

CHAPTER 2 LITERATURE REVIEW

This chapter reviews the literature pertaining to Quality, ISO 9000 and Total Quality Management.

2.1 QUALITY

2.1.1 What is quality?

The concept of quality establishes a foundation for an understanding of TQM. There are many literature prescribing the effective quality management. Famous academicians and practitioners including Deming (1986), Juran (1986), Crosby (1979), Feigenbaum (1983), Ishikawa (1985) and others have described a variety of technical and organisational approaches in managing quality. Literature also contains many case studies of successful companies, notably Deming prize and Malcolm Baldrige Quality Award (MBQA) winners such as Toyota, Nissan, Rank Xerox, and Motorola and descriptions of their quality concepts and quality programmes. Garvin and Daniel define quality in 5 perspectives (Garvin, 1988 and V. Daniel Hunt, 1993) ie:

- | | |
|------------------------------|------------------|
| a) Transcendent | b) Product-based |
| c) User-based/Customer-based | d) Value-based |
| e) Manufacturing-based | |

All of the above 5 perspectives must be considered as equally important to the customer. An organisation considering TQM must take an effort to define and view

quality from their customer's perspectives.

2.1.2 Definitions

2.1.2.1 Transcendent

"Quality as neither mind nor matter, but a third entity independent of the two.. even though quality cannot be defined, you know what it is" (Robert M Porsig).

"Quality as a condition of excellent implying fine quality as distinct from poor quality. Quality is achieving or reaching the highest standard as against being satisfied with the sloppy or fraudulent" (Barbara W Tuchman).

Quality is difficult to define but you know how to differentiate good and bad quality.

2.1.2.2 Product-based

"Different in quality amount to differences in the quantity of some desired ingredient or attribute" (Lawrence Abbott).

"Quality refers to the mount of the unpriced attribute contained in each unit of the priced attribute" (Keith B. Leffler).

Quality is focused on the product that produced.

2.1.2.3 User-based

"Quality consists of the capacity to satisfy wants" (Corwin D Edwards).

"Quality is fitness for use" (J M Juran).

Quality is focused on the requirements of the customer. Fully meeting customer requirements is essential for quality.

2.1.2.4 Manufacturing-based

"Quality means conformance to requirements" (Philip B Crosby).

"Quality is the degree to which a specific product conform to a design or specification" (Harold L Gilmore).

Quality is complying to the manufacturing specification.

2.1.2.5 Value-based

"Quality is the degree of excellent at an acceptable price and the controls of variability at an acceptable cost" (Robert A Broh).

Quality is focused on the value built into a products or services.

2.1.3

The Customer

Today's quality improvement effort is focused on customer and, more importantly, customer satisfaction. Customers may be either internal or external. The question of customer satisfaction is the essence of a quality product. Identifying customers' needs in the areas of what, when, why, and how is an essential part of process evaluation and improvement.

- The external customer

External customers are those using the product or services provided by the company.

- The internal customer

The internal customer is the person or group that receives the results (outputs) from any individual's work. In our case, the next work station or person at the next activity is the internal customer. Hence, it involves the whole company, every division and department.

2.1.4

Cost of Quality (Juran 1987)

The cost of quality is a shorthand formula for all the business costs incurred in achieving a quality product or service. These include prevention costs, appraisal costs, internal failure costs, external failure costs, the cost of exceeding customer requirements and finally the cost of lost opportunities. Cost of quality analysis aggregates all the costs to the company of

doing thing wrong by not conforming to specification. These costs can drain a company of 20 - 30 per cent of its revenue or turnover. Key areas of waste in a company include material, capital and time, of which time is perhaps the biggest cost. Cutting the cost of quality is one of the core concept of TQM.

There are three main areas of cost to be identified, measured and improved. These are:

- i) Cost of conformance
- ii) Cost of non-conformance
- iii) Cost of lost opportunities

The cost of conformance has two aspects - costs of prevention and cost of appraisal. Cost of prevention is the cost of activities that prevent failure from occurring. Examples include training employees, quality awareness programmes, planning, and quality workshops or quality circles. Cost of appraisal is the cost incurred to determine conformance with quality standards. Examples include inspecting, checking, auditing, and expediting because parts or reports are not delivered on time.

Cost of non-conformance encompasses three aspects. First there is the cost of internal failure. This is cost of correcting products or services which do not meet quality standards prior to delivery to the

customer. Examples include scrap and rework. Secondly there is the cost of external failure - correcting products or services after delivery to the customer. Examples include warranty costs, installation at site, customer invoice errors/adjustments and unplanned field service costs.

Third, there is the cost of exceeding requirements. This is the cost incurred providing information or services which are unnecessary or unimportant, or for which no known requirement has been established. Examples include redundant copies of documents, reports which are not read, and sales calls which are not required by the customer.

The cost of lost opportunities is the most difficult cost of quality to quantify. This is the lost revenue resulting from the loss of existing customers, the lost of potential customers and the lost business growth arising from the failure to deliver products and services at the required quality standards. Examples include cancellations due to service response time, ordering of competitors' products because the company's products are not available, and the wrong products offered for the specific customer's application.

A reduction of the cost of quality offers many benefits, but they are not immediate. It may take two to four

years to halve the cost of quality and 'prevention costs' may rise during the first year or two. Eventually all of the costs (even prevention) can be taken down to half of what they originally were. Then they can be reduced by half again repeating the process again and again.

2.2 ISO 9000

2.2.1 Development of ISO 9000

International Standard Organisation (ISO) started in 1970s as a Defence Standards. In 1979, British Standard (BS) 5750 was introduced for commercial sectors. In 1989 in Geneva, European Community (EC) chose ISO 9000 standards as a European Standard (EN 29000) to provide a universal framework for quality assurance among its 12 member-nations. The focus of the EC standard is to force the establishment of quality management procedures on firms doing business in the EC. The three required components of the standard are to: (1) have a quality control manual that meets ISO guidelines, (2) document quality procedures, (3) ensure written job instructions. Third-party auditors is required to verify compliance to the standard.

Several factors make ISO 9000 the subject of intense interest in the world-wide. These include (1) world-

wide acceptance as a quality system standard, (2) the reality that the standards will be applied to some products made or imported by the EC in 1993, and (3) the possible requirement that firms comply with ISO 9000 for product certification. The advantages are:

- i) lower costs and wastage
- ii) easier to manage change
- iii) easier to train staff
- iv) more dedicated staff

2.2.2

What is ISO 9000?

ISO 9000 is the quality management system standard published by International Standard Organisation and accepted by many nations mainly on reasons dictated by international harmony, trade co-operation, and the sheer business opportunities related to third party registration under ISO 9000. ISO 9000 is a group of generic standards which specify what should be in a company's quality system, whatever the product or service, whether it is a small or large company. ISO 9000 is intended to be relevant to all types of business and applicable to all products and services. The ISO 9000 series must be looked at as a series of minimum quality system requirements. It can be thought of as the lowest common denominator of quality system requirements means for all industry and services groups. ISO 9000 do not refer to the technical specifications of products but to the systems producing

them, assuring that products consistently have the quality buyers expect. The standards consist of five parts:

- ISO 9000 provides some basic definitions and is a guide to the four other standards.
- ISO 9001, the most comprehensive of the standards, is for companies that research, design, build, ship, install, and service products.
- ISO 9002 is for companies that produce and install products. This standard is particularly relevant to process industries, such as chemicals and food, where requirements for products are stated in terms of an established design or specification.
- ISO 9003 requires only conformance in final inspection and testing. This standard concerns equipment distributors that inspect and test the products they supply or laboratories.
- ISO 9004 contains general guidelines for developing and implementing the kinds of quality management systems defined in ISO 9001, 9002, and 9003.

A broad scope of quality system elements are covered by the ISO 9000 series, such as: management responsibility, contract review, document control, purchasing, process control, inspection and testing, design control, control of non-conforming product, corrective action, handling, storage, packaging and delivery, quality records, internal quality audits, training and servicing.

.3 TOTAL QUALITY MANAGEMENT (TQM)

.3.1 Definition of TQM

Inspite of the plethora of conference papers and reports on the subject, the definition of TQM remains shrouded in vagueness. An insight into the definition of TQM is best approached by reflecting on the definitions of quality. The definition of TQM is systematically worked out by analysing the parts; 'total', 'quality', and 'management'. This analysis uncovers further concepts and ideas to be explored. These include 'customer', '(agreed) requirement', 'first time, every time', and 'at lowest cost'.

Our interest in quality builds upon contemporary premises of systems thinking proposes a whole or total approach to quality management. The word 'total' is very important in this expression because it states that we seek comprehensive ways of dealing with complex sets of interacting issues - involving everyone at all levels, addressing all major issues.

Quality can be and has been defined in many ways. Juran (1974) defined it as "fitness for use", Ishikawa (1976) as "customer satisfaction", Deming (1986) as "the most useful products demanded by customers", Feigenbaum (1983) as "the best products made to customers satisfactions", Crosby (1979) as "conformance to requirements", the Oxford Dictionary as "the degree of

goodness or worth", British Standard defined it as "totality of features and characteristics of a product, service or process, which bear on its ability to satisfy a given need; from the customers' viewpoint", and Motorola Company which received the Malcolm Baldrige Quality Award as "a product almost completely bereft of defects". In general, quality means meeting customers' agreed requirements, formal and informal, at lowest cost, first time and every time.

Total Quality Management definitions from the literature review could however be classified into 2 categories, content based definitions and process based definitions.

2.3.1.1 Content-Based Definitions

Content definition of TQM basically focuses on the key element of total quality management. Harvard Business School's Rosabeth Moss Kanter (1993) identified The Five Pillars of TQM. Product is the focal point for organisation purpose and achievement. Quality in the product is impossible without quality in the process. Quality in the process is impossible without the right organisation. The organisation is meaningless without the proper leadership. Strong, bottom-up commitment is the support pillar for all the rest. Each pillar depends upon the other four, and if one is weak, all are.

Other content-based definitions include Dale and Plunkett (1990) recommended 6 principles of TQM process that consisted continuous improvement, suppliers and customers involvement, total operations/functions involvement, performance measurements, teamwork, and employee involvement.

Malcolm Baldrige Quality Award Criteria emphasis 7 categories for the awards which includes leadership, information and analysis, strategic quality planning, human resource development and management, management of process quality, quality and operational results and customer focus and satisfaction.

Similarly, James (1992) identified 9 TQM criteria which emphasises "management-led" approach, "company-wide" scope, "everyone is responsible for quality" scale, "prevention of errors" philosophy, "do it right the first time" standard, "continuous improvement" theme, "delight the customer" goal, "process" focus and "scientific and statistical" methodology.

2.3.1.2 Process-Based Definitions

Process-based definition describes the system of quality management and/or the implementation strategy. Heizer and Render describes Total Quality Management as a quality process that encompasses the entire organisation, from supplier to customer. TQM emphasizes

a commitment by management to have company-wide drive toward excellence in all aspects of products and services that are important to the customers.

TQM is a philosophy towards excellence. It is a concept. It is not a method or a tool. TQM is defined as "a management philosophy embracing all activities through which the needs and expectations of the customer and community, and the objectives of the organisation are satisfied in the most efficient and cost-effective way, maximising the potential of all employees in a continuing drive for improvement. In TQM, quality must be understood based on certain principles.

Quality must be customer-focused - external as well as internal customers. Requirements and criterions to be met by the process owner or supplier must be analysed and understood by both customer and supplier. The second principle is continuous process/work improvement by the team members. And the third principle is the total human involvement and participation in the customer-supplier chains.

.3.2 The Five Pillars of Quality

A quality organisation has five characteristics that may be called the pillars of quality. These pillars are based on organisational values such as honesty, commitment to customer satisfaction, and commitment to creating an environment in which employees can do their best work. (Organisational Dynamics, Inc. (ODI), 1991) Exhibit 1 shows the five pillars of quality. The five pillars of quality are:

2.3.2.1 Customer focus (meeting requirement)

Within an organisation, employees supply products, services, and information to one another. These exchanges link coworkers as internal customers and suppliers. An organisation can better meet the needs of its final, external customers when it also works to meet the requirements of its internal customers.

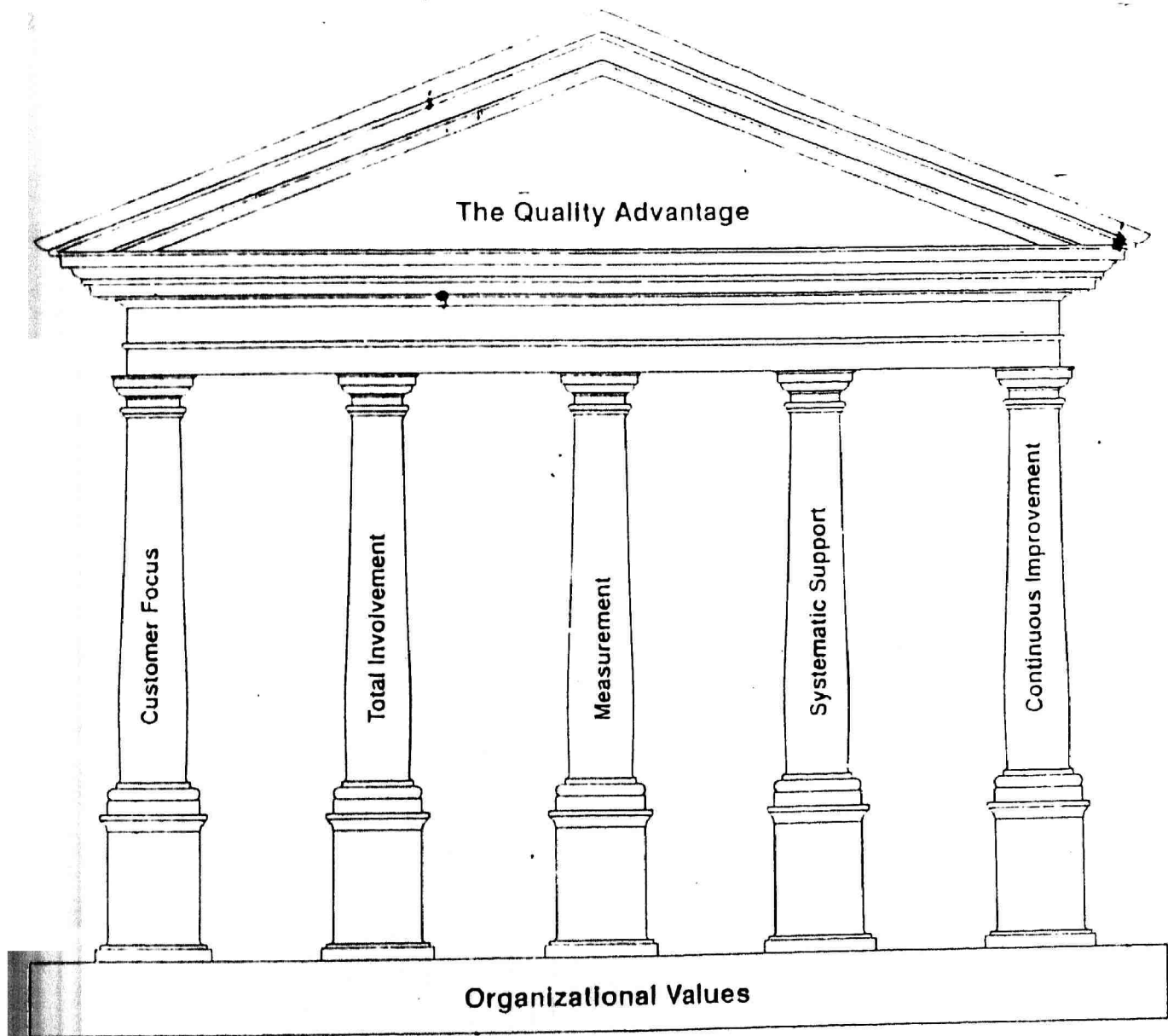
2.3.2.2 Total involvement

Quality is not just the responsibility of management or Quality Control. Everyone in the organisation must be involved in achieving quality.

2.3.2.3 Measurement

An organisation can't meet quality goals unless it establishes baselines and chart progress against them. Decisions about what to measure, and who will measure, should be heavily influenced by customer requirements.

EXHIBIT 1. The Five Pillars of Quality



(Organisational Dynamics, Inc. (ODI) 1991)

2.3.2.4 *Systematic support*

All systems in the organisation, including planning, budgeting, scheduling, and performance management, need to support the quality effort. Coordinating systems can reduce the time it takes to get work done.

2.3.2.5 *Continuous improvement*

An organisation needs to do things better tomorrow than it did yesterday and to be constantly on the lookout for ways to prevent problems, correct flaws, and make improvement. Through continuous improvement, organisations foster creativity and breakthroughs that increase creditibility with their customers.