This chapter discusses the literature on TQM. Thirteen constructs identified for evaluating TQM practice in construction organisation is explained. The business excellence model developed by EFQM is also touched upon.

3.1 INTRODUCTION

The goal of quality management, originally, was to minimise the product cost within a given set of performance specifications; but has since expanded to processes, and to the pursuit of value added products (Chang and Hsu, 1998)\textsuperscript{15}. The TQM approach has forced the companies to move towards proactive improvement to match customer needs and provide superior customer value, for surviving in today's competitive environment. Saraph \textit{et al.} (1989)\textsuperscript{16} attempted to combine the various TQM prescriptions by identifying eight critical factors of TQM. These factors are management leadership and quality policy; the role of quality department; training; product/service design; process management; quality data and reporting; employee relations; and supplier quality management. Porter and Parker (1993)\textsuperscript{17} and Black and Porter (1996)\textsuperscript{18} identified eight such factors, based on an extensive review of literature. Flynn \textit{et al.} (1994)\textsuperscript{19} identified seven key dimensions of TQM from a strategic perspective. The factors include top management support, product design, process management, quality information, workforce management, and supplier and customer involvement. Through a detailed analysis of the literature, Ahire \textit{et al.} (1996)\textsuperscript{20} identified twelve constructs of integrated quality management strategies, namely, top management commitment, customer focus, benchmarking, statistical process control, design quality management, supplier quality management, quality information usage, employee empowerment, employee involvement, employee training, product quality, and supplier performance. Based on these factors, a framework to investigate the effects of quality management strategies on a firm's product quality had been suggested. Another contribution to the development of an instrument to measure the levels of TQM implementation was made by Black and Porter (1996). Their research was based on the Malcolm Baldrige National Quality Award (MBNQA) model. Based
on empirical research, Black and Porter (1995; 1996)\textsuperscript{21} and Flynn \textit{et al.} (1994) developed instruments for measuring TQM levels, and proposed framework /model for TQM in manufacturing industry. Madu \textit{et al.} (1996)\textsuperscript{22} described an empirical investigation based on nine quality dimensions and their effects on organizational performance. Joseph \textit{et al.} (1999)\textsuperscript{23} identified ten factors of TQM, namely organizational commitment, technology utilization, human resource management, quality policy, product design, role of quality department, quality information systems, supplier integration, operating procedures, and training. They also developed a measurement instrument to evaluate the level of TQM practice in manufacturing organisations.

There are evidences to show that effective TQM implementation improved long-term profitability and stock returns (Hendricks and Singhal, 1997).\textsuperscript{24} A study by Adam \textit{et al.} (1994)\textsuperscript{25} examined the relationship between different quality improvement approaches, and operational and/or financial performance of the organisation. They concluded that each organisation identifies the quality improvement strategies, depending on the objectives to be achieved, namely, to improve quality or operating performance or financial performance. Samson and Terziovski (1999)\textsuperscript{26} established that the TQM practices (both individually and collectively) do contribute significantly to the operational performance. Ittner and Larcker (1996)\textsuperscript{27} attempted to measure the impact of quality initiatives on financial performance of firms and concluded that quality management practices would contribute to better financial performance. In another study, Terziovski and Samson (1999)\textsuperscript{28} tested the relationship between TQM practices and organisational performance with and without the covariates, company size, industry type, and ISO 9000 certification. The authors concluded that there was significant relationship between organisational performance and TQM practices. The important finding of these studies was that TQM had significant and positive relation with most of the dimensions of organisational performance. The authors further concluded that the company size impeded the implementation of TQM. Larger companies showed a tendency to gain greater benefits from TQM implementation than smaller firms. In another study conducted by Ahire (1996)\textsuperscript{29}, it was found that the success due to the TQM practice could be observed within two to three years of its
implementation. It is also noted that TQM organisations performed better than non-TQM firms, in terms of organisational performance.

3.2 THE EFQM MODEL

The EFQM Excellence Model\(^{30}\) is a non-prescriptive framework, primarily used as a self-assessment tool and designed to help organisations achieve sustainable business excellence. The Model has a scoring system that enables organisations to rate themselves in nine key areas of the business. The Model is typically used as an overarching framework under which all an organisation's improvement activities and initiatives can fit, thus helping to remove duplication and identify gaps. It is not a standard or quality assurance framework but is a way of striving towards excellence through self-assessment and continuous improvement.

EFQM Excellence Model is a practical tool that can be used in a number of ways:
- As a tool to help an organisation measure its current position, identify improvement actions and generate ideas and solutions
- As a tool to help establish appropriate management systems
- As a way of developing a common language and way of thinking about the organisation which is shared by everyone.

3.3 QUALITY MANAGEMENT IN INDIAN CONSTRUCTION INDUSTRY

The fast changing environment with liberalisation, globalisation and privatisation is driving the Indian construction industry to match the quality and cost to international competition. To adapt to this situation many construction companies in India are now adapting international standards. These international standards direct the companies to improve the processes of their organisation and thereby to enhance performance. The emerging competitive environment is challenging the traditional ways of working of companies that have been in business in India for a long time. Organisations are now striving to achieve a competitive edge and provide more value for money. There is also an increased awareness of the need for satisfying all the stakeholders, end users /customers, share holders, employees and society. Thus the focus has now shifted to customer satisfaction together with profitability.
Quality assurance refers to the entire system of policies, procedures and guidelines established by an organisation for the purpose of achieving and maintaining quality. Quality assurance consists of three principal functions: Quality engineering, Quality control and Quality management. The aim of quality engineering is to incorporate quality into the design of products and processes and to predict the potential quality problems prior to delivery of the product. Quality control involves making a series of planned measurements in order to determine if quality standards are being met. Quality management involves the planning, organisation, direction and control of all quality assurance activities.

In general, construction companies have to be rather product-oriented than service-oriented. Because the construction companies deliver a heterogeneous product it is essential that we pay significant attention to customer transactions and employee behaviour. Thirteen constructs has been identified as particularly relevant to the implementation of a quality system in an organisation. These are discussed in detail below.

3.3.1 Top management commitment and leadership

Leadership for quality is the responsibility of top management. Achieving quality and market leadership requires a long range strategy that reflects long-term commitments to customers, stock holders and suppliers. This strategy must also address training, employee development, supplier development, technology evolution and other factors that relate to quality. A key part of the long term commitment is regular review and assessment of progress relative to long-term plan. Involvement of and leadership by top management are essential to the necessary culture of commitment to quality. The senior leadership of business must create clear quality values and high expectations and build these into the company’s operations. Through regular personal involvement in visible activities, such as planning, review of company’s quality performance and recognising employees for quality achievement, senior executives serve as role models reinforcing values and encouraging leadership in all levels of management. If commitment to quality is not a priority at the top, any initiative at a lower level is doomed to failure.
3.3.2 Organisational culture

Culture is the pattern of shared beliefs and values that provides the members of an organisation, rules of behaviour or accepted norms for conducting operations. It is the philosophies, ideologies, values, assumptions, beliefs, expectations, attitudes and norms that knit an organisation and are shared by employees. It is important for any organisation to have a central core culture of values into which the management and other employees will be drawn. Without this central core, the energy of members of the organisation will dissipate as they develop plans, make decisions, communicate and carry on operations without a fundamental criterion of relevance to guide them. This is particularly true in the case of decisions related to quality. Employees tend to think like their peers and think differently from those at other levels. This suggests that organisations will have considerable difficulty in improving quality unless core values are embedded in the organisation. The basic vehicle for embedding an organisational culture is a teaching process in which desired behaviours and activities are learned through experiences, symbols, and explicit behaviour. The components\(^{32}\) of the total quality system provide the vehicles for change. This is summarised in Table.3.1

<table>
<thead>
<tr>
<th>Focus</th>
<th>From traditional</th>
<th>To Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan</td>
<td>Short range budgets</td>
<td>Future strategic issues</td>
</tr>
<tr>
<td>Organise</td>
<td>Hierarchy-chain of command</td>
<td>Participation/empowerment</td>
</tr>
<tr>
<td>Control</td>
<td>Variance Reporting</td>
<td>Quality measures and information for self control</td>
</tr>
<tr>
<td>Communication</td>
<td>Top down</td>
<td>Top down and bottom up</td>
</tr>
<tr>
<td>Decisions</td>
<td>Ad hoc /crisis management</td>
<td>Planned change</td>
</tr>
<tr>
<td>Functional management</td>
<td>Parochial, competitive</td>
<td>Cross functions, integrative</td>
</tr>
<tr>
<td>Quality management</td>
<td>Fixing/one-shot manufacturing</td>
<td>Preventive/continuous, all functions and process.</td>
</tr>
</tbody>
</table>

Table 3.1 Cultural Change Mechanisms

TQM implementation strategy should be sustaining the process through an ongoing culture change.
3.3.3 Customer/ Client focus

Quality is judged by the customer. All product and service attributes that connote value to the customer and lead to customer satisfaction and preference must be addressed appropriately in quality systems. Value, satisfaction and preference may be influenced by many factors throughout the customer’s overall purchase, ownership and service experiences. This includes the relationship between the company and the customers- the trust and confidence in products and services- that leads to loyalty and preference. This concept of quality therefore also includes those attributes that enhance and differentiate a company’s output from competing offerings. A company must remain close to the customer, knowing what work the customer does and how the customer uses its products. Companies must also recognise that internal customers are as important in assuring quality as are external customers who purchase the product. Employees must view themselves as both customers of and suppliers to other employees. Meeting the needs of internal customer is the first step to meeting the needs of external customers. Conflict frequently arises between the needs of internal and external customers. Therefore a balance needs to be struck between the needs of these customer groups. The solution is to determine the real needs of each and design the process to meet both.

Society is a customer of business. A company’s quality system should address areas of corporate citizenship and responsibility including business ethics, public health and safety, environment and sharing of quality related information in the company’s business and geographic communities. Inclusion of public responsibility areas within a quality system means not only meeting all local, state and federal legal and regulatory requirements but also treating these and related requirements as areas for continuous improvement.

3.3.4 Process quality management

A process focus, by which inputs are transformed to outputs, provides better insights to how the organisation actually operates. This construct examines systematic processes which the company uses to pursue ever higher quality and
company's operational performance. The key elements of process management are examined, including research and development, design, management of process quality for all work units and supplies, systematic quality improvement and quality assessment. Therefore this is concerned with all the processes in the organisation that contribute directly or indirectly to quality as the customer defines it. So the traditional approach of quality control as measuring the output has changed to controlling the continuous improvement of the process.

3.3.5. Quality measures

From a TQM perspective, all managerial decisions should help the organisation meet or exceed customer expectation. To know if such decisions are effective, a means of measuring performance is required. Measurement serves two purposes: control & improvement. Control is the continuing process of evaluating performance, comparing that performance to a goal or standard, and taking corrective action when necessary. Control is not a substitute for continuous improvement- it is a means of maintaining improvement. The data collected through systematic measurement can be used productively to identify further areas for improvement.

The measurement of quality is the price of non-conformance. In order to attract the attention of senior management, quality has to be measured in financial terms. This is how quality can become a management function, and not just a technical one. If one measures the cost consequences involved in doing things wrong, this will represent the result of not doing things right first time. When total customer satisfaction becomes the definition of a quality product or service, it creates need to develop measures which integrate the customer perspective into a measurement system. Therefore need arises for professional quality functions, prevention efforts and quality education. So the extent to which timely completion, savings due to implementation of quality standards and adherence to quality ensured at each & every stage of the project have to be assessed.
3.3.6. Human resource and management:

This includes employee involvement, human resource development & management, employee education and training, employee performance and recognition and employee well-being and satisfaction. At the heart of TQM is the concept of intrinsic motivation – involvement in decision making. Increased involvement means more responsibility, which in turn requires greater level of skill. This is achieved through training. Training usually falls into one of three categories.

1) Reinforcement of quality message and basic skill remediation. 2) Job skill requirements. 3) Knowledge about principles of TQM.

Next, while selecting employees to a company, committed to TQM, in addition to the skill and abilities required for a specific job, he may require additional characteristics such as attitude, values, personality type and analytical ability. Training has to be given for every one right from executive management, middle management, and technical staff to general workforce. Training can be on or off-site. For ensuring that TQM training is successful, first, the training objectives should be developed, secondly, provide a training manual to match course objectives and thirdly, quality training content should include technical and behavioural components.

3.3.7. Employee empowerment:

Empowerment means conveying authority and responsibility to employees. This is very much effective in construction industry where most frequently the customer's perception of quality stands or falls based on the action of the employee in a one-on-one relationship with the customer. It gives employees a sense of ownership and control over their jobs, and helps them feel more responsible, show more initiative and a freedom to respond to unexpected problems and create customer satisfaction. Empowered employees develop the decision making and leadership skills necessary for more advanced managerial positions. It also frees up higher level managers from routine decision making tasks, allowing them time for better strategic planning.

Employee involvement is a process for empowering members of an organisation to make decisions and to solve problems appropriate to their levels in the organisation. The logic is that the people close to a problem or opportunity are in the
best position to make decisions for improvement if they have ownership of the improvement process. Similarly, performance appraisal serves as a diagnostic tool and to review process for development of the individual, team and organisation. Appraisals are used to determine reward levels, validate tests, aid career development, and improve communication and to facilitate understanding of job duties.

3.3.8 Continual improvement:

It is a part of management of all systems and processes. Achieving the highest levels of quality and competitiveness require a well defined and well executed approach to continual improvement. Such improvement needs to be part of all operations and of all work unit activities of a company. Improvement is driven not only by the objective to provide better quality and increase profits but also by the need to be responsive and efficient conferring additional market place advantages. To meet all these objectives, the process of continual improvement must contain regular cycles of planning, execution and evaluation and correction.

The Japanese have a term for improvement – kaizen. In the kaizen philosophy, improvement in all areas of business such as cost, meeting delivery schedules, employee safety and skill development, supplier relations, new product development or productivity enhance the quality of the firm. Many opportunities for continual improvement exist such as:

1. Improving the organisation by improving human resources and managerial practices
2. Improving the designs with features that better meet customer’s needs and achieve higher performance, higher reliability, faster cycle times, and other market driven dimensions of quality.
3. Improving the whole system by reducing defects, inventory, worker idle time, wasted motions and unnecessary transportation and handling of material and equipment.
3.3.9 Benchmarking:

Benchmarking is the continuous process of comparing a company's strategy, products and processes with those of world leaders and best-in-class organisations in order to learn how they achieved excellence and then setting out to match and even surpass it. This helps a company learn its strengths and weaknesses and those of their world leaders and other industrial leaders, and incorporate the best practices into its own operations. Benchmarking allows organisations to set realistic, rigorous new performance targets, and this process helps convince people of the credibility of these targets. This calls for a cultural change in the organisation. Benchmarking also allows the organisation to define specific gaps in performance and to select the processes to improve. The gaps in performance that are discovered can provide objectives and action plans for improvement at all levels of the organisation and promote improved performance for individual and group participants. Benchmarking provides a basis for training. Employees begin to see the gap between what they are doing and best-in-class are doing. Closing the gap points out the need for personnel to be involved in techniques of problem solving and process improvement.

3.3.10 Infrastructure and facilities:

There need to be adequate infrastructure and facilities provided in the organisation. Availability of latest software packages required for the design as well as packages related to resource planning is of great priority. Access to data between all levels of organisation and also between the sites also has to be enabled.

3.3.11 Communication:

Communication is defined as the exchange of information and understanding between two or more persons or groups. Communication is linked extricable in the quality process, yet some executives find it difficult to tell others about the plan in a way that will be understood. An additional difficulty is filtering. As top management's vision of quality gets filtered down through the ranks, the vision and plan can lose both clarity and momentum. Thus top management as well as managers and
supervisors at all levels serve as translators and executors of top management's directive. The ability to communicate is a valuable skill at all levels.

3.3.12 Employee commitment and attitude:

The talents, skills and creativity of workers can be of significant value if actively sought. Employee involvement offers many advantages such as:

1. Replacing the adversarial mentality with trust and co-operation.
2. Developing the skills and leadership capability of individuals creating a sense of mission and fostering trust
3. Increasing employee morale and commitment to organisation
4. Fostering creativity and innovation- the source of competitive advantage
5. Helping people understand quality principles and instilling these principles into the corporate culture
6. Allowing employees to solve problems at the source immediately
7. Improving quality and productivity

The overall attitude towards satisfying customer needs, cultural change and interpersonal relationship between fellow employees are also assessed.

3.3.13. Risk management:

This construct takes into consideration the possible risks which could jeopardise the successful completion of a project or a quality improvement effort. Risk management can reduce costs and effort, can assess potentially damaging circumstances and control any slippage in the project plan.

3.4 GAPS IN THE LITERATURE

From the above discussions, it is evident that the research literature on TQM in manufacturing industries is quite comprehensive. Numerous aspects of TQM, such as the identification of the critical factors of TQM, the people-oriented issues (i.e., soft issues) of TQM, the influence of contextual factors on TQM, the relationships between TQM practices and organisational performance, relationships between TQM practices and operational performance, the relationship between product quality and customer's
perceptions of quality, the relationship between TQM implementation and quality management systems like ISO 9000, and the demarcation between TQM and non-TQM firms, are discussed in the literature. While a lot of research works have been reported on the topic of quality management in manufacturing as well as service industries, the research works on quality management in construction industry do not appear to be comprehensive. The survey of literature on quality management reveals that the application of quality management techniques has enabled the manufacturing and service industries to gain better control over the processes and expenses, and to improve customer satisfaction, thereby strengthening their competitiveness.

3.5 CONCLUSIONS

There exists a scope to identify the critical factors and operating elements of TQM in construction industry and hence an attempt in this direction would be highly instrumental in achieving customer satisfaction, which is considered as the essence of quality management.

Having pointed out the constructs pertaining to TQM, study was carried out among the different construction organisations in India to assess the level at which these organisations are functioning in the context of TQM. This is explained in the succeeding chapter.