While studying the total quality management practices in Indian tyre industry, several important principles of the management philosophy that influence its successful implementation are brought to the fore. These include management commitment, customer focus and satisfaction, employee empowerment, continuous improvement, and organisational culture and attitudes. Others are education, teamwork, communication, measurement, and process chain. It is these tenets of TQM that will constitute major areas of review of scholarly literature.

This chapter will be structured as follows: first section reviews the literature concerning ISO 9000 certification towards infusing TQM, second section concerning critical dimensions for successful implementation of TQM, third section deals with cost of quality, fourth section reviews on quality improvement tools and lastly the barriers to successful implementation of TQM.
3.1 Review of Literature on ISO 9000

Samuel K. M. Ho (1994), in his paper has given a diagnostic study of TQM and ISO 9000, their relationships, and how successful the companies are. Counter-examples have been given to explain some of the misinterpretation and mismanagement of the systems. Finally, the study has suggested a framework for implementation, which can be used as a valuable guideline for firms going for ISO 9000 and TQM.

W. Andrew Taylor (1995) reports a study of senior executives, exploring their attitudes to, and perceptions of, ISO 9000 and the outcomes which they believe to have accompanied its implementation. The majority of senior executives indicated a propensity to go beyond ISO 9000 to TQM. The findings show that many ISO 9000 organisations which are planning TQM show poor levels of understanding of the latter’s purpose and very few are yet measuring customer satisfaction beyond the requirement to measure complaints. Therefore, the real test of senior executive commitment will arise during the next phase of the quality journey.

Jaideep Motwani, et al. (1996) provides an overview of ISO 9000 and compares ISO 9000 with equivalent national standards developed in other countries, the ISO certification process, benefits, criticisms and
misconceptions of obtaining ISO 9000, and discusses how a US manufacturing organisation achieved its ISO 9000 certification. The survey findings reports that, ISO 9000 provides substantial benefits in terms of higher customer satisfaction, smoother operations and lower costs, higher quality and productivity.

Barbara E. Withers, et al. (1996) based on the operational issues, cost and level of effort needed to achieve registration and reasons for pursuing registration. This study compares the practices of ISO 9000 registered firms within three ownership categories: American, Japanese and German firms operating in the USA. The study reports some distinct differences among the plant in terms of number of employees involved in registration process, quality system procedures and documentation and more detailed manuals. Similarities in terms of corporate goals, motivated registration, customer demands, quality improvement, and competition were noticed. However, no single registration strategy emerged. Each plant achieved registration using its own approach.

Matts Carlsson (1996) highlight different aspects of the change currently taking place in many companies to implement the quality system ISO 9000 in Swedish industry. This article is based on the assumptions that, the members involved in the participation for a change
was at a greater extent and secondly information and communication have great importance for the successful implementation of a quality system. The study was oriented towards studying the overall organisational consistency in attitude to the implementation of the ISO system.

George Tsiotras, et al. (1996) reported that ISO 9000 standards offer a great opportunity to Greek companies wanting to improve their internal organisation system and increase their product competitiveness. The study reveals that they must be careful in order to avoid the ISO 9000 pitfalls. It reports that certification alone must not be the aim. The ultimate target must be the development of a solid quality assurance system which will lead to the future development of a total quality system.

An article by Daniel Vloeberghs, et al. (1996), where in the main objective of the survey was to profile the companies that have ISO 9000 certificates, define their motivation for implementing ISO 9000, evaluate their experiences with ISO 9000 implementation, and analyse the effects of the ISO 9000 system on their organisations. The survey also examined the relationship between human resources management and quality management.
Matthew Hind (1996) attempts to show that, while ISO 9000 is part of total quality management, the organisational culture that is suited to ISO 9000 is not suited to the other aspects that make up total quality. The research contends that it is the inherent strength or inflexibility of the registration that has contributed to the failure of so many total quality initiatives.

Sarah T. Meegan and W. Andrew Taylor (1997) explore that the process of using ISO 9000 registration as a springboard for other quality initiatives and issues related to the transition. The study identifies key factors and those influence the transition process.

W. Andrew Taylor, et al. (1997) published second paper where the initial analysis did not embrace sufficiently on all the factors influencing a successful transition from ISO 9000 to TQM. This paper reviews the key issues raised by other authors and identifies further issues that remain unexplored. The ultimate objective is to identify good practice, to provide managers with a better understanding of the dynamics of this transition process.

Francis Buttle (1997) reports the findings of the impacts of ISO 9000 on business in UK. The main objective of this paper is to identify, whether ISO 9000 certification is pursued as part of TQM, the motivations for pursuing certification, the benefits experienced from
certification, difficulties experienced during initial certification, problems experienced following certification, has certification met desired expectations, the level of satisfaction with ISO 9000’s organisational impact, willingness to recommend certification to similar firms and time taken to recover the costs of certification. This paper also reports that, pursuing ISO 9000 certification enhances both operational and marketing benefits which impact on costs, revenues and by inference profits.

G. Dennis Beecroft (1997) studies the implementation philosophy of ISO 9000 versus QS 9000. The study says that QS9000 and ISO 9000 are fundamentally different in their approach and philosophy.

S. Subba Rao, et al. (1997) explores the relationship between ISO 9000 and the level of quality management practices and quality results. The findings indicate that ISO 9000 registered companies exhibit higher levels of quality leadership, information and analysis, strategic quality planning, human resource development, quality assurance, supplier relationships, customer orientation and quality results.

Tat Y. Lee (1998) conducted a survey on certified firms in Hong Kong. The survey results indicated that ISO 9000 was implemented for different purposes in different industries. For manufacturing firms, the majority of them
aimed at using ISO 9000 to improve the management and control of their operations. It was quite common for them to use the ISO 9000 system to assist the management and control of production and associated operations in China. While using ISO 9000 to improve the management of operations was the main objective in the service sector. Small and medium firms in this sector tended to be customer-driven. The main reason for construction firms to obtain an ISO 9000 certificate was to meet the customers' demand.

Alan Brown, et al. (1998) conducted a study on a group of small and medium enterprises (SMEs), which focus more on the specific issues related to the SMEs and on the issues related to subgroups within the SMEs. The study issues related to ISO 9000 series certification, achievement certification, benefits due to certification, difficulties encountered and to overcome such difficulties due to certification. The study also highlights the differences between those enterprises, which have found certification beneficial versus those which have not.

Hesan A. Quazi, et al. (1998) studied both manufacturing and service SMEs. The study results show some degree of quality management practices among the responding SMEs; however, it is concluded that these SMEs are slowly progressing toward becoming TQM organisations.
The results reported here show that ISO 9000 certification provides a stepping stone toward TQM practices. The findings regarding benefits of and barriers to quality management practices, ISO 9000 certification has provided significant benefits for SMEs. The study concludes saying journey towards TQM will however, require not only full commitment of the management, but also a quality culture created externally by governments which is crucial to the progress beyond ISO 9000.

An article by Atul Gupta (2000) attempts to find the differences between ISO and non-ISO organisations in India. The study focuses on four areas, which include technology management, causes of poor quality, participation in the quality improvement programs and quality control techniques used. The results of this study indicate that statistically significant differences do exist between ISO and non-ISO organisations under all the four categories, specifically in training, using quality in the strategic planning, product design and team building.

An article by Hongyi Sun (2000) based on a survey conducted in Norway show that, the TQM criteria such as quality leadership, human resource development, quality information, etc., contribute to the improvement of customer satisfaction and business performance. The study
shows that none of these enablers can guarantee enhanced performance unless contributed collectively. ISO 9000 standards are partially related to the implementation of TQM and the improvement of business performance. The study recommends that ISO 9000 should be incorporated with the philosophy and methods of TQM.

Tom Bramorski, et al. (2000) reviews the philosophy and the structure of QS 9000 automotive quality standards and examines the relationship between ISO 9001, QS 9000 and TQM. The paper concludes that QS 9000 is extensive because a company needs to focus on all procedures and document in detail and is necessary because QS 9000 company will not get the business until their system is certified.

A research by Salleh Yahya (2001) indicates that ISO 9000 elements that relate to an organisation quality system are difficult to implement compared to elements that relate to operational procedures. The survey reports that, the elements that are identified as difficult to implement and related to an organisation quality system are corrective and preventive actions, design control, management responsibility, statistical techniques, process control, document and data control and quality system. And the elements that are perceived as easy to execute are inspection and test status, packaging, preservation, and delivery, and inspection and testing.
The survey also reports, that the degree of difficulty in practising the requirements of ISO 9000 series standards are more with companies which have fair market share in Europe.

Jeroen Singels, et al. (2001) shows the relationship between certification on the ISO 9000 series and the performance of the organisations. The results reveal that ISO certification alone does not automatically result in an improvement of the performance of organisations. The type of motivation of an organisation plays an important role in explaining the level of performance. The research results also have an important contribution for practice. The results make it clear that the use of ISO as a selection criterion for suppliers does not necessarily mean that the organisations that possess an ISO certificate are in fact the “better” suppliers than organisations without an ISO certificate. Organisations must be aware of their motivation and aim for gaining ISO certification. The study highlights organisations still seem to pursue certification out of external pressures, which often results in a hollow achievement. Only when an organisation is internally motivated for an improvement of its organisational processes, the certification results in an improvement of its performance.

Carmen Escanciano, et al. (2001) shows how relevant certification may be in the progress of Spanish companies
towards TQM. The analysis from the study shows that the ISO 9000 certification influences company's progress towards total quality. The study reveals that, obtaining of numerous benefits has a positive influence on the firm's advance to total quality. Enterprises that progress in this direction have perceived greater benefits than those firms which just keep certification or do not plan any quality-related action for the future. The study concludes that companies, which are more intensely using quality practices to keep and improve the system and certification alongside it, are the ones that move towards TQM.

Jeffrey Lo Chi Fong, et al. (2001) illustrates a comparison of QS 9000 with other automotive standards (VDA of Germany, EAQF of France and AVSQ of Italy) and examines the relationship between ISO 9000, QS 9000 and TQM. The study shows ISO 9000 is a product focused, system-based and quality detection standard with a short-term objective. Whereas, QS 9000 is concerned more about customer satisfaction, application of statistical tools and techniques, address more on cross-functional teams and process performance on continuous basis in automotive manufacturing industries. Hence QS 9000 may be treated as a stepping stone to implement the TQM philosophy in case of the automotive industry.
Ahmet Beskese, et al. (2001) attempts a broad review of the current status of TQM and ISO 9000 in Turkey. It considers the extent to which ISO 9000 and TQM are being successfully implemented. The study presents the reasons for obtaining an ISO 9000 certificate, difficulties faced during the registration process, improvements achieved and disappointments experienced after being certified. The findings of this study are compared with those from other countries.

Poksińska Bozena, et al. (2002) focused on motives for certification and identified few motives like corporate image, quality improvements, marketing advantage, customer pressure/customer demands, cost reductions, capturing worker’s knowledge, relations with authorities, competitors being certified, relations with communities, benefits experienced by certification and avoid potential export barrier.

Katerina D. Gotzamani, et al. (2002) conducted a survey, designed to test the motives that lead Greek companies to ISO 9000 certification, performance improvement from the standards implementation in basic TQM areas and the overall internal and external, benefits or positive results that they have witnessed from certification. In order to carry out research, the researchers identified 10 different motives form the literature and 8 basic TQM performance categories.
Hesham Magd, et al. (2003) provides a critical view of literature on ISO 9000 and TQM to identify whether they are complement or contradict to each other. ISO 9000 represent a trend in quality management, which cannot be ignored in today's business environment. It is recommended that the use of ISO 9000 as a foundation for a much broader system of TQM which is based on the fact that ISO 9000 is an important part of TQM and implementation of both will lead to organisational success. Hence the research says both approaches tend to complement each other.

Marty Casadesus (2005) illustrates empirical research into the benefits of ISO 9000 standards. The main objective of this paper is to analyse the evolution of ISO 9000 benefits over time, specifically focusing on the ISO 9001: 2000 version with that of the ISO 9001/2/3:1994. The survey results discovered that the level of reported benefits of ISO 9001/2/3:1994 decreases with time in companies with ISO 9001:2000.

3.2 REVIEW OF LITERATURE ON TOTAL QUALITY MANAGEMENT

There has been a plethora of published research related to total quality management (TQM) in last few decades.
Jaideep G. Motwani, et al. (1994) conducted a survey based on nine major critical factors: top management quality policies, role of the quality department, training, product design, vendor quality management, process design (statistical quality control), quality data, feedback and employee relations. A field survey based on these critical factors was conducted to identify the degree to which quality management practices are present in Indian manufacturing organisations and to locate the organisational areas where better management control can make the quality programs more effective.

The study concludes that, it is not necessary for all the factors to be present to ensure the success of the total quality program of an organisation. In other words, even if a few of the factors were not present, it is possible to obtain the required level of quality. The study results, relate to managers regardless of their position, expect an organisation to implement these critical quality factors to a great extent and constantly improve practices in areas where deficiency is perceived.

Sharad K. Maheshwari, et al. (1994) studied some of the quality related issues in major Indian companies, specifically the extent to which Indian manufacturers adhere to the “quality is free” philosophy, the quality management practices of Indian manufacturers, the level of workforce participation and training in the area of
quality management, and the level of efforts towards improving the quality of products and services. The study finally compares the quality management practices of Indian manufacturers with quality management practices of manufacturers in developed countries.

The survey by P.L. Goh, et al. (1994) serves to lay a framework to implement TQM in small and medium-sized enterprises, many of which do not have the same management capabilities, incentives and resources as do large enterprises. The survey is based on the concepts of TQM based on the works of the quality philosophers vis-a-vis management leadership and employee participation (management commitment), emphasis on meeting the requirements of both the internal and external customer (customer focus), eliminate non-conformance, appraise conformance to standards, have zero defect standard of performance, reduce costs of appraisal, prevention and failure (quality costs), use statistical and quantitative control methods, implement problem solving using quality control circles and quality assurance (quality systems), search continually to improve processes and products, develop new products and processes, quality is continuous (continuous improvement). The survey result shows a framework is required to enable any small or medium-sized manufacturing company successfully and cost-effectively
to implement TQM irrespective of its present quality position.

Masood A. Badri, et al. (1995) identifies eight critical factors like role of divisional top management and quality policy, role of quality department, training, product/service design, supplier quality management, process management/operation procedures, quality data and reporting and employee relations. This study measures these eight critical factors of quality management from both service and manufacturing firms in United Arab Emirates. The empirical results suggest that, high level of quality management practices on a consistent basis is a key to success for many organisations.

Another study conducted by N. Capon, et al. (1995) aims to explore the role of measurements in a TQM program. Based on current practices, five areas like customer perceptions of service provided, encouragement of continuous improvement, consistency of processes - both administrative and mechanical, cost effectiveness of quality program, and easy to understand & update are addressed for effective measure of TQM success.

The research further considered alternative methods like cost of quality, SPC, parts per million ratings, customer questionnaires, “vital few” objectives, audits against procedures and standards, the Baldrige and EQA frameworks, employee attitude audits and response time
measurements. Each method was rated against five objectives stated above.

The research provides evidence that measuring and displaying results increases the chance of success in a TQM program. Finally, the research concludes specifying management involvement, strategic quality planning, employee involvement, training, process capability, customer perceptions, a set of six monitors based on the Baldrige Award for the most effective measure.

Burhan Fatih Yavas (1995) explores possible answers to the question: what perceptions do employees at different levels in the organisation have of the dimensions of quality and where differences exist, how can the perceptions be more closely aligned?

For this, eight factors were delineated. The results show that among the variables, “communications”, “managerial involvement”, “process improvement”, “reward and recognition” and “responsiveness to both external and internal customer demands” was found to be significant. Analysis of the survey results suggests that team efforts had a positive impact on employees’ perceptions of many dimensions on quality. The findings suggest that a significant number of employees did not agree that management had a high commitment to quality. The finding, together with the perceived lack of communication, indicate the need for a greater role for team
participation through which better means of communicating information can be determined.

TQM has far reaching implications for the management of human resources. Simon S. K. Lam (1995) reports on what changes employees see TQM programs having on their jobs and whether they perceive an increase in job satisfaction because of TQM. The study reports that, to ensure the commitment of employees to TQM, human resources management needs must be integrated into the TQM process. The hard side (human resources policies, including the organisation of work, pay, working conditions, reward systems and the training and development of the employees) must be accompanied by equal attention to the soft side (commitment to quality and job satisfaction) of the process for the success or failure of TQM.

Anoop Patel (1995) provides an insight of how a large manufacturing company is laying down the foundations for implementing TQM to achieve competitive supremacy. TQM is the most recent element of quality improvement. Particular emphasis is being placed on the customer relationship to TQM and pilot schemes are being set up of interfacing departments. Each element of quality improvement has played a major role towards the organisation’s goal of continuous improvement. The study reveals that TQM is now seen to introduce an important
competitive edge through organisational transformation. It is stated that, even the best strategies will fail if not adequately implemented and is only possible if the core themes of TQM are suitably managed.

Robin Mann, et al. (1995) conducted a study, which address the shortcomings by identifying the factors that most commonly affect the implementation of TQM. The findings of the study recommend that, organisations should undertake a thorough analysis of their quality critical organisational characteristics (QCOCs) before implementing TQM. The findings have shown that there is a complex relationship between organisational factors and quality activities. Organisations must constantly be aware that these factors (QCOCs), which are critical to a quality activity success, which may change with time, vary for each quality activity, vary depending on the stage of quality activity development. The study concludes revealing, organisations must be ready to change their approach to the changing circumstances.

An analysis of the responses to the survey conducted by Zinovy D. Radovilsky (1996) in the manufacturing, distribution and service industries leads to the conclusion that when companies implement TQM, successful results are most likely when a company’s implementation covers the whole scope of the principles and elements of TQM. The study attempts to identify the quantitative
relationships between quality improvement characteristics and different internal factors (indicators). The survey data were analysed on five basic quality improvement characteristics: reduction of errors/defects, decrease in cost of quality, growth of productivity, increase of profit and decrease of customer complaints.

The analysis of the survey data showed a strong correlation between reduction of errors/defects and the number of quality control tools used, and between reduction of errors/defects and cost of quality. The same analysis identified that the growth of productivity indicator is quantitatively related to the cost of quality and the number of implemented TQM elements. The increase of profit characteristic appeared to be correlated with the cost of quality, the number of years of using TQM and the number of implemented TQM elements.

This analysis also highlighted the leading predictors of a successful TQM implementation among which are, cost of quality, number of implemented TQM elements, number of quality control tools used, the just-in-time system, manufacturing resource planning, implementing SPC throughout the production process, number of training classes, incentives for quality improvement and long-term investment in R&D.

The study concludes saying a successful TQM programme should include the generation of timely and
reliable information on the results of implementing TQM, training in TQM issues for all employees and managers, re-evaluation of existing methods of communication between departments implementing TQM and development of standards to measure and control the cost of quality.

Sanjay L. Ahire, et al. (1996) empirically investigate quality management in TQM versus non-TQM firms. This research analysed the extent of execution of ten TQM constructs, viz, top management commitment, customer focus, supplier quality management, design quality management, benchmarking, statistical process control (SPC) usage, internal quality information usage, employee involvement, employee training and employee empowerment by various firms, and its impact. The results showed that TQM firms tend to do better than non-TQM firms. The more rigorous the execution of these constructs, the better the quality performance in a TQM firm. The results of the study concludes, that the real key to an effective quality management is how well a firm practices the various elements of the TQM philosophy represented by the ten constructs identified in this study.

Luis Maria R. Calingo (1996) proposes that quality-strategy integration have both a substantive dimension and a process dimension. Substantive quality-strategy integration occurs when top management has translated the
fundamentals into strategic planning objectives. These includes continuous improvement, greater responsiveness from development through manufacturing and sale to the final use, greater flexibility in adjusting to customer needs, cost reduction process integration occurs when quality planning effectively governs the organisation’s strategic planning and goal-setting processes. This paper focuses on the process dimension of quality-strategy integration. It recognises that, while both substantive and process integration should be expected to be taking place in world-class organisations, strategy-quality integration does not occur overnight.

Implementation of Glaxo Wellcome Excellence Process in Glaxo Wellcome India was to bring in an attitudinal change in the entire company and to bring in excellence in all spheres of business activities. Richard M. Blythe, et al. (1997) studied that the simpler the process used, the better it works. The process works if there is commitment from the top and rest work at it. The study reveals that there is an improvement in product and service, decrease in wastage of resources, sustained competitive advantage, motivated workforce and increased employee involvement. The study underlay in order to achieve this, a process should be determined with a starting point and defined destination, mapping the route, a structured and organised training programme for
all staff, set goals and measurable, and a system for recognition.

Wen-Hsien Chen (1997) examines the quality in leadership and human resources management of TQM in Taiwan, more specifically, the leadership and human resources management of TQM in US subsidiaries, Japanese subsidiaries, and local Taiwanese firms were compared. Criteria stipulated in the Malcolm Baldrige National Quality Award were used to assess the quality of leadership and human resources management of TQM. A general observation in this paper is that a company with larger sales revenue, more numerous employees, or greater production automation manifests better leadership and human resources management. The study concludes saying both leadership and human resources management are positively correlated with the management effectiveness of the quality department.

To measure a supervisor’s role in quality improvement efforts of a firm, from organisational behaviour, HRM and TQM literature Damodar Y. Golhar, et al. (1997) identified eight scales. This scale consisted of top management commitment to quality, quality training, top management encouragement and support, supervisors’ job-related tension, supervisors’ satisfaction, supervisors’ participation in quality efforts, supervisor-worker collaboration and quality of
manufacturing processes and products. The main objective of this empirical study is to compare the role of supervisors in TQM and non-TQM firms. The survey results show that the TQM firms show a sincere commitment to quality through support for supervisors and in return, the supervisors show an increased commitment and active participation in the quality movement in TQM firms. The study recognises that supervisors play a crucial role in implementing quality improvement strategies, successful in developing human resource capital and improved quality of products and processes.

T. S. Raghunathan (1997) compares the quality management practices in three different countries: USA, India and China. The following constructs are identified as critical in quality management: leadership, information and analysis, strategic quality planning, human resource development, quality assurance, supplier relationships, quality results and customer orientation. From this study it was found that in all the three countries quality practices were considered to be important. There were commonalties as well as differences in the quality practices and results are measured by the eight constructs in these three countries. The commonalties were that in all the three countries leadership, strategic quality planning and quality assurance practices were perceived to be more important.
However, human resource development practices were not perceived to be as important as the rest of the quality practices.

Eileen Drew (1998) focuses on the degree to which quality initiatives have been developed in Irish organisations. The paper shows the scale of adoption of total quality concepts and the degree to which total quality management (TQM) is associated with standards, strategic planning, teamwork, employee and customer satisfaction, use of quality tools/techniques, benchmarking and relationships with suppliers.

A paper by Mary Anderson, et al. (1999) reported the results of analysis conducted on data collected from 62 small and medium-sized Australian companies. The study examined the relationship between quality management practices and performance based on the Australian quality awards framework. This research identified a number of significant relationships between TQM practices and organisational performance. The research determined that leadership practices were particularly important. The research concludes a strong customer focus, quality system or good information management provide a positive influence on the quality of outputs.

Frank Dewhurst, et al. (1999) presents a complete and comprehensive review of the literature concerning the relationship between information technologies (IT) and
total quality management (TQM) and examines the key issues. The examination is made against a number of dimensions of TQM including customer and supplier relationships, workforce management, process flow management and quality data and reporting. Issues concerning the impact that IT is having on these TQM dimensions are highlighted and future potential issues are raised.

Mike Kaye (1999) advocates a planned and integrated approach for achieving continuous improvement in an organisation. For this five important and common themes were identified namely leadership, strategic focus, organisational culture and focusing on employees, processes, standardisation and measurement, learning from results. The researcher felt it would not be possible to making continuous improvement with these common themes. An attempt was therefore made to identify the linkages and inter-relationships between the key criteria. Further, ten key criteria were derived from the review, which is enunciated as below.

- Senior management commitment and involvement.
- Leadership and active commitment to continuous improvement demonstrated by managers at all levels.
- Focusing on the needs of the customer.
• Integrating continuous improvement activities into the strategic goals across the whole organisation, across boundaries and at all levels.

• Establishing a culture for continuous improvement and encouraging high involvement innovation.

• Focus on people.

• Focus on critical processes.

• Standardising achievements in a documented quality management system.

• Establishing measurement and feedback systems.

• Learning from continuous improvement results, the automatic capturing and sharing of learning.

The research work has demonstrated that the achievement of quality and continuous improvement is far from easy. The study reveals that continuous improvement requires continuous management, senior managers have to learn the importance of their role in ceaselessly driving the improvement cause. Focus on keeping the business aligned with stakeholder requirements, measuring performance and learning from results also contribute to the driving force for improvement. The underpinning foundations are provided through creating a culture for innovation, involving and focusing on employees, identifying the critical processes for achieving success,
and integrating improvement activities throughout the organisation.

Mile Terziovski (1999) studied the strength of the relationship between TQM practice and organisational performance. Based on the results, the study reveals that TQM has significantly positive effect on operational and business performance, employee relations and customer satisfaction. However, it appears that there are significant differences in the relationship between TQM and organisational performance across industry sectors and different size companies, particularly on the effect of defect rates, warranty costs and innovation of new products. Based on the findings of the study it is concluded that a typical manufacturing organisation is more likely to achieve better performance in employee relations, customer satisfaction, operational performance and business performance, with TQM than without TQM.

An article by Ladawan Krasachol (1999) compares the approaches to TQM implementation between three ownership categories: Thai, Japanese, and US-owned companies operating in Thailand. Despite the differences, important common characteristics of successful TQM implementations were found in all the three companies. These were considered to be top management commitment, good communication, effective use of problem-solving tools and
techniques, group activity, employee training and development.

Hongyi Sun (2000) compares the quality management practices in Shanghai and Norwegian manufacturing companies. The research is to investigate the differences about quality categories based on Malcolm Baldrige National Quality Award model (Leadership, information, strategy, human resources, processes, suppliers, business results and customer focus). The study revealed that though Shanghai companies have a good basis for applying quality control methods and QC activities, it is very important to correct the misconception of TQC being TQM, wherein, customer and market focus are the broader concepts of TQM philosophy.

Based on the comprehensive review of the TQM literature Zhihai Zhang (2000) identifies 11 constructs for implementation TQM consisting of leadership, supplier quality management, vision and plan statement, evaluation, process control and improvement, product design, quality system improvement, employee participation, recognition and reward, education and training and customer focus. This research aimed at identifying TQM implementation constructs, developing an instrument for measuring these constructs, and empirically validating the instrument using data from Chinese manufacturing companies. This study reveals that,
though this instrument was empirically tested and validated using data from Chinese manufacturing companies, researchers and practitioners from other countries will be able to use it. The reason is that this instrument was developed on the basis of an extensive literature review. However, it should be noted that this instrument is more valid for Chinese manufacturing companies than for companies in other countries.

Joseph Osa Nosa Khare (2000) examines the concept of TQM vis-à-vis the level of awareness and implementation in Nigeria. The research focuses on the approach adopted by organisations that have implemented the concept and its rate of success that has been achieved. Issues related to ISO 9000 and environmental series is also surveyed in this research.

Usha Devi (2000) studied the level of business performance of both private and public companies based on selected components of TQM. This research also studied the influence of components of TQM on business performance.

Gertrude P. Pannirselvam (2001) examines the categories, items, and framework of the Malcolm Baldrige National Quality Award (MBNQA) criteria. The study presents the underlying relationships between the various quality management constructs and between quality management and organisation performance. The results
indicate that, leadership affects all of the systems constructs directly or indirectly, except for strategic quality planning and information management, which was not tested in the model. The results indicate that information management, human resources management and customer focus have a significant effect on customer satisfaction and business results. A strong focus on customers and employees, along with effective leadership and information management is clearly shown to be essential for organisation success.

Sha'ri Mohd. Yusof, et al. (2001) presented the case studies conducted in four companies, in which all have implemented TQM. The survey shows a wide range of quality initiatives has been implemented by all of them. From this study, it was found that some similarities were observed between the case companies with regard to their approaches towards excellence. People focus was one of the key drivers for changing the culture. The study revealed that continuous improvement should be focused on harnessing the potential of all available human resources within an organisation and initiating new techniques without waiting for customers' demand. The report concludes that the manner in which these companies have implemented TQM was primarily customer-driven.

Based on extensive review of prescriptive, conceptual, practitioner, and empirical literature,
Jaideep Motwani (2001) identifies seven critical factors and more than 45 performance measures of TQM. The aim of this study was to identify and interpret the critical factors and performance measures of TQM. As far as the implementation of these factors is concerned, the author visualise TQM as constructing a house putting top management commitment to TQM as the base or foundation, employee training and empowerment, quality measurement and benchmarking, process management, and customer involvement and satisfaction viewed as the four pillars. Once these things are enriched the researcher concludes, “it is time to incorporate the factors of vendor quality management and product design as final elements to achieving TQM”.

A study by V. K. Khanna, et al. (2002), addresses issues relating to the identification of TQM variables based on the Malcolm Baldrige National Quality Award model, for the auto-manufacturing sector in India, among the different variables that represent enablers (leadership, strategic planning, human resource focus, customer and market focus, supplier focus, process management and information management) and results (impact on society, human resource satisfaction, customer satisfaction, supplier satisfaction and company specific business results), operating within 44 identified feedback loops. The study shows leadership is the most
important enabler for improving the TQM index. Top management commitment has a significant influence on, and the ability to make changes to the system. The study shows a positive relationship between the leadership and TQM and casual relation between the enablers and results.

Ismail Sila, et al. (2002) conducted a literature review to investigate the state of TQM by examining and listing various TQM factors based on the survey studies conducted in different countries and published in a variety of journals. The state of TQM survey research was analysed from the 347 survey based articles published between 1989 and 2000 in various journals. An examination of 76 survey studies that used an integrated approach to TQM showed 25 TQM factors, which are commonly listed as follows:

1. Top management commitment.
2. Social responsibility (includes environmental control, security and safety of employees, customers and communities and other related issues).
3. Strategic planning.
4. Customer focus and satisfaction.
5. Quality information and performance measurement.
7. Human resource management
8. Training.
9. Employee involvement.
10. Employee empowerment.
11. Employee satisfaction.
12. Teamwork.
15. Process control.
16. Product and service design.
17. Supplier management.
18. Continuous improvement and innovation.
21. Quality culture.
22. Communication.
23. Quality systems (mostly ISO 9000).
25. Flexibility.

The study reveals that, out of these 25 TQM factors the most frequently covered TQM factors in the literature were customer focus and satisfaction, employee training, leadership & top management commitment, teamwork, employee involvement, continuous improvement and innovation, quality information and performance measurement. Along with these, many articles dealt with issues related to process management including process control, and product & service design to a certain
degree, as well as supplier management, communication and strategic planning. However, five of these factors including strategic planning, communication, product & service design, employee appraisal & rewards, and social responsibility were not covered exclusively by most of the studies.

The other factors that received relatively low coverage in the TQM survey literature, including benchmarking, employee satisfaction, flexibility, quality assurance, zero defects, quality culture, quality systems, and just-in-time which can be examined further within a TQM context. The study underlay, the more survey studies must be conducted to understand the extent to which these factors contribute to the TQM activities of companies.

Hsien H. Khoo (2003) compares the distinctive differences and overlapping concepts between the US (The Malcolm Baldrige National Quality Award) and Japanese (The Japanese Deming Prize, and The Japan Quality Award). The study also compares approach to TQM, with regard to the countries, quality award frameworks and criteria including: leadership and social responsibilities, strategies & plans, customer focus/relations, human resource development, information management, processes, quality, suppliers, and overall results. The study results shows that Japanese and US organisations, in
their strivings to achieve organisational and quality excellence, differ significantly in various aspects of management and work culture. Spiritual teachings, and Buddhism, have shaped the Japanese people's concept of human relations and management philosophy. The west, on the other hand, highly advocates freedom and creative thinking, and has created competitiveness through fostering a culture of entrepreneurship.

Temtime Z. T. (2003) identifies eight dimensions namely customer satisfaction, managerial leadership, employee empowerment, continuous improvement, supplier partnership, quality philosophy/culture, working environment, measurement and feedback to measure TQM practice. The purpose of this paper is to investigate the planning and TQM practices of SME's and to draw attention to the importance of understanding the dynamic relationship between them. The study shows that the quality improvement in all the eight dimensions requires systematic thinking and an organised approach. It could be a source of competitive advantage only if it is properly planned.

Samir Baidoun (2004) conducted an empirical study of total quality management (TQM) implementation in the Palestinian industrial context. The main focus of the study was to identify the critical quality factors for effective TQM implementation and to understand how these
critical quality factors are implemented by the Palestinian organisations. Nineteen critical quality factors are the core components of the proposed framework. The study reveals that, the successful implementation of TQM in the Palestinian context should be a gradual approach with progression and selection of appropriate major top management actions. The study suggest that a logical and simple framework based on the core components (critical quality factors) including the major top management actions, the organisational activities and the guidelines that need to be taken when addressing the foundation elements and for successful implementation.

In this line of work, an empirical study by Juan Jose Tary (2005) identifies the components of total quality management, to facilitate successful quality management implementation, and shows the situation of ISO 9000 certified firms concerning these components. The survey results show that there is no unique model for a good TQM programme. On one hand this paper has pointed out that managers should consider right TQM component for successful implementation within their firms. On the other hand, it has examined the TQM elements in ISO 9000 certified firms.

Masahiro Miyagawa (2005) explores the relationship between TQM practices and the business performance of
Japanese-owned manufacturers in China. The study shows that in these companies TQM practices are positively and significantly related to the performance of the organisations. The study findings summarises, that the TQM practice of employee involvement through company-wide program and total commitment to improving customer’s satisfaction in Japanese-owned manufacturers in China significantly relates to internal performance such as reducing cost, increasing profitability and improving employees’ satisfaction. Strategic planning process of quality management including operational plan to improve customers’ satisfaction relates to external performance such as increasing market share and competitiveness. The study concludes that TQM is an effective method to improve business performance regardless of where the company might be operating, as long as the TQM practices are implemented appropriately.

Jiju Antony, et al. (2005) provides an empirical study on the identification of the critical success factors of TQM implementation in Hong Kong industries. A total of 11 success factors with 72 variables were identified to develop the questionnaire. Based on the factor analysis on the collected data, 7 critical success factors with 38 key variables of TQM were identified. The results of the study clearly indicate that training and education is the most critical factor for the successful
implementation of TQM in Hongkong organisations followed by quality data reporting, management commitment and so on.

3.3 REVIEW OF LITERATURE ON COST OF QUALITY

Quality cost is one of the most important tools necessary for the successful implementation of a quality program. George P. Laszlo (1997) aims to study the role of quality cost in TQM. The article reveals that a process based on cost analysis is a straight-forward method to obtain and maintain management approval of a quality improvement initiative. A major benefit of employing a quality cost approach to quality improvement is that, it provides a method to monitor the pertinence of projects to the overall goals of the organisation. A cost-based approach is to select the quality improvement projects that are appropriate to the organisation is a key part of the strategy for overall business.

Wen-Hsien Tsai (1998) presents a conceptual framework for measuring quality costs under activity based costing (ABC) such as departmental, products, customers, channels and resource costs. This paper reports the approaches to measure cost of quality, development of two-dimensional model of activity based costing and activity based management (ABM), cost of
quality approach and ABC are compared and an integrated COQ-ABC framework is framed. Finally, measurement, reporting and uses of COQ information under ABC are discussed.

Andrew J. Czuchry, et al. (1999) put forth an integrative systematic approach to address the cost of quality based on nonconformance relative to a set of internal manufacturing standards. This approach provides a detailed corrective action path, which stresses employee participation.

S. Roden, et al. (2000) the study reports an examination of the management’s, staffs and operator’s attitudes to and awareness of the concept of quality costing in the division of a small-sized to medium-sized enterprises manufacturing precision components for the aerospace industry. The study reports that, despite a previous unsuccessful quality costing initiative, it was found that some confusion exists at all levels of the organisational hierarchy, over the terms used in quality costing.

S. Roden, et al. (2001) studied the issues and difficulties of developing costing system in a small engineering company. Process mapping, departmental interviews, departmental study, and checklist of cost elements were used to identify the costs. The study reports that the main difficulties in developing the
quality costing system relate to blame culture, lack of visibility of how people spend their time and the structure of the accounting system. The study reported that the involvement of senior management in developing a quality costing system.

P. A. Cauchick Miguel, et al. (2004) deals with the assessment of quality costs and warranty costs. The paper outlines quality cost models and describes an exploratory survey. The paper underlay one of the most important categories of quality costs is that of external failure costs. The consequences of these failures are not only related to the costs incurred to the failure in the field, but also related to customer appeasement within this quality cost category against warrant claims. This paper deals with the assessment of external failures by presenting a case study on warranty costs. The findings demonstrated that warranty costs can be significant and its reduction is very important.

Vincent K. Omachonu, et al. (2004) examines the components of quality cost (internal failure cost, external failure cost, appraisal cost, and prevention cost) in the context of two key manufacturing inputs, materials and machines. The main purpose of this research is to analyse the variables that impact quality in a manufacturing environment. The study analysed that there is an inverse relationship between appraisal cost and
prevention & failure cost. The relationship between appraisal and prevention cost and quality is positive, while failure cost is negatively correlated with quality. This study also revealed a strong relationship between appraisal cost and prevention cost. The results indicate that as the appraisal cost plus the prevention cost increases, quality improves and failure cost decreases.

3.4 Review of Literature on Quality Improvement Tools

Simon S. R. Lam (1996) examines the usage of quality improvement tools among the companies in Hongkong. The study has revealed that 7QC tools were popular, but most of sophisticated quality improvement tools were not used. The research study concludes that lack of top management understanding of the tools and lack of resources, lack of ability to solve the existing quality problems was one of the major barriers of this study.

H. S. Bunney, et al. (1997) outlines the main findings of a longitudinal study into the use and application of quality management tools and techniques in a speciality chemical manufacturer. The study finds that the use of a particular tool or technique is related to the stage of development of the organisation’s improvement process and, in the early phase of the improvement process, tools and techniques were used in a
haphazard manner, which improved with operating experience. The study points out that those tools and techniques which were introduced in relation to a defined need were better understood and utilised than those which were applied company-wide and without a specific use in mind at the time of the training. The study highlights the fact that soundly based training delivered by credible trainers is vital to early success in the use of tools and techniques.

Jiju Antony, et al. (1998) discussed the problems and cognitive gaps in the statistical knowledge required by engineers for solving manufacturing quality problems using these advanced statistical techniques. This paper presents a strategic and practical methodology to guide engineers with limited statistical ability for tackling quality problems in real life situations. It is reported that the advanced statistical quality improvement techniques (ASQIT) such as design of experiments and Taguchi methods form an essential part of the search for effective quality control.

Ka Yin Kwok, et al. (1998) attempts to integrate the different quality tools that are commonly available in manufacturing and service industries. The authors identified the opportunities for improvement in the basic total control methodology (TCM) model in terms of classification of quality tools, extent of quality tools
covered and inter-relationships among the quality tools. A framework for the enhanced TCM model was developed based on these aspects. This paper presents several quality tools that are available in the market were studied, analysed, carefully categorised and positioned properly on the enhanced TCM framework based on their functions, applications, and interrelationships with other tools. The final enhanced TCM model was then formulated and explained in great detail. The three levels and the quality tools used in the model were described individually and the inter-relationships among the quality tools were also highlighted.

M. Spring, et al. (1998) presents the details of an assessment approach, which has been, developed to assess the use and application of quality tools and techniques in the new product design and development (NPDD) process. The study examines its use will help management to recognise the symptoms, root causes, issues and problems that are adversely affecting NPDD, with respect to application of quality tools and techniques or lack of it.

Although some of the quality tools and techniques which are of product or service specific, few basic tools and techniques are commonly used in manufacturing firms. Shamsuddin Ahmed, et al. (2003) focus on the state of application of QM tools and techniques in small and
medium industries (SMIs). Quality management cannot be assured unless some objective assessments are undertaken. A number of tools and techniques are available to conduct such analysis. The findings reveal that by-and-large, lack of methodical analysis is a major weakness of SMIs.

Michael Clargo (2004) uses quality function deployment, a more sophisticated tool to clarify the dimensions of success. The dimension of success is obtained by clearly defined objectives and performance targets, identification of key supply-chain processes, defining the responsibility for delivering the objectives, explore the interdependence between the processes and establish how they needed to work together; and finally clarification for how the processes would fulfill their responsibilities and commitment.

The basic “quality” tools and techniques can be applied to everyday activities and tasks. The major benefit of such application is a greater understanding of the process to which such tools have been applied. The greater use of such techniques within the working environment, greater process knowledge and understanding will lead to fewer issues of poor quality or dissatisfied customers. David R. Bamford, et al. (2005) describes the use and application of a structured approach to the basic implementation of quality management tools and techniques such as the 7QC tools. The research suggest that, for the
successful implementation, use and success of applying the QC and 7M tools and techniques, in-depth knowledge of the process, formal training in problem solving techniques, appropriateness of tools selected for use and application of simple models at all levels in the organisation to aid communication and learning is essential.

3.5 **Review of literature on barriers to TQM**

Hubiac & O’Donnell (1996) observes the main reasons for the failure of TQM programs are individualism, competitiveness, linear thinking and problem solving orientation.

Robber J. Masters (1996) lists eight barriers that affect all types of organisations. The barriers being lack of management commitment, inability to change organisational culture, improper planning, lack of continuous training & education, incompatible organisational structure and isolated individuals & departments, ineffective measurement techniques and lack of access to data & results, paying inadequate attention to internal & external customers, and lastly inadequate use of empowerment & team work.

Tamimi and Sebastianelli (1998) have linked the barrier factors in the TQM implementation with the seven
MBQNA criteria. In this study, barriers to the TQM implementation are faced by the samples grouped under the ISO 9001:2000 clauses.

Adebanjo and Kehoe (1998) studied TQM implementation in UK manufacturing organisation and identified barriers like: lack of upper management commitment, lack of training, customer related issues, organisations lack in involving suppliers for meeting the quality requirement, insufficient teamwork facilitators & team building techniques and lack of systematic approach in evaluating the workers.

Salegna and Fazel (2000) surveyed the obstacles faced by TQM and non-TQM organisations. The results showed three major barriers facing TQM organisations. These are identified as insufficient time, poor communication and lack of real employee empowerment. In case of non-TQM organisations, the barriers identified were lack of motivation, insufficient time and lack of strategic planning for change.

Kifayah Amar, et al. (2002) examines the barriers faced by Indonesian manufacturing organisation in implementation of TQM. The analysis identified 11 pertinent factors acting as barriers that are most frequently faced by the local organisations. These are issues related to human resource issues, management, attitude towards quality, organisational culture,
interdepartmental relations, raw materials, machines & equipments, information, methods and training. It is gauged from the study that the barriers against the successful TQM implementation are almost similar amongst organisations from different parts of the world.

3.6 Summary

This chapter has reviewed the relevant literature on ISO 9001:2000 certification, total quality management, cost of quality, quality improvement tools and barriers to implementation of total quality management. The results of review of literature show that so far no research study has been conducted specifically in tyre industry. The literature available on application of and effectiveness of ISO 9001:2000 and total quality management in other manufacturing organisations is considered as base for this study.