified foods and similar matters. Buyers may insist that products destined for such markets have been produced in a manner that does not violate their social or environmental concerns. Relevant recommendations come from organizations like Social Accountability International, with its SA 8000 standard, for good social conduct in industry, the Forest Stewardship Council (FSC) for

standards in the wood and paper industries, and the Fairtrade Labelling Organizations International (FLO). Demonstrating compliance, i.e. through certification, to such private standards is therefore important to gain a competitive edge.

- **Consortia standards in high-technology sectors**: A fourth group of private standards are important in specific, usually high-technology, sectors; the GSM standards for the mobile-phone industry are an example of such standards. The compliance and certification demands of these sectoral private standards are as varied as the standards and the sectors themselves; hence, a proper study of the requirements of the sector is indicated before any decisions are made.

Buyers like retail chains specify the attributes that they want in the goods they purchase. They argue that by doing so they are more able to meet their customers' requirements. However, international trade problems arise, especially where purchasers like the big retail chains in developed countries wield enormous market power in comparison with small-scale suppliers in developing countries. These problems are exacerbated when different purchasing organizations apply different private standards on the same suppliers, or if there is a significant cost to the suppliers in demonstrating that they are meeting the purchasers' standards.

In part because of concerns raised by developing countries that multiple private standards raise the costs of compliance, private-sector retail organizations have moved to consolidate the standards of individual companies into industry-wide standards in order to avoid unnecessary adverse impacts on international trade.

ITC has developed a tool called the Standards Map which provides users with information enabling them to analyse and compare information on voluntary standards operating in over 200 countries, and certifying products and services in more than 80 economic sectors. The Standards Map (www.standardsmap.org) is a partnership-based effort to enhance transparency in voluntary standards and to increase opportunities for sustainable production and trade.

What is a technical regulation

Technical regulations are not standards, but these two are sometimes confused with each other because they seem alike. Technical regulations could be stand-alone documents, but they could also be based on standards or may reference them. Whereas standards are considered voluntary in principle, i.e. suppliers and buyers can choose to implement them or not, technical regulations are mandatory in nature, i.e. everybody has to comply with them by law.

A technical regulation is a document or legislation that lays down *product characteristics* or their related processes and production methods. A technical regulation may also include or deal exclusively with terminology, symbols, packaging, marking or labelling requirements as they apply to a product, process or production method. In all cases, a technical regulation would include the *administrative measures* required to implement it. For example, it can identify the regulatory authority, list the conformity assessment requirements, and provide for market surveillance responsibilities and the implementation of sanctions in case of non-compliance. The building blocks of a typical technical regulation are shown in the figure below.

Technical regulations are formulated and implemented by a variety of government ministries or regulatory agencies or both, depending on the practices and legal system of the country. Technical regulations are given a range of different names. In the European Union, they are called Directives, Regulations, Decisions. In some countries, they are called Compulsory or Mandatory Standards, sometimes even Compulsory Specifications or just simply Regulations.

Technical regulations can apply to all industrial and agricultural products. An agricultural product may therefore be subject to both technical regulations and SPS measures. It also happens frequently that a specific product is subject to more than one technical regulation, e.g. a fax machine may be subject to electrical safety requirements, to electromagnetic interference (EMI) requirements and to connectivity requirements with regard to the communication network of the country. Furthermore, these three technical regulations may even be administered by three different regulatory agencies.

The spread of information on technical regulations, the diversity of the regulatory agencies responsible for their administration, and the variety of inspection, testing and certification requirements – all these factors may make it difficult for a supplier to obtain relevant information and to ensure compliance with all the requirements for the product that is to be exported or marketed. Although the WTO Agreement on Technical Barriers to Trade (TBT) endeavours to ensure that technical regulations do not act as unnecessary barriers to trade and are harmonized with international standards as much as possible, the world is still far from attaining that goal. Suppliers therefore have to ensure that they obtain the correct information on their products for their target market before marketing and shipping them in order to prevent major disappointments, unanticipated costs or financial losses

What are sanitary and phytosanitary measures?

Sanitary and phytosanitary (SPS) measures are requirements imposed on goods by governments to control certain kinds of risks to human, animal or plant life and health. Most SPS measures are concerned with the maintenance of food safety, and the protection of animal and plant health against pests and diseases. Sanitary measures deal with the protection of the life or health of humans or animals; phytosanitary measures deal with the protection of the life or health of plants.

The function performed by governments in keeping out exotic animal and plant pests and diseases of plants and animals is often called biosecurity. According to FAO (Food and Agriculture Organization of the United Nations), biosecurity is a strategic and integrated approach encompassing the policy and regulatory frameworks for analysing and managing risks in the sectors of food safety, animal life and health, and plant life and health, including the associated environmental risks.

The WTO Agreement on the Application of Sanitary and Phytosanitary Measures (the SPS Agreement) defines sanitary and phytosanitary measures as any measure applied to:

- Protect human life or health from risks arising from additives, contaminants, toxins or disease-causing organisms in food and beverages, or from diseases carried by animals or plants or their products, or from pests;
- Protect animal life or health from risks arising from additives, contaminants, toxins or disease-causing organisms in feedstuffs, or from diseases carried by animals or plants, or from pests, diseases or disease-causing organisms;
- Protect plant life or health from pests, diseases or disease-causing organisms; and
- Prevent or limit other damage to a country from the entry, establishment or spread of pests.

Food standards enforced by government agencies to ensure the safety of foods, and biosecurity controls enforced at international borders to keep out exotic animal and plant pests and diseases are typical SPS measures.

The measures also cover those taken to protect the health of fish and wild fauna, as well as forests and wild flora. Environmental provisions to protect consumer interests or the welfare of animals other than as defined above do not fall within the purview of the SPS Agreement.

The measures include all relevant laws, decrees, regulations, requirements and procedures. These may stipulate end product criteria; processes and production methods; testing, inspection, certification and approval procedures; quarantine treatments and requirements for the transport of animals or plants, and for the materials necessary for their survival during transport. They may also impose obligations in regard to statistical methods, sampling procedures and methods of risk assessment. Finally, they may prescribe packaging and labelling requirements directly related to food safety.

What are the requirements for the export of food and agricultural products?

Exports must always conform to the official requirements imposed by the government of the importing country (mandatory requirements), and with the commercial requirements of the importer (purchaser's requirements). Food and agricultural products are subject to sanitary and phytosanitary controls and technical regulations and standards that vary from country to country and sector to sector.

Regulatory requirements will include compliance to products standards e.g. for certain food commodities of popular interest, labelling requirements, additive standards (permitted use of food additives, maximum levels of use, conditions of use), microbiological standards, maximum level of contaminants and others, as well as legislation for specific foods. This specific legislation may usually be categorized according to product group such as Cereals; Meat, Eggs and Fish; Fruits and Vegetables; Edible Oils; Dairy Products; Non-alcoholic Beverages; Alcoholic Beverages; Sugars and Honey; Special Purpose Foods . Therefore food companies would need to classify their products under the given categories and comply with the stipulated regulation for that product group. To comply with requirements mentioned above, some tests are required to be performed by an accredited laboratory or other laboratories recognized by the importing countries.

The Codex Alimentarius Commission was created by FAO and WHO to develop food standards, guidelines and related texts such as the codes of practice under the Joint FAO/WHO Food Standards Programme. It aims to protect the health of consumers, ensure fair trade practices in the food trade, and promote coordination of all food standards work undertaken by international governmental and non-governmental organizations. Some of the important Codex Committees are the Codex Committee on Contaminants in Foods, Codex Committee on Fish and Fishery Products, Codex Committee on Food Additives, Codex Committee on Food Hygiene, Codex Committee on Food Import and Export Inspection and Certification Systems, Codex Committee on Food Labelling and the Codex Committee on Fresh Fruits and Vegetables. As required by the WTO Sanitary and Phytosanitary (SPS) Agreement, many countries base their food regulations on the Codex standards, which are recognised as international standards.

Over and above the requirements specific for the products, suppliers may be required to implement food safety methodology like the Codex Hazard Analysis and Critical Control Points (HACCP) or food safety management system like ISO 22000. Many countries have made it mandatory for certain food suppliers to implement HACCP.

There is also a proliferation of private standards for food and agricultural products. In this context, the Global Food Safety Initiative (GFSI), a non-profit foundation created under Belgian law, benchmarks existing food standards against food safety criteria. It is also looking to develop mechanisms for exchanging information in the supply chain, to raise consumer awareness and to review existing good retail practices.

Food labelling requirements

These vary from country to country, however unless specifically exempted, a food label should contain the following essential information:

- Prescribed Food Name
- List of Ingredients (ingredients should be listed in descending order at time of manufacture. When an ingredient is the product of two or more ingredients, the compound ingredient may be declared and should be immediately accompanied by a list, in brackets of its ingredient in descending order of proportion).
- Mandatory warning, advisory statements or allergens declarations (as specified by the regulations of the importing country).
- Net weight or volume (where applicable)
- Date mark ("Used By", "Best Before")

- Nutrition Information Panel
- Instructions for use or storage (for public health and safety)
- Country of origin
- Name and address of the business, manufacturer or importer

What are the requirements for textile products

The International Organization for Standardization (ISO) has developed and published hundreds of international standards on textiles. These can be found in the ISO online catalogue. The list is very helpful, and referring to the four main ISO committees involved might ease the search further. These are TC 38 Textiles, TC 94/SC 13 Protective clothing, TC 219 Floor coverings and TC 221 Geosynthetics. In spite of the existence of these international standards, few if any have been adopted by all countries. Many national and regional standards remain.

National and private standards bodies also publish extensive collections of standards for textiles and textile products. Here are two examples:

- In China, a whole suite of new standards for textiles was published in 2008 for implementation, replacing many outdated standards.

- The American Society for Testing and Materials (ASTM) has published two handbooks with a collection of more than 350 textile-related ASTM test methods, practices and specifications covering the uses of textiles, nomenclature, characteristics and properties.

Some of the mandatory technical requirements for textiles and clothing in the European Union are to be found in the REACH Directive. This Directive, for example, disallows the use of certain products in the manufacture of textiles and clothing such as azo dyes, organotin compounds, dimethyl fumarate substances and the like. In the United States, the US Consumer Product Safety Commission has been given the mandate to implement safety requirements for marketed textile products, e.g. fire resistance and the banning of certain types of children's upper body garments that incorporate drawstrings as these are considered a 'substantial product hazard'.

Clothing and other goods manufactured from textiles is big business, and the large retail organizations and specialized trading companies will have their own ideas regarding standards for these goods. These may relate to the design of the clothing, the technical requirements for the fabric and manufacturing processes, labelling and packaging and other matters. This contrasts with the general lack of mandatory technical requirements for clothing in almost all countries, quite unlike textiles which have to comply with a number of technical regulations.

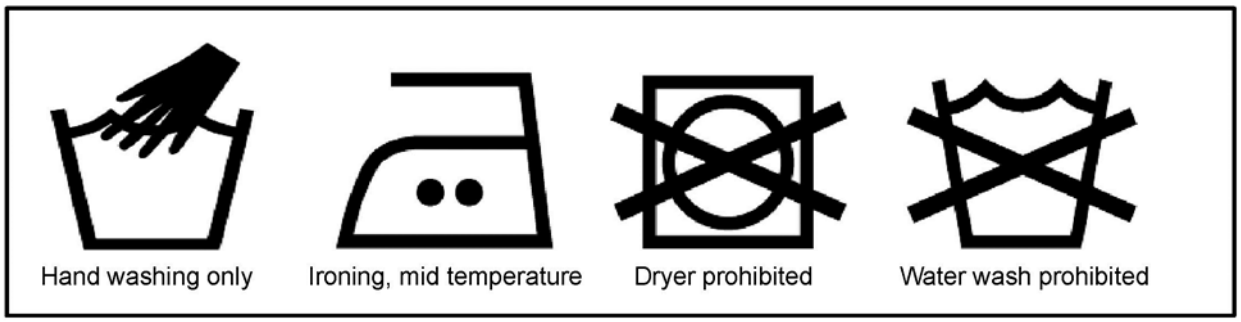
The exporter therefore has to find out exactly what these buyer-specific requirements are, and which testing and certification regimes are demanded. Mandatory technical requirements for textiles cannot be ignored by the clothing manufacturers either. They will have to ensure that the cloth, yarn and other manufacturing inputs do comply with the mandatory requirements, otherwise the clothing fashioned from them may not be allowed in the marketplace.

As regards conformity assessment, some of the major retail organizations operate their own textile testing laboratories, whereas others rely on independent accredited laboratories and certification organizations for these services. Many national standards bodies in textile-producing countries have established textile laboratories.

Labelling

Some countries have technical regulations requiring the proper labelling of textiles. In the United States, for example, any product that is exclusively composed of textile fibres, or a product containing at least 80% by weight of textile fibres, has to carry a label indicating the fibre content, e.g. cotton 80% polyester 15% nylon 5%. The types of names that must be used are also prescribed. Some products that contain textile fibre are exempt from these requirements, including tobacco pouches, footwear, sails, oven gloves. The European Union has similar fibre content requirements in place.

The other information that must appear on labels has to do with how the textile products are to be cared for. Examples are how warm they can be washed; whether they should only be dry-cleaned; whether they can be spin-dried or ironed, and if so at what temperatures. These labels differ slightly from country to country. Hence, the correct pictograms have to be obtained for each market. Typical examples are shown in the figure below.



Clothing sizes

No recognized international system for clothing sizes has been implemented so far, hence clothing has to be marked specifically for the market it is destined for. A man's dress shirt marked 15 in the United States would be the equivalent of a size 38 shirt on the European continent. For women, a 12 in the United States would translate roughly into a 14 in the United Kingdom and a 42 in France.

In the European Union, two mandatory standards have been in operation since 2006 to replace the many national systems, namely: EN 13402-1: Terms, definitions and body measurement procedure and EN 13402-2: Primary and secondary dimensions. In contrast, there is no mandatory standard in place in the United States, and a whole series of customs and practices have evolved over the years, starting with the US standard clothing sizes which are slowly being replaced by US catalogue clothing sizes.

A few countries make use of the ISO standards on clothing sizes. These are ISO 3635:1981 Size designation of clothes – Definitions and body measurement procedure, ISO 8559:1989 Garment construction and anthropometric surveys – Body dimensions, and ISO/TR 10652:1991 Standard sizing systems for clothes.

Private certification standards

Probably no consumer product is more affected or targeted by social, ethical and environmental demands than textiles and clothing. Hence certification to SA 8000 (social accountability), Fairtrade (ethical considerations) and WRAP (environmental concerns) may be required to gain market acceptance. Quite a few eco-labelling type schemes exist that could be applied to textiles and clothing and in some markets these are important parameters for marketing success. There are several additional schemes and programmes specific to textiles and clothing e.g. the Woolmark, the Global Organic Textile Standard (GOTS), The Textile Exchange (previously Organic Exchange), the Better Cotton Initiative (BCI) and the Oeko-Tex.

Environment Regulations

In many countries, governments have introduced various environmental protection laws demanding more environmentally friendly products, greener manufacturing practices, stricter reduction on the use of hazardous substances, better recycling practices and clearer product stewardship. However, these laws can eventually become technical barriers to trade which exporters increasingly find daunting to comply with.

Such laws include the EU legislation on the Restriction of Hazardous Substances (RoHS) and on Registration, Evaluation, Authorisation, and Restriction of Chemicals (REACH).

The RoHS Directive 2002/95/EC was implemented by the European Union on 1 July 2006. Subsequently, countries like Japan, Korea, China and the United States have also introduced similar regulations. RoHS restricts the use of hazardous substances in electrical and electronic equipment (EEE) to specified concentration levels. It affects EEE exporters, manufacturers, as well as businesses in their supply chains. All exports of electrical and electronic products to the EU must contain a reduced amount of hazardous substances, namely lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE). The main objectives of the directive are to:

- eliminate or minimise the hazardous substances in the production, treatment and disposal of electrical and electronic equipment (EEE), and
- reduce the waste from EEE and improve or maximise their reuse, recycling and recovery.

A revised version of RoHS entered into force in 2011 and is commonly known as EU RoHS (Recast) Directive 2011/65/EU. It repeals the original RoHS Directive 2002/95/EC indicated above.

The EU REACH legislation is implemented since 1 June 2007. This EU Regulation, No 1907/2006 and its series of amendments, requires registration of all chemical substances in quantities above one tonne per year which are manufactured or imported into the EU. This also applies to substances in preparations or in articles (i.e. products) where there is potential for release of these substances into the environment. One of the objectives of REACH is to improve protection of health and the environment. The European Chemicals Agency (ECHA) is responsible for managing all REACH registrations, carrying out dossier evaluation and coordinating the substance evaluation process. It also serves as an expert advisory to the EU Commission in the authorisation and restriction of chemicals. ECHA also handles requests for registration exemptions and facilitates sharing of test data during the pre-registration stage through formation of the Substance Information Exchange Forum (SIEFs).

There are presently new developments in environment regulations, e.g. carbon footprint declaration. Carbon footprint can be defined as the total greenhouse gas (GHG) emissions caused by an organisation, event, product or person. It is usually calculated by its carbon dioxide (CO_2) equivalent. A product's total carbon footprint is the sum of the GHG emitted at each stage of its life cycle (e.g. raw material, transportation, fuel, manufacturing, distribution, usage and disposal of products). Life cycle assessment databases and carbon calculators can be found in various websites.

The resulting carbon footprint figure can be used in labelling of products so that customers can become aware of the amount of GHG emissions accompanying their purchases and be able to make an educated decision when selecting products. It can also be used for declaration of materials' carbon footprint which will help companies to identify inefficient processes with high GHG emissions. They will thus be able to make decisions that further reduce their carbon footprint, as well as that of their end products.

The International Organisation for Standardisation (ISO) has developed several international standards that guide companies in quantifying, reporting and reducing GHG e.g. ISO 14064, ISO 14065, ISO 14066 and ISO 14067.

Several countries have set up voluntary carbon labelling schemes, e.g. Australia, Japan, Korea, Taiwan, Thailand and the United Kingdom.

Packaging requirements

The subject of packaging requirements is complex, but generally these requirements have to be addressed from the marketing point of view and at the regulatory level for aspects related to legal metrology, packaging integrity and the environmental impact of packaging materials.

Marketing requirements

The actual design or look of the packaging plays an important role in your marketing success. Packaging is the first thing a potential customer sees, and good design is essential to grabbing his or her attention and directing it to your product among all the other products on offer. This usually means that you have to have your packaging designed by a specialist designer. Packaging institutes and many trade promotion organizations (TPOs) can be of assistance in this regard. The major retailers often have very specific requirements for packaging and labelling, with which you as supplier need to comply.

Trade metrology requirements

There are quite a few mandatory metrological requirements in place in various countries for packaging. Most countries have established legal or trade metrology (sometimes called 'weights and measures') requirements for pre-packaged goods. These deal not only with net quantity requirements, but also with the proper labelling of the package as well as the maximum amount of allowable unfilled space in the package.

These requirements are usually based on the Recommendations (R 79 and R 89) of the International Organization of Legal Metrology (OIML), which can be downloaded freely from the OIML website. The net quantity requirements are based on what is called the average system, which means that the average actual quantity in a package has to be at least that declared on the package if the average is calculated from the production lot or consignment. There are also conditions for the variation of net quantity within the lot so that the risk of a consumer having a short measure is minimised.

Packaging integrity and environmental concerns

If technical regulations or SPS measures are in place for a produce or product, these often carry packaging requirements for the product or produce in question. Many countries impose general packaging requirements to ensure the continued integrity of packaging during transport and regulate the environmental impact of packaging when it is disposed of.

Management system requirements

All organizations – profit or not-for-profit, large or small- have a management system through which it conducts its activities. The management system may be formal or informal and it comprises different parts or sub-systems which try to address the different needs and expectations of stakeholders, such as customers, suppliers, shareholders, employees and society. Many organizations make use of standards to respond consistently to these needs and to manage specific aspects of their performance such as those related to quality, food safety or the environment. In recent years, there has been an increase in the development and use of such management system standards in response to stakeholder demands.

ISO has developed several management system standards. A few commonly used ones are given below:

ISO 9001:2008	Quality management systems – Requirements
ISO 14001 : 2004	Environmental management systems -- Requirements with guidance for use
ISO 22000: 2005	Food safety management systems -- Requirements for any organization in the food chain
ISO 27001: 2005	Information technology -- Security techniques -- Information security management systems – Requirements
ISO 50001:2011	Energy management systems -- Requirements with guidance for use
ISO 28000:2007	Specification for security management systems for the supply chain

The above are international management system standards. There may also be other management systems like OHSAS 18001 which deals with occupation health and safety and which was created via a concerted effort from a number of national standards bodies, certification bodies, and specialist consultancies.

As indicated in section 3 above, there are also several private standards which are imposed by certain big retailers and which your management system has to incorporate and address.

Depending on the type of product you supply and your market in which you are interested, you may therefore be required by your customer or by the regulatory bodies controlling the market to implement any of the above management system and be certified to the relevant standard by an accredited certification body.

Even if you are not required by your market, the implementation of management standards may be of benefit to you as such standards can give you a competitive advantage. This is indeed the case for ISO 9001 where more than one million organisations are certified to ISO 9001, though in many cases it is not a requirement of either the buyer or the regulatory bodies. Many companies use their ISO 9001 certification for marketing purposes.

The WTO Agreements on TBT and SPS

The World Trade Organization (WTO) was established in 1995 after the Uruguay Round of multilateral trade negotiations, which took place from 1986 to 1994. Its overriding objective is to help trade to flow smoothly, freely, fairly and predictably. It does this, inter alia, by administering trade agreements and rules, monitoring Members' trade policies, settling trade disputes and assisting developing countries on trade policy issues through technical assistance and training programmes.

WTO is a forum for governments, and businesses can be represented only through their governments. Although businesses cannot obtain direct assistance from WTO, they can participate in the training programmes that the organization promotes. WTO Members agree by consensus on the rules and regulations that are to be applied multilaterally. They do not lose their sovereignty when they take decisions with their partners on these rules.

The WTO Agreements take into account the different levels of economic development in member countries, and the differing commercial and economic policies of their governments.

Background to the WTO Agreements on TBT and SPS

There has been an increase in non-tariff measures such as standards, technical regulations, conformity assessment procedures and sanitary and phytosanitary measures in most countries following the reduction in tariff barriers. Because non-tariff measures can constitute barriers to trade, WTO Members established the Agreement on Technical Barriers to Trade (the WTO Agreement on TBT) and the Agreement on the Application of Sanitary and Phytosanitary Measures (the WTO Agreement on SPS) to lay down international rules for the establishment and application of standards, technical regulations, conformity assessment procedures, and sanitary and phytosanitary (SPS) measures.

A provision of the Agreements calls for WTO Members to use international standards as a basis for their technical regulations and SPS measures unless the use of international standards would be an inappropriate or ineffective means of achieving the desired policy objective or desired level of protection. Where international standards have been used as a basis for technical regulations and SPS measures, it is presumed that these do not create unnecessary obstacles to trade. Although both Agreements are signed by governments, their goal is to help business obtain market access for regulated products by providing a framework to ensure that non-tariff measures dealing with technical requirements will not create arbitrary or unnecessary obstacles to trade.

Because the Agreements impose similar but not identical requirements on importing countries, it is critically important to sort out which are SPS and which are TBT measures. SPS measures are those that conform with the definitions in Annex A of the SPS Agreement, covering, for instance, such matters as pesticide residues in fruits and aflatoxins in peanuts. All other technical barriers to trade come under the TBT Agreement.

The WTO Agreement on TBT

The premise of the WTO Agreement on TBT is that WTO Members are allowed to adopt technical regulations, standards and conformity assessment procedures for legitimate objectives like protection of the environment, prevention of deceptive practices, protection of human, animal or plant life or health, provided they do not constitute unnecessary obstacles to trade. It applies to both industrial and agricultural products but excludes SPS measures and services. It imposes the following obligations on WTO Members:

- To use international standards as a basis for technical regulations and international guides or recommendations for conformity assessment procedures, wherever relevant standards are available, as long as they are not an ineffective or inappropriate means of pursuing the national policy objectives (i.e. legitimate objectives);

- Not to discriminate between imported products by their origin (most-favoured-nation or MFN principle) and between imported and domestic products (national treatment principle) in the application of technical regulations and conformity assessment procedures;

- Not to require retesting or recertification if the technical regulation in the exporting country has been recognized as equivalent or the results of conformity assessment procedures are covered by a mutual recognition agreement;

- To notify WTO and consider comments from other WTO Members before finalizing technical regulations or conformity assessment procedures that would affect international trade if relevant international standards, guides or recommendations do not exist or do not cover the technical content of the technical regulations. Members are required to provide adequate time (at least 60 days) for other Members to comment on the notified measure. Additionally, the TBT Committee recommends a minimum of six months between publication and entry into force of a technical regulation, to allow exporters, particularly those from developing and least developed

countries, time to adapt to the regulation and comply with its requirements. WTO Members are allowed to impose technical regulations immediately in response to urgent situations.

The WTO Agreement on TBT has established a Code of Good Practice for the Preparation, Adoption and Application of Standards to ensure that standardizing bodies which adhere to this code:

- Accord the same treatment to national and foreign products in their standards;
- Ensure that their standards are not prepared to create unnecessary obstacles to trade;
- Participate in the development of international standards;
- Publish a work programme every six months;
- Usually allow a period of at least 60 days for comment on draft standards and take into account these comments before finalizing the standards.

The WTO Agreement on SPS

The premise of the WTO Agreement on SPS is that WTO Members have the right to adopt SPS measures to protect human, animal or plant life or health but these must not constitute unjustifiable discrimination between Members or a disguised restriction on international trade. It applies to SPS measures associated with food and agricultural products, but not with quality issues, e.g. grade and weight, which are dealt with in the WTO Agreement on TBT. It obliges regulatory bodies:

- To base their measures on international standards, international guides or recommendations developed by the Codex Alimentarius Commission, the International Office of Epizootics, and under the auspices of the Secretariat of the International Plant Protection Convention;
- To accept measures of exporting countries as equivalent if they achieve the same level of SPS protection;
- To base measures on science and an appropriate assessment of risks, and inform WTO and consider comments from other WTO Members before finalizing them if international standards, guides or recommendations are not available or a higher level of protection is needed and the measures being drawn up would affect international trade. Members are allowed to impose SPS measures immediately in response to urgent situations.

Technical Requirements - Information Sources

One of the main problems faced by potential exporters is the lack of information on the standards, technical regulations and conformity assessment procedures applicable to products in target markets. You have the following options to obtain such information.

Your trading partner is the best contact point for you to give information about any technical regulatory requirement applicable to your product.

You can also search information from internet. This will require some prior knowledge to reach to the relevant site.

Your country's National Enquiry Points (NEPs) can give you information as given below. (The WTO Agreements on TBT and SPS require that each member country should establish NEPs which are able to answer all reasonable enquiries from other member countries and interested parties, including business organizations, and provide relevant documents on technical regulations, SPS measures and conformity assessment procedures adopted or proposed to be adopted by the member country). If your country is not a WTO Member, you can still contact the NEPs in your target market.

For voluntary standards, you may get information from your National Standards Body (NSB) which keeps a collection of its own standards, and it may also have collection of national standards of other countries and also that of international standards.

Conclusion

As indicated in this unit, when exporting products you should be aware that there may be mandatory requirements established by the government of the importing country, which means your product has to comply with these requirements before it is allowed to access the market in that country. However, that is not enough as your product has also to meet the specific requirements set up by your buyers.

You should know the specifications according to which you, as a product or service provider, should make and deliver the product or service to your customer. While framing specification limits for your product or service, i.e. your own standard, you should keep in view :

- the needs of the user, customer, retailer or any other stakeholder in your supply chain;
- the requirements provided for in national and/or international standards as applicable to your export product;
- the requirements relating to product safety and health hazards provided for in the statutory and regulatory requirements of the exporting/importing country and regional bodies like the European Union, if applicable to your export products;
- the requirements relating to Sanitary and Phytosanitary (SPS) measures (if applicable to your export products) which aim to protect life and health of humans, animals and plants.

There is no way to operate competitively without using the best standards, whether a company's goal is to capture the market in its hometown or in other countries around the world. Good companies use the best standards. Great companies develop them!

UNIT 6

Using management systems standards as criteria for evaluating suppliers

1. What are management systems?

A management system is simply the way an organization manages its processes, people and other resources so that its products or services meet organizational objectives and stakeholder requirements such as those of customers, suppliers, shareholders, employees and society.

A management system is usually a combination of policies, processes, procedures, training, forms and records that enable your business to operate effectively to meet its objectives.

The Plan-Do-Check-Act (PDCA) cycle is the operating principle of all ISO management system standards. By following this cycle, you can manage and continually improve your organization's effectiveness:

- Plan – set objectives and develop plans (analyse your organization's situation, establish overall objectives, set interim targets and develop plans to achieve them).
- Do – implement your plans.
- Check – measure/monitor your actual results against the planned objectives.
- Act – Take actions to correct and improve your plans to get better results.

At whatever level you are in the business, the PDCA cycle is very useful in achieving continual improvement.

In this unit, the main management system standards will be presented, including those relating to quality management, the environmental management, food safety and social accountability.

2. Quality management system standards

The ISO 9000 family of standards represents **an international consensus on good quality management practices**. It consists of standards and guidelines related to quality management systems (QMS) and supporting standards. The ISO 9000 family comprises the following four main standards:

ISO standards and contents

Standard	Content
ISO 9000:2005	Principles, fundamental concepts and terms used in the ISO 9000 family of standards.
ISO 9001:2008	Requirements of a quality management system to enable an organization to continually satisfy its customers and regulatory requirements. It is the only standard in the ISO 9001 family against which organizations can be certified.
ISO 9004:2009	provides guidance to organizations to support achieving sustained success with a quality management approach.
ISO 19011:2011	Provides guidance on auditing management systems, including the principles of auditing, managing an audit programme and conducting management system audits, as well as guidance on the evaluation of competence of individuals involved in the audit process, including the person managing the audit programme, auditors and audit teams.

ISO 9001 is applicable to all sectors of industry, including manufacturing and service, and to organizations of all sizes. It is not a product standard but a management system standard to demonstrate an organization's ability consistently to provide products or services that meet

customer and regulatory requirements. ISO 9001 specifies 'what' is required to be done by an organization but does not indicate 'how' it should be done, thus giving you great flexibility in running your business.

Furthermore, ISO 9001 does not set any particular level of quality. You and your customers do that. The standard will only help you to achieve the level you want. For example, if you set an objective that 99% of the time you will meet your delivery commitments, the system will help you to achieve that.

At both national and international levels, certification to ISO 9001 by accredited certification bodies has received wide acceptance. More than 1.1 million of certificates have been to organisations in around 180 countries.

The ISO 9000 family of standards is increasingly becoming a symbol of quality in both the manufacturing and services industries. It engenders greater customer loyalty as implementation ensures that customer needs and expectations are continually met, giving customers less or no reasons to complain. More and more small and medium-sized firms are choosing to adopt the ISO 9000 family of standards – often because their customers expect them to have it. Adherence to the ISO standards can also be publicized to gain market access abroad, because many foreign buyers place a premium on these standards.

Sector specific standards

ISO 9001, being a generic standard, could be used by any sector of industry, including the hardware, processed materials, services and software sectors. However, specific industry sectors, such as the automotive, telecommunications, aerospace, medical devices, oil and gas, and information technology sectors, felt the need for specific QMS requirements in addition to those included in ISO 9001. This led to the development of sector-specific QMS standards, both by ISO and by industry groups, as indicated below.

ISO/TS 16949:2009 – Quality management systems – Particular requirements for the application of ISO 9001:2008 for automotive production and relevant service part organizations

ISO 13485:2003 – Medical devices – Quality management systems – Requirements for regulatory purposes

ISO 15378:2011 Primary packaging materials for medicinal products – Particular requirements for the application of ISO 9001:2008, with reference to Good Manufacturing Practice (GMP)

ISO/TS 29001:2010 – Petroleum, petrochemical and natural gas industries – Sector-specific quality management systems – Requirements for product and service supply organizations

In addition to the sector-specific standards which can be used for certification as well, ISO has developed the following guideline standards and international workshop agreements (IWAs). The latter are ISO documents produced through workshop meeting(s) and not through the technical committee process.

ISO/IEC 90003:2004 – Software engineering – Guidelines for the application of ISO 9001:2000 to computer software

ISO 16106:2006 – Packaging – Transport packages for dangerous goods – Dangerous goods packagings, intermediate bulk containers (IBCs) and large packagings – Guidelines for the application of ISO 9001

ISO 22006:2009 – Quality Management Systems – Guidelines for the application of ISO 9001:2008 to crop production

IWA 1:2005 – Quality management systems – Guidelines for process improvements in health service organizations

IWA 2:2007 – Quality management systems – Guidelines for the application of ISO 9001:2000 in education

IWA 4:2009 **–** *Quality management systems – Guidelines for the application of ISO 9001:2008 in local government*

The above guideline standards and IWAs do not add to, change or otherwise modify the requirements of ISO 9001:2000 or ISO 9001:2008 and are not intended for use in contracts for conformity assessment or for certification. However, they help the organizations concerned in developing ISO 9001 QMS for the above products and services and then to obtain certification against ISO 9001.

The eight management principles of ISO 9001

ISO 9001 is built around the following eight management principles:

a. **Customer focus**: The customer is king and your business exists because of the customers. You need to understand current and future customer needs. You should meet customer requirements and strive to exceed customer expectations.
b. **Leadership**: An organisation can move forward only when a sense of purpose and direction has been created and shared by all employees. This can only be achieved through effective leadership. Leaders establish the unity of purpose and the direction of the organization. Leaders should create and maintain an environment where people can become fully involved in achieving the organization's objectives.
c. **Involvement of people**: The greatest asset of any organisation is its people. Organisations that do well are those that fully involve their people so that the latter can offer their best abilities for the organisation's benefit.
d. **Process approach** Results are achieved more efficiently when activities and related resources are managed as a process.
e. **System approach to management**: When you identify, understand and manage interrelated processes as a system, it contributes to the organization's effectiveness and efficiency in achieving its objectives.
f. **Continual improvement**: Continually improving your organization's overall performance should be a permanent objective as competition is becoming fiercing and new technologies are emerging.
g. **Factual approach to decision making**: Any organisation has to take decisions, which may affect its performance or even existence. Effective decisions have to be based on the analysis of data and information.
h. **Mutually beneficial supplier relationships**: An organisation and its suppliers are interdependent and a mutually beneficial relationship improves the ability of both to create value.

The requirements of ISO 9001

<u>Planning aspect</u>

Management of an organisation is required to:

- Find out what the customer’s current and future needs and expectations are (Customer focus);
- Use the above information obtained from the customer to write a quality policy that is relevant to your organisation (Quality Policy);

- Establish measurable objectives for the organisation to achieve your aims for quality (Quality Objectives);
- Allocate responsibilities and authorities, and establish effective processes to achieve the above objectives (Planning of the system);
- Review the system at regular intervals to ensure that it is working properly and it meets its purpose. Improve the system where necessary, making sure that appropriate resources are provided (Management Review)

Management has also to ensure that appropriate communication processes are in place within the organisation and that the effectiveness of the quality management system is well communicated.

There are three types of resources which are needed to implement the system: people, infrastructure and work environment. You have to ensure the people in your organisation have the right competencies and skills. You have to determine and provide the appropriate infrastructure, which includes the facilities and equipment needed to perform effectively. You have to look at the work environment, i.e. the conditions under which work is performed and ensure that this is appropriate for meeting customer's requirements.

The doing aspect

Now that management has provided the commitment, the sense of direction for the organisation and the necessary resources to do the job, ISO 9001 gives you also a set of requirements for managing the work you do. You have to plan the product or service realisation from the point where the customer makes a request right through delivery and beyond if necessary. This will involve defining different processes like sales, design and development, purchasing, production/operational/service activities and delivery. You have to ensure that for each process people know their role and are competent to do the tasks in line with the organisation's policies, procedures and objectives.

The check and act aspect

Your work does not stop once you have delivered to the customer. You should find out whether your customer is satisfied. There are also other measurements of the system's performance that you should take and analyse, and identify the areas for improvement.

ISO 9001 requires:

- the monitoring of customer perception. This can be done in many different ways relevant to your business, e.g. customer satisfaction surveys, customer data on delivered product quality, lost business analysis, compliments, warranty claims, etc.;
- Internal audits to be conducted at planned intervals to ensure that your system is effectively implemented and maintained and things are going to plan;
- monitoring and measurement of products and processes. Individual processes drive the system and it is important that they operate effectively and efficiently. Products should also be measured and monitored to ensure that they meet the customer's requirements;
- Control of non-conforming products to ensure that if something goes wrong, procedures are in place to have control on the problem and to deal with it appropriately.

Implementing the standard effectively will produce data indicating how effective your system is. These data can indicate areas for improvement of the system.

Continual improvement of the effectiveness of the quality management system is one of the key objectives of ISO 9001 and it has to be achieved through the quality policy, quality objectives, audit results, analysis of data, corrective and preventive actions and management reviews.

Benefits of ISO 9001

If you implement and keep practicing the system well it will provide you with a number of benefits such as:

- Quality will be seen as everyone's responsibility instead of being the sole responsibility of the quality control inspector or manager.
- QMS will provide you with a means of documenting the company's experience in a structured manner (quality manual, procedures, instructions, etc.).
- You will generate savings, as the costs of reprocessing, rework, repeat inspections, replacing products, penalties due to delayed deliveries, customer returns, customer complaints and warranty claims will gradually fall.
- You will be able to secure your customers' loyalty as their needs and expectations will be continually met, leading to more business opportunities for you.
- You can use ISO 9001 for publicity to win more sales.
- You get preferential treatment from potential customers who themselves have implemented ISO 9001.
- Export marketing will be easier for you, as many foreign buyers place a premium on ISO 9001 systems.
- You will have a level playing field with large companies when bidding for new contracts.
- Obtaining certification will reduce the frequency of audits of your system by different customers.

The biggest benefit to be gained from maintaining a QMS (which is an investment in preventing failures) is the huge savings you can make by considerably reducing the cost of failures.

3. Environmental management system

Organizations around the world as well as their stakeholders are becoming increasingly aware of the need for environmental protection. To enable organizations to manage environmental issues proactively, ISO has developed the ISO 14000 family of environmental management standards. Its two main standards are: 'ISO 14001:2004 Environmental management systems - Requirements with guidance for use' and 'ISO 14004:2004 Environmental management systems - General guidelines on principles, systems and support techniques'.

ISO technical committee TC-207, which is responsible for developing the ISO 14000 family, has since 1996 been developing standards in other areas as well, such as environmental labelling, life cycle assessment, greenhouse gas management and related activities, and carbon footprint of products.

ISO 14001:2004

ISO 14001 is the world's most recognized framework for environmental management systems (EMS). The overall aim of an EMS based upon ISO 14001 is to support environmental protection and the prevention of pollution in a balance with socio-economic needs.

ISO 14001 can be implemented by any type (public, private, manufacturing, service) and size (small, medium-sized or large) of organization. An EMS based upon ISO 14001 provides a framework to help you identify those aspects of your business activities that have significant impacts on the environment, to set objectives and targets to minimize those impacts, and to develop programmes to achieve targets and implement other operational control measures to ensure compliance with your environmental policy.

ISO 14001 does not establish a minimum level of environmental performance. Rather, it requires you to achieve the objectives for environmental performance that your management has set in your environmental policy. It also requires you to demonstrate a commitment to complying with the applicable environmental legislation and to the continual improvement of your environmental performance.

It will be possible for you to integrate your ISO 14001 EMS with your ISO 9001 QMS as they are compatible with each other.

The impact of the environmental performance of an organization goes beyond its customers and suppliers to a broader range of stakeholders - ordinary citizens, regulators, employees, insurance companies and shareholders. Everyone has an interest in the quality of the environment around them. Thus, demonstrating compliance with an environmental management system based on ISO 14001:2004 is a sound business decision.

Certification to ISO 14001 has been constantly increasing. By the end of December 2011, a total of 267 457 certificates had been issued to organizations in 158 countries.

Applicability to the services sector

Although the implementation of ISO 14001 seems to be more popular in the manufacturing sector, it is equally applicable to the services industry. Public utility organizations like power-generating and power supply units, water supply agencies, waste collection and disposal agencies, domestic fuel and gas supply agencies, petrol stations dispensing petrol, diesel oil and gas to the public, and transport companies belong to the services sector. The implementation of ISO 14001 EMS will enable such entities to control their environmental aspects and minimize their environmental impact. For example, transport services could use less petrol, have more efficient and better tuned engines, and follow more efficient routes.

In addition to these public utility organizations, other services providers have made effective use of ISO 14001 EMS. Examples are hotels, construction agencies and general office services. A hotel can make substantial savings in power, fuel and water consumption by implementing ISO 14001. General office activities generate large quantities of waste such as computer monitors, printers, cartridges, telephones, cameras and other electronic devices (popularly called e-waste) which need to be safely disposed of. The implementation of ISO 14001 in offices can assist the organizations concerned in the handling, handling, recycling and disposal of e-waste.

ISO 14001 and compliance with environment-related legal requirements

The overall aim of ISO 14001 is to support environmental protection and the prevention of pollution. To achieve this broad objective you will need to develop and implement an environmental policy. This policy should provide for the following, among others:

- A commitment to continual improvement and the prevention of pollution.
- A commitment to comply with legal and other requirements related to the environmental aspects of your activities, products and services.

To demonstrate compliance with environmental legal requirements the following system elements of ISO 14001 will need to be implemented.

- As a first step, identify and obtain access to the environmental legal requirements applicable to your business activities and ensure that while setting up your EMS these legal requirements are kept in mind.
- Take the legal requirements into account while setting up your environmental objectives and targets.
- To achieve the above objectives and targets, set up environmental management programmes covering roles, responsibilities, resources, procedures and the time frame needed to achieve them.
- Your employees should be aware of the importance of conformity with your environmental policy (including the commitment to comply with legal requirements).
- Your employees should also be aware of the consequences of departures from specified requirements (including legal requirements).
- All operations that are associated with compliance with legal requirements should be planned and operational control procedures for the same should be followed by all concerned.
- Periodically evaluate compliance with applicable legal requirements.
- Identify any instances of non-compliance with legal requirements (or foreseeable non-compliance) and take prompt action to identify, implement and verify preventive and corrective action taken.
- Maintain records of compliance with legal requirements.
- While conducting periodic internal audits, assess issues related to legal compliance.
- Use information on changes to, or new, legal requirements when making modifications to your EMS.

Benefits of implementing an ISO 14001 EMS

There are several costs associated with implementing and maintaining an EMS, like training and sensitisation of personnel, assessing the current status of waste and pollutant generation in your company, revamping certain pollution abatement equipment or installing new ones and periodic testing of effluent. However, there are many tangible and intangible benefits which will offset these costs. These important benefits include the following:

- Enhanced public image leading to improved business opportunities, for both domestic and export trade.
- Many customers, including governmental procurement agencies, use ISO 14001 EMS as one of the criteria for evaluating their potential suppliers. The implementation of ISO 14001 EMS will give you an edge over other suppliers.
- Improved compliance with legislative and regulatory requirements will reduce penalties and remediation costs.
- EMS will help reduce incidents of release of uncontrolled pollutants and oil or chemical spills, for example, and thus cut expenses associated with their recovery.
- Cost savings can be obtained from recycling and reusing materials.
- One of the objectives of EMS is the reduction of waste and its possible reuse and recycling, which will result in lower disposal costs.
- Employees will have a safer work environment, thereby improving productivity, lowering the number of sick days and reducing insurable risks.

Here are some examples of the benefits that can be gained from an effective EMS.

In Singapore, SGS-Thomson has saved US$ 200,000 by improving the energy efficiency of its cooling plant. Another company, Sony Display Devices, has saved about US$ 7.5 million a year by

eliminating raw material wastage. Baxter, which has obtained ISO 14001 certification, has disclosed savings and cost-avoidance of up to US$ 3.4 million by implementing an environmental management system.

A medium-sized manufacturer of precision fittings for the automotive and refrigeration industries identified inefficiencies in its oil recovery procedures in the course of the EMS implementation. By addressing the problem, the firm expects to realize more than US$ 20,000 per year in savings. Another manufacturer reported a 70% reduction in waste disposal costs as its ISO 14001 EMS was put into place.

Larger companies may not find it too difficult to implement the EMS – they have financial strength and economies of scale. However, many SMEs are likely to have problems in adopting environmental controls because of their lack of resources.

Some governments are therefore providing SMEs financial support for implementing EMS. For example, in Singapore, the government agency SPRING (Standards, Productivity and Innovation Board) has extended its Local Enterprise Technical Assistance Scheme to give financial assistance to SMEs wishing to implement EMS and gain certification to ISO 14001. In India, financial assistance is provided to SMEs for acquiring quality, environmental and food safety (HACCP) management systems.

4. Food Safety System Standards

Every person has the right to expect that the food he/she eats is safe and will not cause injury or illness. The hazards related to food safety are known as biological, chemical and physical hazards, which, if present in food, may cause injury or illness to the human being. In this section, two systems will be presented, namely the HACCP and ISO 22000.

HACCP

Hazard Analysis and Critical Control Points (HACCP) is defined as “a system, which identifies, evaluates and controls hazards which are significant for food safety” (FAO). HACCP is a proactive concept. It helps to ensure that food is safe from harvest to consumption (‘from farm to fork’). Each step involved in food production, i.e. purchasing, receiving, storage, processing, packaging, warehousing, distribution up to the point of consumption is subjected to hazard analysis and necessary controls are introduced. The premise is simple: if each step of the process is carried out correctly, the end product will be safe.

HACCP was first developed in 1960 in the early days of the space programme. NASA (National Aeronautics and Space Administration) wanted assurance that food taken on board space flights would not cause food-borne diseases. As a result of this requirement, the Pillsbury Company and the United States Army Natick Research Laboratories developed a process that would ensure production of safe food; the process was named HACCP.

In 1993, the Codex Alimentarius Commission (CAC) published guidelines for the application of the HACCP system. Later, in 1997, CAC incorporated HACCP into an appendix of the ‘Recommended International Code of Practice General Principles of Food Hygiene (latest version: Rev.4-2003).

The HACCP system consists of seven principles, which give an outline of how to establish, implement and maintain a HACCP plan.

Seven principles of the HACCP system

1. Conduct a hazard analysis	Prepare a process flow diagram covering all steps from receipt of raw material to dispatch of finished product. Identify likely hazards at every process step. Describe the measures for control of hazards at each process step.
2. Determine the critical control points (CCPs)	Analyse each step by using the decision tree. Identify the steps (points) where control is critical for assuring the safety of the product.
3. Establish critical limits	Fix critical limit for control measures relating to each identified CCP (e.g. temperature, time, speed, pH, moisture content)
4. Establish a system to monitor control of the CCP	Decide on monitoring procedure, which should cover the nature of monitoring (observation, testing), monitoring frequency and responsibility for monitoring and recording monitoring results.
5. Establish corrective action to be taken when monitoring results indicate that a particular CCP is not under control.	Develop procedures for dealing with the deviation from critical limits when it occurs and how to bring the CCP back into control, including disposition of the affected product produced during deviation.
6. Establish procedures for verification to confirm that the HACCP system is working effectively.	Develop procedures for verification to confirm that the HACCP plan is working (e.g. periodic audit, random sampling and analysis, review of the HACCP system and its records)
7. Establish documentation on all procedures and records appropriate to the HACCP principles and their application.	Prepare and follow procedures and work instructions for each control measure, including those needed for maintaining hygiene conditions; keep records.

Source: S.C. Arora, India.

HACCP is not a stand-alone system. Good hygiene practices and other prerequisites for food processing as well as strong management commitment are also necessary. HACCP is not a substitute for these.

If your company produces a variety of food products, you should develop a separate HACCP plan for each product, abiding by the seven principles outlined above.

During the 1990s, HACCP was adopted by many countries (Australia, Denmark, Germany, India, Ireland, Netherlands, United States and others) in national standards specifying requirements for a food safety management system. It was also included in the regulations of the European Community dealing with 'Hygiene of foodstuffs'. The International Organization for Standardization (ISO) developed in 2005 the international standard, 'ISO 22000:2005 Food Safety Management Systems – Requirements for any organization in the food chain', which incorporates HACCP principles.

It is important for SMEs in the food processing business to use HACCP for two reasons. First, it brings internal benefits such as reduced risk of manufacturing and selling unsafe products, which will in turn generate greater consumer confidence in these products. Second, food regulatory authorities in many countries are adopting or are likely to adopt HACCP in their food regulations. By implementing HACCP, an exporter of food products will have greater chances for market access in these countries. For example, Canada made HACCP mandatory in its fish processing industry in 1992, followed by the United States for seafood processing in 1995. The United States then required meat and poultry processing plants and producers of fruit and vegetable juices to have HACCP in place from January 1996. European Union rules on food hygiene (effective 1 January 2006) also state that all food businesses (i.e. dealing with food of animal origin, food of non-animal origin and food containing both processed ingredients of animal origin and ingredients of plant origin), after primary production, must put in place, implement and maintain a procedure based on the HACCP principles.

ISO 22000 and its difference from HACCP

The primary objective of both the Codex HACCP principles and the ISO 22000 food safety management system (FSMS) is to ensure that the food produced by an organization is safe for human consumption. All the HACCP system elements are included in ISO 22000 and several more management system requirements have been added. The format of ISO 22000 is in line with the format of ISO 9001 ('Quality management system – Requirements'), thus making it compatible with other management systems.

The development of ISO 22000 was based on the assumption that the most effective food systems are designed, operated and continually improved within the framework of an organization's structured management system. ISO 22000 thus carries some management system requirements that are not explicitly stated in Codex HACCP. These include a food safety policy and related objectives, planning and documenting the food safety system, effective external and internal communication arrangements, the assignment of specific responsibilities to the food safety team leader, internal audits, management reviews, continual improvement and updating of FSMS. Briefly, the ISO 22000 requirements are a combination of the following four key elements:

- Interactive communications
- System management
- Prerequisite programmes
- HACCP principles.
-

ISO 22000 makes extensive reference to the Codex hygiene recommendations for the development of prerequisite programmes for different sectors of the food industry. ISO 22000 in its Annex B provides a comparison of the various requirements of FSMS with those of Codex HACCP.

ISO 22000 is designed to allow all types of organizations within the food chain to implement a food safety management system. These include crop producers, feed producers, primary producers, food manufacturers, transport and storage operators, retailers, food service operators and caterers together with related organizations such as producers of the equipment, packaging materials, cleaning agents, additives and ingredients needed during food processing.

As CODEX HACCP is a guidance document, certification to it is not possible. To fill this gap many countries such as Australia, Denmark, Germany, India, Ireland and the United States have developed national standards on the basis of the Codex HACCP. The Netherlands also did so, and the standard is popularly referred to as the Dutch HACCP. Certification against these standards is possible. ISO 22000 has made it easier for organizations worldwide to implement the Codex HACCP system for food safety in a harmonized way, i.e. it does not vary with the country or food product or service concerned. ISO 22000 can be used for certification, and this may be acceptable as an alternative to certification against different national standards.

Acceptance of ISO 22000 certification by retail chains

Food marketers, particularly retailers, are becoming increasingly interested in third-party auditing (certification) and are seeking to replace their own second-party audits of suppliers with the less costly solutions available through certification. By December 2011, a total of 19 980 certificates for ISO 22000 in 141 countries had been issued, according to a 2011 survey conducted by ISO. Your export customers may thus be the first to ask you whether or not you have a certified FSMS in place, as certification will assure them that you have met their national statutory and regulatory requirements.

FSSC 22000, a certification scheme for food safety systems, is based on ISO 22000:2005 and the Publicly Available Specification (PAS) for prerequisite programmes on food safety for food manufacturing (British Standard PAS 220:2008). FSSC stands for Food Safety System Certification and the scheme was developed by the Foundation for Food Safety Certification.

The scheme is applicable to manufacturers that process or manufacture animal products, perishable vegetable products, products with a long shelf life and other food ingredients like additives, vitamins and bio-cultures. It has been given full recognition by the Global Food Safety Initiative (GFSI). According to the Foundation for Food Safety Certification, the scheme is supported by the Confederation of the Food and Drink Industries of the European Union (CIAA).

5. Social accountability management systems

SA 8000

The rising concerns of customers in developed countries about inhumane working conditions in developing countries led to the creation in 1997 of the SA 8000 standard on social accountability. The purpose of developing this standard was to draw up a universal code of practice for labour conditions, so that consumers in developed countries could be confident that the goods they were buying – in particular clothes, toys, cosmetics and electronic goods – had been produced in accordance with good labour practices.

It has been estimated that 100 million children worldwide are in full-time labour (United States Department of Labor, 2010). The vast majority are in Africa, Asia and South America. Under the terms of SA 8000, companies must not support child labour. The standard also requires companies to ensure that none of their staff, or those working for their suppliers, is required to work more than 48 hours a week, or more than six days a week. Moreover, wages must be at least equal to legal or 'industry minimum' levels, and must be sufficient to leave the employee with some discretionary income.

SA 8000 is an initiative of Social Accountability International (SAI), an affiliate of the Council on Economic Priorities (a pioneer non-governmental organization dealing with corporate social responsibility). SA 8000 (its latest version was issued in 2008) is based on the international workplace norms of the International Labour Organization (ILO) Conventions, the Universal Declaration of Human Rights and the United Nations Convention on the Rights of the Child. The SA 8000 system has the following nine requirements:

1. **Child labour**: No workers under the age of 15 (unless the local minimum age law stipulates a higher age) should be employed. If the local law sets the minimum age at 14 years in accordance with developing-country exceptions under ILO Convention 138, the lower age will apply.
2. **Forced labour**: The company shall not engage in or support the use of forced labour (service that is extracted from any person under the menace of any penalty), nor shall personnel be required to lodge 'deposits' or identity papers upon commencing employment with the company.
3. **Health and safety**: The company shall provide a safe and healthy work environment; take steps to prevent injuries; give regular health and safety related training to workers; have a proper system for detecting threats to health and safety; provide access to toilets and potable water, etc.
4. **Freedom of association and right to collective bargaining**: The company should respect the worker's right to form and join trade unions and bargain collectively; where the law prohibits these freedoms, the company should facilitate parallel means of association and bargaining.
5. **Discrimination**: There should be no discrimination based on race, caste, origin, religion, disability, gender, sexual orientation, union or political affiliation, or age; there should be no sexual harassment.

6. **Discipline**: There should be no corporal punishment, mental or physical coercion or verbal abuse.
7. **Working hours**: The company should comply with the applicable law but, in any event, its employees should work no more than 48 hours per week with at least one day off for every seven-day period. Voluntary overtime is paid at a premium rate and should not exceed 12 hours per week on a regular basis. Overtime may be mandatory if this is part of a collective bargaining agreement.
8. **Compensation**: Wages paid for a standard work week must meet legal and industry standards and should be sufficient to meet the basic needs of workers and their families. There should be no disciplinary deductions.
9. **Management systems**: Facilities seeking to gain and maintain certification must go beyond simple compliance to integrate the standard into their management systems and practices.

Third-party certification to SA 8000, which is voluntary in nature, is being offered by certification bodies accredited and overseen by the Social Accountability Accreditation Services (SAAS). All types of industries can obtain SA 8000 certification.

According to the SAAS, as of 30 September 2010, a total of 2 330 facilities in 62 countries covering 66 industries have taken SA 8000 certification. The industrial sectors with the most certifications include apparel and textiles, building materials, agriculture, construction, chemicals, cosmetics, cleaning services and transportation in countries like Brazil, China, India and Italy.

The implementation of SA 8000 provides benefits to all stakeholders including workers, trade unions, businesses, consumers, investors. Workers become more aware of their labour rights; trade unions are better able to bargain collectively; businesses can attract and retain more skilled employees. The specific benefits to businesses in export trade include: enhanced company image and brand reputation, provision of assurance to buyers in developed countries that their suppliers have socially acceptable workplace practices; increased opportunities to join the socially responsible supply chain.

WRAP

In the late 1990s, the American Apparel and Footwear Association (AAFA) funded a three-year study to examine working conditions in factories making sewn products around the world. This study led to a programme which was later called WRAP (Worldwide Responsible Accredited Production).

The objective of WRAP is to promote and certify lawful, humane and ethical manufacturing in the sectors producing apparel, footwear and other sewn products. It also covers other labour-intensive industries such as the hotel and construction sectors and those producing jewellery, furniture, food, home furnishing, cutlery, glassware, carpets and rugs, lamps and other products throughout the world.

WRAP is also the registered trademark of the international, non-profit and independent organization that administers the certification programme.

WRAP principles

The 12 WRAP principles listed below are based on generally accepted international workplace standards, local laws and workplace regulations. They cover human resources management, health and safety, environmental practices, and legal compliance including compliance with import, export and customs regulations and security standards.

1. **Compliance with laws and workplace regulations**: Facilities will comply with laws and regulations in all locations where they conduct business.
2. **Prohibition of forced labour**: Facilities will not use involuntary or forced labor.

3. **Prohibition of child labour**: Facilities will not hire any employee under the age of 14 or under the minimum age established by law for employment, whichever is greater, or any employee whose employment would interfere with compulsory schooling.
4. **Prohibition of harassment or abuse**: Facilities will provide a work environment free of supervisory or co-worker harassment or abuse, and free of corporal punishment in any form.
5. **Compensation and benefits**: Facilities will pay at least the minimum total compensation required by local law, including all mandated wages, allowances and benefits.
6. **Hours of work**: Hours worked each day, and days worked each week, shall not exceed the limitations of the country's law. Facilities will provide at least one day off in every seven-day period, except as required to meet urgent business needs.
7. **Prohibition of discrimination**: Facilities will employ, pay, promote and terminate workers on the basis of their ability to do the job, rather than on the basis of personal characteristics or beliefs.
8. **Health and safety**: Facilities will provide a safe and healthy work environment. Where residential housing is provided for workers, it should be safe and healthy.
9. **Freedom of association and collective bargaining**: Facilities will recognize and respect the right of employees to exercise their lawful rights of free association and collective bargaining.
10. **Environment**: Facilities will comply with environmental rules, regulations and standards applicable to their operations, and will observe environmentally conscious practices in all locations where they operate.
11. **Customs compliance**: Facilities will comply with applicable customs laws, and in particular, will establish and maintain programmes to comply with customs laws on the illegal transshipment of finished products.
12. **Security**: Facilities will maintain security procedures to guard against the introduction of non-manifested cargo into outbound shipments (i.e. drugs, explosives, biohazards and other contraband).

WRAP certification

WRAP has adopted a management systems approach towards compliance. This requires senior management to adopt the WRAP principles in writing, assign the necessary staff to ensure that the required practices are implemented throughout the facility, and to put an internal audit system in place to provide an assurance of continuous compliance. Facilities must undergo a rigorous self-assessment and then be audited by an independent third-party monitoring company.

WRAP certifies facilities, not brands or businesses. Since 2006, it has provided a three-level facility certification programme. The 'Platinum' certificate is a two-year certificate awarded to a facility that has demonstrated full compliance with all WRAP principles for three consecutive years, and has successfully passed each audit with no corrective actions. The facility will be subject to an unannounced audit during its two-year certification. The 'Gold' certificate is a one-year certificate presented to a facility that has demonstrated full compliance with all WRAP principles. The 'Silver' certificate is a six-month certificate given to facilities that demonstrate substantial compliance with WRAP principles but has minor non-compliances in procedures or training that need to be addressed.

Over the years, WRAP certification has been in demand among purchasers in developed countries who want to have an assurance that facilities in developing countries are adopting ethical practices. In Bangladesh, over 140 facilities dealing with apparel and sewn products for export have obtained WRAP certification.

6. Occupational health and safety management standard and OHSAS 18001

OHSAS 18001 is a standard for establishing and practicing an occupational health and safety management system. It provides a framework for an organization to identify and control its health and safety risks, reduce its potential for accidents, ensure compliance with legislative requirements, and improve its overall health and safety performance.

OHSAS 18001 is not an ISO standard as it has not been developed by the International Organization for Standardization. It was formulated by three national standards bodies (those of Ireland, South Africa and the United Kingdom), 10 certification bodies and other stakeholders. The target was to address a gap where no third-party certifiable international standard existed. While developing this standard, in order to enhance its compatibility with other management system standards, due consideration was given to the provisions of ISO 9001, ISO 14001 and the guidelines for an occupational health and safety management system published by the International Labour Organization.

This standard can be used by all types (private, public, manufacturing, service) and size (small, medium-sized, large) of organizations. It can also accommodate diverse geographical, cultural and social conditions.

OHSAS 18001 only addresses occupational health and safety (OHS) issues at the workplace – for example, any physical location in which work-related activities are performed under the control of an organization. Health and safety at the workplace covers employees, individual contractors, customers and citizens. The standard does not deal with other health and safety areas such as the employees' well-being or wellness, product safety, property damage or environmental impact.

OHSAS 18001 covers the following key areas:

- Planning for OHS hazard identification, risk assessment and risk control;
- OHS management programmes;
- Organizational structure and responsibilities for OHS;
- Training, awareness and competence;
- Consultation and communication with stakeholders;
- Operational control on OHS;
- OHS-related emergency preparedness and response; and
- OHS performance measurement, monitoring and improvement.

As with any other management system standard, you will need to follow some steps for the implementation of OHSAS 18001:

- Develop an OHS policy and objectives;
- Carry out risk assessment to identify significant OHS hazards;
- Determine which of the OHS legal requirements are applicable to your type of business activities;
- Define OHS objectives and related programmes for implementing those objectives;
- Develop an OHS manual, operational control procedures and the other documents you need for the effective planning and control of OHS processes; this also covers the records to be maintained;
- Implement the system and monitor compliance and effectiveness through internal audits.

Once the system stabilizes and if you wish to obtain certification, you may select an accredited certification body from among those who provide OHSAS 18001 certification services. According to the BSI group, by the end of December 2009, a total of 54 357 certificates to OHSAS 18001 or its equivalent had been issued by various certification bodies. The process of certification is the same as that followed for other management systems such as ISO 9001, ISO 22000 and ISO 14001.

It may be added here that compliance with OHSAS 18001 does not exempt you from fulfilling legal obligations. However, it will enable you to demonstrate legal compliance in a systematic way.

By implementing OHSAS 18001, you will be able to provide assurance of safe work practices to foreign buyers who prefer to trade with suppliers that provide a safe working environment to their employees, for example.

7. Other management system standards

In addition to ISO management system standards such as ISO 9001, the sector-specific versions of ISO 9001 standards, ISO 14001, ISO 22000, and other management system standards such as the standards on occupational health and safety, and social accountability, there are additional management system standards that you might also consider, depending on your type of business.

ISO standards

- **ISO/IEC 27000 series of standards**

ISO's information security management systems (ISMS) is a systematic approach to managing sensitive company information so that it remains secure. It encompasses people, processes and information technology (IT) systems. It is becoming ever more important to establish a management system to prevent breaches in the security of records or data on electronic media (such as data on designs, banking transactions, stock trading).

The ISO/IEC 27000 series includes 'ISO/IEC 27001:2005 Information technology - Security techniques - Information security management systems - Requirements', which is a certifiable standard. The series provides good practical guidance on designing, implementing, auditing and certifying information security management systems to protect the confidentiality, integrity and availability of the information.

- **ISO/IEC 20000 international IT service management standard**

This standard is published in two parts. 'ISO/IEC 20000-1:2005 Information technology - Service management - Part 1: Specification' is the formal specification and defines the requirements for an organization to deliver managed services of an acceptable quality for its customers. 'ISO/IEC 20000-2:2005 Information technology - Service management - Part 2: Code of practice' describes the best practices for service management processes within the scope of ISO/IEC 20000-1. The code of practice is of particular use to organizations preparing to be audited against ISO/IEC 20000 or planning service improvements.

The standard is applicable to any organization which makes use of IT services. The users covered include internal IT departments providing services to other parts of their companies and organizations that outsource their IT functions.

- **ISO 28000 series of standards on the security management systems of supply chains**

The ISO 28000 series of international standards specifies the requirements for a security management system to ensure safety in the supply chain. The standards address potential security issues at all stages of the supply process; it thus targets threats such as terrorism, fraud and piracy.

'ISO 28001:2007 Security management systems for the supply chain - Best practices for implementing supply chain security, assessments and plans - Requirements' is a requirements and guidance standard that can be used for certification by organizations of all sizes involved in manufacturing, service, storage or transportation by air, rail, road and sea at any stage of the production or supply process. The standard could be applied to all ships, irrespective of size, type,

purpose and whether operated internationally, domestically or within internal waters. The same can be said of all other transport segments in the supply chain.

- **ISO 50001 energy management systems**

'ISO 50001:2011 Energy management systems - Requirements with guidance for use' was issued in 2011. Its purpose is to enable organizations of all types and sizes to establish the systems and processes necessary to improve energy performance, including energy efficiency, its use and consumption.

Implementation will lead to reductions in greenhouse gas emissions and other environmental impacts. It will also result in a fall in energy cost through the systematic management of energy. The term 'energy' in the standard covers electricity, fuels, steam, heat, compressed air, and other like media.

The standard has a high level of compatibility with ISO 9001 and ISO 14001.

Other important standards

- **Eco-Management and Audit Scheme (EMAS)**

EMAS is the European Union's eco-management and audit scheme. The latest version of its enforcing regulation (EMAS III) is entitled 'Regulation (EC) No 1221/2009 of 25 November 2009 on the voluntary participation by organisation in a Community eco-management and audit scheme (EMAS)'.

The scheme is intended for companies and other organizations who wish to evaluate, manage and continuously improve their environmental performance. The system has been in operation since 1995. It incorporates an environmental management system in line with EN/ISO 14001. Organizations with an ISO 14001-certified EMS can progress towards EMAS registration by incorporating a number of additional elements.

EMAS III came into effect on 11 January 2010. This version improves the applicability of the scheme and strengthens EMAS's visibility and outreach. For instance, EMAS is strengthened by the introduction of environmental core indicators, against which environmental performance can be thoroughly documented.

Participation in EMAS is voluntary and extends to public or private organizations operating in the European Union and the European Economic Area (EEA) – Iceland, Liechtenstein and Norway. An increasing number of candidate countries are also implementing the scheme in preparation for their accession to EU. EMAS III makes registration to the scheme also possible for organizations and sites located outside EU and EEA.

- **International Safety Management (ISM) Code**

The ISM Code, formulated by the International Maritime Organization (IMO) and made mandatory under the International Convention for the Safety of Life at Sea, provides an international standard for the safe management and operation of ships; it also covers the prevention of pollution.

The purpose of the ISM Code is:
- To ensure safety at sea;
- To prevent human injury or loss of life; and
- To avoid damage to the environment and to the ship.

In order to comply with the ISM Code, each ship class must have a working safety management system (SMS). The Code also imposes a mandatory planned maintenance system, according to which vessels must be maintained at specified intervals.

Each ISM-compliant ship is inspected regularly by a 'classification society' to check the effectiveness of its SMS. Once the classification society verifies that the SMS is working and effectively implemented, the ship is issued a safety management certificate. The American Bureau of Shipping is an example of a classification society.

- **Global Food Safety Initiative (GFSI)**

The GFSI benchmarking process has been developed on the basis of internationally accepted food safety requirements, industry best practice and sound science, through a consensus-building process by key stakeholders in the food supply chain. The requirements can be found in the GFSI Guidance Document, which is freely available on their website.

GFSI is coordinated by the Consumer Goods Forum, the only independent global network for consumer goods retailers and manufacturers worldwide.

GFSI has benchmarked, as of November 2010, eight schemes for the manufacturing sector, including the BRC Global Standards, Dutch HACCP and FSSC 22000. It has also benchmarked three schemes for primary production (including GLOBALG.A.P.) and one for the primary sector. A brief description of three of the GFSI-benchmarked schemes is given below.

Foundation for Food Safety Certification: FSSC 22000

The FSSC scheme was developed by the Foundation for Food Safety Certification and is supported by FoodDrinkEurope.

FSSC 22000 is a certification scheme for food safety systems based on the food safety management standard ISO 22000:2005 'Requirements for any organization in the food chain' and the publicly available specification (PAS) British Standard 'PAS 220:2008 for Prerequisite programmes on food safety for food manufacturing'. The latter standard is equivalent to ISO/TS 22002-1:2009. The scheme is applicable to manufacturers that process or manufacture animal products, perishable vegetal products, products with a long shelf life and other food ingredients like additives, vitamins and bio-cultures.

The certification is accredited under the standard ISO/IEC 17021. Manufacturers that are already certified to ISO 22000 will only need an additional review against BS PAS 220 to meet the requirements of this certification scheme. The FSSC 22000 certification scheme has been given full recognition by the Global Food Safety Initiative.

GLOBALG.A.P.

The GLOBALG.A.P. standard comes from EUREPGAP, a standard that was developed by the major European food retailers. GLOBALG.A.P. is a private sector body that sets voluntary standards for the certification of agricultural products, including fresh produce, livestock, fresh-cut flowers, etc. around the globe.

The private standard is primarily designed to reassure consumers that food is produced on farms that minimize the detrimental environmental impacts of their operations by reducing the use of chemical inputs and ensuring a responsible approach to worker health and safety, as well as animal welfare. GLOBALG.A.P. has established itself as a key reference for Good Agricultural Practices (GAP) in the global marketplace. GAP translates consumer requirements into agricultural production practices in a rapidly growing list of countries.

British Retail Consortium (BRC) Global Standards

The BRC Global Standards comprise four technical standards that specify requirements to be met by an organization to enable the production, packaging, storage and distribution of safe food and consumer products. Originally developed in response to the needs of United Kingdom members of the British Retail Consortium, the BRC Global Standards have gained usage worldwide and are specified by a growing numbers of retailers and branded manufacturers in the European Union, North America and other regions.

Certification by accredited certification bodies is available for the above ISO and private standards. Further details of the schemes can be obtained direct from the website of the certification bodies concerned.

8. Conclusion

Many customers are not only concerned with quality of the product or service, but also how the product or service has been produced. They want to get assurance of:

- the consistency of the level of quality,
- the least environmental impact of the product throughout its life cycle,
- the good treatment of the employees of the supplier, and
- other ethical practices of the supplier.

Different management system standards are implemented across the world by enterprises to provide the necessary confidence on the above. This unit has given an overview of the most common management systems required by potential markets.

Unit 7

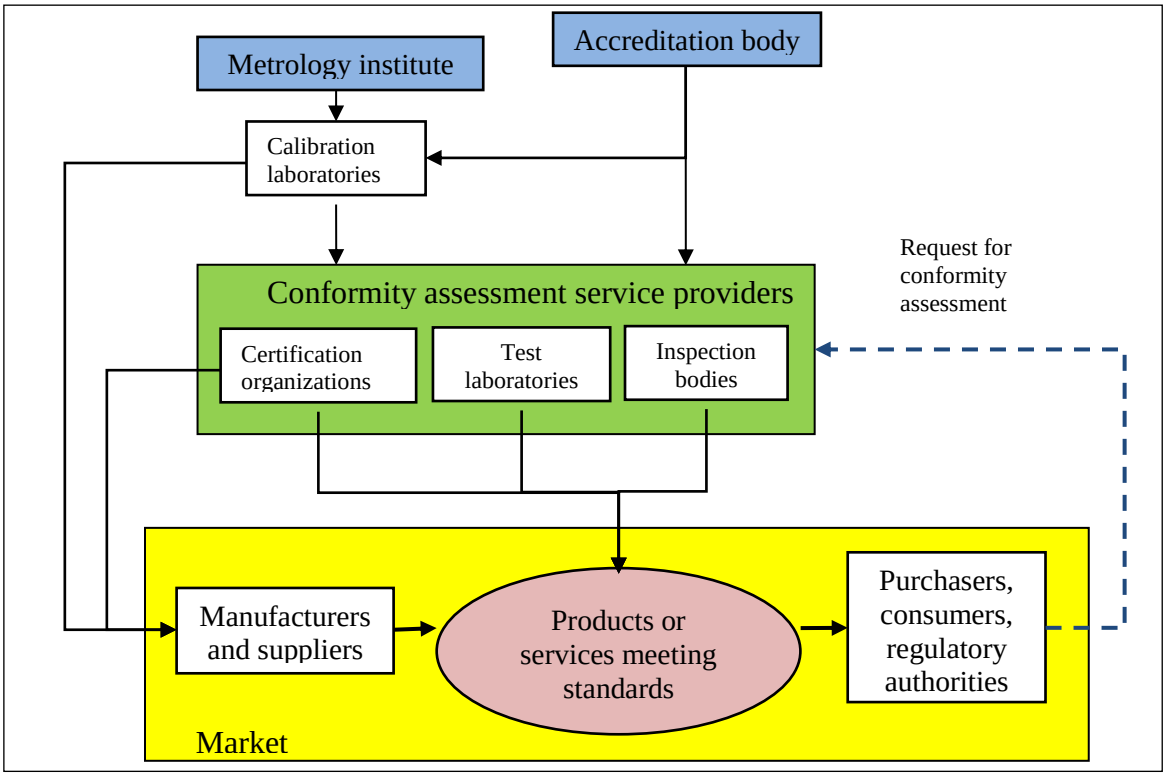
Monitoring suppliers' performance

1. What is conformity assessment?

Suppliers' performance is monitored by a range of activities which can be referred to as **conformity assessment**. This is a collective term covering the many elements required to demonstrate that a product or a service complies with stated technical and other requirements. In general, testing, inspection and certification are considered the core conformity assessment services and they are used either individually or collectively as circumstances demand.

Testing, inspection and certification are supported by metrology and calibration to ensure the validity of measurements and by accreditation to ensure the technical competency of the conformity assessment service providers.

Conformity assessment system



Source: Martin Kellermann, South Africa.

First party, Second party and Third party conformity assessment

Conformity assessment services can be provided by the supplier himself/herself– in which case it is considered first-party conformity assessment. This is the case, for example, where a company of a product declares the conformity of its product based on the tests that have been done in its own testing laboratory.

Conformity assessment can also be conducted by the purchaser, i.e. the second party. This is an expensive option for the purchaser, so second-party assessment is generally encountered only among major purchasers operating their own inspection and testing infrastructures.

Much more acceptable, though, especially for SMEs in developing economies, is the provision of conformity assessment services by an organization that is independent of both the supplier and the

purchaser. Such an organization would be a third-party conformity assessment body. It can be either a public or private independent organization that has no interest in the transaction between the first and second party. The main issues are that the third party conformity assessment body should be able to demonstrate its technical competence through internationally accepted accreditation and that its test reports and certificates are recognized in the export markets.

The fact that a conformity assessment service provider is a government body, e.g. the national standards body or government laboratory, does not lead to automatic acceptance of its test reports or certificates. Furthermore, sometimes the market or regulatory authorities abroad may not accept its test reports and certificates even though it is accredited. This situation is getting better with time with the increasing number of mutual recognition agreements.

In developing countries, inspection, testing and certification services are frequently provided only by the national standards body and government laboratories. There are many private inspection bodies, testing laboratories and certification bodies that operate in the marketplace. Some of these are extremely successful, large multinational organizations with offices in more than 100 countries.

2. Inspection

There are numerous definitions of inspection, but all of them include the concepts of information gathering (testing, measuring), observation (of conditions) and forming judgements on suitability for use or compliance with requirements. As judgement is an essential element of the process, inspection is therefore prone to some variability of outcome. For this reason, it is crucial that inspectors be thoroughly trained for the sectors in which they are expected to work.

Inspection is not limited to its application to manufacturing processes and products. It can also be used in diverse activities such as design verification, installation and commissioning of equipment, in-service monitoring, regulatory affairs, financial auditing and failure investigation.

In many societies, inspection is always and exclusively used in the context of regulatory control, while in others it may also cover commercial supervision by third-party bodies and in-house production control by the manufacturer itself.

In the regulatory sense, inspection may cover mandatory product compliance with technical regulations prior to being made available in the market. In some societies, most notably those belonging to the former Soviet Union, there may be several thousand products that require mandatory approval before release to the market. This practice normally focuses on domestic products but may also apply to imported products in some sectors. While called inspection, such activities are often largely testing leading to a certificate of compliance.

Inspection also includes both pre- and post-market surveillance activities and regular examination of installations for safety purposes. Inspection of this type is applied to common products like motor vehicles, cranes and lifting gear, boilers and pressure vessels, and electrical installations. Probably the most common form of regulatory inspection takes place in the area of food safety and food outlet hygiene. Some inspection activities are associated with excise and taxation supervision.

In the manufacturing sector, inspection, including testing and gauging or measurement, is an essential tool for production control. It may extend to physical examination of in-process product to assess its fitness (e.g. cleanliness) to proceed to the next step. Inspection departments may also be responsible for calibration of process control instrumentation and will carry out any final inspection prior to dispatch to the customer.

Inspection is used in the services sector as well, to establish conformity with performance and service delivery specifications. This can include checks for process readiness or compliance with service procedures and specifications, including timeliness and fulfilment of other critical service characteristics.

In the manufacture of complex products or assemblies or if a non-conforming product may have catastrophic consequences for the customer, it is not uncommon for the customer either to participate in the multi-production inspection process or to engage a third-party inspection body to represent its interests. In all such cases, as in aircraft manufacture and shipbuilding, the customer

will pay great attention to the inspection systems adopted by the manufacturer and the management of those systems.

Pre-shipment inspection is usually performed by the manufacturer but, where the product is being exported, additional inspection may be required at the point of shipping. 'Cargo superintending' is the term often applied to this activity. It involves not only inspection of the product but also of its packaging, handling, quantity and documentation. The cargo superintending company acts as the customer's agent.

When countries have products which they have designated as being of particularly high value but which are prone to damage during transportation or when they wish to bolster or protect an image in the market, governments themselves may impose an inspection prior to shipment. This was a key strategy of Japan for a number of products such as quality optical equipment. Australia also requires export certification for a range of perishable food products.

Finally, the customer may impose additional inspection at the point of receipt.

A number of countries impose import inspection for the purpose of ensuring freedom from disease, rather than because of any concern over quality. Such regimes are most rigorous for countries that are generally free of animal and plant diseases such as Australia and New Zealand but may also be imposed as an emergency measure where outbreaks of human diseases occur. Importing countries may designate private organizations as their agents to conduct pre-export inspection or approve import consignments in relation to official requirements.

While inspection may be the oldest form of conformity assessment, it has been the last to be internationally standardized. The pervasive use of inspection throughout all industries led the European Union to introduce a common standard (EN 45004 General Criteria for the Operation of Various Types of Bodies Performing Inspection) when it created the single market. This initiative was followed by the international community when it adopted EN 45004 as ISO/IEC 17020:1998, which carries the same title and is identical with the EN. This standard is now used by accreditation bodies to accredit inspection bodies in a number of countries.

3. Testing

Testing is defined as a 'technical operation that consists of determination of one or more characteristics of an object of conformity according to a procedure'. Typical tests involve measurement of dimensions and determination of chemical composition, microbiological purity and strength or other physical characteristics of materials or structures such as freedom from defects.

The results of testing often provide sufficient information to permit a competent person to draw a conclusion as to whether or not a product or service meets requirements specified by regulatory authorities, buyers or other users. In other cases, such as in-service inspection of elevators and motor vehicles, inspection alone may be sufficient. It is important to recognize that the boundaries between testing and inspection are quite blurred as there is some overlap; the same activity may be labelled as being in either field.

It is important to ensure that all the measuring equipment used either for testing or for inspection are accurate and provide reliable results on which compliance decision would be made. Such equipment have to be calibrated on a regular basis to confirm their accuracy status and their traceability to international measurement standards. In many countries there are calibration or metrology laboratories which offer such calibration services.

Testing is most often conducted in a laboratory, either before dispatch or upon delivery to the customer. However, in many cases it may be performed in the field or on-site following delivery or installation. This is true of large or complex machinery and welded pipelines and rail tracks.

Regulatory authorities and commercial buyers of foreign products frequently require testing at the point of import or delivery by their own designated laboratories even when adequate testing has been performed in the country of manufacture. Such policies are regarded as technical barriers to

trade because they add cost through duplication and delays. If the testing carried out at the point of manufacture is performed competently and in accordance with the requirements of the customer or of the import market, then there is no technical reason for the product to be retested unless conditions during transit may cause the product to deteriorate. Mutual recognition of the competence of test laboratories and other conformity assessment bodies is therefore important to reduce such technical barriers.

While the World Trade Organisation urges Members to accept testing performed in the country of export, there is a wide range of mechanisms that are used in different jurisdictions. These require that the testing laboratory providing the data be:

- Operated by the regulatory authority of the importing country;
- One with a good reputation established with the accepting authority;
- Recognized by the regulatory body;
- Accredited by the national body of the importing country;
- Recognized by one of the partners under a government-to-government mutual recognition agreement (MRA); or
- Accredited by a body within the ILAC Arrangement.

In today's trading environment, accreditation is the most widely used tool for establishing and maintaining confidence in the competence of conformity assessment bodies, but it is the responsibility of the exporter to understand the rules of the importing market.

4. Third party certification

While testing and inspection are very common means of determining conformity, in some cases, testing or inspection alone is regarded as insufficient by either the regulator or the customer. In some product sectors, certification by a third-party is also required. There are two main types of certification :

- Product certification, which is a mechanism whereby a certification organization attests that products, either a batch or the continuous production thereof, have been inspected and tested by it and that the products collectively comply with specified requirements, usually contained in a standard; and

- Management system certification, which an assessment of compliance of the management system (policy, processes and procedures) comply with the requirements of a specified standard for the system (e.g. ISO 9001 for quality management system, ISO 22000 for food safety management system, etc.)

Product certification

If a product bears a recognized mark such as a national certification mark, this would give confidence to the buyer that the product meets the specifications to which the mark corresponds. In other words, the product can be considered as a 'quality/safe product' by the buyer.

A product bearing a third-party mark carries an assurance that:

- The product has been produced according to an applicable standard.
- The production process has been supervised and controlled.
- The product has been tested in an independent laboratory.

The mark is normally found on the product or on its packaging. The mark also carries a reference to the number of the relevant product standard against which the product is certified. If the customers find that a marked product does not meet the declared standard, they can approach the certification body that awarded the product certification for addressing their complaint.

Product certification services are offered by many certification organizations, in both public and private domains, at the national and international levels. In developing economies, national standards bodies frequently provide the only product certification with any market relevance. In developed economies, private certification bodies are often more important from a market perspective. Product certification is mostly accepted only in the home market of the certification organization, but a few operate successfully at the regional or even at the international level.

Typical examples of product certification marks are the BSI Kitemark (general products – United Kingdom), the SABS mark (general products – South Africa), the GS mark (product safety – Germany), the VDE mark (electrical and electronic equipment – Germany), the UL mark (product safety – United States), the ASME mark (pressure vessels – United States), the CSA mark (general products – Canada), KEMA (electrical equipment – the Netherlands) and AGMARK (agricultural products – India). There are many, many more. It should be noted that the CE mark is not a product certification mark but a regulatory device of the European Union.

Certification of Management Systems

It is a well-known fact that the required level of quality can only be built into the product through management of processes. A properly established Quality Management System preferably in conformity with the International Standard ISO 9001 will help to demonstrate the supplier's ability to consistently provide products conforming to the buyer's requirements. This will also build the supplier's image of being a reliable one.

Other popular system certifications include:

- *HACCP*[3] *guidelines (published by Codex Alimentarius Commission)* - define the system requirements for ensuring the safety of food, and can be applied throughout the food chain, from the point of primary production to final consumption. Third-party certification can be obtained for the HACCP system alone or in combination with ISO 9001 certification. Food regulatory authorities in many countries have adopted HACCP as part of their food regulations.
- *ISO 22000 Food Safety Management System* - This International Standard specifies requirements for a food Safety Management System where an organization in the food chain needs to demonstrate its ability to control food safety hazards in order to ensure that food is safe at the time of human consumption. It also integrates the principles of HACCP. Third party certification to this standard can be obtained by any organization in the food chain such as harvesters, farmers, producers of ingredients, food manufacturers, retailers, food services, catering services, etc.
- *GLOBALGAP Certification* – A system for assuring good agricultural practices at farm level.
- *Organic Farming Certification* – A system for assuring that the farm uses organic inputs for farming. (Organic farming is the form of agriculture that relies on crop rotation, green manure, compost, biological pest control, and mechanical cultivation to maintain soil productivity and control pests, excluding or strictly limiting the use of synthetic fertilizers and synthetic pesticides, plant growth regulators, livestock feed additives, and genetically modified organisms).
- *ISO 14000 Environmental Management Systems* – A system for assuring protection of the environment and prevention of pollution in an organization. Third-party certification of ISO 14001 *EMS* is facilitating international trade as it provides evidence of the existence of a system in an organization to prevent pollution and continual improvement of the environmental performance.
- OHSAS 18001 Occupational Health and Safety Management Systems – A system for assuring occupational health of persons and for workplace safety.
- SA 8000 Social Accountability – A system for demonstrating compliance of staff welfare measures. The standard requires, inter alia, that companies respect the Convention of the International Labour Organization (ILO), the Universal Declaration of Human Rights and the United Nations Convention on the Rights of the Child.

[3] Hazard Analysis and Critical Control Point

- WRAP (Worldwide Responsible Accredited Production) Apparel Certification Program – A combined system applicable for apparel including footwear, covering prevention of pollution, staff welfare, customs and security measures.
- *Fair Trade Labelling Organization* - The Fairtrade Labelling Organization International exists to improve the position of poor, small-scale, and marginalized producers in the developing countries by influencing the conditions of trade in their favour. The fairtrade label stands for: guaranteed minimum prices that cover the cost of sustainable production and living, long-term trading relationships, acceptable working conditions, fair-trade practices and environmentally sound production. There are now thousands of products that carry the FAIRTRADE Mark. Fair-trade standards exist for food products ranging from tea and coffee to fresh fruits and nuts. There are also standards for non-food products such as flowers and plants, sports balls, etc.

5. Supplier's declaration of conformity (SDoC)

The supplier's declaration of conformity is a procedure by which the supplier (may be a manufacturer, distributor, importer, assembler, service organization, etc.) provide written assurance of conformity to the specified requirements. Under this approach, the supplier rather than the regulatory authority, takes on the responsibility for ensuring that products entering a market comply with the mandatory technical regulations. Assessment may be undertaken either by the supplier's own internal test facility or by an independent test facility. The use of such supplier's declaration of conformity for products is widely used in the USA and in Europe.

6. Supplier audit

The business practices of suppliers have a direct impact on your organization. If you have a supplier that is not able to deliver the quality of products you require and on time, that directly affects your revenue. Auditing a supplier is therefore a necessary part of your quality management system. You may decide to audit a new supplier which you are considering for your business needs, or you may decide to audit a current supplier because of an incident that occurred in the past.

Supplier audit is an effective way to ensure that supplier is following the processes and procedures that you agreed to during the selection processes. The audit identifies non-conformances in manufacturing process, shipment process, engineering change process, invoicing process and quality process at the supplier. After the audit, the supplier and manufacturer jointly identify corrective actions which must be implemented by the supplier within an agreed-upon timeframe. A follow up audit is normally scheduled to ensure that these corrective actions have been successfully implemented.

It is important to to develop a suitable risk approach that informs the development of an audit and monitoring programme that relates to the degree of dependency of your operations on each supplier. The supplier audits may use the GMP or ISO style checklist and are designed to review quality procedures, processes and systems.

7. Accreditation of conformity assessment bodies

Accreditation is a formal recognition of competence. From the point of view of conformity assessment, accreditation is applied to testing laboratories, inspection bodies and certification bodies. The accreditation process has been applied to laboratories since the 1940s while the accreditation of certification and inspection bodies is more recent.

Accreditation requirements for conformity assessment bodies are provided in the ISO/IEC 17000 series of standards as follows :

Organizations	International standards	Client requirements
Calibration laboratories	ISO/IEC 17025	Calibration of measuring instruments
Testing laboratories (general)	ISO/IEC 17025	Compliance of products with technical requirements
Inspection bodies	ISO/IEC 17020	Compliance of products and services with technical requirements
Certification bodies for:		
i. Quality management	ISO/IEC 17021	Compliance with ISO 9001
II. Environmental management	ISO/IEC 17021	Compliance with ISO 14001
iii. Food safety	ISO/IEC 17021	Compliance with ISO 22000, HACCP
iv. Product certification	ISO/IEC 17065	Compliance with product specific requirements

Accreditation of a laboratory by an accreditation body which is a signatory of the mutual recognition agreement of the International Laboratory Accreditation Cooperation (ILAC MRA) normally provides the confidence in the competence of the laboratory for the scope of its accreditation. Similarly, the competence a certification body accredited by an accreditation body which is a signatory of the multilateral agreement of the International Accreditation Forum (IAF MLA) would be normally recognised for the scope of its accreditation.

8. Conclusion

Monitoring supplier's performance is an essential responsibility of an organization since the products and services it purchases have an impact on its own performance. There are different ways of monitoring supplier's performance:

- Inspection and testing done by the organization itself or by a third party,
- third party certification,
- conducting supplier audits, or
- relying on supplier's declaration of conformity which is backed by documentary evidence for assessments conducted.

It is important to consider the competence and recognition aspects of any conformity assessment body which is involved in the process. In this context, accreditation would be an essential consideration.

Unit 8. Beyond conformity

1. Introduction

With globalisation and the reduction of barriers to trade, competition is becoming fiercer since the market is open to all enterprises, no matter the location, the size and the nationality. Meeting the technical requirements of customers and regulatory bodies is not enough. Companies are forced to differentiate their products in terms quality, price and service from others indicating better value for money.

In this century, the success of an organization will not only depend on its financial performance, the development of its employees, the efficiency and effectiveness of its processes and the care and satisfaction of its customers, but also on the way it is conducting its business in terms ethics, impact on environment and social responsibility. It has to demonstrate that it is a good corporate citizen caring for the triple bottom line, i.e. people, planet and profit.

In the above context, with the aim of achieving and demonstrating higher performance than others and their social responsibility, many organizations have recourse to different practices, a few of which will be presented in this unit.

2. Six Sigma

There are many roads to quality, each of which is represented by methodologies that attempt to encapsulate complex theories in simplified forms. There is the concept of zero defects for quality which is remarkable for its simplicity and directness: zero defects means just what it says.

However, a process without defects doesn't just happen. It requires performing tasks right the first time and every time. That's where the concept of variation reduction comes in. Uncontrolled variation in a business process is indeed the enemy of quality.

Uncontrolled variation in a business process is the enemy of quality.

Six Sigma is a data-driven structured problem-solving methodology for dealing with chronic issues facing a business by reducing variations in the business processes. The Six Sigma methodology, started and popularized in 1987 by Motorola in the United States, provides techniques and tools to improve the process capability and reduce the defects in any process. Six Sigma essentially has two elements: the 'voice of the customer' and the 'voice of the process'. It entails reducing the gap between the two voices and ensuring that they match. Six Sigma efforts target three main areas:

- Improve customer satisfaction
- Reduce cycle time
- Reduce defects

Six Sigma aims at virtually error-free business performance. Achieving the goal of Six Sigma requires more than small incremental improvements – it demands a breakthrough in every area of the business.

Sigma is a Greek letter symbolized by 'σ'. It is used to designate the standard deviation of a process. In other words, sigma is a measurement used to determine how good or bad the performance of a process is, i.e. how many mistakes a process makes. Traditionally, Six Sigma stands for 'six standard deviations' from process mean. The table below gives process yields at various sigma levels.

Process yield at various sigma levels

Sigma level	Product meeting requirements: %	Defects per million opportunities (DPMO)*
1	68.26	697,672.15
2	95.45	308,770.21
3	99.73	66,810.63
4	99.9937	6,209.70
5	99.999943	232.67
6	99.9999998	3.40

Source: David Hoyle, ISO 9000 Quality Systems Handbook, 6th ed. 2009.

*DPMO with a 1.5 Sigma shift.

DPMO is the result of DPU (defects per unit) multiplied by 1 000 000 divided by opportunities for errors in a unit. For example, if a purchase order has 50 opportunities for errors and assuming that the data entry operator who prepares purchase orders makes 1 defect on average, the DPMO in this case will be 1 multiplied by 1 000 000 divided by 50 or 20,000.

Suppose that you run a business that delivers pizzas to nearby offices. You have a reputation for making good pizzas and you have many customers. According to your contract with customers, pizza will be delivered to them fresh and hot between 11.45 am and 12.15 pm. This allows them to receive their orders in time for lunch (their 'requirements'). You have also agreed that if a pizza is delivered before 11.45 am or after 12.15 pm (a defect), you will discount their next order by 50%. Because your staff gets a bonus for on-time delivery, you are all very motivated to deliver the pizza during the half-hour window.

Here is how Six Sigma, as a measure, could play a part in this simple process. If you deliver about 68% of your pizza on time, your process is only at the 1 sigma level. If you deliver it 99.73% on time, which sounds good, you are operating at only the 3 sigma level of performance. To be a 6 sigma pizza shop, you would need to have on time pizza delivery 99.9999998% of the time. That is practically perfect. In fact, for every million pizzas you make, you would end up with only three or four late deliveries.

The first step in calculating sigma or in understanding its significance is to grasp what your customer expects. In the language of Six Sigma, customer requirements and expectations are called CTQ (critical to quality).

In the pizza example, one of the key customer requirements is timely delivery; other requirements are likely to be related to the temperature of the pizza, the accuracy of the order, tastiness and so on. In fact, one of the keys of Six Sigma is to understand better and assess how well a process performs on all CTQs, not just one or two.

Companies operating at three or four sigma typically spend between 25 per cent and 40 per cent of their revenues fixing problems. This is known as the cost of quality, or more accurately the cost of poor quality. Companies operating at Six Sigma typically spend less than five per cent of their revenues fixing problems. Depending on the size of a company and the volume of its production, the dollar cost of this gap can be huge. For example, the gap between three or four sigma and six sigma was costing General Electric between US$ 8 billion and US$ 12 billion per year.

Six Sigma uses a handful of proven methods and tools. But the tools are applied within a simple performance improvement model known as DMAIC (Define-Measure-Analyse-Improve-Control).

An important feature of Six Sigma is the creation of an infrastructure to ensure that performance improvement activities have the necessary resources. A small percentage of managers are assigned full time to the identification and execution of Six Sigma improvement projects. They are popularly called Six Sigma Black Belts, Green Belts or Champions. Effectively, Six Sigma has been the first quality initiative to bring line managers into action in addition to quality managers, quality engineers and auditors, allowing them to become Black Belts, Green Belts or Champions. The requirements are high; for example, a Black Belt should have a college level background in

mathematics, know the basic tools of quantitative analysis, and undergo 160 hours of classroom training plus one-on-one project coaching from a Master Black Belt.

To ensure access to needed information for initiating improvement projects, Six Sigma activities should be closely integrated with the organization's information systems. Obviously, the acquisition of skills and training of Six Sigma Black Belts must be enabled by investment in software and hardware.

3. National Quality Awards

National quality awards (NQA) play an important role in promoting and rewarding excellence in organizational performance. In the short history of the development of NQAs, three awards have played a key role. They are the Deming Prize (Japan, 1951), the Malcolm Baldrige National Quality Award (United States, 1987) and the EFQM (European Foundation for Quality Management) Excellence Award (Europe, 1992). Many countries have modelled their award programmes on these three awards.

Quality awards are now popular in all parts of the world. For example, there are NQAs in Australia, almost all countries of Latin America and the Caribbean, in the Middle East (Egypt and Israel), in Asia (Hong Kong SAR, India, Malaysia, Singapore, Sri Lanka), and in Africa (Mauritius, South Africa).

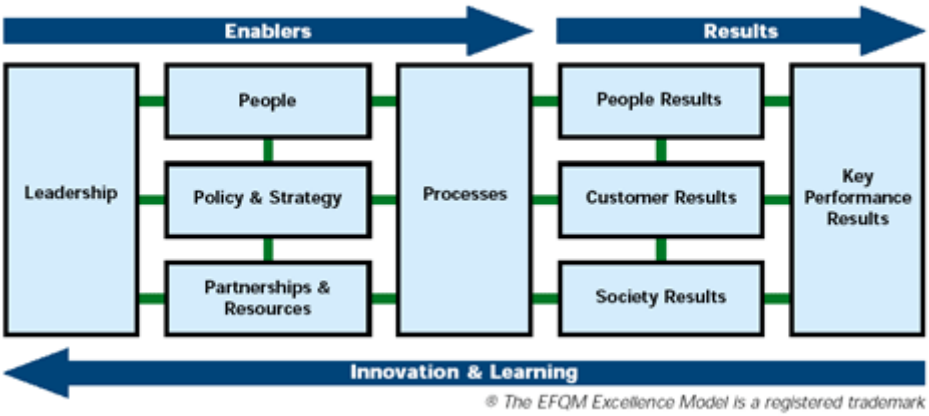
Some governments have shown strong commitment to ensuring the successful implementation of NQAs. For example, the Malcolm Baldrige National Quality Award and its associated awards were established by the Malcolm Baldrige National Quality Improvement Act of 1987 and the awards are given by the President of the United States. Another example is the National Quality Award of Argentina, which was also established by law and is supported by government funds.

NQAs are designed to promote quality awareness, understanding of the requirements for quality excellence, and the sharing of information on successful strategies and their benefits. NQAs typically contain 7 to 10 criteria for performance excellence (with 20 to 30 subcriteria). The 10 usual criteria elements are as follows:

- Leadership
- Strategic planning
- Customer and market focus
- Information and analysis
- Human resource focus
- Process management
- Business results
- Impact on society
- Resources
- Performance and management of suppliers/partners

For example, the European Foundation for Quality Management has nine criteria elements which are divided into two categories: enablers and results (see figure below). The enabler criteria are concerned with how the organization conducts itself, how it manages its staff and resources, how it plans its strategy and how it reviews and monitors key processes. The organization's results are what it achieves. These encompass the level of satisfaction among the organization's employees and customers, its impact on the wider community and key performance indicators.

The EFQM Excellence Model Framework



The British Quality Foundation (BQF) has also developed a software tool called 'BQF snapshot' which will run on most Windows-based computers. It provides a quick and simple way of finding out how your organization measures up to the characteristics of excellence.

The general assessment process for the selection of the winners of an NQA involves preliminary scrutiny and assessment of the applicants' data for preliminary selection, followed by site visits and then final selection by a panel of judges. Feedback reports on the findings of the entire review process, covering among others the applicants' strengths and areas for improvement, are also given to the applicants. The names of the winners are displayed on the website of the NQA administering organization and the awards are given to the winners in a ceremony which receives huge publicity.

Separate awards are given by most countries for different sizes and sectors of industry. For example, in the case of the Malcolm Baldrige Award, the categories awarded include manufacturing, small business, health care, non-profit activities and education.

SMEs are becoming increasingly crucial to national competitiveness and job markets (in the United States, SMEs contribute with more than half of the country's total value produced, while the proportions attributed to SMEs in Singapore and Hong Kong SAR are 91% and 98%, respectively). Several countries/areas have modified their award criteria for SMEs; for example, the national quality award organizations of Australia, Chile, India and Hong Kong SAR have simplified their NQA criteria for SMEs.

SMEs can also apply for an NQA. Such an award will boost the image of an SME on both domestic and international markets.

4. Managing the sustained success of an organization

As defined by ISO 9004, sustained success is the ability of an organization to achieve and maintain its objectives in the long term. The immediate objective of any organization is to satisfy customers by consistently giving them products and services meeting their requirements. Effective implementation of ISO 9001 will help you to achieve this objective. However, if you wish to attain your long-term objective of economic survival, you should use ISO 9004, which supports companies seeking sustained success. ISO 9004 can be used by any organization regardless of its size, type or activity.

ISO 9004 provides a wider focus on quality management than ISO 9001. While ISO 9001 addresses the needs and expectations of customers, ISO 9004 takes into account the needs and expectations of all relevant interested parties. Customers need and expect product quality, an acceptable price and delivery performance; employees search for a good work environment and job security; society expects a commitment to ethical behaviour and environmental protection; owners and shareholders push for sustained profitability. Meeting all these needs and expectations will help you achieve sustained success.

The important elements of ISO 9004 include:

- Managing for the sustained success of an organization – covering processes required for sustained success, the organizational environment, the needs and expectations of interested parties.
- Strategy and policy – including its formation, deployment, and communication.
- Resource management – including financial resources, people, suppliers and partners, infrastructure, work environment, knowledge, information technology and natural resources.
- Process management – including process planning and control and process responsibility and authority.
- Monitoring, measurement, analysis and review – including key performance indicators, internal audit, self-assessment and benchmarking.
- Improvement, innovation and learning – covering small-step continual improvement in the workplace and significant improvements in the entire organization, innovation in order to meet the needs and expectations of interested parties, and encouraging improvement and innovation through learning.

ISO 9004:2009 complements ISO 9001:2008 (and vice versa). If you have not implemented ISO 9001 earlier and you wish to use ISO 9004 straight away, you can do so. As ISO 9004 is a guidance standard, it is not intended for certification, regulatory or contractual use, or as a guide for the implementation of ISO 9001. Annex C to ISO 9004 provides a clause-by-clause correspondence between ISO 9001:2008 and ISO 9004:2009.

The self-assessment tool, given in Annex A to ISO 9004:2009, can help you to assess the performance of your organization and the degree of maturity of its management system. The results of the self-assessment can also help you to identify areas for improvement or innovation and determine priorities for subsequent actions.

5. Ethics and corporate social responsibility

What are ethics for an enterprise?

Ethics are moral principles that guide the way an enterprise conducts its activities. The same principles that determine an individual's actions also apply to an enterprise.

Acting in ethically involves distinguishing between "right" and "wrong" and then making the "right" choice. Unethical business practices are easily identified. For example, companies should not use child labour. They should not illegally use copyrighted materials and processes. They should not involve in bribery.

Though it is legitimate for a company to make a competitive return for its shareholders, it has also wider responsibilities like treating its employees fairly, minimising any harm to the environment and

working in ways that do not damage the communities in which it operates. This is known as corporate social responsibility (CSR).

The key starting point for any business is the law of the countries in which it operates. Most leading companies also have their own statement of business principles which set out their core values and standards. A company should also follow relevant codes of practice that cover its sector. Many enterprises have created voluntary codes of practice that regulate practices in their sector. These are often drawn up in consultation with governments, employees, local communities and other stakeholders.

Why are ethics important for an enterprise?

An enterprise has a great potential to transform people's lives and to alleviate poverty through generating economic growth. It produces goods and services that customers want and it creates jobs for people. It contributes to government revenue by paying taxes to finance schools, hospitals and other public services.

The enterprise has also to be in tune with the wishes of the societies it serves or it runs the risk of alienating its shareholders, stakeholders and customers. This would be bad for its business, reducing growth and potentially affecting profit.

The objective of CSR is to contribute to sustainable development and it is a good strategy for doing business.

Setting goals for sustainable development

Many companies set goals every year for sustainable development. These goals may include:

- working with reduced accidents;
- eliminating occupational diseases;
- increasing diversity in the workplace;
- improving employees' welfare;
- increasing the benefits of local communities;
- reducing their carbon footprint;
- increasing energy efficiency.

By working towards these goals, a company attempts to gain a competitive advantage. Through the demonstration of a more caring and sustainable approach, the company may be able to differentiate itself from rival companies and becomes a partner of choice for the government and the local communities.

Assessing corporate social responsibility of an enterprise

There are different indicators for assessing the level of CSR for an enterprise and these may include the following:

- Has the enterprise publicized a Code of Conduct/Ethics?
- Are the enterprise's conflict of interest guidelines publicly available to investors?
- Does the enterprise make it clear who the designated Ethics/Compliance Officer is?
- Does the enterprise have a whistle blowing process implemented and is it easily accessible?
- Does the enterprise publish a CSR or sustainability report?
- Is CSR one of the company's core corporate principles or business objectives?

Corporate Social Responsibility and ISO 26000

The International Organization for Standardization has published an international Standard ISO 26000: 2010, which provides guidance on how businesses and organizations can operate in a socially responsible way, i.e. acting in an ethical and transparent way that contributes to the health and welfare of society. This standard is expected to set the norm for social responsibility in the time

to come. It is applicable for all types of organizations and is based on 7 principles, 7 Core subjects or requirements, with a total of 37 potential issues to be addressed by an organization. The latter has to identify which issues are relevant and significant for it to address in prioritized way, through its own consideration and through dialogue with stakeholders.

The 7 principles

The seven principles of ISO 26000 include:

- **Accountability**: answerable for decisions and activities and their impacts on society, the economy and the environment
- **Transparency**: openness about decisions and activities that impact on society and the environment
- **Ethical behaviour**: Based on accepted principles of right or good conduct
- **Respect for and consideration of stakeholder interests**: take into account the rights, claims and interest of all stakeholders
- **Respect for the rule of law**: Compliance with all applicable local laws and regulations
- **Respect for international norms of behaviour**: Compliance with international guidelines and codes of conduct
- **Respect for human rights**: should respect and foster the rights covered in the international Bill on Human Rights

The 7 Core subjects

6. Conclusion

Conformity to customers and regulatory requirements is a must for market access, but not adequate for the long term survival of the enterprise. Competition is becoming fiercer. Long term survival requires a zero defects approach and demonstration of a good corporate social responsibility.

Enterprises can do well by doing good! They can differentiate their brands and reputations as well as their products and services and attract top talent if they take responsibility for the protection and future of societies and environments in which they operate. A combined quality and social responsibility effort offers a holistic solution to strengthening the triple bottom line of people, planet, and profit.

Bibliography - ITC's role in global supply chain quality

- ISO 9001 for Small Businesses (joint publication of ISO & ITC)
- Export Quality Bulletins
- Export Quality Management (an answer books for SMEs)
- ISO 9000 Diagnostic Tool
- CD for ISO 14000 (joint publication of ISO & ITC)
- CD for ISO 22000 (joint publication of ISO & ITC)
- ITC website on 'Standards Map'

References

Gower, 1997 : Successful TQM : Inside stories from European quality award winners Gower Publishing Ltd, Hampshire, UK