INTRODUCTION

The concept of quality has been contemplated throughout history and continues to be a topic of intense interest. The advent of value seeking, informed consumers, globalisation of markets, increased global competition have made it necessary for organisations to improve their effectiveness, and to do so, many have targeted the area of quality. Quality certification has emerged as a key organisational practice helping companies reach world wide and to establish rationalised production process. ISO 9000 certification is one of the most popular quality assurance systems.

The Total Quality Management (TQM) is a system for improving product and operational quality that has been adopted by leading manufacturers everywhere. It is a key strategy for maintaining competitive advantage and market leadership. In today’s manufacturing environment where quality is crucial to success, manufactures use TQM as a powerful tool to continuously improve productivity and customer satisfaction. The importance of quality as a driver of competitive advantage increases with increase in local and global competition. In a Total Quality Management approach there is a need for managerial leadership to create the appropriate characteristics of total quality culture.

The presence and practice of Total Quality Management is inevitable in an ISO 9000 certified organisation, irrespective of type of environment it operates. There is an increasing trend among the organisations in India, particularly in the state of Kerala, to obtain ISO 9000 certification for their organisation. This situation leads to the question as to what extent these ISO 9000 certified manufacturing organisations in Kerala are practicing Total Quality Management. The perception about the practice of TQM should also remain the same within the organisation and
also between the organisations irrespective of the individual roles or the type/size of the organisation.

**Need for the study**

This research makes a contribution to both industrial practice and academic knowledge. It is an endeavour to find out how TQM is practiced among the ISO 9000 certified manufacturing organisations in Kerala and also offers a solid foundation for future academic research. From the practical perspective this study could be utilised to 'ways and means to' the improve the manufacturing organisations. Secondly, the relationship between the elements of TQM and organisational performance could be revealed whereby the managers will get an opportunity to allocate the resources in a better way so that the manufacturing organisation may gain by it. Thirdly, this study intends to find out how TQM principles are practiced and illuminated by the private sector and public sector manufacturing organisations. Fourthly, this study will help to identify the perceptual consistency among the organisational members of the ISO 9000 certified manufacturing organisations in Kerala. This intense investigation about the effective implementation of TQM philosophy by the manufacturing organisations in the private and public sectors will be an eye-opener to other organisations of similar type, which in turn will enable them to attain greater heights of excellence through TQM practice.

**Scope of the Study**

This study was conducted in the state of Kerala, in South India. The study was focused on the ISO 9000 certified medium and large scale manufacturing organisations in Kerala. The organisations were randomly selected from all the districts of the state of Kerala. In this study the respondents were the managers and the workers of the ISO 9000 manufacturing organisations in Kerala. The manager respondents included the Top executives, Middle level Managers and Junior managers, and in this research the term used to represent this category is “Managers”. The
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worker respondents included the supervisors and workers of different grades and in this research the term used to represent this category is “Workers”.

Statement of the problem

Many studies attempted to test the relationship between TQM and organisational performance. However there has been little empirical research on whether ISO accredited organisations in-fact pursue quality improvements consistently with a TQM perspective. The ISO 9000 certified organisations are expected to practice TQM irrespective of its type, size or area in which it operates. The present study is designed to address this question as to what extent the ISO 9000 certified manufacturing organisations in the state of Kerala practice TQM principles.

The practice of TQM by an organisation ought to be reflected in its organisational performance. In this circumstance this study aims to identify the relationship between TQM and organisational performance among the ISO 9000 certified manufacturing organisations in the state of Kerala.

The practice of TQM by the organisations should be consistent, irrespective of its type. In this context it is worthwhile to analyse whether there are any differences exist between organisations in the private sector and public sectors in the implementation and practice of TQM.

The organisational members of the ISO 9000 certified manufacturing organisations are expected to have the same perception about the practice of TQM, irrespective of their positions. This study also attempts to make a comparative study on the perception about the practice of TQM by selected manufacturing organisations in the state of Kerala.

Taking up the broad research problem discussed above, this study aims to answer the following research questions.
• Do the selected ISO 9000 certified manufacturing organisations in Kerala practice TQM principles? If so, what is the nature of practice of TQM in ISO 9000 certified organisations in Kerala?

• What is the relationship between TQM and organisational performance in selected ISO 9000 certified manufacturing organisations in Kerala?

• Is there any perceptual difference between the managers and the workers of the ISO 9000 certified manufacturing organisations in Kerala?

• Is there any difference in the practice of Total Quality Management, between the ISO 9000 certified private and public sector manufacturing organisations in Kerala?

Objectives of the Study

The main objectives of the study are:

• To identify whether ISO 9000 certified manufacturing organisations are practicing TQM principles.

• To identify the style in which the TQM elements are practiced by the ISO 9000 certified manufacturing organisations in Kerala.

• To identify the relationship between TQM practice and organisational performance among the ISO 9000 certified manufacturing organisations in Kerala.

• To make a study on the TQM practices of selected public and private sector manufacturing organisations in Kerala

• To analyse the difference that exists in the perception about the practice of Total quality Management between the managers and workers among the ISO 9000 certified manufacturing organisations in Kerala.
To analyse the differences exist in the practice of Total Quality Management between ISO 9000 certified private and public sector manufacturing organisations in Kerala.

Hypothesis of the Study

The hypothesis developed for analysing the research problems of this study are mentioned below:

- There exists significant relationship between Total Quality Management and the ISO 9000 certification among the ISO 9000 certified manufacturing organisations in Kerala.
- There exists significant relationship between Total Quality Management and organisational performance among the ISO 9000 certified manufacturing organisations in Kerala.
- There exist significant differences in the practice of Total Quality Management between the ISO 9000 certified private sector and public sector manufacturing organisations in Kerala.
- There exist significant differences in the perception about the practice of Total Quality Management between the managers and workers of the ISO 9000 certified manufacturing organisations in Kerala.

Methodology

The type of research adopted for this study was analytical research and is meant for analysing the role of Total Quality Management among the ISO 9000 certified manufacturing organisations in Kerala and to make suggestions based on the analysis. The population of this study was the ISO 9000 certified medium and large scale manufacturing organisations in the state of Kerala. Several issues related to the Topic under study were discussed with experts, researchers, industrialists, and other eminent personalities in the field of Industrial Engineering, Quality Management, Production and Operations Management, Maintenance Management and
Quality Auditors to have an idea about the subject for finalising the data and collecting the data. The information and ideas obtained from the discussions were well utilised for the formulation of a framework for the study.

**Pilot Study**

A pilot study was conducted with the help of a draft interview schedule for evaluating the practice of Total Quality Management in ISO 9000 manufacturing organisations in the state of Kerala. The respondents were randomly selected for the pilot study. Based on the pilot study, the aspects irrelevant to the topic with respect to the population were removed and the aspects relevant to the topic with respect to the population were added. After conducting a thorough analysis of the data collected from the pilot study, the style of some of the questions were modified to avoid probable ambiguities and to obtain more reliable, unbiased and accurate answers. Slight rearrangements in the logical order of the questions were also done. After pilot study it was found that comparing the practice of TQM between ISO and non-ISO 9000 certified manufacturing organisation in the state of Kerala is of no use, because on approaching non-ISO 9000 certified manufacturing organisations it was found that they don’t implement TQM in a systematic way. It was also understood that the study of the practice of TQM among the SSI units and medium and small scale industrial units was of no importance, so these units were excluded from the study.

**Sampling Design**

The population of this study includes the ISO 9000 certified manufacturing organisations in the state of Kerala. The organisations which received ISO 9000 certification on/before April 2005 were considered for the study. The study will focus only on the medium and large manufacturing organisations in the state of Kerala. The study excluded those organisations without ISO 9000 certification from the purview of the research.
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The participating organisations were selected on the basis of multilevel stratified random sampling method. In the first level, the fourteen districts of Kerala were divided into three regions: southern region, central region, and northern region. Southern region consists of Thiruvanathapuram, Kollam, and Alappuzha districts. Central region consists of Pathanamthitta, Kottayam, Ernakulam, Idukki and Thrissur districts. Northern region includes Malappuram, Kozhikode, Waynad, Palakkad, Kannur and Kasargodu districts. The directory of medium and large scale manufacturing Industries in Kerala published by the Kerala state Industrial Development Corporation (KSIDC) was used for getting the information about the population. According to the 2008 directory the number of Medium and Large Scale ISO 9000 certified manufacturing organisations in Kerala is 252. Data was collected randomly from 36 medium and large scale organisations in Kerala. The sample selected for study from among medium and large scale organisation were in the proportion 1:2, that is out of the total 36 sample organisations selected 12 units will be from the medium organisations and 24 units will be large organisations.

Collection of Data

The primary data have been collected through interview and schedule method from 126 manager category respondents and 126 worker category respondents. The primary data collection started on 1st April 2007, continued till 28th February 2009. At the exploratory stage of this study, a detailed survey of literature was undertaken in order to identify various dimensions of Total Quality Management. The researcher mainly utilised the library of Indian Institute of Management (Kozhikode and Bangalore) and TA Pai Institute of Management, Manipal. The data was very helpful in evolving an appropriate methodology for the study and in formulating a conceptual framework of the study. For this purpose various secondary sources like books and periodicals, research articles, seminar reports, working papers, study reports of government agencies, news papers, study reports of expert committees, plan documents, web sites etc. were
reviewed. A careful survey of literature and discussion with practitioners and scholars in this field helped the researcher to collect and synthesise prior studies and to discover the important variables and concepts relevant to the problem.

The data were collected by conducting interviews with the samples selected for the study. Multiple choice questions, open-ended questions, ranking by the respondents and five point ranking scale developed by the researcher especially for this study in conformity with statistical methods and principles were used to elicit necessary information.

Forty-two organisations were contacted for the survey purpose and thirty six organisations responded. The major reason explained by the organisations for their non-co-operation was difficulty in revealing organisational information. The non-cooperating organisations were contacted again to explain the importance and the objectives. The managers and workers of the ISO 9000 certified manufacturing organisations were the respondents of this study. In order to investigate the research problem and answer the research questions, data were collected from the selected manufacturing organisations using the questionnaire method. Two different types of questionnaires were used to collect data from the managers and workers. Questionnaire method has been adopted to collect the data from the managers and schedule method has been adopted to collect data from the workers. The questionnaires used to collect the data from the managers were distributed in English language since the responding persons were managerial executives. Some respondents, unwilling to answer a few questions, filled up the questionnaire only partially and so their responses were rejected. The questionnaire was focused on identifying how TQM elements are practiced and on analysing the effect of this TQM practice on organisational performance in selected ISO 9000 certified manufacturing organisations in Kerala. The researcher collected all the responses personally from the respondents. This ensures the accuracy and authenticity of the collected data.
Analysis of the Data

The data collected from the respondents have been classified, tabulated and analysed by applying appropriate mathematical and statistical techniques. Since the sample size is large (n=126), tables, diagrams and statistical results have been derived with the help of the SPSS software.

The data collected were tested using percentages, regression analysis and independent sample t-test.

The following types of analysis have been made.

1. The relationship of Total Quality Management and the quality management standard ISO 9000 among the ISO 9000 certified manufacturing organisations in Kerala has been analysed using percentages and one sample t-test.

2. A profile of how the ISO 9000 certified manufacturing organisations in Kerala are practicing the TQM concepts has been analysed with percentages and priority analysis.

3. The relationship between Total Quality Management and organisational performance among the ISO 9000 certified manufacturing organisations in Kerala has been analysed using regression analysis.

4. The perception on the practice of Total Quality Management between the managers and workers of the ISO 9000 certified manufacturing organisations in Kerala has been analysed using percentages and independent sample t-test.

5. The difference in the perception on the practice of Total Quality Management between the ISO 9000 certified private sector and public sector manufacturing organisations in Kerala has been analysed using percentages and independent sample t-test.
Literature Review

This section aims to summarise and evaluate the previous studies on quality, TQM, ISO 9000 certification, relationship between TQM and ISO 9000 certification, and elements of TQM practice. The literature review also focuses on the relationship between TQM practice and organisational performance. The benefits and difficulties for perusing TQM are also considered.

Quality

A search for the definition of quality has yielded inconsistent results. Quality has been variously defined as value (Abbott, 1955), conformance to specifications (Gilmore, 1974), excellence (Pirsig, 1974), conformance to requirements (Crosby, 1979), meeting and for exceeding customer’s expectations (Gronroos, 1983), fitness for use (Juran, 1986), loss avoidance (Taguchi, cited in Ross, 1989).

Crosby (1980) defined quality as ‘conformance to requirement’, focusing on people and organisational factors, emphasising cultural change, training, management commitments to quality, and the ongoing calculation of quality cost.

Feigenbaum (1983) stated that product and service quality can be defined as the total composite product and service characteristics of marketing, engineering, manufacturing and maintenance through which the product and service in use will meet the expectations of the customer.

Deming (1986) approached quality from a statistical perspective, emphasising the reduction of variance through statistical process control techniques. The Deming cycle (plan, do, check and act) links the production of a product with customer needs and focusing the resources of all departments (research, design, production, and marketing) in a cooperative effort to meet or exceed customer requirements.
As per Juran (1989), Quality consists of those product features which meet the needs of customers and thereby customer satisfaction and freedom from deficiencies can be attained. Juran emphasised planning and product design, quality audits, and supplier/customer relations.

Taguchi and Clausing (1990) extended the quality improvement activities to include product and process design. Taguchi and Clausing’s methods provide a system to develop customer based specifications and then design those specification into a product and/or process.

Griffin (1988) defines quality as the ‘totality of features and characteristics of products or services that bear on the ability to satisfy stated or implied needs’.

Quality is never ending improvement of everything an organisation does, including sales, production, accounting, legal, research and development, shipping, purchasing human resource, and marketing (Hart M. et. al. 1991).

In general, quality has been defined from the following viewpoints: transcendent quality (superiority or excellence), product based quality (quality vis-à-vis price), manufacturing based quality conformance to specifications and user-based quality (fitness for intended use). Transcendent definition offers little practical guidance for managers, product based and value based definition represent two concepts, quality and price. Manufacturing based definition is an internally focused definition of quality that may cause managers to focus on internal efficiency rather than external effectiveness. User based definition is a customer focus definition of quality. Most business today define it as meeting or exceeding customer expectations (Evans and Lindsay, 1995).

Although no universally accepted definition of quality exists, enough similarity does exist among the definitions so that common elements can be extracted. The following common elements of quality were identified by (Goetsch and Davis 1994), i.e.; Quality applies to products, services,
peoples, processes, and environments, Quality involves meeting or exceeding customer expectations, Quality is an ever changing state (ie, what is considered enough today may not be good enough to be considered as having quality tomorrow).

**Total Quality Management (TQM)**

TQM is currently a basic business practice in organisations worldwide. Many people contributed in meaningful ways to the development of organisational concepts.

Crosby (1979) popularised the concepts of cost of quality and placed more emphasis on conformance to requirements.

Deming (1982) emphasised fourteen management principles in the practice of Total Quality Management which include continuous improvement, statistical quality control, employee involvement in decision making, education and training.

Juran (1991) also contributed to Total Quality Management philosophy by focusing on training, problem solving process, statistical quality control, long term commitment to quality and continuous improvement. Total Quality Management is a corporate business management philosophy which recognises that customer needs and business needs are inseparable. It is applicable within both industry and commerce. Total Quality Management is now considered as a system of management rather than simply as a system for improving quality. The principles of Total Quality Management can be extended through out the organisation. The ‘total’ in Total Quality Management has four fundamental dimensions. Horizontal, vertical, intellectual and strategic. Horizontal means that it includes all the stages in the organisations activity; Vertical means it encompasses all levels of the organisation. Intellectual means that the ideology and attitude which drive the improvement process are derived from education and training programs and reflect the best managerial, behavioural and technical thinking. Finally,
strategic means it makes quality leadership a strategically important goal for the organisation.

Oakland (1993) described Total Quality Management as an approach to enhancing the performance of the whole organisation. It is essentially a way of planning, organising and understanding each activity, and depends on each individual at each level.

Another definition of Total Quality Management is “the integration of all functions and processes within an organisation in order to achieve continuous improvement of the goods and services (Omachonu and Ross, 1994).

Lawler (1994) defines Total Quality Management as “A managerial approach which stresses the long term development and growth of the organisation by customer satisfaction through total participation and the concept of total quality.

Hellstan and Klefsjo (2000) define Total Quality Management as a management system in continuous change, which is constituted of values, methodologies and tools, the aim of which is to increase external and internal customer satisfaction with a reduced amount of resources.

Total Quality Management is systems approach that considers every interaction between the various elements of the organisation. Thus, the overall effectiveness, of the system is higher than the sum of the individual outputs from the subsystems. The subsystems include all the organisational functions such as design, planning, production, distribution and field service. The management subsystems also require integration, including strategy, with a customer focus, the tools of quality, and employee involvement (Omachonu and Ross, 1994).

Total Quality Management is a totally integrated effort to gain competitive advantage by continuous improvement of every facet of organisational culture. Total Quality Management is total (every person in the firm is involved, and where possible its customers and suppliers) quality
Total Quality Management is often described as a journey not a destination. Total Quality Management represents the eternal search for continuous quality improvement in the product or service, which is offered to both internal and external customers.

Total Quality Management is a process that actively involves every employee in satisfying customer needs by continuously improving all aspects of work activity through structured control, improvement and planning methods. It requires a transformation of the roles of all employees empowering them to continuously improve their work processes.

ISO 9000 Certification

One of the strongest arguments for a company adopting ISO 9000 is that it may become necessary to keep major customers (Voehl et. al., 1994). The ISO 9000 series are basically standards used for external quality assurance purposes and designed for internal use. Current trends in industry are towards a total quality system certification. The ISO 9000 certification is a leading international system certification trusting on supplier-customer relationships with greater opportunities for improved performance and efficiency for both. The ISO standards help the organisations to document all key work process; ensure that implementation of these process is as per documentation; identify and take needed corrective actions; and lead to an environment for continuous improvement. A company can gain ISO certification or registration when it passes an audit by an approved ISO 9000 registrar. ISO 9000 registration does not guarantee quality products. It only guarantees a set of documents attesting to the quality practices of the company.

There are two main differences between Total Quality Management and ISO 9000 series. First the ISO 9000 certification focuses on one aspect of the quality, consistency in the production of a product or service and
does not address the nature of quality which is customer driven. Second, going for ISO certification is a good way of measuring a firm’s progress, but it really should be considered as the beginning of a continuous process rather than a goal to achieve.

There are benefits to being ISO 9000 certified that extent beyond access to foreign markets and compatibility with foreign suppliers. Market access and compatibility are important enough benefits by themselves to justify ISO 9000 certification, but there are additional benefits. The process that a company goes through to achieve certification tends to improve the quality and uniformity of work while simultaneously improving productivity. An outstanding characteristic of ISO 9000 for management is that it automatically both provides controls to ensure quality of production and delivery and reduces waste, down-time, and labour inefficiencies, thereby increasing productivity.

ISO 9000 sets broad requirements, for the assurance of quality and for management’s involvement. The emphasis is on preventing defects rather than inspection and rework. In fact, this emphasis is placed not only on the production process, but also on the product design process. Quality assurance is a subset of Total Quality Management.

ISO 9000 and total quality are not the same, any total quality organisation should apply the kinds of procedures, checks and management involvement required by ISO 9000. Total Quality Management and ISO principles offer the promise, when combined with hard work and commitment of fewer accidents and losses, improved working conditions; increased profits.

ISO 9000 approach completely compatible with total quality philosophy. ISO 9000 is a step towards Total Quality Management.

Ismail, M. I. & Hashmi, M. S. J. (1997) conducted a study on the implementation and implication of quality management in the Irish manufacturing industry to identify an implementation order concerning tools
and techniques. Data from survey show there has been continuous decline in the number of new ISO 9000 registrations in the manufacturing industry since reaching its peak some 4-5 years ago (up to and including 1996). Statistically significant relationships exist between firms with ISO and those without ISO registration. The survey shows that majority of the firms have ISO 9000, registration without embracing and implementing Total Quality Management. Empirical results show that there would be a marginal increase over a year and 6 year period respectively, upon installing Total Quality Management programs. This means that unless firms maintain and sustain the TQM drives continuously, there will be decline in competitiveness. This study concludes that the level of quality as practiced by the Irish manufacturing industry is on average at the ISO quality system stage. Also, the best groups of firms in the industry are in the good part of the humanism stage in the total quality picture.

**Studies on identification of critical elements of TQM practice**

Saraph, Benson and Schroeder (1989) argued that no systematic attempt had been made in the literature to organise and synthesise the various sets of critical factors for organisations to measure Total Quality Management related performance. Saraph et. al., (1989) was the first to group critical factors for Total Quality Management, and then conducted a study in the United States which led to the proposal of a list of 78 factors. A subsequent research conducted in the United Kingdom which replicated the study undertaken in the United States. Employee focus, information usage, leadership commitment, quality strategy, SPC tools, supplier quality were found out as important factors in the study.

A study conducted by Flynn B et al., (1995) among world class manufacturers in the US, on the impact of Quality management practices on performance and competitive advantage has suggested that top management support is critical to both infrastructure and core quality management practice. The study proposed that the customers, suppliers, top management and workforce cooperate to form an infrastructure that is
supportive of the use of the core quality management practices. Core practices include practices related to product design, process flow management, statistical control and feedback, which contribute to the physical quality of the product.

Benson S et. al., (1991) provides an empirical framework based on eight critical factors of quality management namely top management leadership, quality data and reporting, process management, product/service design, training supplier quality management, role of the quality department and employee relations.

Anderson et. al., (1994) developed a model of the theory of quality management underlying the Deming management method. Anderson et. al tested that model using path analysis. They used data from an existing data base collected from 41 manufacturing plants in the electronics, machinery and transportation industries with 100 or more employees.

A study conducted by (Fisher, T. J. 1992) which retests their model using a larger and more diverse sample, including service companies, not-for-profit organisations, and government institution. The study suggests that visionary leadership, internal and external co-operation, learning and process management causally affect continuous improvement.

Youssef and Zairi (1995) used the 22 critical factors developed by Ramirez and Loney (1993) to investigate the firms in the Middle East countries to check whether the level of critical factors is applicable in different countries. The study showed that senior management role, commitment and support and education were considered critical factors in Middle East countries.

Thiagarajan and Zairi (1998) used the 22 critical factors developed by Ramirez and Loney (1993) to investigate the critical factors of Total Quality Management in Malaysian and Singapore companies and found that the senior management role and commitment were considered to be the most critical and also customer satisfaction.
Powel (1995) developed a TQM measurement instrument based on exhaustive review of the TQM perspective literature, and through consultation with quality experts. The final scale contained 47 items covering 12 variables, and they were executive commitment, adopting new philosophy, measurement, zero defect mentality, process improvement, and flexible manufacturing system, closer to suppliers, employee empowerment and involvement, closer to customers and benchmarking.

Ahire, Golhar, and Waller (1992), through a detailed analysis of the literature identified twelve constructs of integrated quality management strategies. Using a survey of 371 manufacturing firms, the constructs are then empirically tested and validated. The critical successful factors in the study include top management commitment, customer focus, supplier quality management, design quality management benchmarking, SPC usage, internal quality information usage, Employee empowerment, employee involvement, employee training, product quality, supplier performance.

Black and Porter (1996) developed a model for measuring critical factors of TQM. A 39 item questionnaire was developed based on a series of items from the Baldrige model and established literature and sent to over 200 managers drawn from a target sample of members of the European Foundation of Quality management. Ten factors were identified as most critical. They are strategic elements, people involvement, emphasis on communication, a focus on the customers, and awareness of the external market, the need to develop supplier partnership, measurement and long-term emphasis on developing a culture for quality improvement.

Flynn BB, Shroeder RG and Sakakibava (1994) built on Saraph et. al., (1989), study focused on a leading manufacturing plant in US considered organisation as a unit of analysis and utilised the perceptions of both line and managerial level employees. The seven critical successful factors to the practice of Total Quality Management were identified as top management leadership, quality in formation, process management, product design, supplier involvement and customer involvement.
According to a survey conducted in Indian manufacturing organisations by Motwani, Mahmoud, and Rice (1994) the critical factors that are required for effective quality management can be classified into top management, quality policy, role of the quality department, training, product design, Vendor quality management, process design, quality data and feedback and employee relations.

Ramirez and Loney (1993) prepared a questionnaire based on the critical factors of TQM practice as per Deming, Crosby and Juran. This list was finalised by comparing it with activities which award winning organisations tend to undertake. Ninety two organisations, in US were considered. The results showed significance of top management commitment, and this was to be demonstrated through active involvement, setting clear goals, a vision for the organisation and integrating TQM into the strategic quality planning process. TQM introduction is heavily reliant on employee involvement and participation and total quality based performance is dependent on people productivity. As such, investment in people through education and training is fundamental to the success of TQM practice.

N. Joseph, C. Rajendran, T.J. Kamalanabhan (1999) developed an instrument for TQM implementation in business units in India. A factor analysis uncovered ten underlying dimensions of TQM with a total of 106 items which were similar to that of the elements recommended by Saraph et. al., (1989). Motwani (2001) integrated the composite of TQM through a judgmental process of grouping similar requirement and he claimed that the critical successful factors were top management commitment and benchmarking, process management, process design, employee training, and empowerment, supplier quality management, customer involvement and satisfaction.
The focus of quality at the source requires empowering production workers to inspect their own work and to stop production if the process is out of control. Empowerment entails providing supporting framework such as necessary resources and technical support, to assist them in such decision making. Empowerment entails not only shifting the responsibility for quality decisions to workers, but also providing them with necessary resources and technical support to assist them in decision making.

It has been found that four contextual factors affect employee commitment to participation: explicitness of performance target, revocability of one’s actions, consequent publicity and volition of actions. Employee involvement groups have been found to positively impact employee commitment to quality (Oliver. N., 1988).

Organisations must develop formal systems to encourage track and reward employee involvement. The use of cross functional quality improvement teams and quality circles along with framework of appropriate evaluation and reward systems for quality improvement projects have been shown to improve quality significantly.

Many quality management firms implements such reward systems and also offer profit sharing programs to enhance the employer’s ownership in the jobs and quantity improvement activities (Stalk, G et. al., 1993).

Top management commitment has been identified as one of the major determinants of successful TQM implementation. The critical role of top management in providing leadership has been illustrated in literature for several diverse organisations (Dale, B. G. & Duncolf A. J. 1984).

Top management acts as a driver of quality management implementation, creating values, goals and systems to satisfy customer expectations and to improve an organisation’s performance. The clarity of quality goals for an organisation determines the effectiveness of quality efforts (Stalk, G, Evans, P. 1992).
Top management should demonstrate quality commitment by providing adequate resources to the implementation of quality management efforts, particularly considerable investment in human and financial resources. (Chapman, R.L 1991).

Top management must convey the philosophy that quality will receive a higher priority over cost or schedule, and that in the long run, superior and consistent quality will lead to improvements in cost and delivery performance (Ferdows, K et. al., 1990).

Performance assessment for plant managers and organisation’s top executives should also include their performance on quality dimension. (Chase, R. B. & Aquilano 1992).

Customer expectations are dynamic in nature. An organisation’s long-term success is tied to customer retention efforts. Organisations may out perform their competition by being able to. (1) respond quickly to customer’s demands with new ideas and technology (2) produce products that satisfy or exceed customer’s expectations, and (3) anticipate and respond to customer’s evolving needs and wants (Stalk, G et.al., 1992).

Customer focus of an organisation is usually assessed by the frequency and rigor of customer satisfaction surveys. Mere execution of such surveys is not useful unless the results are made available to functional areas such as manufacturing, design and planning. Further, these results should be used in improving product quality (Hauser, J.R, & Clausing, G L 1988).

The supplier’s role is critical in many ways. First, the quality of incoming parts from suppliers determines the level of inspection efforts of a buyer organisation. Second the quality of the supplied material to an extent, determines the final product quality. Third, suppliers capability to react to a buyer firm’s needs, in turn, can determine the buyers flexibility in responding to the customers needs. (Stamm, C. L. & Golhar D. Y. 1993).

Quality oriented organisations have a few reliable, competent, and co-operative suppliers on a long-term basis. Through a comprehensive vendor evaluation, quality oriented forms identify suppliers who are willing to establish long-term partnerships by investing on technology and quality improvement efforts a cooperating with the buyer firms to resolve and specific quality problems. (Waller M.A. 1993).

Statistical process control techniques are often used to detect assigned causes contributing to the variation in manufacturing quality. To provide useful information for product design, and to determine process capability, a wide range of SPC tools such as scatter diagrams, Pareto charts, cause effect diagrams, and control charts are used to monitor quality. SPC tools help quality oriented forms to monitor quality variations and to investigate critical areas where improvements are needed. (Robinson, A.G. & Schroeder, D. M. 1990).

SPC tools and benchmarking will be rendered ineffective if there is inferior dissemination of the generated information. One of the indicators of the extent to which the quality information is shared is the frequency of quality performance data relayed back to the concerned work stations, cells, and departments. (Kono, N. A. 1993).

Benchmarking consists of analysing the best products and process of leading competitors in the same industry, or leading organisations in other industries using similar process.

Benchmarking entails produce as well as process benchmarking. Benchmarking must be done with a clear focus on the goal of improving product quality and reducing cost. Juran (1981) strongly recommends investment of time and resources in designing quality into products.
Continuous improvement is an inherent part of TQM process. Continuous improvement consists of measuring key quality and other process indicators in all areas, and taking actions to improve them. Continuous improvement concept focuses on finding shortfalls and sources of variability in administrative, manufacturing, and service processes that can detract from a quality output and improving the process to eliminate undesirable outputs. (Joseph & Susan Berk 1995).

Only when employees are trained, in the quality concepts and tools, can they understand the quality-related issues. Availability of adequate resources is a prerequisite for an organization-wide training.

Participation by various levels of employees and managers in training sessions not only enhances the quality of the immediate session, but due to a breakdown of barriers between ranks, it also helps subsequent employee participation. Refresher courses in quality concepts rejuvenate employee participation by reinforcing quality knowledge in the light of actual practice. (Chapman, R. L. 1991).

Organisational performance

The Quality performance is a difficult concept to define precisely. Indeed, Garvin (1988) lists eight critical dimensions for quality performance. Garvin’s list includes: Performance – Primary operating characteristics of a product; features - characteristics that supplement the basic functioning of a product; reliability- the probability of the product malfunctioning or failing within a specified time period, conformance-the degree to which the products design and operating characteristics meet established standards, durability- the amount of the use the customer gets from the product before replacement is preferable to continued repair, serviceability-the speed, courtesy, competence and ease of repair, aesthetics, which is based on individual preference for how the product looks, feels, sounds, tastes or smells, and perceived quality, which is based on image, brand name and advertising that makes inferences about quality.
Maani and Sluti (1990) describe a conceptual model that combines quality dimensions into two constructs, stating that “the link between quality and business unit performance may be explained via two distinct paths arising from two different definitions of quality: 1. Manufacturing based definition, or quality of conformance, and of 2. Product based definition, or quality of design. Perceived quality market outcomes focuses on management’s perceptions of the plant’s product quality and customer service, relative to its completion. As such it is a multidimensional construct, implicitly including product characteristics such as conformance, reliability, performance and durability and reliability, as well as serviceability and perceptions of customer satisfaction, which could potentially include features and aesthetics. Percentage of items that pass final inspection without requiring rework is an internal measure of the plant’s ability to control its processes so that quality is designed and built into its products, rather than defects inspected out. This primarily measures Garvin’s conformance dimension. As conformance to specifications has an impact on performance, durability and reliability, the percentage of items that pass final inspection without requiring rework is expected to be related to perceived quality market outcomes.

As a firm’s competitive advantage is the way in which it creates value for its customers, it does so by outperforming its competition on various dimensions, which allow it to establish and sustain a defensible position in its product market. Porter (1990) describes three distinct competitive advantages: low cost, focus and differentiation, which may include quality, features, delivery, follow up, service, ease of use and other non cost means of differentiating a firm from its competitions. Hayes and Wheelwright (1985) suggest that there are five manufacturing based competitive advantages: low cost, high quality, dependability, flexibility and innovativeness. Simultaneous pursuit of several competitive advantages can lead to a stronger position in the market than focusing on a single competitive advantage.
Nemetz (1990) suggests including measures of quality, material control, and delivery, inventory, and machine, performance, flexibility, and cost, stating that measures included should meet the following criteria: (1) they should reflect manufacturing processes (2) They should promote decisions congruent with long-term profitability, and (3) they should help to control operations.

Wood, Ritzman and Sharma (1990) empirically found four independent clusters for achieved performance. These were quality (including performance, durability, reliability and features), delivery, (including both speed and dependability), price/ cost and a second quality dimension that included performance, consistency and quality as perceived by the customer.

An important concern in the implementation of TQM is the extent to which TQM should be developed together with managerial performance evaluation systems employing measures of the manufacturing processes. Enhanced performance will be associated with the interaction between well developed TQM programs and a reliance on manufacturing performance measures.

Waldman (1994) analysed various definitions of TQM and stated the elements that are fundamental to the TQM concept. They are upper management commitment to quality striving continually to improve employee capabilities and work processes, involvement of all organisational members in co-operative, team based efforts to achieve quality improvement efforts, a focus on quality through out all phases of the design, Production and delivery of a product (ie, not just the end product), attempts to involve external suppliers and customers involved in TQM efforts, frequent use of scientific and problem solving techniques including statistical process control; the institution of leadership practices oriented towards TQM values and vision and the development of quality culture.
Criteria for Measurement of Organisational Performance

In the abundantly rich literature on TQM, only very few studies are available linking TQM and organisational performance (Zairi, M 1994, Flynn et. al., 1994). Acclaimed researchers have described ways and means by which organisation performance can be measured and evaluated.

Many other researchers (Ahire et. al., 1996, Benson et. al., 1991) have carried out significant research on performance measures that represent organisational excellence. These efforts have resulted into a collection of all possible measures but a consensus has yet to emerge to establish the linkages between TQM and organisational performance.

A study conducted by Flynn. B., Schroedter. R.G, Sakakibara S (1995) on the impact of quality management practices on performance and competitive advantages in three plants indicates that different core quality management practices lead to success in different dimensions of quality. The trimmed model indicated that perceived quality market outcomes were primarily related to statistical control /feedback and the product design process, while the internal measure of percent that passed final inspection without requiring rework was strongly related to process flow management and to statistical control/ feedback, to a lesser extent. Important infrastructure components included top management support and work force management. Supplier relationship and work attitude were also related to some of the core quality practices and quality performance measures.

Ferdows K. & Demeyer. A (1990) have attempted to identify the various factors that are indicators of performance measure which includes; Quality (conformance to design), Unit product cost, Inventory turnover, Speed of new product development, On time delivery, Delivery speed, and Overhead costs.

Study conducted by Shrivastava, R. L. et. al., (2006) to identify and interpret the critical factors that affect TQM and organisational performance and statistically validate the purpose. The instrument developed for
collecting the data contains 18 variables. The variables for productive business orientation includes; Structure of planning framework, Technology policy, organisational goals, Infrastructure, Product design, Flexibility and Financial position. The variables to assess the internal support are top management support, Employee relation, compatibility and co-ordination, organisation size, customer interaction. The variables for collecting data on competitive assessment are competitive strategy, management risk taking ability and vendor relations. The variables of participatory orientation were assessed by analysing the communication and team building approach.

An inter-organisational performance measurement system focuses upon what are termed by Brewer and Speh (2000) as traditional logistics performance measures, i.e. measures such as order fill rates, error rates, inventory costs, and delivery time.

Beamon (1998) concludes that it is unlikely that a single performance measure will be adequate for an entire supply chain, and that a system of performance measures is required for accurate measurement of supply chain systems.

Folan P and Browne J. (2005) developed a performance measurement system by considering the internal perspective, supplier perspective customer perspective and extended enterprise perspective. The macro measures of performance were measured analysing the costs, time quality, flexibility, precision and innovation. Performance measures analysed in cost factor includes plant operational cost per hour, process cost, delivery cost, package cost, inventory earning cost, inventory turnover. The delivery time of the supplier, delivery time to the customer, average customer query response time, invoice issue time, delivery frequency are the variables assessed in the time factor. While considering the quality, manufacturing quality, percentage of products that fail test, warranty and returns, percentage of release errors, percentage of invoices released with errors, number of plan variations, product return rate are considered. Identification of manufacturing process flexibility (production flexibility and source
flexibility) and market requirement time are assessed. Production plan adherence and delivery accuracy, delivery performance, percentage of orders scheduled to customer requirements data, forecast precision are the measures assessed when considering the aspect of precision.

Voss C and Fynes B. (2001) developed a path analytic model of quality practices, quality performance and business performance, and tested in the electronics sector in the Republic of Ireland. The major findings were quality practices have a positive effect on conformance quality and design quality has a positive effect on conformance quality.

**Outline of the thesis**

This thesis consists of five chapters. The main structure of each chapter is as follows:

**Introduction**

In this part of the research topic is identified and articulated, the importance of the study is mentioned; the research problems and research questions are recognised. It also presents the significance of the research. The research methodology including sampling design, variables and criteria of measuring variables, tool development, and methods of data collection and methods of data analysis also explained. Reviews on the relevant literature in terms of quality, ISO certification, TQM practice, organisational performance and the relationship between practice of TQM and organisational performance were also explained. Studies on TQM in the western, Middle East, Far East as well as Indian context were reviewed. Limitations are addressed and directions for future research are included.

**Chapter One**

Chapter One focuses on developing a conceptual framework on Quality and Total Quality Management.
Chapter Two

Chapter Two presents an explanation on standards, ISO 9000 certification. This chapter also provides a detailed explanation on the relationship between TQM and ISO 9000 certification.

Chapter Three

Chapter Three presents the analysis of the data collected through the questionnaire. It also includes hypothesis testing and interpretation of results.

Chapter Four

Chapter Four presents the findings obtained through analysis.

Chapter Five

Chapter Five presents the conclusions, suggestions, contributions and managerial implications that the research makes to TQM practice. This chapter also states some recommendations that would enable organisations to improve its performance. Suggestions for further study conclude the thesis.

Limitations

1. This study is confined to the selected manufacturing organisations in Kerala.

2. The criteria for analysing the organisational performance were assumed to be the same in all organisations irrespective of their turnover, production and number of employees.

3. This study did not address non-ISO 9000 certified companies in Kerala.

4. This study considers only those companies certified with ISO 9001: 2000 Quality Management Standard.

5. The knowledge of the concept of TQM is still in infancy in many manufacturing organisations in Kerala.
6. The study did not take into account the turnover, productivity, number of employees, and age of the company. Although the samples were randomly selected within each substratum, it was not designed to be generalisable to all the organisations in the Kerala industry.

The next chapter introduces the concept of Quality, ISO 9000 certification and Total Quality Management.