CHAPTER 5

EXISTING TQM MODELS - AN ANALYSIS

An Investment in Knowledge pays the Best Interest
- Benjamin Franklin.
5.1 INTRODUCTION

The total Quality Management is a management philosophy and a way of thinking that has helped mainly organizations towards achieving world-class status. TQM is a concept, rather than a single programme or method (Burr 1993) and is based on the planning and communication. It should focus on the work as a process, and hence TQM, therefore should concentrate on process improvement and not just on task improvement (Woodruff 1993). Since, TQM helps in creating a culture of trust, teamwork, participation, quality-mindedness, zeal for continuous improvement, continuous learning and ultimately a working culture that contributes towards a firm’s success and existence. Based on those concepts, many practitioners and experts in the field had sprung innumerable models and frameworks. The factors, elements, and dimensions incorporated in those models depended on the belief and the concept of the practitioner. In spite of so many models, a number of surveys had evidenced TQM’s ineffectiveness, due to their inadequacy in universal acceptance (Eskildson 1994). Black and Porter (1996) also agreed to that view that no single model had yet established itself as a basis for TQM theory. Hence, effective models were needed to improve the odds of success. The challenge is to define, implement and sustain a simple TQM model for the company to become a low-cost and high-quality producer (Woodruff 1994).

The implementation of TQM is one of the most complex activities that any company can attempt, due to the fact, that it involves a change in working culture and impacts on people (Kanji & Barker 1990). Most of the organizations do not understand actually the complexity of organizational change and innovation (Glover 1993). The authors of articles and books had often used the terms Models and Framework of TQM, but had not clarified, whether or not a TQM model is equivalent to a TQM
(implementation) framework. It is assumed that a model answers the questions of ‘what is TQM’ with the overall concept or elements put down together, whereas a framework answers ‘how to’ questions and provides an overall way forward. The present study had taken TQM model as synonymous to TQM framework, since a sound framework secures links between concepts and practical applications (Hakes 1991). It was adduced by Glover (1993) who had reasoned that the failure of TQM was due to the wrong implementation and hence, the mission, the strategy and the needed values had to be interfaced with the TQM approach. TQM should be seen as a ‘new way of managing business’ requiring a new thinking style, the thinking for quality (Yusof et al. 2000).

The TQM models / framework could be clarified in many ways depending upon of the point of view of segregation. It could be author’s background and experience like: Consultant / Experts based, Awards based, and Academic based; or the nature of the process such as Manufacturing or Service based, even though there is no clear demarcation between them.

Basically, consultants-based models were those derived from the personal opinion and the judgment through the experience in providing consultancy like the ones proposed by Deming, Juran, Crosby, Feigenbaum, Garvin, etc. Whereas the academic based frameworks were the ones developed by academicians and researchers mainly through their own research and experience in the field of quality such as: Oakland’s (1993) seven key steps of TQM implementation plan and Dale’s (1995) UMIST succinct frameworks were examples of this category. Awards-based models were mainly for organizations seeking to be recognized such as Malcolm Baldrige Award model and European Quality Award Model. Some of the models
were reviewed descriptively and a few representative models were taken up for portraying.

5.2 MANUFACTURING TQM MODELS – A REVIEW

The following TQM models reviewed were generally recommended for manufacturing industries, yet, the philosophies, concepts, and approaches could as well be applicable to service industry and hence the advocators did not explicitly distinguish them. Goodman et al. (1994) had proposed a five-step process to effectively improve the customer satisfaction based on the customer loyalty being the foundation of TQM. The five steps were:

- Determining what is Important to Customer by using Baseline Market-damage Surveys.
- Decriminalizing and Soliciting Complaints.
- Integrating and Reconciliation of Problems and Data.
- Tracking the Results of Quality Initiatives.
- Educating Staff on the link between Customer Problems and Customer Loyalty, and, Extra Costs and Employee Frustration.

Pimblott (1995) had also advocated a three part model recognizing the team effort needed between supplier and customer resulting in delighted customer and business success. Burati (1993) suggested a four-phase implementation framework of TQM: Exploration and commitment, Planning and preparation, Implementation, and sustaining. Reeves et al. (1993) highlighted that the success of TQM depended on the support of top management, employee training, resources for reward and incentives and involvement by all employees.
Saraph and his team (1989) had formulated an eight critical factors model with seventy eight measurement items (out of 120 quality management prescriptions originally thought of) distributed amongst the factors such as:

1. Role of Management Leadership and Quality Policy (13 points).
2. Role of Quality Department (6 points).
3. Training (10 points).
5. Supplier Quality Management (10 points).
7. Quality Data and Reporting (9 points).
8. Employee Relations (9 points).

Expanding Saraph’s model, Powell (1995) had developed an empirical model with the following twelve factors based on Award Criteria and perceptions of quality gurus:

- Committed Leadership.
- Adoption and Communication of TQM.
- Closer Customer Relationships.
- Benchmarking.
- Increased Training.
- Open Organization.
- Employee Empowerment.
- Zero – Defects Mentality.
- Flexible Manufacturing.
- Process Improvement.
- Measurement.
- Closer Supplier Relationship.
Quite a few empirical and conceptual models and frameworks of TQM had been generated from the models of Saraph et al. and Powell. Black and Porter (1995) had initially developed a nine factor empirical model and later extended it by addition, deletion and modification to end up with the following ten factors:

- Corporate Quality Culture.
- Strategic Quality Management.
- Quality Improvement Measurement Systems.
- People and Customer Management.
- Operational Quality Planning.
- External Interface Management.
- Supplier Partnership.
- Teamwork Structures.
- Customer Satisfaction Orientation.
- Communication of Information on the Improvement Activities.

However, a convenient taxonomy of items extracting inter-related factors was not developed.

Madu et al.'s (1996) empirical model correlated the association between quality dimensions namely: Customer Satisfaction (CS) Employee Satisfaction (ES) and Employee Service Quality (ESQ) with Organizational Performance (OP). The importance of TQM to organizational success was the theme it had brought out. They had used 31 items to measure these 4 dimensions i.e. CS (6 items), ES (11 items), ESQ (5 items), and OP (9 items). Their study included the type of firm, its size, and age along with the presence or absence of quality department in the organization.
The impact of three contextual factors: Quality Philosophy, Unionization, and Production Strategy - on successful quality management in small firms were studied by Ahire (1996b). He had adopted the following ten-quality management implementation constructs to create an operational performance framework:

- Top Management Commitment.
- Customer Focus.
- Supplies Quality Management.
- Design Quality Management.
- Benchmarking.
- SPC Usage.
- Internal Quality Information usage.
- Employee Training.
- Employee Empowerment.
- Product Quality.

Product Quality was identified as an Operational Performance Measure of critical importance because, in the absence of visible positive impact of all quality efforts on product quality, customers will eventually walk away, resulting in reduced long-term market share and profitability of the firm (Shepetuk 1991). Firms formally committed to TQM philosophy, exhibited systematic approach and were customer-focused with involved employees. Trade Unions had a major impact on the internal culture of a firm. The manufacturing strategy had to be balanced between ‘make-to-order (MTO)’ and ‘make-to-inventory (MTI)’ for optimal utilization of the business resources. Ahire et al. (1996a) had developed another model by extending the number of constructs to twelve from eleven with the addition of “Supplier performance” as the twelfth construct. In their study, they had brought out a total of 60 measurement items for
evaluating the performance of each construct of their empirical TQM model. Ahire et al. (1996 b) had further ventured to provide a clear demarcation between TQM and Non-TQM firms, and confirmed that TQM implementation resulted in definite advantages, over non-implementation.

Joseph et al. (1999 a, b) had modified Saraph's 8 factors TQM model and stretched it to a 10-factor model. They investigated the empirical relationship between the levels of quantity management and levels of organizational factors (i.e. variables) e.g. Quality of Work Life (QWL), Organizational Climate (OC), and Communication. They advocated a concept that TQM is an integrative management philosophy aimed at continuously improving the quality of products and processes through a holistic approach integrating technical systems with socio-cultural systems within an organization, to achieve Customer satisfaction (Joseph et al. 1999 b). Accordingly, they (Joseph et al. 1999 a) had dropped or modified twenty items from Saraph et al.'s seventy eight-items, eight-factor model and inserted additional fifty three items and two factors, to develop their ten factors, one hundred and eleven items model.

The distribution of measurement items against the factors is as follows:

<table>
<thead>
<tr>
<th>Critical Factors</th>
<th>Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organizational Commitment.</td>
<td>23</td>
</tr>
<tr>
<td>Human Resource Management.</td>
<td>19</td>
</tr>
<tr>
<td>Supplier Integration.</td>
<td>14</td>
</tr>
<tr>
<td>Quality Policy.</td>
<td>10</td>
</tr>
<tr>
<td>Product Design.</td>
<td>11</td>
</tr>
<tr>
<td>Role of Quality Department.</td>
<td>10</td>
</tr>
<tr>
<td>Quality Information System.</td>
<td>6</td>
</tr>
<tr>
<td>Technology Utilization.</td>
<td>6</td>
</tr>
</tbody>
</table>
Victor et al. (2000) developed a theoretical model, in which the total quality management role for line employees resulted in a dual work that required both standardized production and continuous improvement. They assumed that the workers effectively integrated both types of work by switching and shifting between standardized production and continuous improvement jobs as the situation demanded. They also believed that the standardized production was not a passive, automatic or mindless shift. To the contrary, standardized production was actively guided by thoughtful habits, which required a mindful state of alertness and solving problems.

Zhang (2000) had postulated a model of Quality Management Methods and used it to evaluate the effect on business performance. His model consisted of eighty three parameters in Quality Management Methods (QMM) which were categorized under the eleven elements primarily aimed for improvement, such as:

- Supplier Quality Management.
- Process Control and Improvement.
- Product Design.
- Quality System Improvement.
- Leadership.
- Vision and Plan Statements.
- Evaluation.
- Participation.
- Recognition and Reward.
- Education and Training.
Customer Focus.

His model could be used to assess an organization's strengths and weaknesses with regard to the use of QMM. QMM had to be an integral part of TQM, because the QMM would improve product quality, the TQM would improve the business performance as a whole.

5.3 SERVICE TQM MODELS – A REVIEW

The service sector has been growing by leaps and bounds in economies throughout the globe. Customer's perception of service quality is continuously changing for better. The availability of literature exclusively for service industry is limited, if not rare. Yet, a few authors had proposed and developed TQM models exclusively for Service Quality. Others normally had extended the manufacturing TQM models to the service sector as well, might be with certain adoption and modification as required; since the basic issues of both the sectors were the same or similar, such as: organizational culture, customer focus and continuous improvement with empowered employees' involvement, etc. Of late, Service Quality Measurement had been an area of growing interest to researchers and practitioners.

Parasuraman et al. (1994) were the early pioneers to deal with the service quality. They had used the Customer satisfaction / dissatisfaction (CS/D) levels to measure the service quality. Three levels of customer satisfaction standards were postulated:

(1) Expected (Perceived) Service Quality – general researchers viewed it as 'normative' standards i.e. customer's belief about what service provider 'should' offer. CS / D researcher reviewed it as 'predictive' standard i.e. customer's belief about what the service provide 'will' offer.

(2) Desired Service Quality – The level of service representing a blend of what customers believe 'can be' and 'should be' provided.
Adequate Service Quality – The minimum level of service that customers are willing to accept. Parasuraman et al. had labeled the discrepancy between perceived service and desired service as 'measure of service superiority' (MSS), and the discrepancy between perceived service and adequate service as 'measure of service adequacy' (MSA).

Parasuraman et al. (1985, 1988, 1991) had adopted a SERVQUAL, (a twenty two - item scale), for measuring service quality amongst the five dimensions: Reliability (5), Responsiveness (4), Assurance (4), Empathy (5), and Tangibles (4). The SERVQUAL battery as called by the authors, contained the twenty two items distributed between the five factors of quality as indicated by the numbers within the brackets.

Mergeni et al. (2000) proposed a Quality management models applicable to higher education and other service industries such as accounting, marketing, information systems, etc. based on the fundamental phases of quality namely - Quality of Design, Quality of Conformance, and Quality of Performance. They had formed a sort of taxonomy of items applicable to various sectors of industries under the three phases of quality.

Quality of software is of paramount concern to everyone, including users and developers. Software quality is multi-dimensional. Flexibility, maintainability, reusability, integration, consistency, usability, reliability, salability, functionability, efficiency, and portability were some of the specific characteristics of quality in software as highlighted by Parzinzer and Nath (2000) who had also advocated an eight factor, forty three item model.

The eight factors of Parzinger and Nath (2000) Model were:

- Employee Empowerment.
According to Sureshchander et al. (2001 b) the critical factors of 'customer-perceived service quality' were:

- Core Service or Service product.
- Human Element of Service Delivery.
- Systematization of Service Delivery – Non-human Element.
- Tangibles of Service (Servicescapes).
- Social Responsibility.

In line with SERVQUAL instrument, Sureshchander et al. (2001 a) had conceptualized a TQM model for service organization and labeled it as Total Quality Service (TQS) with the following twelve critical dimensions with forty one items. The twelve critical dimensions were:

- Top Management Commitment and Visionary Leadership.
- Technical System.
- Information and Analysis System.
- Bench Marking.
- Continuous Improvement.
- Customer Focus.
5.4 PORTRAYALS OF EXISTING TQM MODELS

Some of the exponents of TQM models had been portrayed in pictorial form. A few of them are reviewed below, in addition to the descriptive ones already reviewed in the previous section 5.3, for better visualization of the existing TQM models.

5.4.1 THE HOUSE OF TOTAL QUALITY MODEL

The House of Total Quality Model developed by Voehl Frank (1992) and subsequently modified by Lindsay and Petrick (1997), with six elements is depicted in Fig. 5.1. The elements are as follows:

1. The roof having four organizational sub-systems i.e. social, technical, educational, and management.
2. The four pillars of quality: customer satisfaction, continuous improvement, speaking with facts, and respect for people.
3. The four foundation slabs: managements of strategy, process, project, and individual task.
4. The four corner stones; planning of strategy, process, project, and individual task.
5. The mortar of deployment between the joints of the roof, pillars and the stones and slabs.
6. The ethical work-culture. The ethical work-culture requires regular assessment, monitoring, and development like other parameters and had found a place in this TQM model.
5.4.2 EVANS AND LINDSAY MODEL

According to Evans and Lindsay (1993) Total Quality System was a combination of two system segments, namely the management system and technical system. The former one dealt with the planning, organizing, resourcing, and controlling the management processes related to quality assurance. The latter system was concerned with the technical aspects of the assurance of quality in product design, the planning of manufacturing or service producing processes, and the control of material and finished goods. Those were covered under 'quality of design and performance process' and 'quality of conformance process'. Their model had been built on system, process, structure, and techniques as shown in Fig. 5.2.
FIG. 5.2 EVANS AND LINDSAY MODEL (Evans et al. 1993).
5.4.3 EUROPEAN MODEL

The European Foundation for Quality Management (EFQM 1995) had developed TQM model more or less in line with the Malcolm Baldrige Award model of America. It was claimed to have been developed by the businessmen for the businessmen (Batalas). The model was based on the premiss, that Customer Satisfaction, Employee Satisfaction, and Impact on Society were achieved through Leadership. They manage and control the Policy and Strategy, People Management, Resources and Processes leading ultimately to excellence in Business Results. The European TQM model interconnects the leadership and the business results through the processes with six elements in between them as illustrated in Fig. 5.3.

![Diagram of European Model](image)

**FIG. 5.3 EUROPEAN MODEL** (Batalas)
5.4.4  **SILVESTRO MODEL**

Silvestro (1998) had proposed a model with six core issues i.e. Customer Orientation, Leadership, Empowerment, Continuous Improvement, Elimination of Waste, and Quality Measurement. He further expanded radially covering various tools, techniques, approaches, and systems, within a circle, which encompassed them. Silvestro made two models / frameworks - one for manufacturing and the other for service quality managements, which gave a total comparative picture. The TQM model for service – one might call it as TQS (Total Quality Service) - developed by Silvestro had included SERVQUAL, an instrument that measured service quality.

Fig. 5.4 reveals the elements of Silvestro's TQM models for Manufacturing Industry.
FIG. 5.4 SILVESTRO MODEL (MANUFACTURING) (Silvestro 1998).
Fig. 5.5 brings out the elements of Silvestro’s TQM model in Service Industry.

**FIG. 5.5 SILVESTRO MODEL (SERVICE) (Silvestro 1998)**
5.4.5 WESTINGHOUSE MODEL

Westinghouse being one of the companies pioneering in TQM had developed a TQM model and it is shown in Fig. 5.6. It had been built upon the foundation of Management Leadership, and subsequently with superstructures such as: Product / Process Leadership, Human Resource Excellence, and Customer Orientation. It contained 11 elements in its built-up (Swift et al. 1998).

![Diagram of Westinghouse Model]

**FIG. 5.6 WESTINGHOUSE MODEL (Swift et al. 1998)**

5.4.6 MALCOLM BALDRIGE AWARD MODEL

In America, an award for Quality was created in honour of Malcolm Baldrige, the then secretary of commerce, and was labelled as Malcolm Baldrige National Quality Award, like the Deming Prize of Japan. The award stipulated seven criteria with 1000 points for assessment of the company, and they are: Leadership (125), Strategic Planning (85), Customer and Market Focus (85), Information and Analysis (85),
Human Resource Focus (85), Process Management (85), and Business Results (450). The number within the bracket indicates the points allocated to the respective criteria. The core values and concepts of this award were: Visionary Leadership, Customer Driven, Organizational and Personal Learning, Focus on the Future, Managing for Innovation, Management by Facts, Public Responsibilities and Citizenship, Focus on Results and Creating Values, and System Perspectives. The quality model consisted of the seven criteria as shown in Fig. 5.7.

5.4.7 ISO 9000 MODEL

International Standard Organization had suggested a Quality System Model through ISO 9000. Being a Process-based model it interlinked the Customer Requirements with the Customer Satisfaction through a set of parameters such as, in a cycle:
The ISO 9000 model is illustrated in Fig. 5.8.

**FIG. 5.8 ISO 9000 MODEL (BIS 2000).**

5.5 **SUMMARY**

The domain of TQM had probably become too great to be conveniently and taxonomically defined on the basis of past literature, as seen in the review of the existing literature on both manufacturing and service quality management. The
models and the frameworks postulated, proposed, and practiced differed vastly from author to author and from practitioner to practitioner with varying factors both in quantity and approach. Nevertheless, a silver lining fact was, that there were some concurrency in the views amidst a vast diversity in approaches and concepts. The common factors were:

- Customer Focus.
- Culture of the Organization.
- Continuous Improvement.
- System Driven.
- Performance Oriented.

The entire TQM - from policy formulation to complete implementation and review could be segmented into three stages, i.e. Quality of Design, Quality of Conformance, and Quality of Performance. These phases are universally applicable irrespective of the nature of business, size of the organization, and the category of the activity – be it a management of strategy, structure, system, service, or the process, planning, performance, and product. An undisputable fundamental agreement - a near unanimity – is, that TQM implementation would lead to a World-Class Quality with sustained and continued Excellence in Business.

Having reviewed the encyclopaedia of literature on the existing TQM models, an analysis has been carried out for their adequacy in the next chapter.

*If the Doors of Perception were cleansed,*

*Every Thing would Appear to man, as it is, Infinite - William Blake.*