EVALUATION OF TOTAL QUALITY MANAGEMENT PRACTICES IN INDIA: A COMPARATIVE STUDY OF PUBLIC AND PRIVATE MANUFACTURING UNITS IN KARNATAKA

A thesis submitted to the University of Hyderabad in partial fulfillment for the award of the degree of

DOCTOR OF PHILOSOPHY

By

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DECLARATION

I, S. Gayatri, hereby declare that the thesis titled "**Evaluation of Total Quality Management Practices in India: A Comparative Study of Public and Private Manufacturing Units in Karnataka**", submitted by me under the guidance and research supervision of Prof. B. RAJA SHEKHAR is an original and independent research work. I also declare that, it has not been submitted previously in part or in full to this University or any other University or Institution for the award of any degree or diploma.

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CERTIFICATE

This is to certify that this thesis entitled "**Evaluation of Total Quality Management Practices in India: A Comparative Study of Public and Private Manufacturing Units in Karnataka**"**,** submitted by **Mrs. S. Gayatri**, Research Scholar enrolled for Ph.D. programme at the School of Management Studies, University of Hyderabad, is the bonafide work done under my supervision and guidance as prescribed under Ph.D. ordinances of the University.

This thesis has not been submitted earlier for the award of research degree of any University or institution.

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ABBREVIATIONS

AALA	American Association of Laboratory Accreditation
AOQL	Average Outgoing Quality Limit
APICS	The Association for Operations Management
ASQC	American Society for Quality Control
BPR	Business Process Re-engineering
CEA	Central Electricity Authority
CSO	Central Statistical Organization
DMAIC	Define, Measure, Analyze, Improve and Control
EQA	European Quality Award
HRM	Human Resource Management
ILAC	International Laboratory Accreditation Conference
IQS	International Quality Study
ISO	International Organization for Standardization
ISO 9000	ISO 9000 Series Standards include three basic standards (ISO 9001, ISO 9002 and ISO 9003) which can be used in Third Party Certification of Quality Management Systems.
JIT	Just In Time
JUSE	Japanese Union of Scientists and Engineers
KCTU	Karnataka Council for Technical Upgradation
KRA	Key Result Area
LTPD	Lot Tolerance Percent Defective
MTMA	Malaysian Textile Manufacturers Association
PDCA	Plan, Do, Check and Act
QC	Quality Circle
QD	Quality Department

QFD	Quality Function Deployment
QI	Quality Improvement
QM	Quality Management
R&D	Research and Development
SQC	Statistical Quality Control
SPC	Statistical Process Control
SPSS	Statistical Package for the Social Sciences
TM	Top Management
TPM	Total Productive Maintenance
TQM	Total Quality Management
TQS	Total Quality Service
TS	Technical System

CHAPTER - I

INTRODUCTION

"Competition on a global scale is a fact of life; everyone is competing for the new global markets. With competition fierce in all aspects ─ technology, cost, product quality and service quality ─ Every one must seek a competitive advantage. TQM is the proven approach needed to confront the challenges of the economic war and build victories upon victories today and in future". – Saylor (1992)

Business competition in national and global markets becoming fiercer, excellence is the norm required by a company to survive and grow in this competitive arena. *Quality is one of the keys to the continued success of business.* The survival and growth of companies are being claimed to be dependent upon the adoption of an ever competitive business philosophy of excellence by adopting TQM. TQM has been implemented by companies in almost all sectors of business, including manufacturing and service industries, all over the world. The implementation successes have been claimed to be due to the correct understanding of the TQM concepts and principles, their appropriate implementation techniques in full. The use of a partial criteria set of TQM and its incorrect implementation approach, have usually resulted in failure. This reminds us to the prediction of J.M. Juran, the Quality Guru of the World, who said that business in 21st century, shall be decided by "Quality" and industries ignoring this fact, shall be wiped out.

Quality is one aspect, where Indian manufacturers can still leave their footprints. Gradually Indian manufacturing sector is getting back into the national economic environment. This recent growth pattern is witnessed due to radical policy reforms by Indian Government and liberalized foreign investment strategies, which urged Indian manufacturing sector, public as well as private, to concentrate on maintaining a sustainable competitive edge, which is directly, related to the upkeep of quality ─ both in terms of services as well productivity. Past research has confirmed that the effective implementation of TQM can lead to improvement in organizational performance. A survey conducted by NPC (Singh 1991) revealed that quality improvement was considered vital to strengthen the competitiveness of Indian business and industry.

1.1 Meaning of Quality

Two important meanings of quality, which are of critical importance are:

"Quality" means, those features of products, which meet customer needs and thereby provide customer satisfaction.

"Quality" means, freedom from deficiencies – freedom from errors that require doing work over again (rework) or that result in field failures, customer dissatisfaction, customer claims, and so on. In this sense, the meaning of quality is oriented to costs, and higher quality usually "costs less."

The distinction between the two meanings is clearly explained in Table 1.1.

Table 1.1

Meanings of Quality

Product features that meet customer needs	**Freedom from deficiencies**
Higher quality enables companies to:	Higher quality enables companies to:
Increase customer satisfaction	Reduce error rates
Make products salable	Reduce rework and waste
Meet competition	Reduce field failures
Increase market share	Warranty charges
Provide sales income	Reduce customer dissatisfaction
Secure premium prices	Reduce inspection
	Shorten time to put new
	Products on the market
	Increase yields and capacity
	Improve delivery performance
The major effect is on sales.	Major effect is on costs.
Usually, higher quality costs more.	Usually, higher quality costs less.

The meanings of quality (Planning for quality, 2d ed.(1990) Juran Institute, Inc,Wilton, CT , pp.1-10.

Table 1.2

Content of Little Q and Big Q

Topic	Content of Little Q	Content of Big Q
Products	Manufactured goods	All products, goods and services, whether for sale or not
Processes	Processes directly related to manufacture of goods.	All process manufacturing, support business, etc.
Industries	Manufacturing	All Industries, manufacturing, service, Government, etc. whether for profit or not.
Quality is viewed as	A technological problem	A business problem
Customer	Clients, who buy the products	All those who are affected, external and internal
How to think about quality	Based on culture of functional departments	Based on universal trilogy
Quality goals are included	Among factory goals	In company business plan
Cost of poor quality	Costs associated with deficient manufactured goods.	All costs that would disappear, if everything were perfect.
Evaluation of quality is based mainly on	Conformance to factory specifications, procedures, standards.	Responsiveness to customer needs.
Improvement is directed as	Departmental performance	Company performance
Training in managing for quality is	Concentrated in the quality department	Company wide
Co-ordination is by :	The quality manager	The quality council of upper managers

Source: Planning for quality, 2d ed. (1990) Juran Institute, Inc, Wilton, CT, pp.1-12.

1.2 Definition of Quality

Quality Guru J.M. Juran defined quality as 'fitness for purpose'. Another Quality Guru Philip Crosby defined quality as 'conformance to specifications'. For assessing the quality of a product or service, the criterion of fitness for purpose is a highly subjective term, the interpretation of which may vary from individual to individual. The perception of quality of a product or service from the point of view of a customer may be different from that of the producer. If a third party, such as a quality certification agency, has to decide about the quality of the product or service, its perception may be different from those of the customer and producer.

The criterion of 'fitness for purpose' is perfectly suitable at only one stage of production or service. This is at the stage of designing the product or service. In all, the subsequent stages such as development, engineering, production, distribution and after-sales service, quality is measured in terms of 'conformance to specifications'. During the development of the product, various specifications are evolved. These specifications have to be adhered to in all the stages of production in order to achieve the desired quality of the product. Conformance to these specifications can be verified by objective evidence in contrast to the subjective approach of the 'fitness for purpose' criterion.

Quality is, thus, both a user-oriented and a production-oriented expression. From the user's point of view, quality is an expression of the products/services usefulness in meeting the needs and expectations and its reliability, safety, durability and so on. From the production point of view, the quality of a product is measured by the quality of its performance, which depends on the quality of design and the quality of conformance. Quality of design is concerned with the stringency of the specifications for manufacturing the product. The quality of conformance is concerned with how well the manufactured product conforms to the original requirements.

Different views of quality are held by Marketing, Engineering and Manufacturing departments. Garvin (1988) outlines these as:

- Transcendent – Quality as a simple analyzable property recognized only through experience.
- Product-based – Quality as a precise and measurable variable.
- User-based – 'Quality lies in the eyes of the beholder'.

- Manufacturing-based – Quality as conformance to the requirements.
- Value-based – Quality as performance or conformance at acceptable price or cost.

Garvin argues that these meanings co-exist. Furthermore, it is necessary to change the approach to quality from user-based to product-based as products move from the stage of market research to design, and then from product-based to manufacturing based as products move from the design stage to manufacture.

1.3 The Goals of Total Quality

The almost universally accepted goals of total quality are lower costs, higher revenues, delighted customers, and empowered employees.

Lower Costs: Higher quality can mean lowering costs by reducing errors, reducing rework, and reducing non-value-added work. In the past 15 to 20 years companies around the world have repeatedly demonstrated that higher quality frequently means lower costs. The costs associated with preventing errors during design are often far less than correcting the errors during production, the costs of preventing errors during production are far less than correcting the errors after final inspection, and the costs of finding and correcting errors during final inspection are far less than fixing the errors after the customer has received the goods or services.

Higher Revenues: Higher quality can mean better satisfied customers, increased market share, improved customer retention, more loyal customers, and even premium prices. Customers are increasingly beginning to expect and demand high-quality goods and services. By exceeding the levels of quality offered by competitors in the market place, organizations can add new customers, retain old customers, and move into new markets. Often, informed customers are willing to pay a price premium for higher levels of quality that provide new and useful features or that reduce total life-cycle costs.

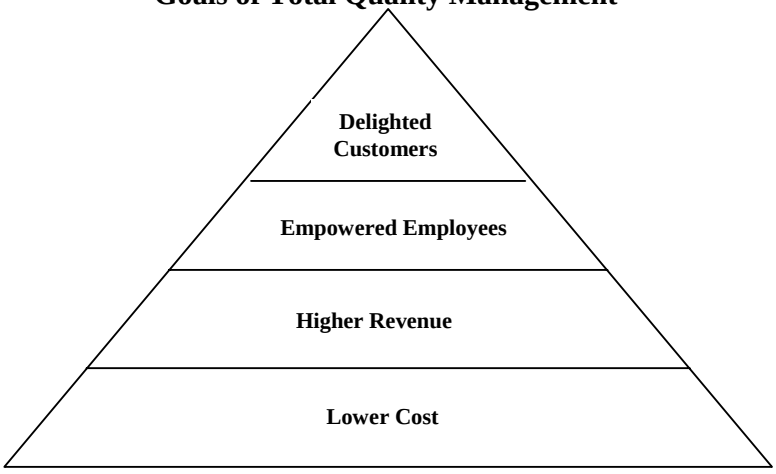
Delighted Customers: "Delighted" customers are customers, who buy over and over again, customers, who advertise your goods and services for you; customers, who check you first, when they are going to buy anything else to see if you also offer those goods or services. Loyal customers will frequently increase their purchases to the point of selecting sole suppliers for certain goods and services (Reichheld 1996).

Empowered Employees: For many years, organizations viewed empowered employees as a means for achieving lower costs, higher revenues and delighted customers. Now, most leading organizations realize that creating such employees is also a major goal of total quality management. These organizations not only aim to solve the problems of today, but they also want to create an organization that can solve, or even avoid, the problems of tomorrow.

The concept of empowered employees embraces many new ideas. Empowered employees are in self-control. They have means to measure the quality of their own work processes, to interpret the measurements, and compare these measurements to goals and take action, when the process is not on target.

Figure 1

Goals of Total Quality Management



(Leadership for the Quality Century, 1997, Juran Institute, Inc., Wilton, CT.)

1.4 Introduction to Total Quality Management

Total Quality Management **(**TQM) has been looked at as an effective method that will accomplish the task of higher quality levels and increased productivity. The purpose of Total Quality Management is to implement a process that is long-term with continuous improvement initiatives throughout the organization. TQM integrates the fundamental techniques and principles of quality function deployment, Taguchi methods, statistical process control, Just-In-Time, and existing management tools into a structured approach. TQM was developed from the teachings of Deming, Juran, Crosby, Ishikawa and Taguchi, using their principles as a foundation to build upon. TQM relies on the methodical change

of the process. It provides the tools and the direction to improve quality and performance. By implementing TQM, many companies have realized the benefits quickly with higher quality products that would increase customer satisfaction. Total Quality Management is a process of constantly improving the system of production and service through the integration of fundamental management techniques, existing improvement efforts, and technical tools into a disciplined approach focused on continuous process improvement. Continuous improvement results provide a track record that can give an organization an advantage over their competitors for new product development and additional resources.

The odyssey towards TQM is a long, steady, sustained and demanding one. The key is strong management commitment that will create an entire restructuring of the organizational culture and way of operating, so as to make all members of the organization striving all the time for continuous improvement. The pursuit of quality improvement is not a finite task, with a traditional begin, middle and end, but a continuous journey with no definable destination other than the wish to strive for continuous improvement, and to look for breakthrough with dramatic order of magnitude changes that once again, we would have dismissed as impossible only a few years ago (Jeanes 1990).

1.4.1 Definitions of TQM

Total Quality Management is a set of systematic activities carried out by the entire organization to effectively and efficiently achieve company objectives so as to provide products and services with a level of quality that satisfies customers, at the appropriate time and price. (The Japanese Union of Scientists and Engineers JUSE, 1948).

TQM is termed as an approach for continuously improving the quality of every aspect of the business life, i.e., it is a never ending process of improvement for individuals, groups of people and the whole organization (Khanji and Asher 1993, 1999).

It is an integrated approach and set of practices that emphasize inter alia management commitment, continuous improvement, customer focus, long range thinking, increased employee involvement and teamwork, employee empowerment, process management, competitive benchmarking, etc.(Rops 1993).

1.5 TQM in Indian Manufacturing Sector

Liberalization, Privatization and Globalization are causing a transition in the world economy and Indian manufacturing sector is no exception. The industries earlier nurtured in a protected and subsidized environment, have been suddenly made to face free market and global competitors. The period of nineties, has seen Indian companies developing core competencies in terms of technologies and managing the dynamism and opportunities that have come by over the years. These reforms were aimed at making Indian industry more efficient and technologically modern. This efficiency improvement, technological up gradation, and enhancement of competitiveness were expected to enable Indian industry achieve rapid growth.

The industrial sector with its forward and backward linkages and its high employment potential holds the key to the economic development of a country. Since independence, India has achieved reasonable level of self-sufficiency in manufacturing a variety of basic and capital goods. Growth in the manufacturing sector has the potential to elevate much of the Indian population above poverty line by diverting majority of the workforce out of low-wage agricultural sector. This would create a more stable and prosperous India and, in turn, attract more business.

India is fast emerging as a global manufacturing hub. India has all the requisite skills in product, process and capital engineering, thanks to its long manufacturing history and established higher education system. India's cheap and skilled manpower is attracting a number of companies spanning diverse industries making India a global manufacturing powerhouse. The index for industrial production has also shown an upward trend over the past few years. India has emerged as one of the world's top ten countries in industrial production as per United Nations Industrial Development Organization's (UNIDO) new report titled 'Yearbook of Industrial Statistics 2010'. India surpassed Canada, Brazil and Mexico in 2009 to reach the 9^{th} position from the 12^{th} position, it held in 2008. The next wave of manufacturing thus lies in India. India's impressive growth performance over the past decade has made it a global powerhouse today, a force to be factored in all the calculations of world growth and development. High economic growth in a country that has a stable democracy and free market has in fact made India, the cynosure of the world in the new millennium. Added to this a large stock of manpower, the fastest growing population of workers and consumers, strong spirit of entrepreneurship and innovation that

has been given free rein with the economic reforms over the past two decades, and it is clear, why India has attracted global investors from all sectors.

India ranks 13th in Global FDI flows; but more importantly, it ranks 3rd on the list of most-favoured FDI location. India burst onto the global scene by establishing its leadership in information technology, the past few years have seen its stature rise in various sectors, including Steel, Auto, Biotech and Pharma. India's potential for growth has been recognized, time and again, and the economy is expected to grow in size from 7% of the US's in 2007 to 88% in 2050. The strong boost for infrastructure and a liberalized environment are a sure recipe to achieve India's aim of sustainable growth at 8.5% per annum for the next decade.

The country is in fact poised for greater achievements ahead as India has bucked the global slowdown. While the developed world was in a contraction mode following the global financial crisis, India registered a 6.7% growth in 2008-09 and 7.2% the following year; the country continued to be the second-fastest growing economy in the world for the fourth year in a row. The twin engines of growth have been service and manufacturing sectors, which have expanded at 7.5% and 10.3% per annum over the period 2004-2009. The world now looks to the developing economies for the much needed push to growth as China and India power the world.

Figure 1.2

Share of India in World Economy

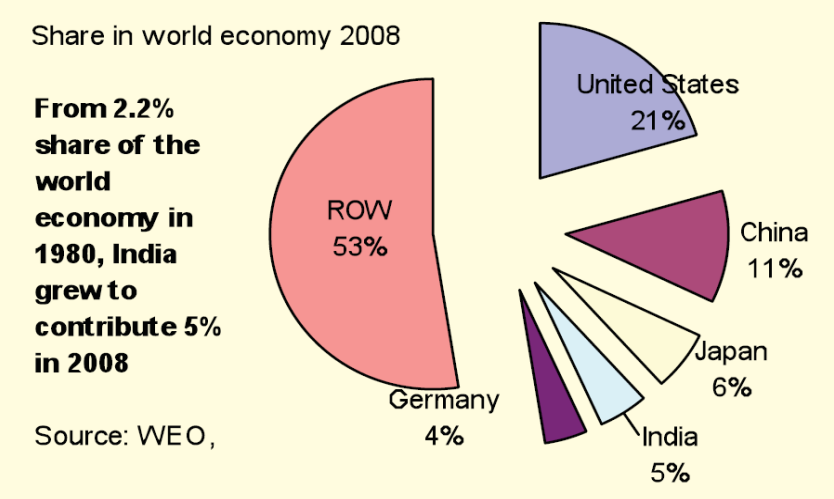
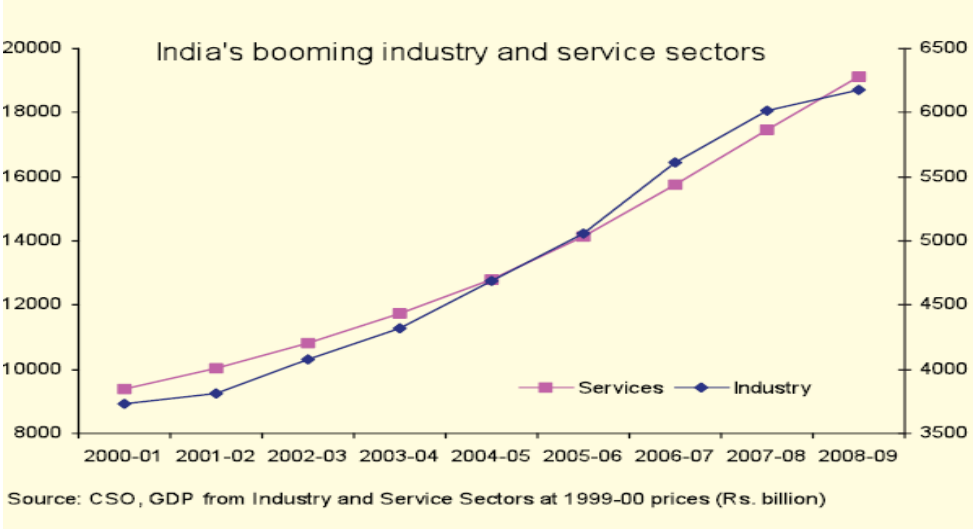


Figure 1.3

India's Booming Industry and Service Sectors



Manufacturing has been recognized as the main engine for economic growth and creation of wealth and accordingly emphasis was placed on growth of manufacturing industry in most of the five year plans. Manufacturing sector grew more than 10 percent in the second quarter of 2005 alone. India is well on its way to become the premier manufacturing location for companies around the world. The share of industrial sector in India's GDP is 26.4 percent (financial year 2006-2007). According to a recent Confederation of Indian Industry-Mc.Kinsey study, the global trend of manufacturing and sourcing products in low-cost countries such as India is likely to rise in the next decade. Indian manufacturing exports could see an annual growth of 17 per cent to cross the $300 billion mark by 2015.World renowned TQM expert, Professor Yasutoshi Washio, has predicted that the quality of Indian manufacturing will overtake that of Japan by 2013. This is attributed to the rising level of competence and productivity of India's human resource.

Indian companies need to adopt global mindset to build economies of scale and achieve cost excellence, acquire market access rapidly, strengthen design and innovation skills, build global or regional operating footprint; and master the ability to manage a world-class talent pool and organization. While initiatives are taken at the country and sector levels to enhance competitiveness in the economy, maintaining firm level competitiveness is crucial if growth aspirations are to be realized. Individual firms must do

this by building abilities to acquire, assimilate and develop new technologies, reduce production costs, cut down delivery time, practice Total Quality Management, enhance productivity and customer service.

Table 1.1 shows the evolution of TQM-related activities in India and projection for the future given by Janak Mehta (1999). Phase I, for 35 years after independence, there was a virtual stagnation in the quality movement as business was protected from competition by the government regulated market using licensing and custom duties as a barrier. The basic technique used for quality was the outdated and reactive approach of inspection, which is like bolting the stable after the horses have fled. This resulted in enormous wastage of resources through the generation of scrap and rework, and the brunt was borne by the customer, for whose protection the laws were made.

This led to a high cost economy, slow rate of economic growth, growing trade deficit, lower share of the international market, high incremental capital output ratio, low productivity, poor quality and hardship for the consumer. With every crisis, be it the wars with our neighbours, the oil shock or internal strife, protectionism grew stronger and outsiders were blamed for the misfortunes, and responsibility was disowned.

Phase II, from 1983 to 1994, witnessed the first tentative steps towards relaxing control over the business activity, which resulted in introducing a small degree of competition among producers. The economic growth rate picked up, but the focus was on making quick money through a new culture of imported kits. The need for quality improvement was felt and awareness for quality grew. Many companies tried the concept of quality control circles to obtain worker participation; but for want of management involvement, effects were limited. The rate of economic growth picked up, but foreign debt mounted rapidly, leading to loss of economic independence.

Phase III, from 1995 to the present day, witnessed major policy changes towards deregulation of the economy and growing domestic competition. In such an environment, quality gained relevance, and the enlightened industry, though small in size, started learning and adapting to new quality technologies.

A few companies started working towards TQM, and a few others focused on development and implementation of quality assurance systems in conformance with the international standard ISO 9000 series. There are a small number of companies that have

started work on effective utilization of statistical quality control techniques. However, the bulk of the focus continues to be on inspection as a means to achieve quality.

The effort on quality improvement will intensify only when it becomes an issue for survival, and is dependent upon the intensity of fair competition in the market place. In this context, it is high time that the Indian companies follow business strategies of survival and growth to face the threat of competition effectively.

Table 1.3

Evolution of TQM- Related Activities in India and Projection for the Future

1947-82				
Changes in social and economic environment	***Development in quality***	***Quality control (QC) tools***	***Quality assurance (QA) systems***	***Change of concepts in policy management***
India becomes independent Regulated economy Very low competition	QC in inspection stage (identification of defectives)	Inspection	Regulation of inspection Regulation of product audit	
1983-94				
Initial phase of deregulation of economy Slow growth rate Imported kits Emerging domestic competition	Quality awareness growing Attempted use of QC circles	7 tools of QC	QA systems compliance with ISO 9000 quality system requirements	Importance attached to measures or means in addition to targets
1995-2000				
Transition to open economy Adequate growth rate of economy	QC in manufacturing stage (prevention of defectives)	Various statistical methods Design of experiments	Regulation of process control QC process chart, control chart and check	Importance attached to coordination of all the divisions in addition to

Growing domestic competition Select international competition		Quality table Failure mode effect analysis and fault tree analysis	sheet Quality tables deploying required qualities	management of each division
2001-07				
Deregulation of economy High growth of economy Open competition	QC in design stage (making new products to satisfy customer requirement)	Multivariate analysis Weibull probability 7 management tools	Quality tables transforming required qualities to design qualities	Importance attached to midterm and long term policies in addition to those specified.
From 2008				
Self regulated economy Total integration with global market (development of technology for new products) Steady growth of economy	QC in research stage	Subsystem in managing research programme using a combination of Q table, process design and process control	Regulation of design review	Transition to strategic management of business by the participation of all members and all divisions.

Source: Mehta (1999)

1.5.1 Manufacturing Scenario in Karnataka

Karnataka, the eighth largest State in India, has contributed significantly to India's rising success. Karnataka, with its varied agricultural and mineral resources and strong manufacturing capabilities accounts for close to 10% of India's product exports. The capital city of Bangalore is in fact known globally as the IT capital of India. The State's software exports form more than 35 % of India's software exports. Karnataka is also the knowledge hub of the nation ─ it has the highest number of medical colleges and third highest number of engineering colleges in the country. The State is the pioneer in two cutting edge industries ─ aerospace and biotech ─ where it is the global face for India.

Brand Bangalore has come to mean cost effective and quality solutions in numerous industries. While at the beginning, this represented off-shoring of low-end services in the BPO sector, the latent strengths of the State have now made it the first stop destination for high-technology cutting edge research and manufacturing centre of global majors. Bangalore is the world's fourth largest technology cluster as it has the perfect ecosystem fostering growth and development of State-of-the-art technology.

The State economy of Karnataka has a sound base in its rich resources, manufacturing expertise and proactive government policies that have kept growth going in tough times.

Karnataka's manufacturing sector is well diversified. It contributes to 8% of India's industrial income, with firms in all sectors of manufacturing - engineering, auto, chemicals, electrical and electronic products, food processing, etc. Industrial growth has accelerated from 6.2% in the nineties to 8.9% per annum since 2000. Karnataka is India's third largest producer of steel and seventh largest producer of cement. It accounts for 20% of India's garment production and 8% of national apparel exports. The State is India's fourth largest automobile hub and the largest contributor to the aerospace industry. Home to 700 MNCs and 87 Fortune 500 companies, Karnataka is a state with varied agricultural and mineral resources and strong manufacturing capabilities.

Karnataka is one of India's leading industrial states, contributing almost 8% to the national manufacturing income. It has a long tradition of supporting entrepreneurs and encouraging innovation and research. Its strong and vibrant industrial base combines the intrinsic strengths of large industrial public sector undertakings, large and medium privately owned industries and a wide range of small-scale units. While at one end of the spectrum, the state is the aerospace hub of the country operating on cutting edge engineering and IT capabilities, at the other end its garment sector, dominated by small units, constitutes 20% of the national production.

According to the global list of cities complied by HR Consultancy Mercer for 2010, Bangalore has climbed a couple of notches and continues to be the best place to live in among Indian Cities.

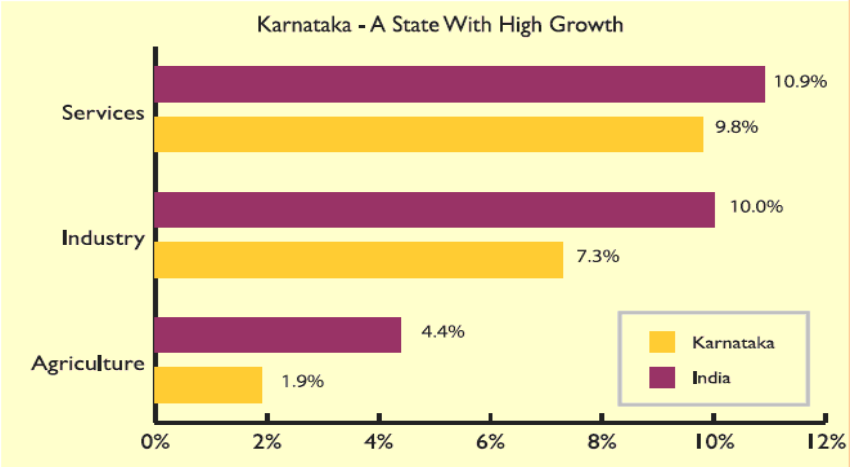
In the past two years, the State has ranked an impressive Rs.5 lakh crore industrial growth, inspite of the global financial crisis, to remain in the forefront as one of the most developed States in the country.

Economic Growth

- One of India's fastest-growing states; Karnataka has a strong industrial base and a vibrant service sector.
- Software is State's star performer; software exports form 35% plus of country's software exports.
- Secondary sector contributes more than a quarter of GSDP
- State contributes 5% of national income
- Since 2003-04, the State growth has pushed the levels of per capita income, higher than the average.

Figure 1.4

Growth in Various Sectors in the State of Karnataka



Source: CSO Directorate of Economics and Statistics, Bangalore

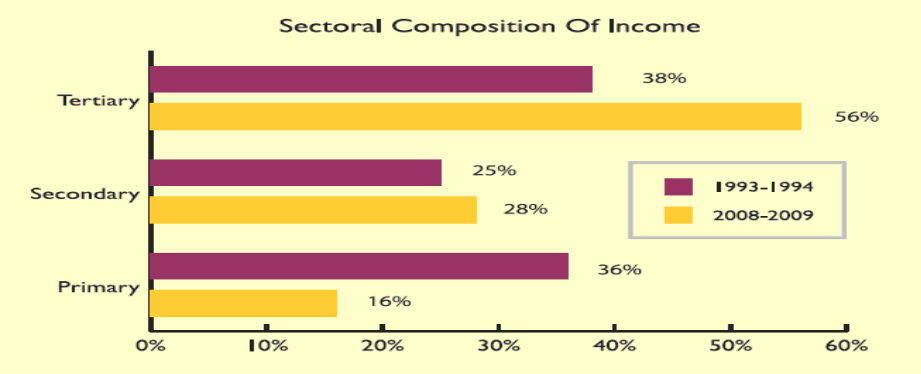
Fy 2006 to 2009-10

Manufacturing

- It is well diversified.
- Main industries are engineering, chemicals, electrical, automobiles, textile, aeronautics and food processing
- Industrial growth is up from 6.2 % in the nineties to 8.9 % per annum since 2000.

Figure 1.5

Composition of Income of Various Sectors in Karnataka



Source: CSO, Directorate of Economics and Statistics, Bangalore

State's Contribution to India's Economy

- No. 1 investment destination
- One of India's most progressive States.
- Contributes 8 % to India's industrial income.
- Contributes 9.8 % of India's product exports.
- More than a third of India's software exports are from State.
- Third-largest producer of steel in the country.
- Seventh-largest producer of cement in the country; 6.5 % of India's production
- Bangalore city is the world's fourth largest technology cluster

1.6 Need and Significance of the Study:

Indian companies are facing a tough challenge from multinational companies ever since the Government of India implemented the policies of liberalization, privatization and globalization. Indian companies are in dire need of new strategies, approaches and techniques for improving their competitiveness.

In order to compete in any field, an organization must work to determine its customer expectations and ensure that its own performance meet those expectations. The future of any organization would depend on how well the concepts of quality are ingrained in the vision, mission and strategy of the company. This can only be achieved through

simultaneous implementation of all appropriate quality tools. Hence, a focused study of TQM practices and the major driving forces behind its implementation becomes very pertinent and relevant in both, sectors public and private.

The subject of Quality Management in the manufacturing industry has been a matter of great interest and concern for business and academia alike.

Deming (1986) recommended 14 principles for effectively managing quality. Garvin (1986) conducted a systematic study on real life quality improvement projects in USA and Japan, and came out with a set of critical factors. Saraph *et al.* (1989) made the most remarkable attempt to develop an instrument for measuring the critical factors of quality management. Juran (1991) stressed upon planning, improvement and control as essentials of quality management. Feigenbaum (1990) proposed the concepts of organization-wide quality control. Crosby (1991) proposed a 14-step zero defect quality improvement programmes. Sink (1991) emphasized `collective ownership' and `common concern' as pre-requisites to TQM. Zaire (1991) identified process flexibility, workplace design, user-supplier chain and management control system as the pillars on which the TQM system is built. Oakland (1992) stressed customer focus, management commitment, total participation, statistical quality control and systematic problem solving as the important dimensions for implementing TQM. The dominant emphasis of these pioneers was on top management leadership for quality, supplier quality management, process design and control, employee training and employee involvement in quality. Various recent studies across the globe have also focused on identification of factors, which are critical to the success of TQM. A number of surveys (for national and international comparisons) reported in the literature have suggested that quality initiatives can improve organizational performance (e.g. Mandal and Gunasekaran, 1999; Sohal et al., 1992). These surveys, to some extent, have enhanced the understanding of impacts of quality concepts in manufacturing. Sohal et al. (1992) conducted a study among Australian manufacturing companies to assess the adoption of quality management practices. Sohal and Eddy (1994) repeated this study again to examine the progress in adoption of quality management concepts. The studies revealed that Australian industries were effectively implementing quality initiatives and were improving their overall quality. A survey reported by Kim and Im (1993) suggests that Korean manufacturing companies are aggressively restructuring their manufacturing process. It is suggested from these findings

that Korea is moving away from a low cost and low quality product market and to a high quality product market. International Quality Study (IQS) conducted by Ernst & Young for the American Quality Foundation suggested that quality is a crucial factor in major manufacturing organizations in the USA, Canada, Japan and Germany (Sohal and Eddy, 1994). The IQS study has made a significant contribution to understanding the link between quality management practices and business benefits among organizations in the USA, Canada, Japan and Germany.

In contrast to the aforementioned studies, Ferme (1995) studied how Australian manufacturing companies address the "design for quality" issue in product designing. The survey indicated that less than 50 percent of the companies use concurrent engineering and design for quality tools in product development process. Conversely, research undertaken by Chikan and Demeter (1996) suggests that Hungarian manufacturing companies are increasingly attaching more importance to quality of products and costs than to customer services. According to Ettlie (1996), German factories that have adopted ISO 9000, JIT and autonomous work groups have significantly outperformed those, who have not adopted these techniques. Modern manufacturing practices are an integral part of German plants, and have significantly enhanced their overall performance in both domestic and overseas markets.

Kim et al. (1997) provided some interesting insights into the quality strategies and improvement programmes among leading manufacturing companies in western economies. They studied the database of the global manufacturing futures project (GMFP) and suggested that the most successful firms followed a step by step quality staircase to achieve competitive edge. The steps to climb on are conformance, reliability, performance and customization and a sequential follow up of these steps leads to achieving competitive edge. Sun (2000) identified the importance of leadership, information strategy, human resources, processes, suppliers and customer focus for quality management practices in Shanghai and Norwegian companies.

Anderson and Sohal (1999) carried out an empirical study to identify factors critical to the success of TQM in Australian manufacturing industry. The study revealed the importance of factors like leadership, strong customer focus, quality systems and availability of information.

The picture is, however, different and unclear for developing economics. Quality literature abounds with successful examples and cases of Western economies adopting quality initiatives, but very little has been reported on quality issues in developing economies. A study conducted by Philipose and Venkateswarlu (1980) indicated that only 24 percent of the Indian manufacturers used control charts, while 32 percent used some type of sampling plans. In fact, at this particular point in time, quality concepts were limited to the use of acceptance sampling and control charts – essentially, the tools for inspection and process control.

Only recently, reports are appearing on quality studies relating to work culture, impacts of government policies, technological diversification, etc., specific to developing countries. Lakhe and Mohanty (1994) identified some of the major factors, e.g., teamwork and participation, statistical methods and analysis, problem solving management, communication, behavioral and cultural change, customer care, motivation for action, responsibility and accountability, adequate procedure and information system, etc. A large number of studies are available on relationship between TQM practices and business performance (Ismail and Ebrahimpour, 2002). These include development of research frameworks to study the effects of TQM on business performance.

In case of India, only sporadic attempts have been made in the past to understand how Indian manufacturing companies are competing in domestic and internal markets. Motwani et al. (1994) conducted a study to identify the degree to which quality management practices were present in Indian manufacturing organizations. The study showed that the modern concepts of quality management were practiced by the large Indian manufacturing organizations. Quality certification is becoming an acceptable way of enforcing quality concepts in India. According to a 1995 survey (CII, 1995), among ISO 9000 certified companies, 54 percent of 330 respondents stated that there had been an improvement in their product and process quality after obtaining certification.

In Indian context, Raghunathan and Subba Rao (1999) also addressed the relationship between TQM practices like leadership, strategic planning, human resource management and quality performance. The studies on TQM in Indian context mainly cover identification of quality management practices (Bhadury and Mandal, 1998) and benchmarking in Indian companies (Motwani *et al.,* 1994). Mohanty and Lakhe (2000)

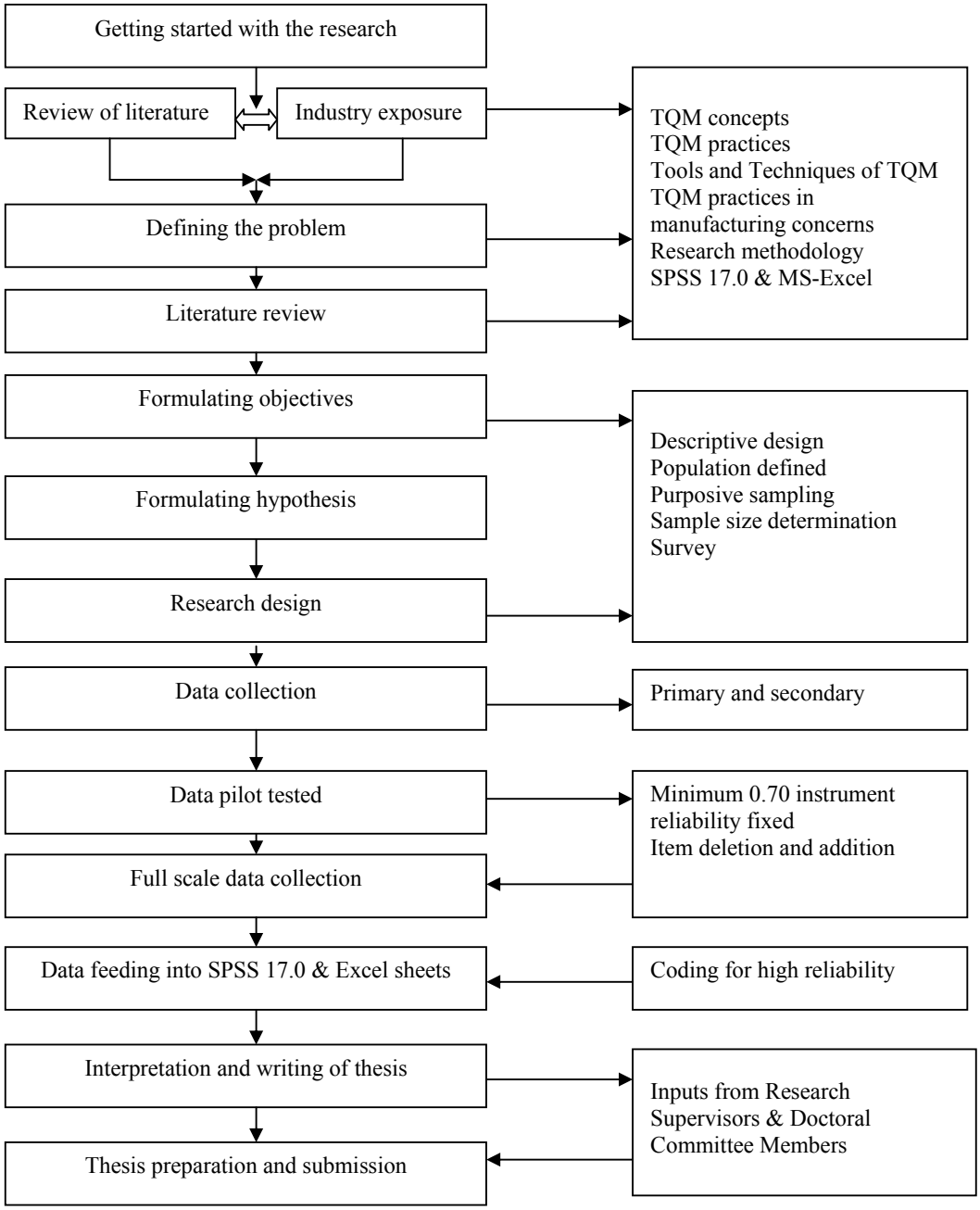
made efforts to identify critical factors for TQM implementation based on five sub-sectors of manufacturing industries.

1.7 Research Gap

There is an enormous amount of literature relating to TQM from both researchers and practitioners. Over the years, number of studies has been reported in literature, which have examined aspects like critical factors affecting total quality management, quality management practices in different countries, studies on TQM implementation in various industries, etc. But, the above studies have not addressed the comparison of TQM practices in public sector and private sector manufacturing units. Therefore, a study on these issues in Indian context is considered important and insightful.

Figure 1.6

Research Framework



1.8 Research Questions

Based upon the gaps found in the review of literature, the following research questions are raised on the TQM practices, TQM practices in manufacturing sector, TQM in public manufacturing sector, TQM in private manufacturing sector and Involvement of various stake holders of TQM:

- What are the most influencing factors in the implementation of TQM practices in manufacturing sector?
- Are there any significant differences between public and private sectors in terms of critical influencing factors?
- Whether employee involvement significantly varies between public and private sectors?
- What is the role played by suppliers and customers of manufacturing concern in the TQM process?

1.9 Objectives

The broad/ main objective of the proposed study is to evaluate the TQM practices in manufacturing sector comprising both public and private sectors. The overall objective stated above is further elaborated into more specific objectives, which are:

- to assess and compare the quality consciousness, role of leadership and involvement of various stakeholders of TQM (top management, employees, customers and suppliers) in public and private sector organizations;
- to identify and analyze the gap between quality policy and implementation in public and private organizations;
- to examine the degree and extent of relationship among TQM parameters in public and private organizations and
- to develop and measure managers' perceptions of critical factors affecting TQM in public and private organizations.

1.10 Research Hypotheses

The following research hypotheses were proposed for the study:

Table 1.4

Research Hypotheses

Sl No.	Hypotheses
1	There exists a significant difference between public and private manufacturing units with respect to leadership.
2	There exists a significant difference between public and private manufacturing units with respect to policy and implementation.
3	There exists a significant difference between public and private manufacturing units with respect to employee involvement.
4	There exists a significant difference between public and private manufacturing units with respect to customer focus.
5	There exists a significant difference between public and private manufacturing units with respect to involvement with suppliers.
6	There exists a significant difference between public and private manufacturing units with respect to role of quality department.
7	There exists significant difference between public and private manufacturing units with respect to training.
8	There exists a significant difference between public and private manufacturing units with respect to product / service design
9	There exists a significant difference between public and private manufacturing units with respect to process management.
10	There exists a significant difference between public and private manufacturing units with respect to quality data and reporting.

Table 1.5

Critical Variables and Operational Definition of Variables

Sl. No.	Item	Definitions
1.	Leadership (X_1)	Acceptance of quality responsibility by general managers and department heads; evaluation of top management on quality; participation by top management in quality improvement efforts; specificity of quality goals; importance attached to quality in relation to cost and schedule and competitive quality planning.
2.	Policy and implementation (X_2)	The organization's mission, values, vision and strategies related to Total Quality.
3.	Employee involvement (X_3)	Implementation of employee involvement and quality circles; employee participation in quality decisions openly; responsibility of employees for quality; recognition for superior quality performance.
4.	Customer focus (X_4)	The organization's identification of customers needs; and achievements as perceived by the customer.
5.	Involvement with suppliers (X_5)	Fewer dependable suppliers; reliance on supplier process control; strong interdependence of supplier and customer; purchasing policy emphasizing quality rather than price; supplier assistance in product development.
6.	Role of quality department (X_6)	Visibility and autonomy of the quality department; quality department's access to top management; use of quality staff for consultation; coordination between quality department and other departments; effectiveness of quality departments.
7.	Training (X_7)	Provision for statistical training, trade training, and quality related training for all employees.

8.	Product Design (X_8)	Thorough scrub-down process; involvement of all affected departments in design reviews; emphasis on reducibility; clarity of specification; emphasis on quality, not roll-out schedule; avoidance of frequent redesigns.
9.	Process management/ operating procedures (X_9)	Clarity of process ownership, boundaries, and steps; less reliance on inspection; use of statistical process control; selective automation; foolproof process design; preventive maintenance; employee self-inspection.
10.	Quality data and reporting (X_{10})	Use of quality cost data; feedback of quality data to employee and managers; timely quality measurement; evaluation based on quality performance; quality data availability.

Source: Saraph *et al.*'s (1989), Rajiv Gandhi National Quality Award (2007)

1.11 Research Methodology

Based on the existing literature review, the definitions and explanations of the 10 critical variables, the set of practices that support TQM implementation, Eighty six items were developed for measuring the 10 critical variables (Table 1.6). The extent of quality management in each business unit were evaluated by rating each measurement item on a Seven point Likert scale, where 1 indicated very very low and 7 indicated very very high levels. Eighty six statements pertaining to the identified 10 variables were evaluated on 7 point scale. Interviews with quality managers, practitioners and academicians helped in the operationalization of variables.

Operationalization of variables helped in designing the questionnaires for the study. Pilot study was carried out in three organizations. Cronbach's alpha reliability test for each of the factors ranged from 0.7 to 0.9. Five sets of questionnaires were designed, for the study to involve all the important stakeholders of quality, viz., quality heads of organizations, functional heads, employees, customers and suppliers. The study is based on survey methodology using structured questionnaire. The survey was conducted among twenty manufacturing units in Bangalore, which comprised of both public and private sectors.

Table 1.6

Operationalization of TQM Variables

Scales	Item Number
Leadership	12
Policy and Implementation	6
Employee Involvement	10
Customer Focus	15
Supplier Quality Management	8
Role of Quality Department	5
Training	8
Product Design	6
Process Control and Improvement	10
Quality Data and Reporting	6

1.11.1 Questionnaire Development

In the field of quality management, a number of researchers have used questionnaire surveys. These included, for example, Flynn et al. (1994), Saraph (1989), all of these researchers developed their questionnaires for data collection, based on their own research purposes, thus, their questionnaires differed from each other. After the questionnaires were examined, it was determined that none fully met the requirements of this research. Therefore, it was necessary to develop a new research questionnaire. However, the questionnaires developed by these researchers did give some insights into developing the questionnaire required for this research purpose. In fact, the design of the research questionnaire was highly dependent on the concepts of theoretical constructs and the operationalization of the theoretical constructs.

1.11.2. Reliability

Reliability refers to whether you get the same answer by using an instrument to measure something more than once (Bernard, 2000). Reliability concerns the extent to which an experiment, test, or any measuring procedure yields the same results in repeated trails (Carmines and Zeller, 1979); it is a statistical measure of how reproducible the survey instrument's data are (Litwin, 1995). There are four methods commonly used for assessing reliability, namely, (1) the test-retest method, (2) the alternate-form method, (3) the split-halves method, and (4) the internal consistency method (Nunnally, 1967).

Internal consistency reliability is a commonly used psychometric measure in assessing survey instruments and scales. Internal consistency is an indicator of how well the different items measure the same concept. This is important because a group of items that purports to measure one variable should indeed be clearly focused on that variable. Internal consistency is measured by calculating a statistic known as Crobach's coefficient alpha (Cronbach, 1951; Nunnally, 1967). Coefficient alpha measures internal consistency reliability among a group of items combined to form a single scale. It is a statistic, which reflects the homogeneity of the scale. Generally, reliability coefficients of 0.70 or more are considered good (Nunnally, 1967).

The internal consistency method does not require either the splitting or repeating of items. Instead, it requires only a single test administration and provides a unique estimation of reliability for the given test administration. It is the most general form of reliability estimation (Nunnally, 1967). Therefore, the internal consistency method was used in evaluating the reliability of the survey instruments in this research.

1.11.3. Validity

Validity is defined as the extent to which any instrument measures what it is intended to measure. The three most popular methods of evaluating the validity of a measurement instrument are content validity, criterion-related validity, and construct validity (Carmines and Zeller, 1979). In this study, only content validity was conducted in order to evaluate the measurement instruments.

1.11.4. Content Validity

Content Validity depends on the extent to which an empirical measurement reflects a specific domain of content. The evaluation of content validity typically involves an

organized review of the survey's contents to ensure that it includes everything it should, and does not include anything it should not. It provides a solid foundation on which to build a methodologically rigorous assessment of a survey instrument's validity. In this research, however, it was argued that the 10 scales for measuring TQM implementation constructs and the four scales for measuring overall business performance had content validity, since the development of these measurement items was based mainly on an extensive review of the literature reviewed by the author during the period of conducting this research. The questionnaire was also evaluated by practitioners, academicians and industry experts in terms of content.

1.11.5 Questionnaire for Quality Department

It is adapted to the study from the instrument developed by Saraph, Benson and Schroeder (1989) and Policy and implementation variable was adapted from Rajeev Gandhi National Quality Award Framework.

This questionnaire was designed to elicit complete information about an Organization's profile and TQM practices followed in the company. Interviews were conducted with the quality heads of the manufacturing units.

Quality heads of the organizations were interviewed and asked to evaluate the TQM practices in their organizations. Eighty six statements pertaining to ten critical variables were evaluated on a scale of 1 to 7 (very very low to very very high) items.

1.11.6 Questionnaire for Functional Heads

This questionnaire was designed to interview and record the perceptions of functional heads regarding the TQM practices followed in the company. Top management representatives and various functional heads of the organization assessed the TQM practices in their firms on a scale of 1 to 7(very very low to very very high). This questionnaire was similar to the questionnaire for quality heads excluding the organizational profile.

1.11.7 Questionnaire for Employees

Questionnaire was designed for the employees of the manufacturing organizations comprising middle level managers, supervisors and shop floor workers. Workers were asked to evaluate thirty statements based on the degree of organizational commitment

towards quality and their level of involvement in the TQM effort on a scale of 1 to 7(very very low to very high).

1.11.8 Questionnaire for Suppliers

Questionnaire was exclusively designed for the suppliers of the chosen manufacturing organizations. Suppliers evaluated the TQM practices in the organization and the degree of their involvement in the TQM effort.

1.11.9 Questionnaire for Customers

Questionnaire was exclusively designed for the customers of the manufacturing organizations. Customers evaluated the TQM practices in the organization and degree of customer satisfaction.

1.11.10 Sample Design

Purposive sampling method was adopted. Only the organizations, which were willing to participate in the study were considered. Sampling frame was the list of manufacturing units compiled by the Department of Industries and Commerce, Bangalore, Karnataka. Criteria for selecting the units were:

- Organizations which possessed ISO-9000 certification.
- Organizations which had a turnover of Rs. 100 crores and above.

There are totally 180 manufacturing units in Bangalore, which are above 100 crores turnover and which are ISO 9000 certified (Source: KCTU) of which twenty manufacturing units, ten each from public and private sector in around Bangalore city were selected for the study. Data was collected during July 2009- March 2010.

Table 1.7

List of Manufacturing Organizations Which Participated in the Study

Study Organizations		
Sl. No.	**Public**	**Private**
1.	BEML Ltd	ABB Ltd.
2.	ITI Ltd.	IFB Automotive Pvt. Ltd.
3.	Karnataka Soaps & Detergents Ltd.	TATA BP Solar India Ltd.

4.	HMT Machine Tools Ltd.	TVS Motor Company Ltd.
5.	Rail Wheel Factory.	Himatsingka Seide Ltd.
6.	Hindustan Aeronautics Ltd.	Toyota Kirloskar Motors Pvt Ltd.
7.	Karnataka Power Corporation Ltd.	Ace Designers Ltd.
8.	Bharat Heavy Electricals Ltd.	L&T Komatsu Ltd.
9.	Bharat Electronics Ltd.	Volvo India Pvt. Ltd.
10.	Karnataka Antibiotics & Pharmaceuticals Ltd.	Millipore India Pvt. Ltd.

Table 1.8

Component Wise Sampling and Data Collection Methods

Sample Respondents	Quality Heads	Top Managers	Employees	Suppliers	Customers
Sampling method	Purposive	Purposive	Purposive	Purposive	Purposive
Data collection method	In-depth interview	In-depth interview	Survey	Survey	Survey
Research instrument	Structured questionnaire	Structured questionnaire	Structured questionnaire	Structured questionnaire	Structured questionnaire
Instrument reliability	0.75	0.75	0.8	0.7	0.7
Number of respondents	20	40	200	40	40

1.11.11 Respondent Profile

- Quality heads/ managers of the organizations = 20 (10 from public sector and 10 from private sector)
- Functional heads/top management representatives = 40 (20 from public sector and 20 from private sector)
- Employees =200 (100 from public sector and 100 from private sector)
- Suppliers = 40 (20 from public sector and 20 from private sector)
- Customers= 40 (20 from public sector and 20 from private sector)

1.11.12 Data Collection

For conducting empirical research, there are two methods of data collection: qualitative and quantitative. These two methods have their strengths and weaknesses. The qualitative method permits researchers to study selected issues in depth and detail. Approaching fieldwork without being constrained by predetermined categories of analysis contributes to the depth, openness, and detail of qualitative inquiry. The quantitative method, on the other hand, requires the use of standardized instruments so that the varying perspectives and experiences of people can fit a limited number of predetermined response categories, to which numbers are assigned. The advantage of a quantitative method is that it is possible to measure the reactions of a great many people to a limited set of questions, thus facilitating comparison and statistical aggregation of the data. This gives a broad, generalizable set of findings presented succinctly and parsimoniously. By contrast, a qualitative method typically produces a wealth of detailed information about a much smaller number of people and cases. This increases understanding of the cases and situations studied but reduce generalization (Patton, 1990).

In order to avoid their respective disadvantages, one important way to strengthen a research design is to use both qualitative and quantitative methods.

1.11.13. Sources of Data

The study made use of both primary and secondary sources of data:

Primary data was collected from all the important stakeholders of quality, i.e., quality managers, managers, employees, customers and suppliers of study organizations by administering a pre-tested and structured questionnaire and using interview methods.

Secondary data was collected from different sources like books, research journals, company records and websites.

1.12 Scope of the Study

The study is confined to examine and evaluate the TQM practices of public and private sector manufacturing organizations in and around Bangalore city.

1.13 Data Analysis

Data collected from the different sources was processed and analyzed by employing appropriate statistical tools like averages, percentages, t-test, regression analysis, correlation analysis and factor analysis with the help of software packages MS Excel, SPSS- version 17.

1.14 Limitations of the Study

1. The study is largely based on opinions collected from top management; employees, customers and suppliers and these opinions may or may not convey the whole truth.
2. It covers manufacturing units located in a specified area and hence the findings may not be generalized for entire Karnataka or India.

1.15 Sample Profile

Age of the Organization:

In order to have an idea about the age of the organization, the sample organizations are classified and presented in the following table:

Table: 1.9

Age of the Organizations

Age in years	Public Sector	Private Sector	Percentage
0-10		1	5%
11-20		5	25%
21-30	2	3	25%
31-40	2		10%
41-50	1		5%
51-60	2	1	15%
61-70	2		10%
71-80			0%
81-90			0%
91-100	1		5%
Total:	**10**	**10**	100%

Age of the public sector and private sector organizations was determined by subtracting the year of establishment of the organization from the year 2009.From the above table, we can infer that 25 percent of the organizations represent 10-20 and 21-30 years of age. 15 percent of the organizations represent 50-60, 10 percent under 61-70 and 5 percent in 0-10 years and 90-100 years age group category.

Total Number of Employees

The information related to the number of employees working in the study sample is presented in the following table:

Table 1.10

Total Number of Employees in the Organizations

Total No. of Employees	Public Sector	Private Sector	Percentage
100-500		2	10%
501-1000	3	4	35%
1001-1500	1		5%
1501-2000	1	1	10%
2001-2500	1		5%
2501-3000			0%
3001-3500	1	1	10%
3501-4000			0%
4001-4500			0%
4501-5000		1	5%
5001 and above	3	1	20%
Total	**10**	**10**	**100%**

35 percent of the organizations represent 501 – 1000 employees' category. While 20 percent represent 5000 and above category.100-500, 1501-2000, 3001-3500 employees constitute 10 percent each. We can see that most of the organizations are in the 501 – 1000 employees' category.

Employees in Quality Department

The information related to the number of employees working in the Quality department is presented in the table -1.11:

Table 1.11

Employees in Quality Department

Total No. of Employees	Public Sector	Private Sector	Percentage
0-50	3	5	40%
51-100	4	2	30%
101-150		1	5%
151-200			0%
201-250			0%
251-300			0%
301-350	1		5%
351-400		1	5%
401-450			0%
451-500		1	5%
501 and above	2		10%
Total	**10**	**10**	**100%**

40 percent of the organizations have around 50 employees in the quality department followed by 30 percent in 51 – 100 categories. 10 percent represent 501 and above category. 101-150, 301-350, 351-400, 451-500 employees constitute 5 percent each.

Type of Goods Produced

The information related to the type of Goods produced by the study organizations is presented in the following table:

Table 1.12

Type of Goods Produced

Type of Goods Produced	Public Sector	Private Sector	Percentage
Industrial Goods	7	6	65 %
Both	3	4	35 %
Total	**10**	**10**	**100 %**

65 percent of the organizations are engaged in the production of Industrial Goods, while 35 percent are engaged in the production of both Industrial and Consumer Goods.

Type of Customers The information pertaining to the various categories of customers of the organizations is presented in the following table:

Table 1.13

Types of Customers

Type of Customers	Public Sector	Private Sector	Percentage
Domestic Customers	3	3	30%
Both (Domestic & International)	7	7	70%
Total	**10**	**10**	**100%**

70 percent of the organizations both in public and private are engaged in production of goods for both domestic and international clients while 30 percent in both public and private sectors are engaged exclusively in domestic production.

Annual Sales

The information related to the annual sales of the study organizations is presented in the following table:

Table 1.14

Annual Sales

Sales in Crores	No. of Public Sector Units	No. of Private Sector Units	Percentage
100-500	3	3	30%
501-1000	1	1	10%
1001-1500	1	2	15%
1501-2000	1		5%
2001-2500		1	5%
2501-3000			0%
3001-3500	1		5%
3501-4000		1	5%

4001-4500	2	1	15%
4501-5000			0%
5001 and above	1	1	10%
Total	**10**	**10**	**100%**

30 percent of the organizations represent 100 – 500 crores (annual sales) category. Organizations with annual sales of 1001-1500, 4001-4500 crores constitute 15 percent each. Organizations with annual sales of 501-1000, 5001 and above crores constitute 10 percent each. Organizations with Annual sales of 1501-2000, 2001-2500 crores constitute 5 percent each.

Years of Adoption of TQM

Information pertaining to adoption of TQM practices by manufacturing organizations is presented in the following table:

Table 1.15

Years of Adoption of TQM

No.of Years of Adoption of TQM	Public Sector Units	Private Sector Units	Percentage
0-5		3	15%
6-10	2	1	15%
11-15	5	5	50%
16-20	2		10%
21-25	1	1	10%
26-30			0%
31 and above			0%
Total	**10**	**10**	**100%**

50 percent of the organizations have adopted TQM in the last 11 to 15 years, while 0-5, 6-10 years of adoption of TQM practices constitute 15 percent each. 16-20 and 21-25 years of adoption of TQM practices constitute 10 percent each. Most of the organizations embraced TQM philosophy in the last 11-15 years.

Designation of Quality Head

The information related to the Designation of Quality Head is sought and presented in the following table:

Table 1.16

Designation of Quality Head

Designation	Public Sector	Private Sector	Percentage
Assistant General Manager	5	1	30%
Deputy General Manager	3	1	20%
General Manager		4	20%
Assistant Vice President		1	5%
Vice President		2	10%
Managing Director	1		5%
Management Representative / Head of the Division	1	1	10%
Total	**10**	**10**	**100%**

30 percent of the organizations have Assistant General Manager (AGM) designation for their quality head. Deputy General Manager (DGM) and General Manager designations comprised 20 percent each. Head Quality was the designation for 10 percent of the organizations and Assistant Vice President and Managing Director designation constituted 5 percent.

Age Group of Quality Heads

The information related to the Age Group of Quality Heads is sought and presented in the following table:

Table 1.17

Age Group of Quality Heads

Age in Years	Public Sector	Private Sector	Percentage
40-50	-	7	35%
51-60	10	3	65%
Total	**10**	**10**	**100%**

35% of the quality heads are in the age groups of 40 -50 years and 65% in the 50 – 60 age groups.

Qualification of Quality Heads

The information pertaining to qualification of quality heads is sought and presented in the following table:

Table 1.18

Qualification of Quality Heads

Qualification	Public Sector	Private Sector	Percentage
Bachelors in Engineering / Bachelors in Technology	7	7	70%
Masters in Engineering / Masters in Technology	3	3	30%
Total	**10**	**10**	**100%**

70 percent of the quality heads had B.Tech. / B.E. as their qualification, while 30 percent had M.Tech. / M.E. as their qualification.

Experience of Quality Heads

Information pertaining to years of experience of quality heads is presented in the following table:

Table 1.19

Experience of Quality Heads

Experience in Years	Public Sector	Private Sector	Percentage
10-20		4	20%
21-30	3	5	40%
31 and above	7	1	40%
Total	**10**	**10**	**100%**

20 percent of the quality heads had work experience of 10-20 years, while 40 percent had work experience of 21-30 years and above.

Membership in Various Bodies

Information pertaining to membership in various bodies of the manufacturing units is presented in table:

Table 1.20

Membership in Various Bodies

Membership	Public Sector	Private Sector	Percentage
Confederation of Indian Industries	5	10	75%
Quality Circle Forum India	3	3	30%
APICS	-	1	5%
MTMA	-	1	5%
CEA	1	-	5%

75 percent of the organizations had membership with CII, while 30 percent had their membership with QCFI.

Total Work Experience of Public Sector Employees in the Organization

Information relevant to the total work experience of public sector employees is presented and discussed in table:

Table 1.21

Total Work Experience of Public Sector Employees in the Organization

Experience in Years	Frequency	Percentage
Less than or equal to five	8	7.9
6 – 10	7	6.9
11 – 15	13	13.8
16 – 20	18	17.8
21 – 25	30	29.7
26 – 30	13	12.9
31+	11	10.9
Total	**100**	**100.0**

29.7 percent of the employees have a work experience ranging from 21-25 years.12.9 percent of the employees have a work experience of 26-30 years.10.9 percent of the employees represent 31+ years work experience category.17.8 percent constitute the 16-20 years of work experience. 7.9 percent constitute 11-15 years of work experience and less than five years work experience each. 6.9 percent constitute 6-10 years of work experience in the organization.

Total Work Experience of Public Sector Employees in the Current Post

Information relevant to the total work experience of public sector employees in the current post is presented and discussed in table:

Table 1.22

Total Work Experience of Public Sector Employees in the Current Post

Experience in Years	Frequency	Percentage
Less than or equal to five	63	62.4
6 – 10	15	14.9
11 – 15	7	6.9
16 – 20	8	8.9
21 – 25	5	5.0
26 – 30	1	1.0
31 and above	1	1.0
Total	**100**	**100.0**

In the public sector 62.4 percent of the employees have a work experience of less than five years in the current post, while 14.9 percent of the employees have a work experience of 6-10 years. 6.9 percent of the employees have a work experience of 11-15 years. 3 percent of the employees have work experience of 16-20 years. 5 percent of the employees represent 26-30 years work experience in the present post category. 26-30 years and 31 and above years constitute one percent each.

Total Work Experience of Private Sector Employees in the Organization

Information relevant to the total work experience of private sector employees in the organization is presented and discussed in table:

Table 1.23

Total Work Experience of Private Sector Employees in the Organization

Experience in Years	Frequency	Percentage
Less than or equal to five	50	49.5
6 – 10	20	19.8
11 – 15	11	11.9
16 – 20	7	6.9
21 – 25	6	5.9
26 – 30	5	5.0
31 and above	1	1.0
Total	**100**	**100.0**

In the private sector 49.5 percent of the employees have less than 5 years of work experience in the organizations, while 19.8 percent have an experience of 6-10 years. 11.9 percent have an experience of 11-15 years 6.9 percent represent the 16-20 years category. 5.9 percent represent 21-25 years category, 5 percent constitute the 26-30 years of experience category. 1 percent constitute 31 and above years category.

Total Work Experience of Private Sector Employees in the Current Post

Information relevant to the total work experience of private sector employees in the current post is presented and discussed in table:

Table 1.24

Total Work Experience of Private Sector Employees in the Current Post

Experience in Years	Frequency	Percentage
Less than or equal to five	74	73.3
6 – 10	17	16.8
11 – 15	5	5.9
16 – 20	2	2.0
21 – 25	2	2.0
Total	**100**	**100.0**

73.3 percent of the employees have less than five years of experience in the current post, while 16.8 percent of employees have 6-10 years of work experience. 5.9 percent

constitute the 11-15 years work experience category. 16-20 years and 21-25 years of experience constitute 2 percent each.

Total Work Experience of Public Sector Managers in the Organization

Information relevant to the total work experience of public sector managers in the organization is presented and discussed in table:

Table 1.25

Total Work Experience of Public Sector Managers in the Organization

Experience in Years	Frequency	Percentage
Less than or equal to five	1	5
6 – 10	1	5
16 – 20	1	5
21 – 25	3	15
26 – 30	12	60
31and above	2	10
Total	**20**	**100**

54.5 percent of the public sector managers have a work experience of 26-30 years, 13.6 percent of the managers have 21-25 years of work experience in the organization, while 16-20 years, 6-10 years and less than 5 years constitute 4.5 percent each, 9.1 percent of the managers have 31 and above years of experience.

Total Work Experience of Public Sector Managers in the Current Post

Information relevant to the total work experience of public sector managers in the current post is presented and discussed in table:

Table 1.26

Total Work Experience of Public Sector Managers in the Current Post

Experience in Years	Frequency	Percentage
Less than or equal to five	17	85
6 – 10	3	15
Total	**20**	**100**

77.3 percent of the public sector managers have a work experience of less than 5 years in the current post, while 13.6 percent have 6-10 years of experience.

Total Work Experience of Private Sector Managers in the Organization

Information relevant to the total work experience of public sector managers in the organization is presented and discussed in table:

Table 1.27

Total Work Experience of Private Sector Managers in the Organization

Experience in Years	Frequency	Percentage
Less than or equal to five	5	22.7
6 – 10	3	13.6
11 – 15	1	4.5
16 – 20	5	22.7
21 – 25	3	22.7
26 – 30	3	13.6
Total	**20**	**100.0**

In the private sector managers have less than 5 years, 16-20 years and 21-25 years of experience constitute 22.7 percent each, while 13.6 percent constitutes 26-30 years and 6-10 years each. 4.5 percent of the managers have 11-15 years of work experience.

Total Work Experience of Private Sector Managers in the Current Post

Information relevant to the total work experience of private sector managers in the current post is presented and discussed in table:

Table 1.28

Total Work Experience of Private Sector Managers in the Current Post

Experience in Years	Frequency	Percentage
Less than or equal to five	17	86.4
6 – 10	1	4.5
11 – 15	1	4.5
21 – 25	1	4.5
Total	**20**	**100.0**

86.4 percent of the managers have less than 5 years of experience in their current post, while 6-10 years, 11-15 years and 21-25 years constitute 4.5 percent each.

1.16 Organization of the Study

The study is organized into eight broad chapters as indicated below:

The first chapter deals with statement of the problem, review of literature, objectives of the study, hypotheses, and sources of data, sample description, methodology and scope and limitations of the study. Introduction to quality, significance of quality, introduction to TQM, importance of TQM and manufacturing sector and evolution of TQM activities in India are the various topics discussed in this chapter

The second chapter focuses on literature review, which is presented under the following broad headings: concept of TQM, TQM implementation, TQM and business performance, TQM and critical factors, TQM organization theory and TQM implementation across countries.

The third chapter discusses the conceptual framework of TQM, various models of TQM, Quality frameworks and tools and techniques of TQM.

The fourth chapter presents the comparison of quality consciousness, role of leadership and involvement of various stake holders of TQM in the study public and private organizations using t-tests.

The fifth chapter analyses the gap between quality policy and implementation in both public and private sectors.

The sixth chapter focuses on measuring managers' perceptions of critical factors affecting TQM through factor analysis. It also examines the nature and extent of relation among TQM parameters between public and private sectors through correlation analysis.

The seventh chapter summarises the observations of research under two headings, findings and recommendations.

1.17 Conclusion

This chapter has introduced the concepts of Quality, Total Quality Management, Quality in Manufacturing, and TQM in the Indian Manufacturing Sector. The chapter then progresses in to details of Indian Manufacturing Industry and Manufacturing sector in

Karnataka and the important reasons for considering for the current study. The study makes an attempt to evaluate the TQM practices in the manufacturing units in the State of Karnataka and compare the TQM practices in both Public and Private Sectors.

Detailed research methodology includes the development of instrument of data collection, sample design, critical dimensions taken up for the study, sources of data, respondent profile and tools used for data analysis.

The next chapter will review the reservoir of the information available in the form of empirical studies. The studies are reviewed, gaps and variables are identified, and various conceptual frame works and models are discussed.

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CHAPTER – II

REVIEW OF LITERATURE

The present chapter examines and reviews the studies conducted by various researchers in the field of Total Quality Management. This chapter captures the findings under various sub-headings. These areas are covered under various heads, viz., Studies on TQM Implementation, Critical Factors Affecting TQM, TQM and Business Performance, TQM and Organizational Theory and TQM Implementation/Practices Across Countries.

There is also a detailed description of the ten theoretical constructs used for the study and various studies covered under these heads.

2.1 Studies on TQM Implementation

Goonatilake, L. (1988), described the following steps for implementing TQM: 1.Commitment of CEO 2.Educate remaining upper-level management 3.Creation of quality steering committee 4.Establish policies 5.Prepare a flow diagram of company processes 6.Customer and employee surveys 7.Continue basic quality education 8.Appoint quality improvement teams and assign tasks 9.Conduct pilot tests on recommended process procedures 10.Company wide 11.Begin supplier improvement.

Burstein and Sedlak (1988) identified the major challenges to TQM implementation: lack of comprehensive quality improvement education, uneven top management support, lack of customer orientation, lack of clarity in measurement systems, scarce resources for required investment.

Sink D.S (1991), specified the following approach to design, development and implementation of TQM: 1.Understanding the organizational system 2.Developing a strategic plan for TQM effort 3.Planning assumptions 4.Specifying strategic objectives 5.Specifying tactical objectives 6.Implementation planning 7.Project management 8.Measurement and evaluation 9.Evaluation, accountabilities, follow through ensuring effective implementation.

Endosomwan and Moore (1991), proposed a four stage model to help organizations understand their TQM posture towards the Malcolm Baldridge National Quality Award criteria and quality improvement process as:

1. current organizational environment assessment
2. development of quality improvement strategy
3. assessment of education and training needs
4. implementation of quality strategy

He further states that implementation of TQM is not an easy task as it requires a total change in organizational culture, shifting of responsibility to management and continuous participation of all in quality improvement process.

B. Sarkar (1991) gave a detailed description of the status of Indian industries with respect to Deming's fourteen points necessary for the implementation of TQM. While discussing the fourteen points individually, the existing status industries in India and the scope for application of these fourteen points were discussed.

Oakland J.S (1992), suggested thirteen steps to TQM implementation: 1.Understanding of quality 2.Commitment to quality 3.Policy on quality 4.Organization for quality 5.Measurement of cost of quality 6.Planning for quality 7.Design for quality 8.System for quality 9.Control of quality 10.Team work for quality 11.Capability for quality 12.Training for quality 13.Implementation of TQM.

Longenecker and Scazzero (1993) indicated that achieving high product quality and pursuing successful TQM implementation are highly dependent on top management support.

Many firms have arrived at the conclusion that effective TQM implementation can improve their competitive abilities and provide strategic advantages in the marketplace (Anderson et al., 1994).

In a significant research work, Powell (1995) provided insights on the "soft issues" of TQM. The work explored TQM as a potential source of sustainable competitive advantage and found that the most generally acceptable features associated with TQM such as quality training, process improvement, and benchmarking, etc., may not be that useful for effective TQM implementation, but that certain tacit, behavioral, imperfectly

imitable features, like open culture, employee empowerment, and executive commitment are vital for an environment conducive to TQM. It was concluded that these tacit resources, and not more TQM tools and techniques are instrumental for success and that organizations that acquire them can win over their competitors with or without the TQM label.

Vishnu D Wakchaure et al. studied the relationship among the three letters paradigm and describes a synergistic relationship among JIT, TPM, TQM and SCM. 45 Indian Manufacturing industries were surveyed and the results underlined the need of joint implementation for revitalizing manufacturing. The study concluded that organizations, which have implemented jointly outperformed the organizations that have implemented one or none.

A study conducted by Stephen Warwood and Jiju Anthony (2003), in UK concluded that certain key factors contribute to the successful implementation of TQM and these have different levels of importance. These key factors, in order of importance, are effective leadership, impact of other quality related programmes, measurement systems, organization culture, education and training, use of teams, etc.

B. Mahadevappa and G. Kotreshwar (2004) studied the quality management practices in sixteen ISO 9000 certified companies in India. The study evaluated the degree of implementation of eight critical factors of quality management, and their impact on quality performance. It was found that ISO 9000 certification has helped the companies in improving their product quality only marginally. The study concluded that quality management systems are to be integrated with TQM for continuous improvement of quality.

Dinesh Seth and Deepak Tripathi (2005) examined the relationship between factors influencing the implementation of TQM and TPM and business performance by studying the following three approaches in Indian contexts: (a) TQM alone; (b) TPM alone; (c) Both TQM and TPM together.

Deepak Tripathi (2005), in his study highlighted the long term effects of TQM on companies' performance in Indian context. The study also points out various country specific factors, which led to marginal improvement during the transition phase. The

study reiterates the fact that TQM with TPM support can be an effective strategy to improve competitiveness of Indian manufacturing companies.

Subhash Kakkar and A.S. Narang (2007), in their study prescribed a TQM model for Indian organizations, in order to maximize the impact of TQM with pre-defined concentrated efforts. The paper identified the four pillars, i.e., efficiency, customer, people and team building, which yielded positive results for Indian organizations.

Usha Devi (2007), in her study made an effort to analyze TQM practices and measure its impact on quality performance in the respondent companies. The study has identified several areas for improvement, of which, the most critical are employee training, employee engagement, policies and strategies, process management and customer focus.

2.2 Critical Factors Affecting TQM

Saraph et al. (1989) heralded the systematic attempt to organize and coalesce the various TQM prescriptions, by identifying eight critical factors of quality management; the role of management leadership and quality policy, role of the quality department, training, product/service design, supplier quality management, process management, quality data reporting, and employee relations. Operational measures of these factors were developed, and were found to be reliable and valid. By using such measures, decision-makers can assess the level of quality management in their organization in order to devise strategies for further improvements.

Starting from a strategic perspective, the work by Flynn et al.(1994) identified seven key dimensions of quality management that include top management support, quality information, process management, product design, work face management, supplier and customer involvement. These dimensions were then tested for reliability and validity, and by doing so, the work offered a clear framework for subsequent research and to help practitioners to keep it as a standard for the evaluation of the effectiveness of their quality management programmers. Flynn argued that the corner stone for theory building is enunciation of the distinction between quality management practices (inputs) and quality performance (outputs), which until then has been blurred under the broad heading of quality. Based on these factors, a frame work to delve the effects of integrated QM strategies on a firm's product quality was suggested.

Mann and Kehoe (1994) divided TQM into ten elements. They are supplier improvement, process control and improvement, internal customer focus, measurement and reporting, leadership, quality system, participation, recognition, education and training and external customer focus.

Waldman (1994) identified eight key TQM elements as: top management commitment to place quality as a top priority, a broad definition of quality as meeting customers' expectations, TQM values and vision, the development of a quality culture, involvement and empowerment of all organizational members in cooperative efforts to achieve quality improvements, an orientation toward managing-by-fact, the commitment to continuously improve employee's capabilities and work processes through training and benchmarking, attempts to get external suppliers and customers involved in TQM efforts.

Ho and Fung (1994) identified ten TQM elements: Leadership, commitment, total customer satisfaction, continuous improvement, total involvement, training and education, ownership, reward and recognition, error prevention and cooperation and teamwork.

Black and Porter (1995) also developed a model for TQM, which provide visual information on ten various factors of TQM, relationship between those factors, strength of those relationships, and the relative importance (or criticality) of those factors.

In Powell's 1995 study, the following elements were identified as TQM framework: executive commitment, adopting the philosophy, closer to customers, closer to suppliers, benchmarking, training, open organization, employee empowerment, zero-defects mentality, flexible manufacturing, process improvement and measurement.

Another contribution to the subject of instrument development to measure the levels of TQM implementation was made by Black and Porter (1996). Their work presented a research methodology that could be used to improve self-assessment frameworks and make organizations more effective in the development of total quality systems. The research work focused on the important elements of the Baldrige Award model and other established literature, and identified ten critical components of TQM, viz., corporate quality culture, strategic quality management, operational quality planning, external interface management, supplier partnerships, team work structures, customer satisfaction orientation, and communication of improvement of information. These factors

were found to be reliable and valid and provided key contributions for the better understanding of TQM.

Through a detailed analysis of literature, Ahire et al. (1996a) identified constructs of integrated QM strategies, namely, top management commitment, customer focus, supplier quality management, design quality management, bench marking, statistical process control, internal quality information usage, and supplier performance. The constructs spanned over the entire ambit of activities deemed to be critical by the Malcolm Baldrige Quality Award.

Choi and Eboch (1998) studied the TQM paradox using management of process quality, human resources management, strategic quality planning and information and analysis as the constructs of TQM implementation.

Through a survey based research R.P. Mohanty and R.R. Lakhe (1998), made an attempt to identify the critical factors for TQM implementation in Indian industry. A factor model was evolved to provide a directed approach to top management to implement the TQM programme.

Joseph et al. (1999) identified ten factors of TQM. These include organizational commitment, human resource management, supplier integration, quality policy product design role of quality development, quality information systems, technology utilization, operating procedures and training. A measurement instrument was also developed, which can be used to evaluate the extent TQM practice in an organization.

In an exploratory study of Indian organizations Ayoob A.Wali et al., (2003), made an attempt to identify critical success factors that should be given special attention for ensuring successful implementation of TQM programme.

2.3 TQM and Business Performance

Brain Maskell (1989), described the following common characteristics used by world-class manufacturing firms to measure their business results: 1.Performance measures are directly related to the manufacturing strategy 2.Primarily non-financial measures are used 3.The measures change over time as needs change 4.The measures are simple and easy to use 5.The measures provide rapid feedback to operators and managers and 6.the measures are meant to foster improvement instead of only monitoring.

A study by Adam (1994) examined the relationship between alternate quality improvement approaches and actual operating and financial performance. The results indicated that a profile emanates for each organization that identifies the improvement strategies that are required to achieve the objectives whether they are to improve quality operating or financial performance.

Ahire and Golhar and Waller (1996) stated that quality improvement can be used as a mediator between total quality management and performance.

Samson and Terziovski (1999) attempted to find the relationship between the various TQM practices, individually and collectively and firms performance. The results showed that the intensity of TQM practice does contribute significantly to the performance. In another research work Samson and Terziovski (1999) tested the relationship between TQM practice and organizational performance with and without the covariates, company size, industry type, and ISO 900 certification statue. The authors concluded that there were significant difference in the relationship between TQM and organizational performance across industry type and size, especially on the effect of defect rates, warranty costs and innovation of new products.

In a recent work, Agus et al. (2000), investigated the simultaneous linkages between TQM customer satisfaction and financial performance. The results have indicated that proper implementation of TQM can positively influence customer satisfaction ultimately leading to enhanced financial performance.

A significant contribution to the TQM Literature was made by Hale Kaynak (2003), by validating the direct and indirect relations among TQM practices and their effects on firms operating, financial and market performance.

Abdullah et al. (2007) studied the relationship between TQM, quality improvement, and performance measurement. Abdullah et al. (2008, 2009) identified six critical success factors that influenced performance improvement.

2.4 TQM and Organizational Theory

Dinesh Kumar (1988), reported that the top management has an obligation to lead and evolve effective plans for the following activities, which ultimately helps Organizations to make significant progress in their journey to become world class manufacturers: 1.Goal setting 2.Integration of strategic quality plans with overall business

plans 3.Defining roles and responsibilities at each level 4.Human resource development 5.Motivation and empowerment of employees 6.Meeting customers and suppliers requirements 7.Identifying key requirements such as new technology, employee education and training 8.Reviewing the status of quality plans and providing timely assistance to units not performing according to plans.

In a major contribution to the subject of organizational theory, Benson et al. (1991) propounded a system-structural model of quality management that relates organizational quality context, actual quality management, ideal quality management and quality performance.

Lakhe and Tidke (1991), in their study revealed that the concepts of quality management and its contribution to the growth of industrial economy is not clearly understood and recognised by the industries. Furthermore, most of the companies did not possess well-defined quality policies. The companies which had policies had no systematic way of communicating it to the employees. The total absence of quality cost analysis and limited use of the statistical techniques were the key features of failure of these industries in quality area. A cross sectional field survey was conducted and multiple methods were utilised to provide a rich basis for interpreting and validity of the findings.

A frame work to be used by Indian organizations to evaluate the quality management practices was developed by Jaideep G. Motwani et al., (1992), a field survey was conducted to identify the degree to which quality management practices are present in Indian manufacturing organizations and to locate the organizational areas, where better management control can make the quality programmes more effective.

Oleker, L.R (1992) has identified 120 prescriptions for effective quality management, which were subsequently grouped into eight categories that are quite similar to the Baldrige Award criteria: 1.The role of management leadership and quality policy 2.The role of quality department 3.Training 4.Product/service design 5.Supplier quality management 6.Process management 7.Quality data and reporting and 8.Employee relations.

Anderson et al. (1994) articulated a theory of quality management, which offered new insights on the usefulness of adopting the Deming's writings, the proposed theory of Anderson et. al serves and fulfils several purposes from the purview of both academic

research and practice. In another empirical research, Anderson et al. (1995) continued the journey of theory building by analyzing the earlier proposed theory, which helped to focus attention on previously unidentified and unconceptualized relationships among the constructs ─ relationships deserving further theoretical and empirical scrutiny.

Revanna and Lakhe (1995), in their survey revealed that there is a need to create facilities for training and education for all levels of management and workers and to organise seminars and workshops to provide a platform for exchange of views and opinions.

Ahire and Rana (1995) proposed an objective and rational approach for pilot testing of TQM in one or more appropriate units of the organization. Thus this approach contributed to a vital decision tool to organizations interested in authenticating the adequacy of TQM philosophy for subsequent organization - wide adoption.

Ahire et al. (1996) ventured to provide a clear demarcation between TQM and non TQM firms. The authors stated that firms should be classified on a scrupulous evaluation of the extent to which they have embraced the TQM philosophy, and the practice of various elements of TQM philosophy to perfection. This will definitely help the organizations to ameliorate their quality performance. In another research work, Ahire (1996) report that age of quality management implementation does not always influence TQM implementation and its consequence, but argued that successful firms get the feel of their success with TQM in terms of greater operational results within the first two to three years of its implementation. It was also concluded that firms that govern their TQM efforts more appropriately, will benefit more, as TQM matures in these firms.

Ahire and Golhar (1996) examined the relationships between firm size and TQM implementation, The findings suggested that small firms though restrained by such inadequacies as want of managerial expertise, clout in the market, insufficient resources etc,. can make up with their relative strengths in flexibility and innovation, there by implementing TQM journey, there should be some means to determine the magnitude to which it makes an initial impact on the overall performance of the organization.

In an exploratory study done by Jiadeep Motwani (1997) regression models were used to explore the relationships between the nine typical factors that measure effective quality management and the level of quality.

Rossi Evelyn. W (1997) investigated the organizational phenomena involved with the implementation of quality as a philosophy through effective training in award winning total quality management programmes. In-depth interviewing and surveys were the main data collection techniques used. Results of this study suggested that to effectively implement total quality training efforts, the professionals responsible for such initiatives should be concerned with the following: securing top management support, reinforcing the skills learned / developed from the training in the performance appraisal process and including the key supervisory levels in all quality training endeavours.

An interesting contribution to the subject of control within the context of TQM was provided by Godfrey et al. (1997) they stated that whether TQM aggrandizes management control or not is dependent on the organizational context and the way in which quality improvement efforts are implemented. TQM seems to modify the form of management control, but whether this is generated or not is a subject of debate and a matter of further empirical research.

R. Jagadeesh (1999) presented an overview of TQM's progress in India starting from initiation towards current status. He also describes how organizational attempts were made by various agencies to establish TQM culture in India.

Joseph et al. (1999) studied that, relationship between organizational factors (quality of work life, organizational climate and communication) and TQM in manufacturing organizations in India. The study concluded that the manager's perception of the organizational factors, are highly influenced by the levels of TQM in their respective business units.

A survey carried out by U.H. Acharya and Sanjit Ray (2000), in 1200 ISO 9000 Certified organizations revealed that ISO 9000 implementation has benefited in better understanding of process, activities being performed and better understanding of responsibilities/ authorities and linkages across the organization.

P. Mandal et al., (2000), investigated the propagation of quality management practices among Indian manufacturing companies over a period of sixteen years from 1918 to 1996. The spread of quality initiatives in various functional areas were analyzed and discussed. The findings indicated that there is an upward trend in the implementation

of quality management practices in all the functional areas such as, Manufacturing, HRM, Marketing, Finance and Administration.

Isaiah O. Ugboro and Kofi Obeng (2000), surveyed organizations that have adopted TQM to determine the relationship between top management leadership, employees' empowerment, job satisfaction and customers' satisfaction. The results revealed a positive correlation between top management leadership, employees empowerment, job satisfaction and customer's satisfaction.

R.K. Mishra, (2006), made a comprehensive research based attempt to look at the performance of public enterprises in the era of economic liberalization. The paper provides the back drop of public enterprise policy and compares it with their working. The paper provides inputs to policy makers, researchers and executives to develop an understanding of the functioning of public enterprises in India in the era of economic liberalization in the over all global setting.

A study conducted by L. Lakshmanan et al., (2007), analyzed the competitiveness of Indian manufacturing sectors and the study suggested that for Indian manufacturing goods to be competitive up gradation of export quality, enhanced R&D, encouraging business environment, improvement in productivity, increased technology, etc., are required.

A study done by Manpreet Kaur and Ravikiran analyzed the trends in output and inputs, as well as, partial productivity and total fact of productivity for all Indian manufacturing, i.e., at aggregative level, as well as, at disaggregative level for twenty two industrial groups. The study depicted a slower growth of Indian manufacturing sector in post reform era, at both, aggregative, as well as, disaggregative level.

2.5 TQM Implementation / Practices Across Countries

Lascelles and Dale (1990) carried out a study on the quality improvement process in a cross section of U.K. manufacturing industry. The study identified potential barriers to the quality improvement process- 1.Fear of change. 2 Lack of necessary skills to facilitate improvement and 3.Lack of information to support the improvement process. The study also revealed the factors for successful quality improvement: 1.Clearly defined and articulated quality improvement policies and objectives 2.Considering quality

improvement as part of a general companywide improvement strategy and not as a standalone programme 3.Effective leadership from the chief executive.

Subba Rao et al. (1997) compared the quality management practices in three different countries India, China and Mexico. The results pointed out that there were significant differences with respect to quality practices amongst these three countries. Top management support turned out to be a very significant factor affecting all quality practices, while information and analysis, as well as, quality assurance practices were affected by length of quality experience in the organization.

Ove Hartz (1998) in his study emphasized that company wide approach combined with the process concept is essential for developing TQM in Industrial Companies. The study was carried out at the Department of Industrial Management, Technical University of Denmark.

Hongming Hua et al. (1998), their study investigated the current quality management practices in shanghai manufacturing industries, relationship between TQM and business results, between ISO-9000 and TQM and between employee involvement and TQM results. The results of their study revealed that the state of quality management in Shanghai manufacturing industries is both positive and negative.

Ying-Jung Yeh (2000), investigated the effects of job and organizational factors on employees practices of Total Quality Management. A study model was developed to show the hypothetical relationships among job and organizational determinants and employees TQM practices in Wisconsin. The impact of employees' involvement mediated the influence of standardization, job enrichment and centralization on customer focus and satisfaction.

Teddy Kok Fei Lian (2001), developed a frame work to help Malaysian Public Organizations understand better the variables contributing to TQM Implementation and impact. The frame work content had four sets of independent variables, namely: Employee characteristics, Leadership characteristics, Organizational variables and Environmental variables. The dependent variables were TQM implementation and impact.

Kee-hung Lai and T.C.E. Cheng (2003), explored the quality initiatives of various industries and examined the links between quality management implementation and

quality outcomes in Hongkong. The results found that significant contrast exists between public utilities / service industries and manufacturing / construction industries, with the former group having a higher level of quality management implementation and achieving better quality outcomes.

Jacob K.Eskildsen et al., (2004), analyzed the differences between private and public sector organizations in Denmark in relation to the penetration of holistic management models and the empirical weight structure of the European Foundation for Quality Management (EFQM) excellence model. The result shows that the penetration of holistic management models is greater among public organizations. Furthermore, private and public organizations do not achieve excellent results in the same way. Private companies put higher emphasis on the systems dimensions, whereas public organization put higher emphasis on the people dimension. Private companies put higher emphasis on the criteria leadership and policy and strategy than public organizations.

Bishnu Sharma (2006) assessed the status of quality management dimensions in Queensland businesses, the results suggested that, implementation of quality management practices in Queensland businesses has begun, but not much progress has been made and the results also suggested that large firms tend to put more emphasis on benchmarking aspect of quality than small and medium firms and measurement and process improvement are found to be more important for manufacturing firms than the firms engaged in construction.

Thawatchai Jitpaiboon and S. Subbarao (2007), adopted a meta-analysis approach to study issues concerning reliability of TQM measures and find consensus on the relationship between TQM practices and organizational performance across studies. The mean values of alpha are significantly different across studies based on years and nations. Top management support shows the highest mean effect size of the relationship between TQM practices and organizational performance as compared to other relations.

Karen J. Frye et al., (2007), tried to identify the critical successful factors for continuous improvement projects in the public sector through literature review.

Williams and Sussman (2009), the ability to produce and deliver quality products and services in hyperactive competitive, global markets is no longer a high order goal achieved by few industry examples, rather a price of admission to compete. Furthermore,

for an organization to achieve excellence, it must seek and implement effective tools and techniques to transform quality from a concept, to an organization-shared value embedded in the fabric of every part of the organization.

Anupam Dass et al., (2008), developed measurement instrument in the context of manufacturing industries in Thailand for evaluating the TQM implementation process and to target improvement areas. The instrument developed provided a practical understanding of TQM implementation in Thailand manufacturing companies.

2.6 TQM in the Manufacturing Sector

The subject of quality management in the manufacturing industry has been a matter of great interest and concern for business and academia alike. Several works(e.g., Saraph et al., 1989; Flynn et al., 1994; Ahire et al.,1996a; Black and Porter, 1996; Joseph et al., 1999; Zhang, 2000) have thoroughly investigated the various dimensions, techniques, and organizational requirements for effective implementation of TQM. These dimensions include top management commitment and leadership, quality policy, training, product/service design, supplier quality management, process management, quality data and reporting, employee relation, work force management, customer focus, customer involvement, bench marking, statistical process control, employee empowerment, employee involvement, corporate quality culture and strategic quality management.

Table 2.1

SURVEY OF TQM PRACTICES IN MANUFACTURING INDUSTRIES AS REPORTED BY DIFFERENT RESEARCHERS

References → / TQM practices ↓	Ahire et al. [6]	Dow et al. [18]	Salaheldin [19]	Dahlgaard et al. [20]	Joseph et al. [21]	Terziovski and Samson [8]	Sohal and Terziovski [22]	Wilson and Collier [23]	Sila and Ebrahimpour [24]	Demirbag et al. [25]	Yusof and Aspinwall [26]	Mady [27]	Armugam and Ooi [28]	Zhang et al. [29]	Lakhal et al. [30]	Total
Top management commitment (TMC)	X	X	X	X	X		X	X	X	X	X		X	X	X	13
Customer focus and satisfaction (CFS)	X	X	X	X		X	X	X	X			X	X	X	X	12
Supplier management (SM)	X	X	X		X		X		X	X	X		X	X		10
Training and education (TE)	X	X	X	X	X		X			X	X			X	X	10
Human resource management (HRM)			X	X	X	X	X	X	X		X	X				9
Process management (PM)			X	X				X	X	X		X	X	X		8
Quality systems (QS)					X		X			X	X		X	X	X	7
Employ Involvement (EI)	X		X	X			X						X	X	X	7
Quality information and performance measurement (QIPM)	X				X		X			X	X			X		6

This framework has adopted the following dimensions of quality, they are: 1:Leadership 2:Policy and Implementation 3:Employee Involvement 4:Customer Focus 5: Involvement with Suppliers 6:Role of Quality Department 7:Training 8:Process Design 9:Product Design 10:Quality Data and Reporting.

Table 2.2

Framework Comparison

Saraph et al. Framework	1:Role of divisional top management and quality policy; 2:Role of quality department; 3:Training; 4:Product /service design; 5:Supplier quality management; 6:Process management/operating; 7:Quality data and reporting; 8:Employee relations
Flynn et al. Framework	1:Quality leadership; 2:Quality improvement rewards; 3:Process control; 4:Feedback; 5:Cleanliness and organization; 6:New Product quality; 7:Interfunctional design process; 8:Selection for Teamwork potential; 9:Teamwork; 10:Supplier relationship; 11:Customer involvement
Ahire et al. Framework	1:Top management commitment; 2:Customer focus; 3:Supplier quality management; 4:Design quality management; 5:Benchmarking; 6:SPC usage; 7:Internal quality information usage; 8:Employee empowerment; 9:Employee involvement; 10:Employee training; 11:Product quality; 12:Supplier performance
Zhang Framework	1:Leadership; 2:Supplier quality management; 3:Vision and plan statement; 4:Evaluation; 5:Process control and improvement; 6:Product design; 7:Quality system improvement; 8:Employee participation; 9:Recognition and reward; 10:Education and training 11:Customer focus
Joseph Framework	1.Organizational commitment 2.Human resource management 3:Supplier integration 4:Quality policy 5:Product design 6:Role of quality department 7:Quality information systems 8:Technology utilization 9:Operating procedures 10:Training
This Frame work	1:Leadership 2:Policy and implementation 3:Employee involvement 4:Customer focus 5: Involvement with suppliers 6:Role of quality department 7:Training 8:Process design 9:Product design 10:Quality data and reporting

The conceptual definitions of the constructs and the practices that support their implementation are presented in the following subsection:

(1) Leadership (X_1

(2) Policy and implementation (X_2)

(3) Employee involvement (X_3

(4) Customer focus (X_4)

(5) Involvement with suppliers (X_5)

(6) Role of quality department (X_6)

(7) Training (X_7)

(8) Product Design (X_8)

(9) Process management/ operating procedures (X_9

(10) Quality data and reporting (X_{10})

Detailed explanations of the 10 theoretical constructs are presented in the following paragraphs:

2.6.1 Leadership

Top management commitment is a prerequisite for effective and successful TQM implementation. Visionary leadership pertains to the formulation of a long range vision for the development of the organization, propagating the vision throughout the organization, devising and developing a plan of action and finally stimulating the entire organization towards the accomplishment of the vision.

Leadership commitment plays significant role in articulating the vision, and mission statement, setting strategic intent and objectives, shared values, and establishing an effective support mechanism for creating and sustaining enabling environment for superior performance. Top management commitment to TQM manifests in strategic planning, customers' focus, quality-based cultural transformation, functional integration, efficient processes, employees' involvement and empowerment, knowledge management pursuits, stakeholders' participation, corporate ethical and social responsibility, good corporate governance and effective resource management (Kannan and Tan, 2005; Kozak et al., 2007; Salaheldin, 2009).

Impetus for any quality management effort (whether it is manufacturing or service organization) should come from the top. Top management commitment is the crème de la crème of effective and successful TQM implementation (Dale and Duncalf, 1984) Smithe (1995) explained that though quality gurus, management consultants and academia proclaim various theories on the different requirements of TQM all would agree that the numero uno necessity for successful business performance is commitment from the leader. Ahire et al. (1996a) enucleated that top management acts as a harbinger for TQM implementation, creating values, goals, and systems to satisfy customer expectations and thereby to ameliorate an organization's business performance. Top management must communicate the philosophy that quality will receive the top most priority over cost or schedule, as superior and consistent quality are vital for improvements in cost and delivery performance (Ferdows and Demeyer, 1990) Ham and Williams (1986) pronounced that top management should not only place quality above all other priorities, but its quality commitment must be demonstrated by allocating sufficient resources to the implementation of TQM efforts, with human and financial resources consuming the bulk of the investments. In addition to shouldering the responsibility for quality, top management must also provide active quality leadership. It is paramount to have a strong, visible leadership for quality in a single focused strategy that has quality at its central point (Flynn et al. 1995). Other empirical studies also have found that top management support for quality is extremely essential of effective QM (Dale and Duncalf 1984: Garvin 1984: Stalk et al. 1992:)

A predominant theme in TQM literature is that strong commitment from top management is vital. The foundation of an effective TQM effort is commitment. Lack of top management commitment is one of the reasons for the failure of TQM efforts (Brown et al. 1994). Garvin (1986) reports that high levels of quality performance have always been accompanied by an organizational commitment to that goal; high product quality does not exist without strong top management commitment. Many such empirical studies have also found that top management support for quality is a key factor in quality improvement. If top managers are committed to quality, they should not only actively be involved in quality management and improvement process, but also strongly encourage employee involvement in quality management and improvement process. In addition, they should learn quality-related concepts and skills, and arrange adequate resources for employee education and training. Various quality-related issues should also be often

discussed in top management meetings. Top management should pursue long-term business success and focus on product quality rather than yields.

2.6.2 Quality policy and Mission Statements

Research has shown that attitudes and philosophy alone are seldom enough to improve quality. A company's programme, policies and systems are the practical representations of its attitudes towards quality (Garvin 1983).

An organization must have quality policy and mission statements, because they determine and strongly influence how work is done and how people behave and are treated. Policies and mission statements are usually indicative of an organization's value system, its assumptions about people and human behaviour and its understanding of and beliefs about what makes organizations effective.

According to Flippo (1976), a policy is a man-made rule of a predetermined course of action that is established to guide the performance of the work toward the organization's objectives. It is a type of standing plan that is established to guide subordinates in the type of standing plan that is established to guide subordinates in the execution of their tasks. Policies are plans or course of actions adopted by business units to guide or channel thinking, and designed to influence and determine decisions, actions and other matters. It is a guiding principle considered to be expedient, prudent and advantageous. Quality policy, therefore, refers to principles and rules of conduct designed and formulated to govern the relationship with employees in the attainment of the organization's TQM objectives. Quality policy and mission statement,

- The key-stone and the life-blood for the successful functioning of quality improvement process.
- The statement of intentions of top management guiding a set course of action and indicating specifically what the organization proposes to do.
- A statement that suggests the values and viewpoints, which dominate the organization's actions and translates the goals of an organization into selected routes.
- A positive declaration and a command to an organization
- A means of encouraging initiative and autonomy.

Organization's need to create a sound quality policy:

- To build enthusiasm and loyalty of people.
- To serve as a standard for evaluating performance.
- To support the mission and principles of the organization.
- To break barriers between people and groups of people.
- To encourage improvement and create conditions that allows innovation.
- To support global optimization and long-term objectives.
- To promote teamwork and leadership.
- To foster decision-making at appropriate levels.
- To enable an organization to carry out the main objective of customer satisfaction.

While designing the quality policy and mission statement, it is essential to observe the following:

- The statement of policy should be definite, clear and easily understood by everyone in the organization.
- It should be well written and documented.
- It should be the result of careful analysis of all the available data.
- It should focus on quality, continuous improvement and customer satisfaction.
- It should not be rigid.
- It should provide a rallying point, uniting people so that they feel satisfied in working towards a common goal.
- It should be communicated properly to one and all in the organization.

The development of quality policy and mission statement is a complex, long and arduous task, calling for the help of experts. Top management has the responsibility for preparing it with the involvement of employees and consultation with unions, vendors, customers, etc. The policy should be evolved after studying existing documents, surveying industry and community practices, reviewing the prevailing condition in the company, interviewing other executives in the organization to collect appropriate information and obtaining their suggestions and cooperation. The policy plan should also

deal with future developments in customer needs, performance requirements, training and skill requirements, supervisory methods, etc. The policy statement, once prepared, should be critically analyzed by the top management; next stage is to circulate it widely to all concerned with the organization. Constructive criticism and suggestions from various channels provide input for further modifications and change. Developed in this manner, the policy statement will stand the test of time and will hold even under conditions of stress. It must, however, be remembered that it takes a substantial time to develop a guiding policy and mission statement. Also, periodic review and evaluation is essential to keep it vibrant. In brief, the steps necessary in designing a policy and mission statement are:

- Initiating a policy by top management.
- Collecting and analyzing facts and information from all sources.
- Preparing a written draft of the policy.
- Expanding and discussing the proposed policy with persons concerned with the organizations.
- Adopting and launching it.
- Communicating it to all levels.
- Follow up and evaluation.
- Reformation.

The quality policy and mission statement, once framed, should be written, published and communicated to all concerned. The written policy makes it apparent to everyone that the management means business and does what is says. It also helps to ensure that the set path is followed even if some changes take place in the organization. A quality policy and mission statement provides guidance and an overall picture of corporate policy. It, therefore, needs to be communicated to everyone concerned with the organization.

2.6.3 Employee Involvement

Oliver (1988) demonstrated that contextual factors like clarity of performance targets, revocability of one's actions, consequent publicity and violation of actions influence employee commitment to participation Smith (1995) critically examined the

essentiality of employee involvement. He enounced that unless the quality leader is a one-man army, he has to depend on others. The leader may set the vision and the example, but someone else still has to do it on his behalf. No management disciplines or improvement techniques, still less neoteric technology, can supplant the reality of the person doing the work as only people make quality, the leader just enables them to do it. Organizations must evolve formal systems to encourage motivate, track, and reward employee involvement (Chevalier 1991). Participation of employees is highly imperative for quality management as TQM requires all employees to accept responsibility for the quality assurance of their own work.

2.6.4 Customer Focus

Organizations must be knowledgeable in customer requirements and responsive to customer demands, and measure customer satisfaction through TQM implementation. Satisfaction of customers is at the core of TQM (Zakuan et al., 2010); Customer focus is evident in a proactive approach of identifying customers' psychological, emotional, and business needs, and their fulfillment. Open communication, and involvement of customers in decision-making enhances mutual bonds. Efficient product innovation, delivery and service processes, empowerment of contact personnel, and customer relationship management drive customer satisfaction. An efficient mechanism based on integrated response by everyone in the organization is vital to anticipate and fulfill customers' changing needs. Constant monitoring of customers' needs is vital to initiate a responsive strategy to achieve competitiveness. Customer focus is a continuous process and calls for an institutionalized approach to achieve strategic gains (Brah and Lim, 2006; Ou et al., 2007; Zadry, 2005).

Customer focus should be an important sub-system of any organizational systems supporting TQM, because organizations can outscore by effectively addressing the customers' needs and demands. In manufacturing, this can be achieved by the use of technology, which will produce products that consists of such attributes of quality as conformance to requirements, conformance to specifications, reliability, durability, absence of variation fitness for use, etc. Organizations can win over their rivals only if they are able to meet their customers' demands with new ideas and technologies, produce products that placate or surpass customer expectations, and anticipate and react to customers' future needs and wants (Stalk et al. 1992). As customer expectations are

intensely volatile in nature, an organization needs to appraise them regularly and regulate its operations accordingly (Takeuchi and Quelch 1983). The customer's perception of the quality of products of services forms the basis for the satisfaction of customers with the services / products, which in turn is the key for any theory of quality management (Anderson et al. 1994) Deming's 14-point approach to QM is built on the motif of customer satisfaction, though it is implicit in it, yet it is reckoned mandatory in his theory (Deming, 1986) Smith (1995) proclaimed that attracting customers today is really very tough: losing them is disastrous.

Establishment and maintenance of candid relationships with customers help to evaluate the needs and desires of customers, thereby providing an input to the design process. Embodiment of communication links between the organization and customers helps to foster strong customer relationships. Key to it are practices that include periodic conclaves with customers, and the encouragement of customer feedback on product and service quality (Schonberger,1985) only, if the customers are closely involved in the betterment process right from the design and development stages, there will be less likelihood of quality problems, once the production begins (Flynn et al. 1994). For example, Garvin (1984) observed that the organizations boasting of superlative quality had permanent customer review boards, that were formed to test and assess products from the customer perspective. A key aspect in quality improvement is customer involvement in the product design stage itself, as it will lead to design of new products with features likely to meet customer expectations better, thereby satisfying them (Tillery 1985).

To sum up organizations' should not surmise or go with their premonitions about the customer wants and expectations, but should try to harmonize customer expectations and the management perceptions of it by asking customers directly (about their quality perceptions, satisfaction, values) through surveys, focus groups and so on, and effectively use such quality data to improve service quality and customer service.

2.6.5 Supplier Quality Management

In TQM environment, suppliers are treated as essential partners. This collaboration fosters sharing of customer-related information that results in improved services and processes. Organizations pursue proactive strategy for long-term relationship with suppliers to achieve cost competitiveness, sharing knowledge about customers, and transforming this knowledge into tangible dimensions to achieve

excellences in services, and processes (Arawati, 2005; Demirbag et al., 2006; Kaynak, 2003; Macinati, 2008). Zakuan et al. (2010), effective supplier quality management can be achieved by cooperation and long-term relationship with the suppliers and also they found that developing supplier partnership and long-term relationships can increase the organization competitiveness and thus, improve performance.

Supplier quality management is an important aspect of TQM, since materials and purchased parts are often a major source of quality problems. The Malcolm Baldrige Quality Award (1997) also recognizes the importance of supplier quality. Garvin (1983) finds that organizations that manufacture the highest quality products have purchasing departments that rank quality rather than cost minimization as their major objective. Conversely, in organizations with the lowest quality performance, he finds that the primary objective of the purchasing department is to obtain the lowest price for technically acceptable components. Poor quality of supplier products results in extra costs for the purchaser; e.g., for one appliance manufacturer, 75 percent of all warranty claims were traced to purchased components for the appliances (Juran and Gryna, 1993). If organizations pursue good supplier quality management, they should establish long-term co-operative relations with their suppliers, often participate in supplier quality activities, have detailed information concerning supplier performance, give feedback on the performance of suppliers' products, regularly conduct supplier quality audits, and regard product quality as the most important factor for selecting suppliers.

2.6.6 Role of the Quality Department

Research has shown that for an organization to be efficient, the quality department should be visible, autonomous and have direct access to top management [Juran, Leonard].

2.6.7 Education and Training

Education and Training spread the knowledge of continuous improvement and innovation in service process to attain full benefits and business excellence. Talib and Rahman (2010) reported the critical role of training and education in maintaining high quality level within the service industry. Further, the research on TQM also found a positive correlation between training and education, and organization performance.

Deming (1986) stresses the importance of education and training for continual updating and improvement. Many research results reveal that education and training are

one of the most important elements in a successful implementation of TQM (Mann, 1992). Investment in education and training is vitally important for TQM success. Employees should be regarded as valuable, long-term resources worthy of receiving education and training throughout their career. All management personnel, supervisors, and employees should accept quality education and training such as quality awareness education and quality management method's education.

2.6.8 Product Design

Product and service design examines an organization's quality and service delivery performance in terms of timeliness, errors, costs of quality, responsiveness, and customer satisfaction (Brah et al., 2000). These indicators are used for measuring the product and service design quality. Bhatt and Emdad (2010) empirically investigated the relationships between information technology (IT) infrastructure, product and service innovation, and business advantages and found that product and service innovation is positively related with business advantages beside the two factors like IT infrastructure and customer responsiveness.

Product design is an important dimension of quality management. For complex products, errors during product development cause about 50 percent of fitness-for-use problems (Juran and Gryna, 1993). Sound product design meets or exceeds the requirements and expectations of customers better than the competitors, leading to an increased market share. For improving product design, design engineers are required to have some shop floor and marketing experiences. Customer requirements and production cost should be thoroughly considered during the process of product design. Different departments in an organization should participate in new product development. Before production, new product design should be thoroughly reviewed in order to avoid problems happening during production. Experimental design (Zhang, 1998b) and quality function deployment (Daetz et al., 1995) are two important and effective methods in product design.

2.6.9 Process Control and Improvement

Sit et al., (2009) Process management is a systematic approach in which all the resources of an organization are used in most efficient and effective manner to achieve desired performance. A key part of any total quality strategy is the management of

processes (Porter and Parker, 1993). Process refers to some unique combinations of machines, tools, methods, materials, and people engaged in production (Juran and Gryna, 1993). Process management focuses on managing the manufacturing process so that it operates as expected, without breakdowns, missing materials, fixtures, tools, etc., and despite workforce variability. One important matter in process management is to ensure that process capability can meet production requirements. One aspect of process management is equipment maintenance, which ensures that variation is kept within acceptable bounds, keeping the manufacturing process running smoothly. Good process management should involve precisely documenting various process procedures, with instructions for equipment operation in order to minimize the likelihood of operator errors. Some methods, such as PDCA cycle, seven QC tools, statistical process control (SPC), sampling and inspection are effective for process control and process improvement.

2.6.10 Quality Data and Reporting

Availability and the use of quality data, especially quality cost data, is an essential ingredient of a strong quality programme (Juran, Crosby, Deming). The Malcolm Baldrige Award also places lot of importance on availability and use of quality data to employees and managers.

A good quality information system is important in continuous quality improvement. For Dale and Boaden (1994), critical quality-related performance indicators (defect rates, scrap rate, percentage of rework, number of customer complaints, etc.) need to be identified, measured, monitored and communicated regularly. These indicators directly link the results and organization members' endeavor, which help reaffirming that their efforts are worthwhile and inducing more commitment to improvement.

Crosby (1979) stressed that data about non-conformities must be collected and reported timely to prompt necessary analysis and action. Apart from giving signals of what the current and potential problems are, the up-to-date information also provides useful feedback for the quality improvement progress. Management can use it to guide further quality planning - review, refine or revise quality goals, scale and peace of improvement and resources allocation.

Quality gurus emphasize the importance of quality information system and agree that quality data should be collected timely, made available to all members, who need it,

linked to the evaluation of quality improvement effort and used as tools for managing quality (Saraph et al. 1989).

2.7 Research Gap

From the above literature reviewed, it is inferred that there is plentitude of research pertaining to TQM practices in manufacturing sector, critical factors affecting TQM and TQM practices across countries and TQM's impact on business performance. The current study assumes significance for the fact that it addresses the comparison of TQM practices in Public and Private manufacturing sector.

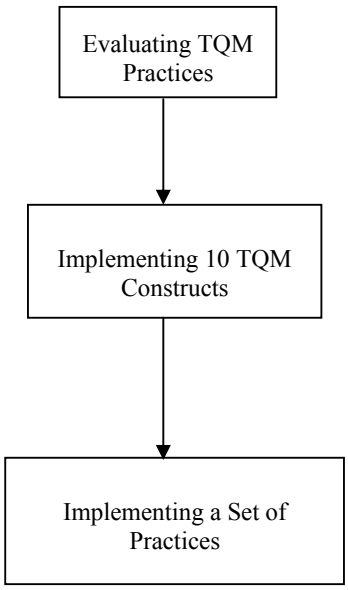
In this study, TQM is defined as follows:

A management philosophy for continuously improving overall organizational performance based on leadership, quality policy, employee involvement, supplier quality management, customer focus, role of quality department, training, process control and improvement, product design and quality data and information.

To evaluate the TQM practices in the manufacturing concerns, the study focused on the implementation of the above constructs through a set of practices. Figure displays the decomposition of TQM implementation.

Figure 2.1

A Decomposition Model of TQM Evaluation



2.8 Conclusion

The present chapter presents a critical review of the literature available on TQM practices in the manufacturing sector. Literature contributions of scholars in the fields of Quality, TQM, and TQM in manufacturing sector were thoroughly discussed.

This chapter captures the findings under various sub-headings. These areas are covered under various heads, viz., Studies on TQM Implementation, Critical Factors Affecting TQM, TQM and Business Performance, TQM and Organisational Theory and TQM Implementation/Practices Across Countries.

There is also a detailed description of the ten theoretical constructs used for the study and various studies covered under these heads.

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CHAPTER III

CONCEPTUAL FRAMEWORK

The current chapter discusses the conceptual framework of TQM. Various models of TQM, quality frameworks and the various tools and techniques of TQM are discussed.

TQM MODELS

3.1 The TQM Pyramid

In JUSE's view, TQM is a management approach that strives for the following in any business environment:

Under strong top-management leadership, establish clear mid-and long-term vision and strategies.

Properly utilize the concepts, values, and scientific methods of TQM.

Regard human resources and information as vital organizational infrastructures.

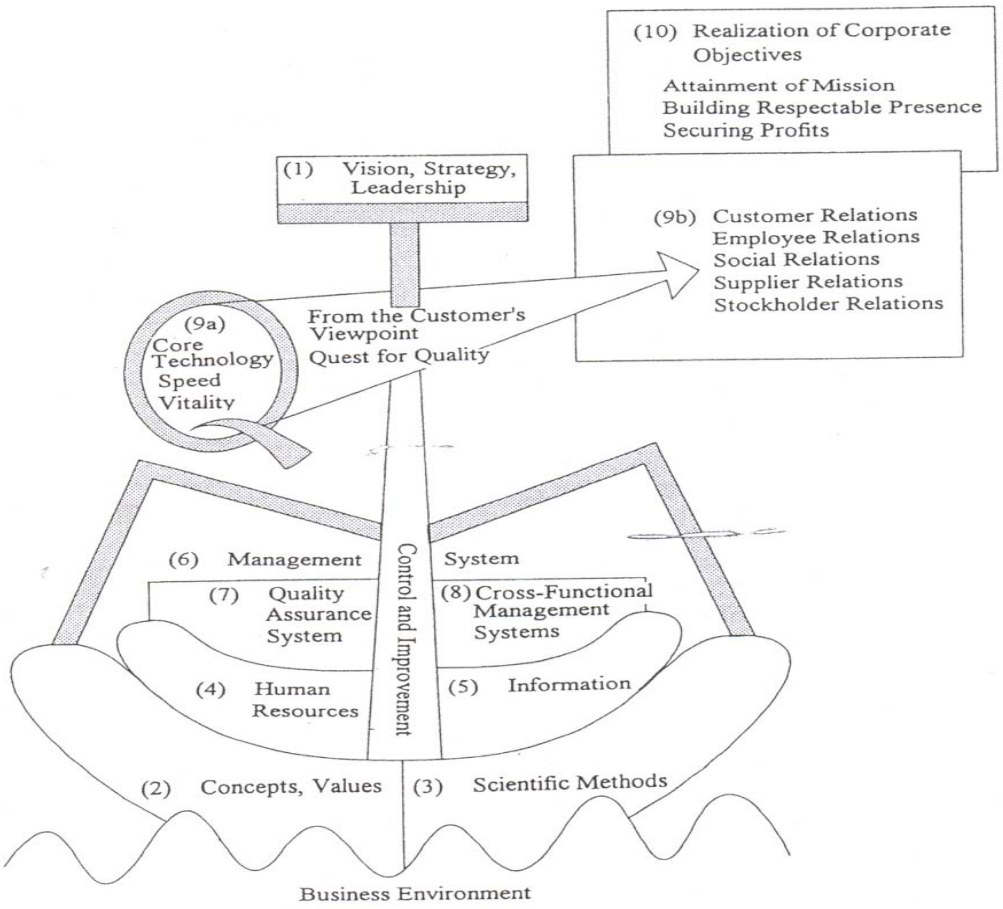
Under an appropriate management system, effectively operate a quality assurance system and other cross-functional management systems such as cost, delivery, environment, and safety.

Supported by fundamental organizational powers, such as core technology, speed, and vitality, ensures sound relationships with customers, employees, society, suppliers, and stockholders.

Continuously realize corporate objectives in the form of achieving an organization's mission, building an organization with a respectable presence, and continuously securing profits.

Figure 3.1

Overall Picture of TQM



Source: The TQM committee 1997 a, p.4 Juran's Quality Handbook (5th EditionMcGraw-Hill International Edition) TQM Pyramid

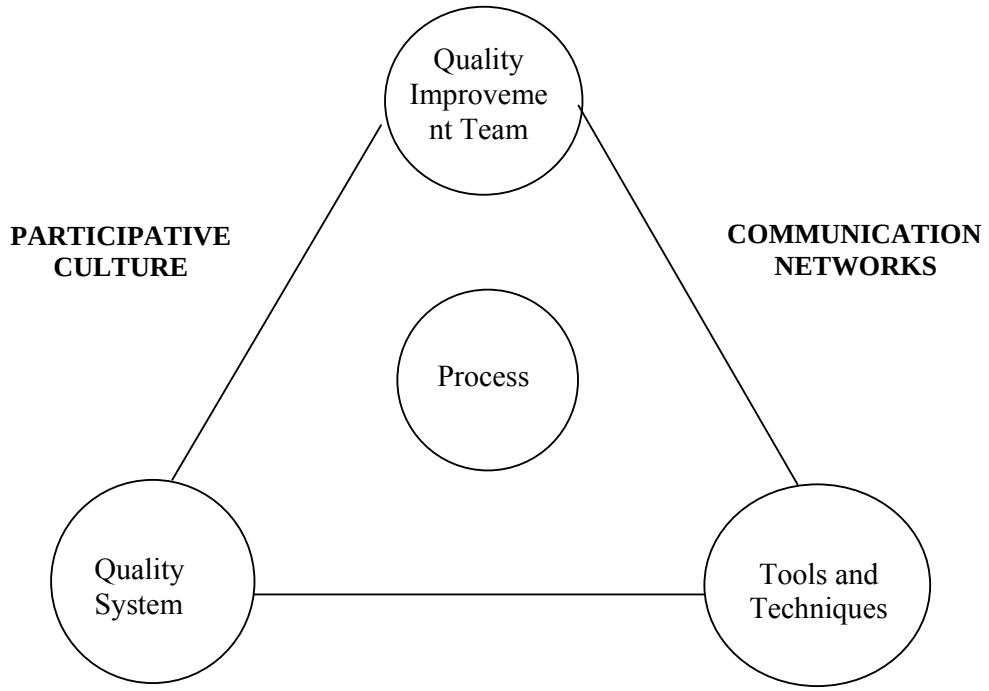
3.1.2 The Oakland's Model of TQM

Fig 3.2 defines TQM as a pyramid representing five distinct components as management commitment, customer-supplier chain, quality systems, SPC tools and team work. The management commitment component of the model identifies the role of senior management team in leading and introducing the change. Their commitment has to be reflected by the levels of investment in the required area and the amount of risk taken for the achievement of success. Customer-supplier chain is at the heart of the Oakland pyramid. It reflects process ownership, process management and process improvement propelled throughout the chain. The model identifies that a good quality management

system statistical process control and team work are the essential requirements for identifying and meeting the customer needs.

Figure: 3.2

The Oakland Model of TQM



(Mohanty and Lakhe (2007) Hand book of Total Quality Management. Mumbai: Jaico Publishing House)**.**

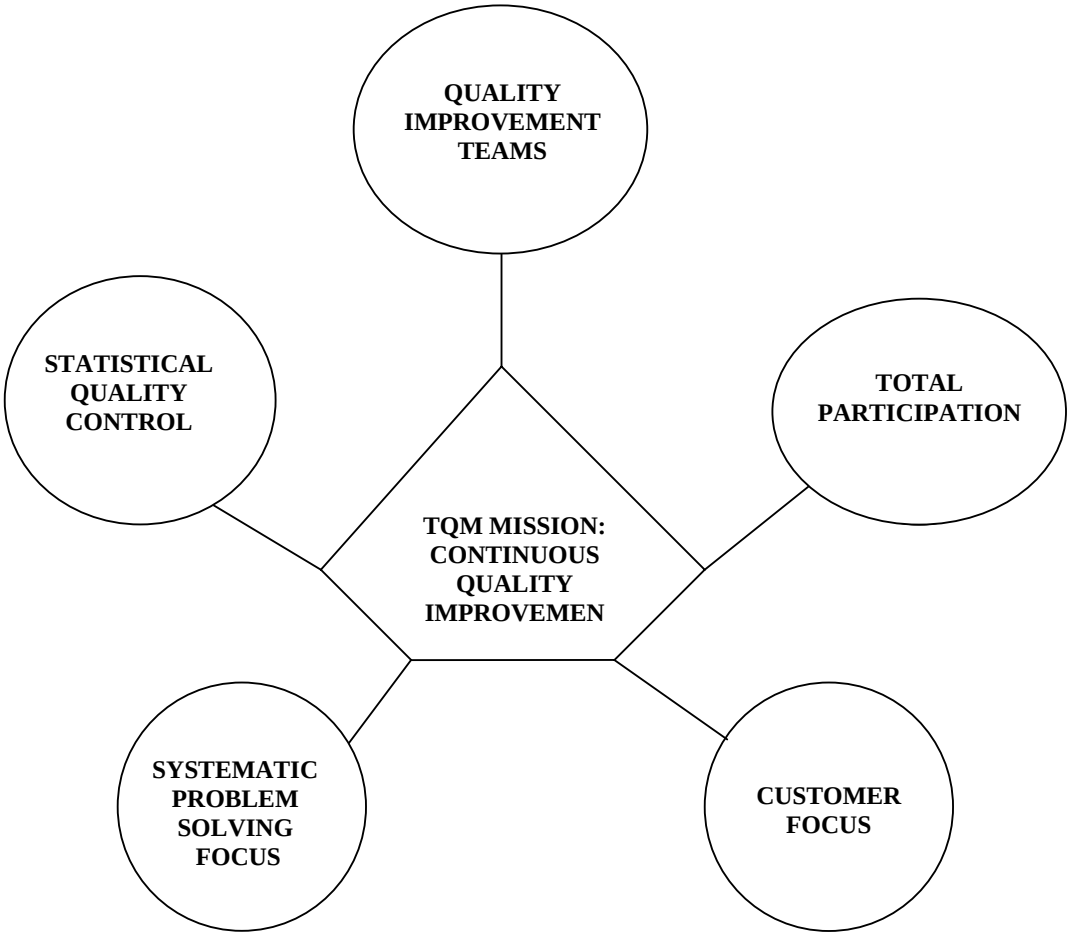
3.1.3. Integrated Model

Sohal, Tay and Wirth (1989) proposed an integrated model (Fig 3.3). This model proposes that continuous improvement in quality has to come from an integrated approach of controlling quality via action plans in different operations of the business cycle. The five important elements in the model are customer focus, management commitment, total participation, statistical quality control and a systematic problem solving process. The model stresses that by involving people at the grass root level, improving their morale, sense of belongingness and responsibility, using statistical techniques to analyse collected data and adopting plan-do-check-action (PDCA) cycle, the mission of continuous quality

improvement can be achieved to deliver satisfying service to the customer (internal and external).

Figure 3.3

Integrated Model of TQM



Source: (Mohanty and Lakhe (2007). Hand book of Total Quality Management. Mumbai: Jaico Publishing House)

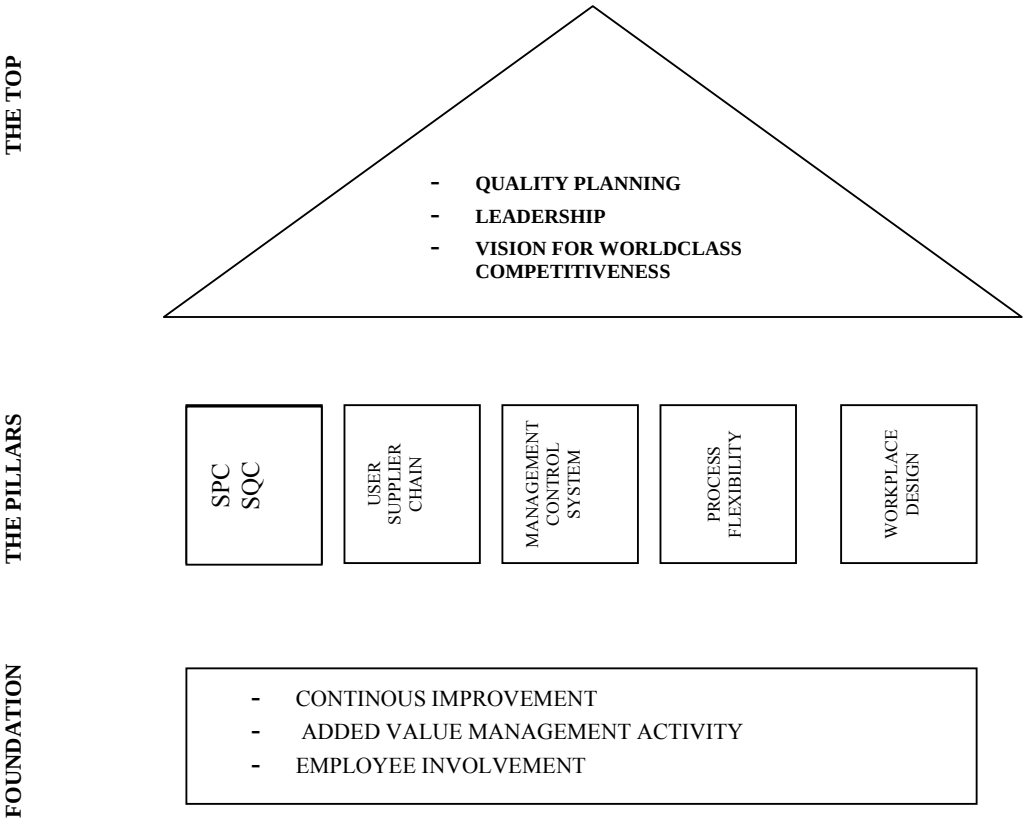
3.1.4 TQM: The Building Blocks of TQM

The TQM model proposed by Zaire (1991) (Fig 3.4) looks at TQM at three levels. The foundation is formed by the continuous improvement, added value management and employee involvement. The pillars of the model constitute SPC, SQC, user-supplier chain, management control systems, advanced manufacturing systems and workplace design. The top level of the model is formed by quality planning, leadership and vision for the world class competitiveness. The model argues that TQM depends on these buildings

blocks, which together determine the strength and safety of the organization. It further argues that a weakness in one area will have a disastrous effect on the TQM process as a whole and therefore proposes that organizations need to focus their TQM implementation strategy on every aspect of business.

Figure 3.4

Building Blocks of TQM



Source: (Mohanty and Lakhe (2007). Hand book of Total Quality Management. Mumbai: Jaico Publishing House)

3.1.5. - Three Dimensional Quality Model

A 3-dimensional quality model and a strategic planning model is proposed by Price and Gaskill (1990) (Fig 3.5) to develop TQM research strategies aligned with the business needs. The 3-dimensions of quality identified are:

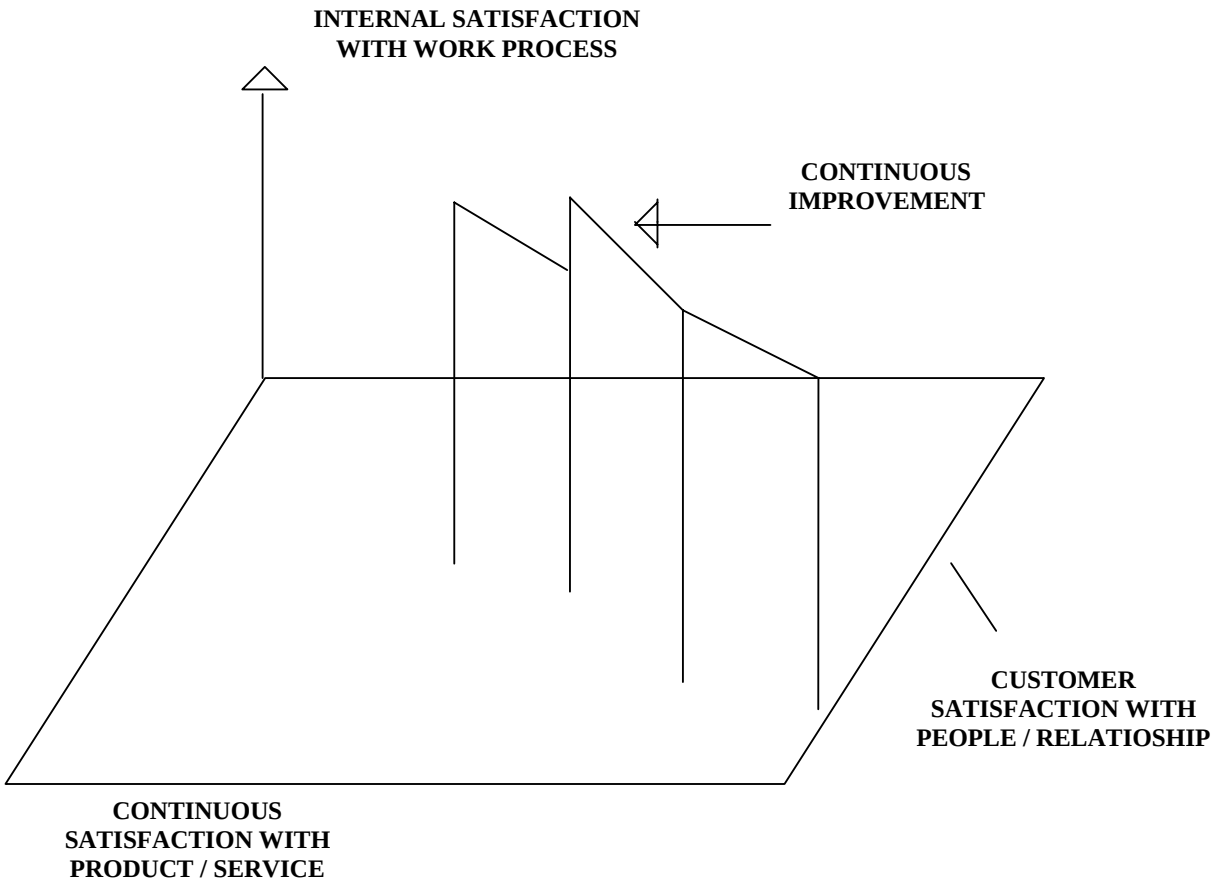
1. Product and Service dimension: The degree to which the customer is satisfied with the product or service supplied.

2. The people dimension: The degree to which the customer is satisfied with the relationship with people in the supplying organizations.
3. The process dimension: The degree to which the supplier is satisfied with the internal work processes, which are used to develop the products and services supplied to the customer.

It proposes that the Organization has to be concerned about all these three dimensions and has to measure, analyse, and improve itself taking all three dimensions in to account.

Figure 3.5

PRICE, GASKILES 3-DIMENSIONAL QUALITY MODEL



Source: (Mohanty and Lakhe (2007). Hand book of Total Quality Management. Mumbai: Jaico Publishing House)

3.1.6 The House of TQM Model

Kano (1993) proposed `The House of TQM` model (Fig 3.6) to show the structure of TQM, and quality sweating theory for introducing TQM. In `the house of TQM; the portion from the floor up to the roof is TQM, where the floor symbolized "motivational approach: and the roof shows "customer satisfaction/quality assurance" – which is the purpose of TQM. The motivational approach, which forms the floor of the model, implies creating conditions that will impel management and employees to carry out `sweating work`, that is hard work such as promoting standardization, educating, training and collecting and analyzing data. 'Concepts', one of the pillars of the house, shows how to proceed from a particular perspective, when a given intrinsic technology and motivation already exists. It consists of both a theory of quality such as "Quality is the satisfaction of the customer" or "The next processes are our customers, and a theory of management such as the "PDCA Cycle", "Build quality into the processes", or "Management by facts".

When actual activities based on these concepts begin, some "techniques" (the second pillar" for collecting and analyzing data become necessary. The seven QC tools and "the QC story" procedure are typical techniques for this purpose and statistical methods can also be used.

Figure 3.6

House of TQM Model

<table>
<tr><th colspan="3">QUALITY ASSURANCE</th></tr>
<tr><td>Concepts</td><td>Techniques</td><td>Vehicles</td></tr>
<tr><td rowspan="2"></td><td>MOTIVATIONAL APPROACH</td><td rowspan="2"></td></tr>
<tr><td>INTRINSIC TECHNIQUES</td></tr>
</table>

Source: (Mohanty and Lakhe (2007). Hand book of Total Quality Management. Mumbai: Jaico Publishing House)

"Vehicles", the third pillar includes management by policy, daily management and QC Circles for effectively and efficiently promoting the improvement activities within the organization as these methods are quicker and facilitate promotion.

Kano, further explains the process of introducing TQM through "Quality Sweating Theory". The Theory states that TQM is an effective tool for improving quality, but its success depends on making many employees sweat. The theory encompasses two

alternative approaches namely CLSQ meaning Crisis consciousness and leadership make people sweat for quality and VLSQ meaning Vision and leadership encourage people to sweat for quality.

3.2 Quality Frameworks

Worldwide, there are several Quality Awards, such as the Deming Prize in Japan (1996), the European Quality Award in Europe (1994), and the Malcolm Baldrige National Quality Award in the United States of America (1999). In the Indian context, we have the CII – Exim Business Excellence Award (1994) and the Rajiv Gandhi National Quality Award (2008). The broad aims of these awards are described as follows:

- Increase awareness of TQM;
- Encourage systematic self-assessment against established criteria and market awareness simultaneously;
- Stimulate sharing and dissemination of information on successfully deployed quality strategies and on benefits derived from implementing these strategies;
- Promote understanding of the requirements for the attainment of quality excellence and successful deployment of TQM;
- Encourage firms to introduce a continuous improvement process.

Each award model is based on a perceived model of TQM. The award models do not focus solely on either product or service perfection or traditional quality management methods, but consider a wide range of management activities, behaviour and processes that influence the quality of the final offerings. They provide a useful audit framework against which firms can evaluate their TQM implementation practices, seek improvement opportunities, and the end results.

3.2.1 The Deming Prize

The Deming Prize was established by the Board of Directors of the Japanese Union of Scientists and Engineers in 1951. Its main purpose is to spread the quality gospel by recognizing performance improvements flowing from the successful implementation of firm-wide quality control based on statistical quality control techniques. The Deming Prize

proved an effective instrument for spreading TQM philosophy throughout the Japanese industries.

There are ten primary elements in the Deming Application Prize (1996), as well as a checklist that is used to evaluate the performance of senior executives. This checklist emphasizes the importance of top management's active participation in quality management activities and understanding of the main requirements of quality improvement programmes. It is also provides senior executives with a list of what they need to do. The primary elements in the Deming Application Prize and the checklist used to evaluate senior executives are listed below:

1) Policies
2) Organization
3) Information
4) Standardization
5) Human Resources
6) Quality Assurance
7) Maintenance
8) Improvement
9) Effects
10) Future Plans

3.2.2 The European Model for TQM

The European Quality Award was officially launched in 1991. The primary purpose of the award is to support, encourage, and recognize the development of effective TQM by European firms. The model of the European Quality Award is divided into two parts, Enablers and Results. The enablers are leadership, people management, policy & strategy, resources, and processes. These five aspects steer the business and facilitate the transformation of inputs to outputs. The results are people satisfaction, customer satisfaction, impact on society, and business results (the measure of the level of output attained by the firm).

3.2.3 The Malcolm Baldrige National Quality Award

In 1987, the US Congress passed the Malcolm Baldrige National Quality Improvement Act, and thus established an annual quality award in the US. The aim of the

award is to encourage American firms to improve quality, satisfy customers, and improve overall firms' performance and capabilities. The model framework can be used to assess firms' current quality management practices, benchmark performance against key competitors and world class standards, and improve relations with suppliers and customers. The Malcolm Baldrige National Quality Award model framework (1999) is listed as follows:

1) Leadership
2) Strategic Planning
3) Customer and Market Focus
4) Information and Analysis
5) Human resource Focus
6) Process Management
7) Business Results

3.2.4 CII-EXIM Bank Award for Business Excellence

CII and Export-Import (EXIM) Bank of India jointly established the Award for Business Excellence in 1994 with the aim to enhance the 'Competitiveness of India Inc.' The Award is based on the EFQM (European Foundation for Quality Management) Model for Excellence.

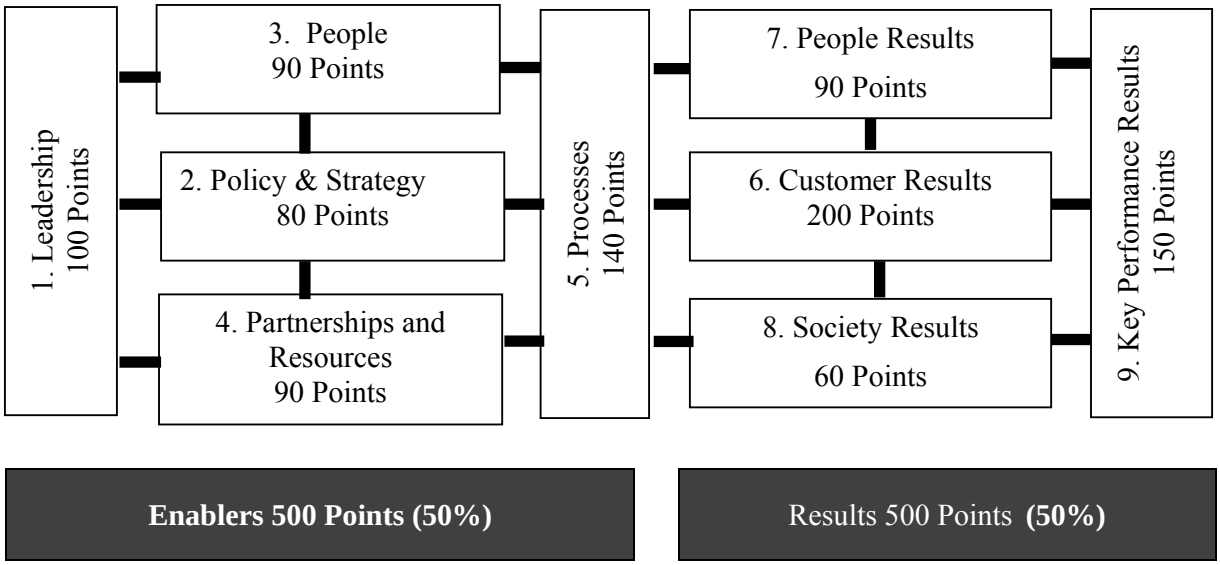
The Excellence Model is based on universally accepted standards and practices prevalent across the world. Apart from recognition, the model provides a holistic management framework to achieve Excellence. A large number of organizations have successfully used this model to:

· Define Excellence across the organization.
· Develop an integrated approach for achieving sustainable competitiveness.
· Measure progress on the journey towards Excellence.
· Review and improve Strategy, Processes and Performance.
· Identify and share good practices.
· Provide learning opportunity to develop Business Leaders.

CII ensures that the model remains dynamic and contemporary to management thinking. Both CII and EFQM are committed to researching and updating the model with practical and academic inputs drawn from organizational experiences across the world.

Figure 3.7

CII-EXIM Bank Award for Business Excellence



3.2.5 Rajiv Gandhi National Quality Award 2008

Rajiv Gandhi National Quality Award was instituted by the Bureau of Indian Standards in 1991, with a view to encourage Indian manufacturing and service organizations to strive for excellence and provide special recognition to those, who are considered to be the leaders of quality movement in India. This award is intended to generate interest and involvement of Indian Industry in quality programmes, drive the products and services to higher levels of quality and equip our industry to meet the challenges of domestic and International markets.

The award has been named after our Late Prime Minister Rajiv Gandhi, recognizing the new thrust he had given to the quality movement in India so that India could move into 21st Century with pride.

Rajiv Gandhi National Quality Award would help Indian Industry to improve quality by:

a) Encouraging Indian Industry to make significant improvements in quality for maximizing consumer satisfaction and for successfully facing competition in the global market as well;

b) Recognizing the achievements of those organizations, which have improved the quality, of their products and services and thereby set an example for others;

c) Establishing guidelines and criteria that can be used by industry in evaluating their own quality improvement efforts; and

d) Providing specific guidance to other organizations that wish to learn how to achieve excellence in quality, by making available detailed information on the `Quality Management Approach' adopted by award winning organizations to change their culture and achieve eminence.

The award has been designed in line with similar awards in other developed countries, like Malcolm Baldrige National Quality Award in USA, Deming Prize in Japan and European Quality Award.

3.3 Kaizen and Innovation

`Kaizen` is a Japanese word meaning small but continuous improvements. These small improvements are achieved due to small performance improvements from quality circle/quality improvement team activities. No major investments are involved here. The best part of these small steps like improvements is each improvement is stabilized before further improvement project is taken up.

`Kai` in Japanese means change, while `Zen` means good (for the better), so that kaizen means `improvement`. Kaizen is a sub-system of JIT and implies continuous improvement in every sphere of activity. The management of the company encourages suggestions or Kaizens from employees regarding possible improvements in their respective work areas. The employees are rewarded on giving a large number of useful suggestions. These rewards are more about employee recognition such as awarding `Kaizen man of the month titles and certificates or small gifts rather than monetary rewards.

All those activities, which support Kaizen, are referred to as the elements within the Kaizen umbrella (Figure 3.11).

Figure 3.8

Kaizen Umbrella

Source: Shridhara Bhat (2007)

3.3.1 Benefits of Kaizen

Kaizen is the simple truth behind Japan's economic miracle and the real reason the Japanese have become the masters of ``*flexible manufacturing system*`` - the ability to adapt manufacturing processes to changing customer and market requirements and to do it fast. Kaizen, which means, "*step-by-step gradual improvement, doing things better, continuously setting and achieving ever higher standards",* is as important as break-through innovations. The whole of Japanese business philosophy is based on the combination of Kaizen and innovation. This has brought a reduction in costs, faster development times and prompt deliveries.

3.4 Quality Circle

Quality Circle essentially is a participatory management process, where the actual involvement of people at the grass root level of the organization is effectively applied. Q.C. is a small voluntary group of people from the same work area, who meet together, on a regular basis, for the purpose of identifying, selecting, analyzing and solving work related problems of quality, productivity, cost reduction, safety and customer service. The problems are chosen in their work area, leading to improvement in their work effectiveness and enrichment of their work life. The Q.C is a group of persons consisting of 3 to 12 employees doing similar work and drawn from the same section of the unit. The

group members volunteer to meet regularly for one hour every week or fortnight usually in `paid time` to identify all the problems or opportunities for further improvement in the work area. Thereafter, the group takes up one problem after another, collects pertinent data, analyses them, applies different quality circle tools and techniques and based on their findings, makes recommendations and present solutions to the management for decision making.

The organization structure of the Quality Circle is pyramidal. It consists of:

1. Non-members:

   They help in implementing the decision of Q.C.

2. Members:

   They are the basic elements of Q.C., who voluntarily join the circle, take active part in its working and performance. They identify their problems, discuss them, use the techniques, identify causes and arrive at solutions. They also present and demonstrate their solutions to the management.

3. Leader:

   He is mutually elected by the members to regulate the working of the group, to ensure members' involvement, to chalk out action plan, to assign tasks and to maintain discipline and decorum during meetings. He trains members, organizes and keeps all records.

4. Facilitator:

   He is nominated by the management and is responsible for the successful performance of the circle. He ensures continued and visible management support, availability of necessary facilities, timely review and organized management presentations.

5. Steering committee:

   It is constituted with major heads of departments, to take an overview of circle activity, to take decisions on important recommendations, to give major policy guidelines and direction and to decide on financial support.

6. Top management:

   It provides support and finance and encourages healthy growth of Q.Cs.

7. Coordinating Agency:

It co-ordinates all activities of Q.Cs in the organization, keeps records, interacts with all Q.C. members for effective performance of the circles. The Q.Cs by using various techniques such as brainstorming, data collection, pareto analysis, line graph, etc. achieve the following objectives:

- Change in attitude from 'I don't care' to 'I do care'
- Continuous improvement in quality of work life through humanization of work
- Self development
- Development of team spirit
- Improved organizational culture.

Q.C. is thus a widely accepted participative management process that aims to bring about total involvement of people at all levels.

3.5 QC Tools Adopted in Public and Private Sector

Information related to various QC tools adopted in public and private sectors is presented in table:

Table: 3.1

QC Tools Adopted in Public and Private Sector

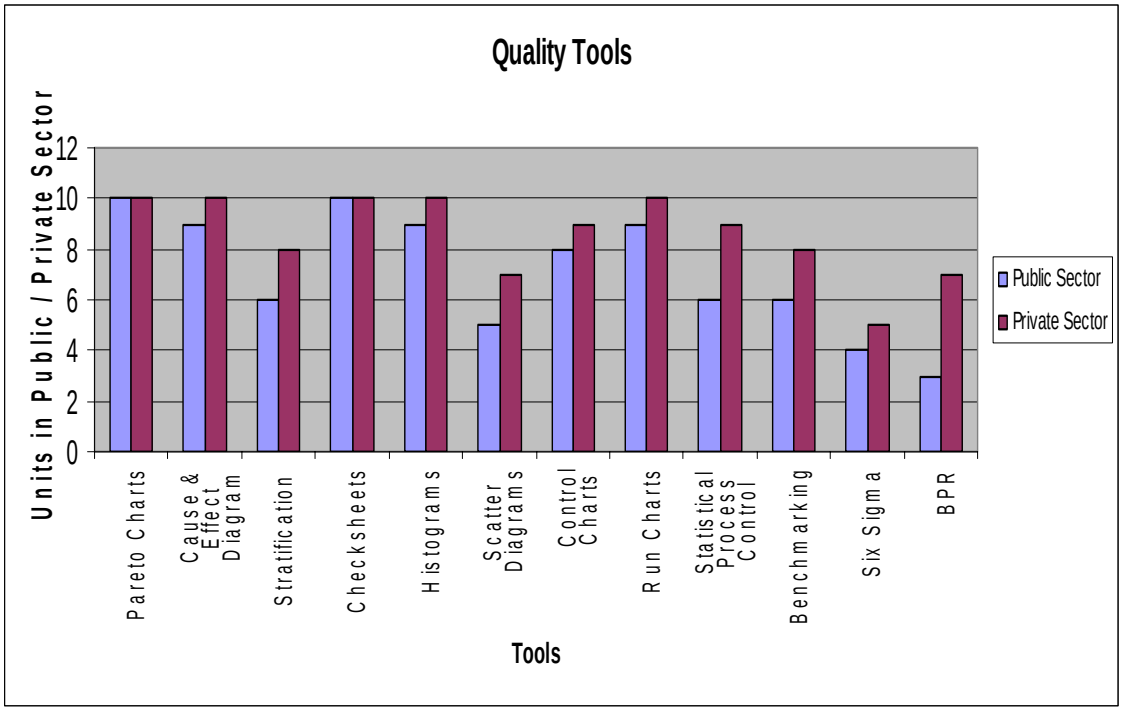
Sl. No.	Quality Tools	Quality Tools Used	
		Public Sector	**Private Sector**
1	Pareto Charts	10	10
2	Cause & Effect Diagram	9	10
3	Stratification	6	8
4	Check Sheets	10	10
5	Histograms	9	10
6	Scatter Diagrams	5	7
7	Control Charts	8	9
8	Run Charts	9	10
9	Statistical Process Control	6	9
10	Benchmarking	6	8
11	Six Sigma	4	5
12	BPR	3	7

The above table discusses the various tools and techniques adopted by manufacturing organizations. Public sector units are predominantly using the quality tools like Pareto Charts, Check Sheets, Cause& Effect, Histogram, and Run Charts to an extent of 80-100 percent. However, Private sector units are using tools like Pareto Charts, Check Sheets, Histogram and Run Charts to an extent of cent per cent and Cause and Effect, Control Charts and Statistical Process Control, Stratification, and Benchmarking very predominantly.

The Aggregate percentage of Quality Tools in the entire sample, predominantly are Pareto Charts, Check sheets, Cause & Effect Diagram, Histograms, Run Charts, Control Charts.

Figure: 3.9

QC Tools Adopted in Public and Private Sector



3.6 Quality Control Tools and Areas of Application in the Organizations

Table furnishes the information pertaining to the various QC tools and respective areas of application in the organizations.

Table 3.2

Quality Control Tools and Areas of Application in the Organizations

Sl. No.	Quality Control Tools	Areas
1.	Pareto Charts	Quality control, customer complaint handling, supplier quality, production, data analysis, quality control circles, cross functional teams
2.	Cause & Effect Diagram	Quality control, customer complaint handling, supplier quality, production, data analysis, quality control circles, cross functional teams, root cause analysis
3.	Stratification	Production, data analysis.
4.	Check Sheets	Dispatch, data collection, assembly and testing areas
5.	Histograms	Customer complaint handling, supply quality, production, data analysis.
6.	Scatter Diagrams	Production, data analysis
7.	Control Charts	Production, process control
8.	Run Charts	Production, process control, trend analysis, assembly, testing
9.	Statistical Process Control	Production, process capability, customer trials
10.	Benchmarking	Improvement projects, product design
11.	Six Sigma	Improvement projects, customer trials.

3.7 Conclusion

The present chapter discusses the various theoretical models of TQM, quality frameworks and various tools and techniques of TQM.

The next chapter highlights quality consciousness, role of leadership and involvement of various stakeholders of TQM in the study public and private sector organizations.

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CHAPTER - IV

ASSESSMENT OF TQM PARAMETERS BETWEEN PUBLIC AND PRIVATE SECTOR UNITS

4.1 INTRODUCTION

One of the important objectives of the study was to assess and compare the quality consciousness, role of leadership and involvement of various stakeholders of TQM (top management, employees, customers and suppliers) in the study public and private sector organizations. T-test was used for this purpose to compare the means of both public and private sectors. The present chapter deals with the analysis and comparison of the two sectors.

4.2 Extent of Involvement of Top Management in Current TQM practices

Extent of top managers involvement in the TQM practices, was examined and compared for Public and Private Sector units, with the help of means and‘t’ test was conducted. The results are presented in the table 4.1.

Based on the current TQM practices in the organization and the extent and degree of top managements, involvement in these practices, managers of the public and private sector units were asked to rank on a seven point scale (7-very very high to 1-very very low) the degree of TQM implementation in their companies. t-test was used for testing the difference between means of public and private enterprises.

Mean scores for private and public sector are significantly different from each other on only frequency of review of quality issues in the meetings (mean response score = 5.50 private sector and 4.70 public sector). Private sector scores higher than public sector and is significant on these attributes. This may be attributed to constant evaluation and monitoring by the owners of the project and perpetual desire to succeed in the thriving competition. The heads of the organization are responsible for the successful culmination of TQM with a view to achieve greater benefits to the organization. This intention would probably lead everyone in the private sector organization adhered to quality improvement process in the long-run and constant monitoring and evaluation leads to fare better. There are no significant differences between public and private sector on other attributes.

Table 4.1

Leadership

Sl. No.	Statements	Mean response score		't' statistic	'p' value
		Public Sector	Private Sector		
1.1	Responsibility for quality performance	5.55	6.05	-1.536	0.133
1.2	Supports long-term quality improvement process	5.70	6.23	-1.853	0.072
1.3	Quality goals and policy are understood within the organization	5.00	5.41	-1.192	0.241
1.4	Importance attached to quality in relation to cost and schedule objectives	5.75	5.95	-0.655	0.516
1.5	Frequency of review of quality issues in the meetings	4.70	5.50	-2.290	0.028*
1.6	Degree to which it considers quality improvement as a way to increase profits	5.55	5.82	-0.719	0.477
1.7	Participation by major department heads in the quality improvement process	4.95	5.41	-1.387	0.174
1.8	Comprehensiveness of the goal-setting process for achieving quality within the organization	5.00	5.27	-0.971	0.338
1.9	Identification and provision of appropriate resources in a timely manner to support total quality	5.05	5.00	-0.326	0.746
1.10	Selection of priority quality projects based on customer evaluation of performance	5.20	5.18	0.130	0.897
1.11	Selection of priority quality projects based on reliable data concerning deficiencies in goods and services	5.20	5.45	-0.484	0.631
1.12	Selection of priority quality projects based on reliable data concerning the status of internal quality culture	5.10	5.36	-0.605	0.549

* Significant at 0.05 level.

Recognition of the critical role of top management and its responsibility in pursuit of quality improvement echoes the arguments put forward by gurus of quality. Garvin (1986) reports that high levels of quality performance have always been accompanied by an organizational commitment to that goal; high product quality does not exist without strong top management commitment (Zhang 2000).

Policy Implementation: In order to understand the quality policy and its implementation in the study public and private sector organizations, the respondents were asked to evaluate the statements. The means are calculated and compared. In order to understand, whether the difference between the public and private sector organizations are significant, t- test was conducted and results are presented in the table 4.2.

Top Managers of the companies, viz., Functional Heads, Vice Presidents and Management Representatives were asked to evaluate the policy and implementation variable on six Statements. Among these Statements, communication of organizations, mission, vision, values, policy and targets to the employees was higher in private sector (mean response score = 6.05 private sector 5.35 for public sector). Similar is the case with the maintenance of quality policy, procedures (mean response score = 6.41 private sector, 5.70 public sector). Quality plans and statements should be well communicated to the employees of organizations, this in turn ensures employees commitment to quality. In order to make these plans and statements, employees from different levels should be involved. Present study highlights the fact that private sector units are taking effective steps in this regard.

Table 4.2

Policy and Implementation

Sl. No.	Statements	Mean Response Score		't' statistic	'p' value
		Public Sector	Private Sector		
2.1	Organization's mission, vision, values, policy and targets are communicated to all the employees	5.35	6.05	-2.071	0.045*
2.2	Organization's quality vision is the basis for strategic planning and decisions throughout the organization.	5.20	5.86	-1.803	0.080
2.3	Organization's strategy for quality is based on solid scientific information about customers' needs and satisfaction.	5.30	5.64	-0.954	0.346
2.4	Quality is an important KRA of all employees.	5.05	5.77	-1.874	0.069
2.5	Quality results are benchmarked against the best in the industry.	5.00	5.59	-1.766	0.086
2.6	Quality policy/ manual/ procedures are maintained as per Quality Management Systems.	5.70	6.41	-2.042	0.048*

* Significant at 0.05 level.

Employee Involvement

The respondents were asked to express the degree of employee involvement in the implementation of Quality policy. The mean values were calculated and t-test was conducted to test the difference. The results are presented in the following table 4.3:

Table 4.3

Employee Involvement

Sl. No.	Statements	Mean Response Score		't' statistic	'p' value
		Public Sector	Private Sector		
3.1	Extent to which employee involvement-type programmes are implemented in the organization.	5.00	5.59	-2.044	0.048*
3.2	Effectiveness of employee involvement-type programmes in the organization.	4.80	5.18	-1.340	0.188
3.3	Extent to which employees are held responsible for error-free output.	4.50	5.14	-1.893	0.066
3.4	Amount of feedback provided to employees on their quality performance.	4.45	5.23	-2.551	0.015*
3.5	Degree of participation in quality decisions by hourly/non-supervisory employees.	4.30	4.86	-1.698	0.098
3.6	Extent to which building quality awareness among employees is ongoing.	4.85	5.36	-1.895	0.066
3.7	Extent to which employees are recognized for superior quality performance.	4.85	5.14	-0.912	0.368
3.8	Extent to which processes designed for merit rating, compensation and promotion incorporate performance with respect to quality as a major factor.	4.40	5.00	-1.735	0.091
3.9	Aiming at training all the personnel in the organization.	5.05	5.59	-1.912	0.064
3.10	Recognition and appreciation of the efforts and success of individuals and teams in the organization.	4.85	5.45	-1.889	0.067

* Significant at 0.05 level.

They evaluated this variable on ten statements on the scale of 1 to 7 (v.v. low to v.v. high). Mean score of the private sector was higher in case of the statement training all the personnel in the organization with the mean score of 5.59. A successful organization is dependent on its human resource. Human resources are valuable assets in a total quality setting. Therefore, involvement of workforce for successful implementation of TQM practices is always a positive step in that direction. From the results, it was found that mean response score of public sector was lower than private sector. Amongst the ten Statements, there are significant differences between public and private sectors with regard to implementation of employee involvement programmes and amount of feedback provided to employees on their quality performance. This may be attributed to high involvement of employees through various teamwork activities, quality circles or quality improvement teams in the private sector.

Customer Focus

The respondents were asked to explain to what extent the quality policy programmes were focused around the customer. The means were calculated and t-test was conducted to know the significant difference. The details were presented in the following table 4.4.

Customer focus involves monitoring customer complaints, determining, meeting or exceeding customer expectations, and assessing customer satisfaction. Table 4.4 depicts the evaluation of the variable customer focus on fifteen Statements by the top managers. Overall mean response score was higher in case of private units. Establishing valid customer requirements & expectations (mean response scores = 5.10 for public sector and 5.68 for private sector) and empowering everyone in the organization to delight the customer (mean response scores = 4.50 for public sector and 5.27 for private sector) are the key statements that distinguish public and private sectors. There were significant differences on other statements like product availability and linking customer requirements for developing new products. In today's rapid and continual changing environment, customers' needs and expectations also change. Focusing on the customer stimulates firms to delight customers by innovatively exceeding the customer needs and expectations, which is going beyond conformance to standards, with new products or services to survive and improve their competitiveness in the market. Customer focus will

encourage firms to develop and innovate new products to continuously adapt to the market's changing needs.

Table 4.4

Customer Focus

Sl. No.	Statements	Mean Response Score		`t` statistic	'p' value
		Public Sector	Private Sector		
4.1	Establishing valid customer requirements & expectations.	5.10	5.68	-2.100	0.043*
4.2	Development and use of customer satisfaction measures.	5.00	5.59	-1.935	0.061
4.3	Creating partnerships with key customers.	4.75	5.27	-1.223	0.229
4.4	Linking customer requirements to the development of new products and services	4.90	5.68	-2.259	0.03*
4.5	Developing and communicating policies and procedures to remedy service errors.	4.85	5.23	-1.060	0.296
4.6	Empowering everyone in the organization to delight the customer.	4.50	5.27	-2.039	0.049*
4.7	Gathering continuous feedback from customers.	4.70	5.27	-1.380	0.176
4.8	Anticipating customers' future needs.	4.30	5.18	-1.994	0.054
4.9	Offering TQM training to customers.	3.85	4.09	-0.524	0.604
4.10	Information provided to the customers/ consumers through informative labeling, brochures and other product literature.	4.75	5.50	-1.892	0.067
4.11	Establishing and participating in joint improvement teams with customers	4.25	4.68	-1.285	0.207
4.12	On-time delivery	4.90	5.27	-1.308	0.199
4.13	Product availability	4.85	5.50	-2.403	0.021*
4.14	Accessibility of key staff	5.05	5.55	-1.717	0.094
4.15	Follow up with the customers	5.00	5.36	-1.192	0.241

* Significant at 0.05 level.

Involvement with Suppliers: The degree of involvement of managers with the suppliers was analyzed and presented in the following table 4.5:

Table 4.5

Involvement with suppliers

Sl. No.	Statements	Mean Response Score		't' statistic	'p' value
		Public Sector	Private Sector		
5.1	Establishing and participating in joint improvement teams with suppliers.	5.00	5.80	-1.375	0.177
5.2	Evaluating, recognizing and rewarding the efforts and achievements of suppliers.	4.70	5.60	-1.286	0.206
5.3	Involving the supplier in product/service development process.	4.80	5.60	-1.521	0.137
5.4	Creating partnerships with key suppliers.	4.70	5.80	-2.040	0.049*
5.5	Anticipating suppliers' future requirements.	4.20	5.80	-0.672	0.506
5.6	Offering TQM training to suppliers.	4.00	4.90	-0.915	0.366
5.7	Benchmarking with key suppliers to learn how competitors are operating.	4.30	5.20	0.495	0.624
5.8	Gathering continuous feedback from suppliers.	4.70	5.30	-0.932	0.358

* Significant at 0.05 level.

Top Managers were asked to evaluate the involvement of the organization with the suppliers on eight statements. Creating partnerships with key suppliers is one dimension, where private sector scores higher than public sector. (Mean response score = 5.80 private sector and 4.70 Public sector) private sector seems to be taking lot of measures in this regard. Effective process management requires working collaboratively and closely with a few selected suppliers, who meet quality standards and specifications of the buyer and deliver the quality material just-in-time on a long-term basis. Successful supplier relationships will improve quality of the purchased materials and parts, reduce variability of the process, optimize the system, and contribute to effective process management.

Role of the Quality Department

Quality department plays pivotal role in devising and implementation of Quality policy. Therefore, the role of the Quality department was examined and means were calculated and presented in the following table 4.6**:**

Table 4.6

Role of the Quality Department

Sl. No.	Statements	Mean Response Score		't' statistic	'p' value
		Public Sector	Private Sector		
6.1	Visibility of Quality department.	5.50	5.64	-0.251	0.803
6.2	Quality department's access to organizational top management	5.85	5.95	-0.319	0.751
6.3	Autonomy of Quality department	5.35	5.82	-1.359	0.182
6.4	Amount of co-ordination between the quality department and other departments	5.40	5.50	-0.249	0.805
6.5	Effectiveness of the quality department in improving quality	5.25	5.50	-0.745	0.461

* Significant at 0.05 level.

Role played by the quality department was evaluated on five statements by the various managers. With respect to role of the quality department, there are no significant differences between public and private sectors. However, the highest mean response score for both public and private sector was in case of statement 6.2. In case of public sector visibility and autonomy of quality department is very crucial for TQM implementation. Quality department must be given its due place in manufacturing concerns for effective TQM implementation.

Training: The type of training that is imparted to the different employees is examined in terms of its relevance to the quality improvements. The responses were analyzed with means and significance was found out with the help of t-test. The results are presented in the table-4.7.

Table 4.7

Training

Sl. No	Statements	Mean response score		't' statistic	'p' value
		Public sector	Private sector		
7.1	Specific work skills training given to hourly employees throughout the organization.	4.70	5.45	-1.959	0.058
7.2	Quality-related training given to hourly employees throughout the organization.	4.65	5.41	-2.088	0.044*
7.3	Quality-related training given to managers and supervisors throughout the division.	5.00	5.36	-1.268	0.213
7.4	Training in "total quality concept" throughout the organization.	4.80	5.27	-1.697	0.098
7.5	Training in basic statistical techniques in the organization as a whole.	4.75	4.77	0.177	0.861
7.6	Training in advanced statistical techniques in the organization as a whole.	4.30	4.32	0.242	0.81
7.7	Commitment of the organizational top management to employee training.	5.15	5.59	-1.395	0.171
7.8	Availability of resources for employee training in the organization.	4.85	5.14	-0.583	0.563

* Significant at 0.05 level.

While evaluating the training variable on eight parameters, majority of top managers opined that investment in education and training is vital for TQM success. Quality related training given to hourly employees throughout the organization is higher in private sector. (Mean response score = 5.41). Education and training are the most important elements in a successful implementation of TQM. The research confirms what most organizations have already realized, namely, that education and training are an integral and essential part of the TQM initiative. Employees should be regarded as valuable, long-term resources, worthy of receiving education and training throughout their career.

Product Design

Quality initiatives with respect to product / service design were examined and analyzed and presented in the following table-4.8:

Table 4.8

Product Design

Sl. No.	Statements	Mean Response Score		't' statistic	'p' value
		Public Sector	Private Sector		
8.1	Thoroughness of new product /service design review before the product/service is produced and marketed.	4.75	5.45	-2.074	0.045*
8.2	Co-ordination among affected departments in the product/service development process.	4.65	5.50	-2.274	0.029*
8.3	Quality of new products/services emphasized in relation to cost or schedule objectives.	4.70	5.55	-2.296	0.027*
8.4	Clarity of product/service specifications and procedures.	4.90	5.64	-1.852	0.072
8.5	Extent to which implementation / producibility is considered in the product/service design process.	4.70	5.68	-2.393	0.022*
8.6	Quality emphasis by sales, customer service, marketing, and PR personnel.	4.65	5.59	-2.472	0.018*

* Significant at 0.05 level.

Product/ service design was evaluated on six statements by top managers. There are significant differences between public and private sectors with respect to product design on most of the statements. The highest mean response score in the private sector was 5.68, in case of statement 8.5 and in the public sector it was 4.9, for statement 8.4 and the lowest mean response score in the private sector was for the statements 8.2 and 8.3 with mean response score of 5.5 each. And lowest in the public sector was for the statements 8.2 and 8.6 with the mean response score of 4.65 each. Private units outscored

the public sector on all statements. Product design is an important dimension of quality management. Customer requirements and production cost should be thoroughly considered during the process of product design. Different departments in an organization should participate in new product development. Before production, new product design should be thoroughly reviewed in order to avoid problems recurring during production.

Process Management/Operating Procedures

Top Managers assessed process management / operating procedures in both the sectors. The mean response scores are presented in table 4.9:

Top managers evaluated process design variable on ten Statements. There were significant differences with reference to fool-proof process design, (mean response score = 5.23 for private sector and 4.45 for public sector). Clarity of work or process instructions given to employees (mean response score = 5.45 for private sector and 4.80 for public sector).

An important aspect of total quality strategy is the management of processes (Porter and Parker, 1993). Process management focuses on managing the manufacturing process so that it operates as expected, without breakdowns, missing materials, fixtures, tools, etc., and despite workforce variability. One important matter in process management is to ensure that process capability can meet production requirements. Good process management should involve precisely documenting various process procedures, with instructions for equipment operation in order to minimize the likelihood of operator errors. Some methods, such as PDCA cycle, seven QC tools, statistical process control (SPC), sampling and inspection are effective for process control and process improvement.

Table 4.9

Process Management/Operating Procedures

Sl. No.	Statements	Mean Response Score		't' statistic	'p' value
		Public Sector	Private Sector		
9.1	Use of acceptance sampling to accept/reject lots or batches of work.	4.90	5.55	-1.941	0.06
9.2	Amount of preventive equipment maintenance.	4.95	5.50	-1.663	0.105
9.3	Extent to which inspection, review or checking of work is automated.	4.40	4.68	-0.788	0.436
9.4	Amount of incoming inspection, review or checking.	5.15	4.82	1.207	0.235
9.5	Amount of in-process inspection, review or checking.	5.15	5.00	0.437	0.665
9.6	Amount of final inspection, review or checking.	5.60	5.77	-1.209	0.234
9.7	Stability of production schedule/work distribution.	5.05	5.23	-0.354	0.725
9.8	Degree of automation in the process.	4.25	4.91	-1.618	0.114
9.9	Extent to which process design is "fool-proof" and minimizes the chances of employee errors	4.45	5.23	-2.403	0.021*
9.10	Clarity of work or process instructions given to employees	4.80	5.45	-2.027	0.05*

* Significant at 0.05 level.

Quality Data and Reporting

The mean response scores of public and private sectors with respect to quality data and reporting are presented in table 4.10:

Table 4.10

Quality data and Reporting

Sl. No.	Statements	Mean Response Score		't' statistic	'p' value
		Public Sector	Private Sector		
10.1	Availability of quality data in the organization.	5.10	5.64	-1.597	0.119
10.2	Timeliness of quality data.	5.10	5.55	-1.271	0.212
10.3	Extent to which quality data are available to managers and supervisors.	5.11	5.68	-1.617	0.115
10.4	Extent to which quality data are used to evaluate supervisorial and managerial performance.	4.58	4.86	-0.602	0.551
10.5	Extent to which quality data are displayed at employee work stations.	4.47	5.18	-1.929	0.062
10.6	Publication /preparation of booklets, articles, video films and other quality training aids, etc.	4.26	4.77	-1.317	0.196

* Significant at 0.05 level.

Display of quality data at employee work stations is an important parameter that differentiates public and private sectors (Mean response score 5.18 for private sector and 4.47 for public sector). Reinforcement of principles of quality through visual displays, controls is higher in private sector. With respect to other statement of quality data and reporting, there are no significant differences. Highest mean response score for both public and private sectors was found in case of statement of availability of quality data to the managers and supervisors with 5.11 and 5.68 for public and private sector, respectively.

TQM Assessment

Top managers assessed the impact of TQM on the below mentioned four factors, namely, Productivity, Cost Reduction, Quality of Service and Customer Satisfaction. Results are presented in Table 4.11:

Table 4.11

TQM Assessment

Sl. No.	Parameters	Mean Response Score		't' statistic	'p' value
		Public Sector	Private Sector		
11.1	Productivity	5.25	5.00	0.715	0.48
11.2	Cost reduction	5.10	5.00	0.262	0.795
11.3	Quality of service	5.30	5.67	-1.232	0.226
11.4	Customer satisfaction	5.30	5.89	-1.986	0.055*

* Significant at 0.05 level.

On a scale of 1 to 7 top managers were asked to assess the effects of TQM on the above four parameters. Mean response score was higher in case of private sector. There was significant difference with reference to customer satisfaction. (Mean response score = 5.89 for private sector and 5.30 for public sector). With respect to productivity, cost reduction and quality of service, there were no significant differences. Adoption of TQM practices has maximum impacted customer satisfaction.

4.3 Extent / Degree of Involvement of the Quality Department in current TQM Practices - Comparison between Public and Private Units.

The degree of Involvement of Quality Department in the implementation of TQM practices were examined with respect to the quality initiatives and presented in the following tables.

Leadership

The degree of support and involvement of Leadership in the design and implementation of TQM practices was examined and presented in the table 4.12:

Table 4.12

Leadership

Sl. No.	Statements	Mean Response Score		't' statistic	'p' value
		Public Sector	Private Sector		
1.1	Responsibility for quality performance	5.60	6.40	-2.133	0.048*
1.2	Supports long-term quality improvement process	5.50	6.50	-3.207	0.005*
1.3	Quality goals and policy are understood within the organization	4.80	5.70	-2.821	0.012*
1.4	Importance attached to quality in relation to cost and schedule objectives	5.30	6.10	-1.880	0.077
1.5	Frequency of review of quality issues in the meetings	5.10	5.80	-2.092	0.052
1.6	Degree to which it considers quality improvement as a way to increase profits	5.10	6.40	-3.081	0.007*
1.7	Participation by major department heads in the quality improvement process	5.10	5.80	-2.263	0.037*
1.8	Comprehensiveness of the goal-setting process for achieving quality within the organization	4.90	5.70	-2.232	0.039*
1.9	Identification and provision of appropriate resources in a timely manner to support total quality	4.70	5.90	-3.218	0.005*
1.10	Selection of priority quality projects based on customer evaluation of performance	4.90	6.10	-2.611	0.019*
1.11	Selection of priority quality projects based on reliable data concerning deficiencies in goods and services	4.70	5.90	-2.688	0.016*
1.12	Selection of priority quality projects based on reliable data concerning the status of internal quality culture	4.60	5.80	-3.317	0.004*

* Significant at 0.05 level.

Leadership variable was assessed on twelve Statements by the quality heads of manufacturing firms on scale of 1 to 7. There are significant differences between public and private sectors with respect to accepting responsibility for quality performance, understanding quality goals and policy within the organization, participation of major department heads in the quality improvement process, comprehensiveness of the goal-setting process for achieving quality within the organization, selection of priority quality projects based on customer evaluation of performance and selection of priority quality projects based on reliable data concerning deficiencies in goods and services

Top management support for quality is a key factor in quality improvement. If top managers are committed to quality, they should not only actively be involved in quality management and improvement process, but also strongly encourage employee involvement in quality management and improvement process. In addition, they should learn quality-related concepts and skills, and arrange adequate resources for employee education and training. Various quality-related issues should also be often discussed in top management meetings. Top management should pursue long-term business success and focus on product quality rather than yields. The impetus for any quality management effort (whether it is manufacturing or service organization) should come from the top.

Policy and Implementation

The differences between the mean response scores of public and private sectors with respect to Policy and Implementation variable are presented in Table 4.13.

Quality heads assessed the policy and implementation variable on six statements. There are significant differences between public and private sectors on almost all policy and implementation statements. Policy and Implementation aspects with respect to TQM are better perceived and implemented in case of private sector than public sector.

Table 4.13

Policy and Implementation

Sl No.	Statements	Mean Response Score		't' statistic	'p' value
		Public Sector	Private Sector		
2.1	Organization's mission, vision, values, policy and targets are communicated to all the employees.	5.50	6.20	-2.308	0.034*
2.2	Organization's quality vision is the basis for strategic planning and decisions throughout the organization.	5.10	5.80	-2.537	0.021*
2.3	Organization's strategy for quality is based on solid scientific information about customers' needs and satisfaction	5.00	5.60	-1.739	0.1
2.4	Quality is an important KRA of all employees	4.70	5.90	-3.051	0.008*
2.5	Quality results are benchmarked against the best in the industry	4.50	5.90	-3.177	0.006*
2.6	Quality policy/ manual/ procedures are maintained as per Quality Management Systems.	5.50	6.20	-2.044	0.057

* Significant at 0.05 level.

Employee Involvement

Quality Heads evaluated Employee Involvement variable on eight parameters. The mean response scores of both sectors are presented in Table 4.14:

Table 4.14

Employee Involvement

Sl. No.	Statements	Mean Response Score		't' statistic	'p' value
		Public Sector	Private Sector		
3.1	Extent to which employee involvement-type programmes are implemented in the organization.	5.00	5.90	-1.941	0.069
3.2	Effectiveness of employee involvement-type programmes in the organization.	4.70	5.60	-1.900	0.074
3.3	Extent to which employees are held responsible for error-free output.	4.70	5.30	-1.508	0.15
3.4	Amount of feedback provided to employees on their quality performance.	4.60	5.40	-2.271	0.036*
3.5	Degree of participation in quality decisions by hourly/non-supervisory employees.	4.30	5.60	-2.977	0.008*
3.6	Extent to which building quality awareness among employees is ongoing.	4.80	5.60	-1.824	0.086
3.7	Extent to which employees are recognized for superior quality performance.	5.20	5.20	-0.066	0.948
3.8	Extent to which processes designed for merit rating, compensation and promotion incorporate performance with respect to quality as a major factor.	4.70	5.00	-0.438	0.667
3.9	Aiming at training all the personnel in the organization.	5.20	5.40	-0.303	0.766
3.10	Recognition and appreciation of the efforts and success of individuals and teams in the organization.	4.90	5.60	-2.204	0.042*

* Significant at 0.05 level.

Provision of feed back to the employees (mean response score = 5.40 for private sector and 4.60 for public sector) is one area, where there is significant difference and there were differences with respect to recognition and appreciation of individuals and teams (Mean response score = 5.60 for private sector and 4.90 for public sector) and also statement 3.5. Organizations must evolve formal systems to encourage motivate, track, and reward employee involvement. Participation of employees is highly imperative for quality management as TQM requires all employees to accept responsibility for the quality assurance of their own work.

Customer Focus

Quality Heads evaluated important parameters pertaining to customer focus in the TQM effort. Results are presented in Table 4.15.

Customer focus was evaluated on fifteen Statements by the quality heads and there were significant differences with respect to statements like development and use of customer satisfaction measures, creating partnerships with key customers, developing and communicating policies and procedures to remedy service errors, gathering continuous feedback from customers, anticipating customers' future needs, establishing and participating in joint improvement teams with customers, on-time delivery and accessibility of key staff.

Customer focus should be an important sub-system of any organizational systems supporting TQM, because organizations can outscore by effectively addressing the customers' needs and demands and anticipate and respond to their evolving interests and wants. In manufacturing, this can be achieved by the use of technology, which will produce products that consists of such attributes of quality as conformance to requirements, conformance to specifications, reliability, durability, absence of variation fitness for use, etc. Organizations can out do their rivals, only if, they are able to meet their customers' demands with new ideas and technologies, produce products that exceed customer expectations. As customer expectations are intensely volatile in nature, an organization needs to appraise them regularly and regulate its operations accordingly.

Table 4.15

Customer Focus

Sl. No.	Statements	Mean Response Score		't' statistic	'p' value
		Public Sector	Private Sector		
4.1	Establishing valid customer requirements & expectations.	5.50	6.10	-2.017	0.06
4.2	Development and use of customer satisfaction measures.	5.20	6.00	-2.108	0.05*
4.3	Creating partnerships with key customers.	5.10	6.00	-2.800	0.013*
4.4	Linking customer requirements to the development of new products and services.	5.50	6.00	-1.385	0.184
4.5	Developing and communicating policies and procedures to remedy service errors.	4.80	5.70	-2.214	0.042*
4.6	Empowering everyone in the Organization to delight the customer.	4.50	5.90	-3.394	0.004*
4.7	Gathering continuous feedback from customers.	5.20	6.10	-2.525	0.022*
4.8	Anticipating customers' future needs	5.10	5.90	-2.263	0.037*
4.9	Offering TQM training to customers.	4.10	4.70	-1.000	0.333
4.10	Information provided to the customers/consumers through informative labeling, brochures and other product literature.	5.10	6.20	-4.771	0
4.11	Establishing and participating in joint improvement teams with customers.	4.70	5.80	-2.811	0.013*
4.12	On-time delivery.	4.60	5.80	-2.366	0.03*
4.13	Product availability.	5.00	5.80	-1.770	0.095
4.14	Accessibility of key staff	5.10	6.20	-2.649	0.017*
4.15	Follow up with the customers	5.40	5.80	-1.074	0.298

* Significant at 0.05 level.

Involvement with suppliers

Involvement with suppliers and important link in the TQM process was evaluated by the quality heads. Mean response scores are presented in Table 4.16.

With respect to supplier involvement, there were significant differences with respect to Anticipating suppliers requirements (mean response score = 5.80 for private sector and 4.20 for public sector) and creating partnerships with key suppliers (mean response score = 5.80 for private sector and 4.70 for public sector). Successful supplier-buyer relationships will give win-win in process improvement for both parties, encourages supplier contribute to improve the buyer' product or process such as simplifying the buyer's product or component and acquiring the materials and parts, which will be used most efficiently.

Table 4.16

Involvement with suppliers

Sl. No.	Statements	Mean Response Score		't' statistic	'p' value
		Public Sector	Private Sector		
5.1	Establishing and participating in joint improvement teams with suppliers.	5.00	5.80	-2.053	0.056
5.2	Evaluating, recognizing and rewarding the efforts and achievements of suppliers.	4.70	5.60	-2.039	0.057
5.3	Involving the supplier in product/service development process.	4.80	5.60	-2.121	0.05
5.4	Creating partnerships with key suppliers	4.70	5.80	-2.811	0.013*
5.5	Anticipating suppliers' future requirements.	4.20	5.80	-4.239	0.001*
5.6	Offering TQM training to suppliers	4.00	4.90	-1.973	0.067
5.7	Benchmarking with key suppliers to learn how competitors are operating.	4.30	5.20	-2.089	0.054
5.8	Gathering continuous feedback from suppliers.	4.70	5.30	-1.416	0.175

* Significant at 0.05 level.

Role of the Quality Department

Crucial role played by the Quality Department was assessed by the various heads of quality. Mean response scores are presented in Table 4.17.

Quality Heads assessed the role of quality department on six statements. Some of the factors considered were visibility, autonomy and direct access to top management. There were no significant differences between public and private sectors with respect to the above statements.

Table 4.17

Role of the Quality Department

Sl. No.	Statements	Mean Response Score		't' statistic	'p' value
		Public Sector	Private Sector		
6.1	Visibility of quality department.	5.60	6.10	-1.699	0.108
6.2	Quality department's access to organizational top management.	5.70	6.50	-3.693	0.069
6.3	Autonomy of quality department.	5.60	5.90	-0.960	0.35
6.4	Amount of co-ordination between the quality department and other departments.	5.60	6.10	-1.950	0.069
6.5	Effectiveness of the quality department in improving quality.	5.40	5.70	-1.050	0.309

* Significant at 0.05 level.

Training

The important role played by training in the quality process was evaluated on eight statements. Results are presented in Table 4.18.

Training dimension was evaluated on eight Statements by the quality heads. There were significant differences with respect to training in basic statistical techniques in the organization as a whole, (mean response score = 5.30 for private sector and 4.30 for public sector) and also on statement 1 (Specific work skills training given to hourly employees throughout the organization).

Table 4.18

Training

Sl. No.	Statements	Mean Response Score		't' statistic	'p' value
		Public Sector	Private Sector		
7.1	Specific work skills training given to hourly employees throughout the organization.	4.80	5.90	-2.920	0.01*
7.2	Quality-related training given to hourly employees throughout the organization.	4.90	5.60	-1.674	0.113
7.3	Quality-related training given to managers and supervisors throughout the division.	5.10	5.70	-1.600	0.128
7.4	Training in "total quality concept" throughout the organization.	4.80	5.30	-1.298	0.212
7.5	Training in basic statistical techniques in the organization as a whole.	4.30	5.30	-2.469	0.024*
7.6	Training in advanced statistical techniques in the organization as a whole.	4.10	4.80	-1.230	0.235
7.7	Commitment of the organizational top management to employee training.	5.40	5.90	-1.439	0.168
7.8	Availability of resources for employee training in the organization.	5.30	5.70	-1.256	0.226

* Significant at 0.05 level.

Product Design: Product design is very crucial to the quality of an end product. Quality Heads assessed this dimension on six parameters. Mean response scores are presented in Table 4.19.

Table 4.19

Product Design

Sl. No.	Statements	Mean Response Score		't' statistic	'p' value
		Public Sector	Private Sector		
8.1	Thoroughness of new product/service design review before the product/service is produced and marketed.	5.60	5.90	-0.860	0.403
8.2	Co-ordination among affected departments in the product/service development process.	5.50	6.10	-2.273	0.037*
8.3	Quality of new products/services emphasized in relation to cost or schedule objectives.	5.50	6.20	-2.000	0.063
8.4	Clarity of product/service specifications and procedures.	5.40	5.90	-1.485	0.157
8.5	Extent to which implementation/ producibility is considered in the product/service design process.	5.40	6.00	-2.000	0.063
8.6	Quality emphasis by sales, customer service, marketing, and PR personnel.	5.30	6.10	-2.322	0.034*

* Significant at 0.05 level.

Comprehensive process design improves the level of quality. Critical sub factors reviewed were design review, coordination, clarity of specifications; etc. There were significant differences with respect to co-ordination among affected departments in the product/service development process (Mean response score = 6.10 for private sector and 5.50 for public sector) and quality emphasis by sales, customer service, marketing, and PR personnel. (Mean response score = 6.13 for private sector and 5.30 for public sector).

Process Management/Operating Procedures

Quality Initiatives with respect to Process Management / Operating Procedures were examined by the quality heads. Results are presented in Table 4.20:

Table 4.20

Process Management/Operating Procedures

Sl. No.	Statements	Mean Response Score		't' statistic	'p' value
		Public Sector	Private sector		
9.1	Use of acceptance sampling to accept/reject lots or batches of work.	5.20	5.80	-1.252	0.228
9.2	Amount of preventive equipment maintenance.	5.40	6.00	-1.670	0.113
9.3	Extent to which inspection, review or checking of work is automated.	4.70	5.80	-2.617	0.018*
9.4	Amount of incoming inspection, review or checking.	5.50	5.60	-0.152	0.881
9.5	Amount of in-process inspection, review or checking.	5.40	5.70	-0.742	0.468
9.6	Amount of final inspection, review or checking.	5.60	6.20	-2.288	0.035*
9.7	Stability of production schedule/work distribution.	5.10	5.80	-1.881	0.077
9.8	Degree of automation in the process.	4.60	5.80	-2.494	0.023*
9.9	Extent to which process design is "fool-proof" and minimizes the chances of employee errors	4.50	5.50	-2.376	0.03*
9.10	Clarity of work or process instructions given to employees	5.30	5.90	-2.366	0.03*

* Significant at 0.05 level.

Process management was evaluated on ten statements. Key aspects examined were preventive equipment maintenance, inspection and automation. On the Statements of automation of inspection, (Mean response score = 5.80 for private sector and 4.70 for public sector) Amount of final inspection, (Mean response score = 6.20 for private sector and 5.60 for public sector) Degree of automation in the process, (Mean response score = 5.80 for private sector and 4.60 for public sector) fool proof process design (Mean response score = 5.50 for private sector and 4.50 for public sector) and clarity of process instructions (Mean response score = 5.90 for private sector and 5.30 for public sector),there were significant differences.

Quality data and Reporting

Quality Data and Reporting variable was assessed on six parameters. The mean response scores are presented in Table 4.21:

Table 4.21

Quality data and reporting

Sl. No.	Statements	Mean Response Score		't' statistic	'p' value
		Public Sector	Private Sector		
10.1	Availability of quality data in the organization.	5.60	6.10	-1.994	0.062
10.2	Timeliness of quality data.	5.30	6.20	-2.663	0.016*
10.3	Extent to which quality data are available to managers and supervisors.	5.10	6.20	-3.463	0.003*
10.4	Extent to which quality data are used to evaluate supervisorial and managerial performance.	4.70	5.70	-2.730	0.014*
10.5	Extent to which quality data are displayed at employee work stations.	4.60	6.00	-3.311	0.004*
10.6	Publication/preparation of booklets, articles, video films and other quality training aids etc	4.30	5.20	-2.196	0.042*

* Significant at 0.05 level.

With respect to quality data and reporting there were significant differences with respect to most of the statements.

TQM Assessment

Quality heads assessed the impact of TQM on the following four factors: namely, Productivity, Cost reduction, Quality of Service and Customer Satisfaction. Mean response scores are presented in Table 4.22:

Table 4.22

TQM Assessment

Sl. No.	Parameters	Mean Response Score		't' statistic	'p' value
		Public Sector	Private Sector		
11.1	Productivity	5.11	5.30	-0.641	0.53
11.2	Cost Reduction	4.88	5.60	-2.267	0.038*
11.3	Quality of Service	5.25	5.56	-1.018	0.325
11.4	Customer Satisfaction	5.33	6.10	-2.619	0.018*

* Significant at 0.05 level.

On a scale of 1 to 7, Quality managers were asked to assess the effects of TQM on the above four parameters. Mean response score was higher in case of private sector. There was significant difference with reference to cost reduction (Mean response score = 5.60 for private sector and 4.88 for public sector) and customer satisfaction. (Mean response score = 6.10 for private sector and 5.33 for public sector) With respect to productivity and quality of service there were no significant differences. Adoption of TQM practices has maximum impacted customer satisfaction and cost reduction.

4.4 Extent / Degree of Involvement of the Employees in Current TQM Practices - Comparison between Public and Private Units.

Employees were asked to indicate their level of involvement in the TQM effort. The mean response scores of both the units are presented in Table 4.23:

Table: 4.23

Employee Involvement

Sl. No.	Extent/Degree of involvement of the Employee in Current TQM Practices	Mean Response Score		't' statistic	'p' value
		Public Sector	Private Sector		
1	There is a strong commitment to quality at all levels of this organization.	5.11	5.87	-5.449	0.000
2	Continuous quality improvement is an important goal of this organization.	5.10	6.03	-6.682	0.000
3	Top management tries to make this organization a good place to work.	5.17	5.75	-4.08	0.000
4	Top management sets clear goals for quality improvement.	5.08	5.80	-4.97	0.000
5	There is a strong spirit of cooperation in this organization.	4.98	5.50	-3.007	0.002
6	We use statistical tools to check on the quality of work or services.	4.91	5.50	-3.311	0.001
7	The materials and supplies we need are delivered on time and as ordered.	4.92	5.53	-3.786	0.000
8	Our organization has embraced the team concept.	5.47	5.61	-0.291	0.758
9	Work problems are being solved through team meetings.	4.67	5.51	-4.879	0.000
10	Resources are available for employee training in our organization.	4.61	5.49	-4.596	0.000
11	There is some kind of employee training going on in our organization.	4.54	5.39	-4.434	0.000
12	I have supplies/ tools/ equipment , I need to do my work well.	4.90	5.65	-4.417	0.000
13	I have new and interesting things to do in my work.	4.88	5.72	-5.588	0.000
14	My work challenges me.	5.03	5.83	-5.131	0.000

15	Praise and recognition for outstanding performance is given in this organization.	4.56	5.40	-4.189	0.000
16	I feel free to discuss problems with my superiors.	5.05	5.77	-4.574	0.000
17	I am treated with respect by my superiors.	5.27	5.70	-3.088	0.002
18	Employees in this organization treat each other with respect.	5.13	5.69	-3.545	0.000
19	I am asked for my inputs.	5.08	5.69	-4.109	0.000
20	My superior gives credit to people when they do a good job.	4.71	5.62	-5.294	0.000
21	My superior gives me feedback on how well I am doing.	4.79	5.56	-4.77	0.000
22	Coworkers in my work unit are like a family.	5.21	5.68	-3.271	0.001
23	I fully understand the goals, policies and objectives of this organization.	5.55	5.84	-2.689	0.006
24	The actions of the management are always consistent with the goals, policies and objectives of the organization.	5.11	5.68	-3.784	0.000
25	Employees suggestions and recommendations are welcomed by the management.	4.81	5.74	-5.897	0.000
26	The management has a sincere concern for the employees.	4.81	5.62	-4.629	0.000
27	The quality of work of in this organization is excellent.	5.32	5.87	-4.371	0.000
28	The working conditions in this organization are excellent.	5.01	5.75	-5.427	0.000
29	The organization has the best reputation in this area as a good place of work.	5.43	5.92	-4.144	0.000
30	If I could find another job with the same pay, I would rather stay here.	5.15	5.54	-3.363	0.001

* Significant at 0.05 level.

Employees of both public and private sectors were asked to rate the above thirty statements based on the current TQM practices in the organization and the extent and degree of organization's involvement in these practices on a scale of 1 to 7. (v.v. low to v.v. high). The overall mean response score was high in case of private sector. With respect to employees perceptions of implementation of TQM practices, there are significant differences between public and private sectors on all the statements. The highest mean response score for private sector was 6.03 with respect to statement 2 and the highest for public sector was 5.47 with respect to statement 8 and lowest mean response score for both the sectors was with statement 11, private sector was 5.39 and public sector was 4.54. This shows that employee involvement programmes are more effective in private sector.

Employee involvement in quality efforts improves the level of quality. Involvement may enable the employees to improve their personal capabilities, increase their self-respect and commit themselves to the success of their organizations. Methods such as cross-functional teams, quality circles, voluntary teams, and suggestion activities can be used for encouraging employee participation.

TQM assessment parameters

The impact of TQM practices on the parameters like productivity, cost reduction, quality of service and customer satisfaction was enquired from the employees and the results were presented in the following table 4.24:

Table: 4.24

TQM assessment parameters

Sl. No.	Parameters	Mean Response Score		't' statistic	'p' value
		Public Sector	Private Sector		
11.1	Productivity	5.58	5.72	-0.868	0.339
11.2	Cost reduction	4.84	5.52	-3.662	0.000*
11.3	Quality of service	5.29	5.94	-3.861	0.000*
11.4	Customer satisfaction	5.54	5.98	-2.776	0.005*

* Significant at 0.05 level.

Employees assessed the impact of TQM practices on the four parameters mentioned above. There were significant differences with respect to cost reduction (mean response score = 5.52 for private sector and 4.84 for public sector), customer satisfaction. (Mean response score = 5.98 for private sector and 5.54 for public sector) and Quality of service (mean response score = 5.94 for private sector and 5.29 for public sector).

4.5 Extent / Degree of Involvement of the Supplier in current TQM practices - Comparison between Public and Private Units.

Suppliers were asked to indicate their level of involvement in the TQM effort by the manufacturing organizations. The mean response scores of both the units are presented in Table 4.25.

Table: 4.25

Degree of Involvement of Supplier in Current TQM Practices

Sl. No.	Parameters	Mean Response Score		't' statistic	'p' value
		Public Sector	Private Sector		
1.1	Involving the supplier in product/service development process	4.86	5.62	-1.133	0.272
1.2	Creating partnerships with key suppliers	4.29	5.23	-1.474	0.158
1.3	Anticipating suppliers' future requirements	4.57	5.08	-.555	0.585
1.4	Giving supplier awards	3.67	4.75	-1.569	0.136
1.5	Offering TQM training to suppliers	4.29	4.15	.154	0.879
1.6	Benchmarking with key suppliers to learn how competitors are operating	4.71	4.23	.435	0.669
1.7	Gathering continuous feedback from suppliers	5.00	5.23	-.472	0.643
1.8	Establishing and participating in joint improvement teams with suppliers	5.67	5.08	-.482	0.723

* Significant at 0.05 level.

Suppliers of the manufacturing organizations were asked to indicate their level of involvement in the TQM practices. As seen from the above table, from the suppliers perspective, there are no significant differences between public and private sectors with respect to supplier involvement parameters.

4.6 Degree of Involvement of the Customer in current TQM Practices - Comparison between Public and Private Units.

Customers of the manufacturing organizations (both public and private sectors) were asked to indicate their level of involvement in the TQM effort. The mean response scores of both the units are presented in Table 4.26:

Table: 4.26

Degree of Involvement of the Customer in current TQM Practices

Sl. No	Parameters	Mean Response Score		't' statistic	'p' value
		Public Sector	Private sector		
7.1	Price	5.17	4.92	.651	0.523
7.2	Value for money	5.33	5.15	.566	0.579
7.3	Product quality	5.86	5.15	2.984	0.008*
7.4	Consistency	5.43	5.15	1.069	0.299
7.5	Durability, maintainability and reliability.	5.67	5.23	1.908	0.073
7.6	Responsiveness, flexibility	5.33	5.23	.449	0.659
7.7	Product training	4.67	5.15	-1.535	0.143
7.8	Sales support; and	4.60	5.15	-1.604	0.128
7.9	Technical support	5.20	5.15	.166	0.871
7.10	On-time delivery	5.00	5.15	-.463	0.649
7.11	Product availability	5.00	5.15	-.539	0.597
7.12	Accessibility of key staff.	5.17	5.15	.050	0.960

7.13	Follow up with the customers.	4.67	5.15	-1.355	0.193
7.14	Redressal mechanism including time of response.	4.80	5.00	-.512	0.615
8.1	Establishing valid customer requirements & expectations.	5.33	5.00	1.249	0.234
8.2	Development and use of customer satisfaction measures.	5.00	4.89	.344	0.737
8.3	Creating partnerships with key customers.	4.40	5.00	-2.083	0.059*
8.4	Linking customer requirements to the development of new products and services.	5.00	4.67	.721	0.484
8.5	Developing and communicating policies and procedures to remedy service errors.	4.67	4.67	.000	1.000
8.6	Empowering everyone in the organization to delight the customer.	4.20	4.44	-.457	0.656
8.7	Gathering continuous feedback from customers.	4.67	4.80	-.269	0.792
8.8	Anticipating customers' future needs	4.67	4.10	1.019	0.325
8.9	Offering TQM training to customers	3.25	4.00	-1.399	0.189
8.10	Information provided to the customers/consumers through informative labeling, brochures and other product literature	4.17	5.00	-1.472	0.163

* Significant at 0.05 level.

Customers of the manufacturing organizations were asked to indicate their involvement in the TQM efforts of organizations. It is seen from the above table that there exist significant differences between public and private sectors with respect to customer focus variables of product quality and creating partnerships with key customers. We can conclude that product quality, and creating partnerships with customers are highly prioritized in private sector than public sector.

4.7 Conclusion

This chapter makes an attempt to assess and compare the quality consciousness, role of leadership and involvement of various stakeholders of TQM (top management, employees, customers and suppliers) in the study public and private sector organizations. The private sector has outscored the public sector on almost all important dimensions indicating that TQM practices are better perceived and implemented in the private sector than public sector.

CHAPTER – V

ANALYSIS OF GAP BETWEEN CRITICAL FACTORS OF TQM

5.1 INTRODUCTION

The present chapter deals with one of the important objectives of the study i.e., to study the gap between public and private sectors with respect to important variables like leadership, policy and implementation, employee involvement, involvement with suppliers and customer focus. Gap analysis was performed for all these variables as evaluated both by top managers and quality heads. Overall mean scores for these variables and the over all mean gap are discussed and depicted through line charts.

5.2 Gap Analysis- Top Managers' Evaluation

The followings tables were evaluated by the Top Managers of the manufacturing units with respect to the ten critical variables.

Table: 5.1

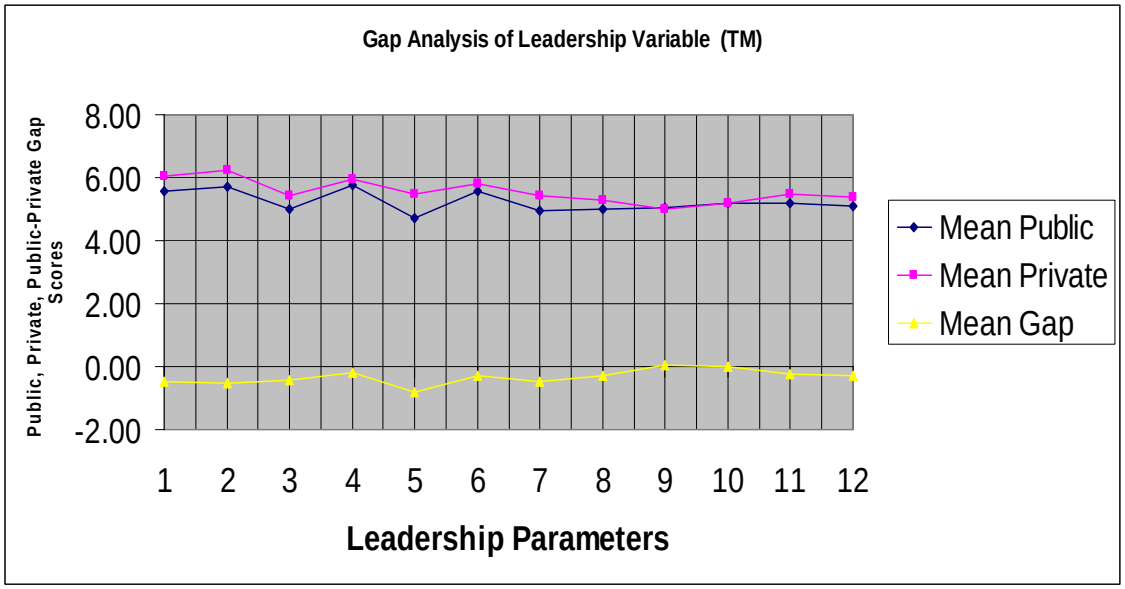
Gap Analysis of Leadership

Sl. No	Statements	Mean		
		Public Sector	Private Sector	Gap
1.1	Responsibility for quality performance	5.55	6.05	-0.50
1.2	Supports long-term quality improvement process	5.70	6.23	-0.53
1.3	Quality goals and policy are understood within the organization	5.00	5.41	-0.41
1.4	Importance attached to quality in relation to cost and schedule objectives	5.75	5.95	-0.20
1.5	Frequency of review of quality issues in the meetings	4.70	5.50	-0.80
1.6	Degree to which it considers quality improvement as a way to increase profits	5.55	5.82	-0.27

1.7	Participation by major department heads in the quality improvement process	4.95	5.41	-0.46
1.8	Comprehensiveness of the goal-setting process for achieving quality within the organization	5.00	5.27	-0.27
1.9	Identification and provision of appropriate resources in a timely manner to support total quality	5.05	5.00	0.05
1.10	Selection of priority quality projects based on customer evaluation of performance	5.20	5.18	0.02
1.11	Selection of priority quality projects based on reliable data concerning deficiencies in goods and services	5.20	5.45	-0.25
1.12	Selection of priority quality projects based on reliable data concerning the status of internal quality culture	5.10	5.36	-0.26
Overall Mean		**5.23**	**5.55**	**-0.32**

Figure: 5.1

Gap Analysis of Leadership (TM)



Leadership was assessed by top managers on twelve parameters and amongst these on ten parameters leadership involvement with respect to TQM practices is more in private sector. The gap between public and private is maximum with respect to frequency of review of quality issues in the meetings. It shows that quality issues are reviewed frequently in private sector. With respect to identification and provision of appropriate resources in the timely manner to support quality, selection of priority quality projects, public sector scores marginally higher than private sector. Overall mean score of leadership is 5.23 and 5.55 respectively for public and private sector. The overall mean gap for leadership variable between public and private sector manufacturing units is -0.32.

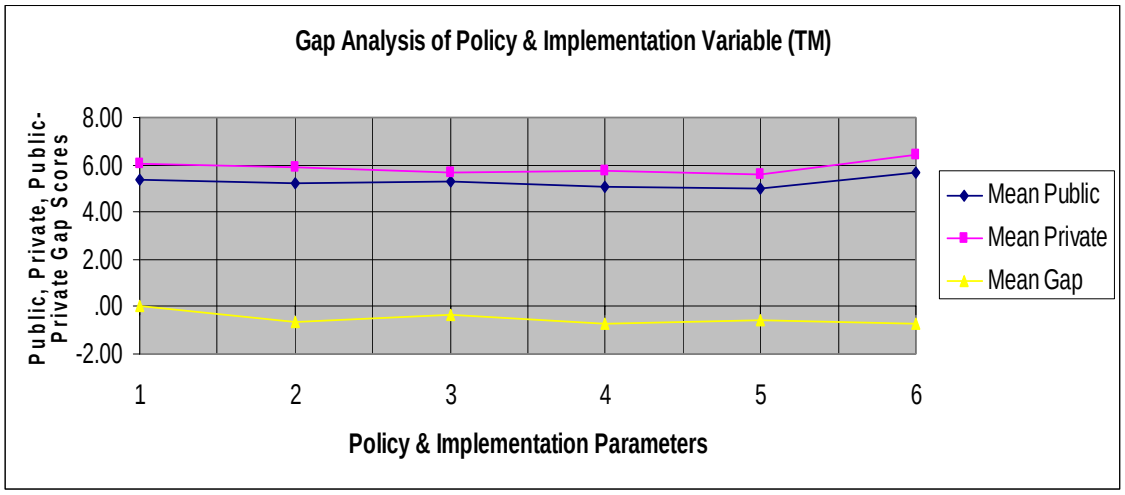
Table: 5.2

Gap Analysis of Policy and Implementation (TM)

Sl. No	Statements	Mean		
		Public Sector	Private Sector	Gap
2.1	Organization's mission, vision, values, policy and targets are communicated to all the employees	5.35	6.05	0.00
2.2	Organization's quality vision is the basis for strategic planning and decisions throughout the organization.	5.20	5.86	-0.66
2.3	Organization's strategy for quality is based on solid scientific information about customers' needs and satisfaction	5.30	5.64	-0.34
2.4	Quality is an important KRA of all employees	5.05	5.77	-0.72
2.5	Quality results are benchmarked against the best in the industry	5.00	5.59	-0.59
2.6	Quality policy/ manual/ procedures are maintained as per Quality Management Systems.	5.70	6.41	-0.71
Overall Mean		**5.27**	**5.89**	**0.00**

Figure: 5.2

Gap Analysis of Policy & Implementation (TM)



The study tried to assess the gap between policy and implementation in the TQM efforts from top management perspective and private sector scored high on all parameters with respect to policy and implementation. The highest was with respect to maintenance of quality policy / manual /procedures and quality is an important KRA of all employees. The overall mean scores for public sector were 5.27 and were 5.89 for private sector. And the overall mean gap was 0.0.

Table: 5.3

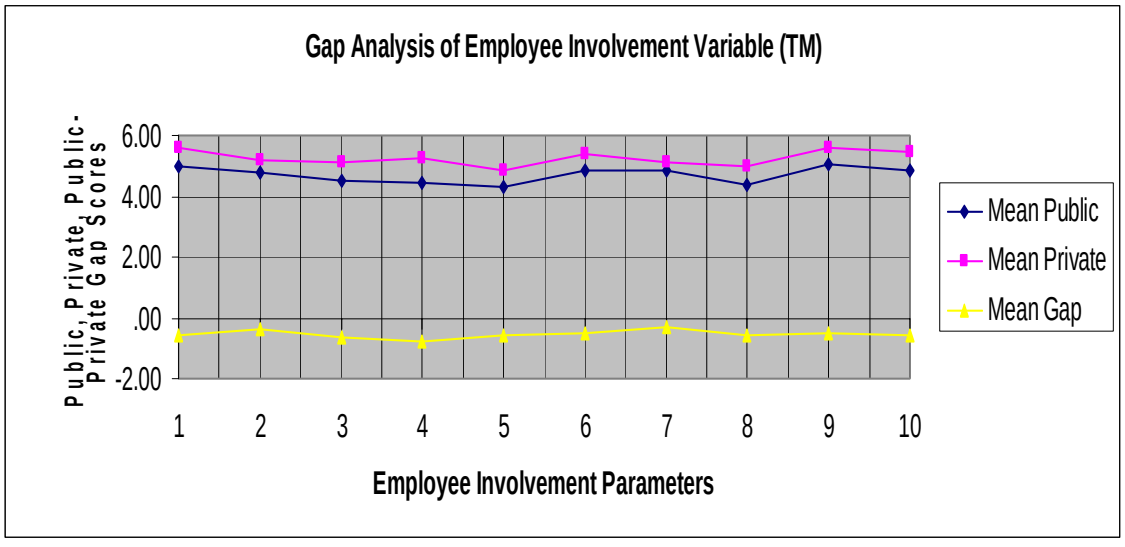
Gap Analysis of Employee Involvement (TM)

Sl. No	Statements	Mean		
		Public Sector	Private Sector	Gap
3.1	Extent to which employee involvement-type programmes are implemented in the organization.	5.00	5.59	-0.59
3.2	Effectiveness of employee involvement-type programmes in the organization.	4.80	5.18	-0.38
3.3	Extent to which employees are held responsible for error-free output.	4.50	5.14	-0.64
3.4	Amount of feedback provided to employees on their quality performance.	4.45	5.23	-0.78

3.5	Degree of participation in quality decisions by hourly/non-supervisory employees.	4.30	4.86	-0.56
3.6	Extent to which building quality awareness among employees is ongoing.	4.85	5.36	-0.51
3.7	Extent to which employees are recognized for superior quality performance.	4.85	5.14	-0.29
3.8	Extent to which processes designed for merit rating, compensation and promotion incorporate performance with respect to quality as a major factor.	4.40	5.00	-0.60
3.9	Aiming at training of all the personnel in the organization.	5.05	5.59	-0.54
3.10	Recognition and appreciation of the efforts and success of individuals and teams in the organization.	4.85	5.45	-0.60
	Overall Mean	**4.71**	**5.25**	**-0.55**

Figure: 5.3

Gap Analysis of Employee Involvement (TM)



The gap between public and private sectors with respect to employee involvement in the TQM process was assessed by top managers on ten parameters. Private sector employees involvement was more than that of public sector in the TQM effort. The overall mean was 4.71 and 5.25 respectively for public and private sectors. The overall mean gap is -0.55. The gap was highest with respect to statement 3.4 (Amount of feedback provided to employees on their quality performance) followed by statement 3.8 and 3.10. Gap analysis with respect to employee involvement reveals that private sector is taking lot of initiatives in this regard.

Table: 5.4

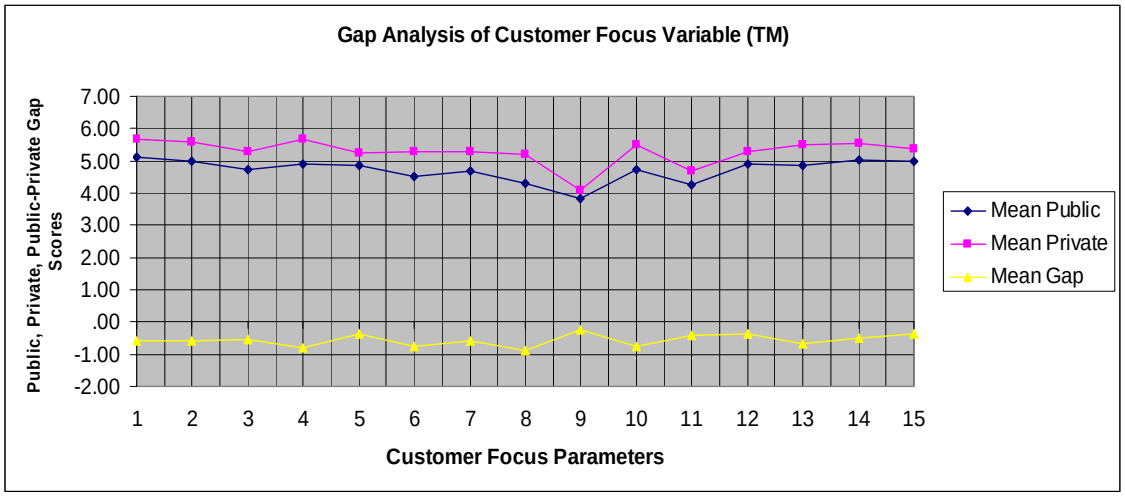
Gap Analysis of Customer Focus (TM)

Sl. No	Statements	Mean		
		Public Sector	Private Sector	Gap
4.1	Establishing valid customer requirements & expectations	5.10	5.68	-0.58
4.2	Development and use of customer satisfaction measures	5.00	5.59	-0.59
4.3	Creating partnerships with key customers	4.75	5.27	-0.52
4.4	Linking customer requirements to the development of new products and services	4.90	5.68	-0.78
4.5	Developing and communicating policies and procedures to remedy service errors	4.85	5.23	-0.38
4.6	Empowering everyone in the organization to delight the customer	4.50	5.27	-0.77
4.7	Gathering continuous feedback from customers	4.70	5.27	-0.57
4.8	Anticipating customers' future needs	4.30	5.18	-0.88
4.9	Offering TQM training to customers	3.85	4.09	-0.24
4.10	Information provided to the customers/consumers through informative labeling, brochures and other product literature	4.75	5.50	-0.75

4.11	Establishing and participating in joint improvement teams with customers	4.25	4.68	-0.43
4.12	On-time delivery	4.90	5.27	-0.37
4.13	Product availability	4.85	5.50	-0.65
4.14	Accessibility of key staff	5.05	5.55	-0.50
4.15	Follow up with the customers	5.00	5.36	-0.36
Overall Mean		**4.72**	**5.28**	**-0.56**

Figure: 5.4

Gap Analysis of Customer Focus (TM)



The gap between public and private sectors with respect to customer focus reveal that private sector scores high on almost all fifteen parameters. The overall mean was 4.72 and 5.28 respectively for public and private sectors. This shows that customer focus is higher in private sector. The overall mean gap is -0.56. This gap is highest with respect to statement 4.8 (Anticipating customers' future needs) followed by statement 4.4 (Linking customer requirements to the development of new products and services).

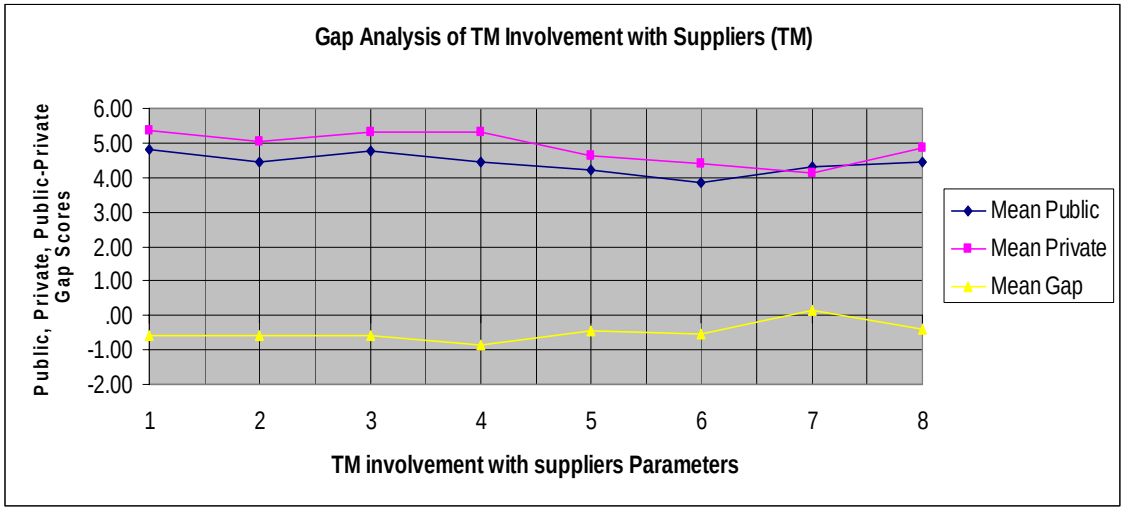
Table: 5.5

Gap Analysis of Involvement with Suppliers (TM)

Sl. No	Statements	Mean		
		Public Sector	Private Sector	Gap
5.1	Establishing and participating in joint improvement teams with suppliers	4.80	5.36	-0.56
5.2	Evaluating, recognizing and rewarding the efforts and achievements of suppliers	4.45	5.05	-0.60
5.3	Involving the supplier in product/ service development process	4.75	5.32	-0.57
5.4	Creating partnerships with key suppliers	4.45	5.32	-0.87
5.5	Anticipating suppliers' future requirements	4.20	4.64	-0.44
5.6	Offering TQM training to suppliers	3.85	4.41	-0.56
5.7	Benchmarking with key suppliers to learn how competitors are operating	4.30	4.14	0.16
5.8	Gathering continuous feedback from suppliers	4.45	4.86	-0.41
Overall Mean		**4.41**	**4.89**	**-0.48**

Figure: 5.5

Gap Analysis of Involvement with Suppliers (TM)



The gap between public and private sectors with respect to involvement of suppliers was evaluated by top managers of the units and it is found that the involvement with suppliers in the quality process is higher in case of private sector. The overall mean was 4.41 and 4.89 respectively for both the sectors. And the overall mean gap is -0.48. The gap is highest with respect to statement 5.4 (creating partnerships with key suppliers) followed by statement 5.2 (evaluating, recognizing and rewarding the efforts and achievements of suppliers). Public sector score is marginally higher than private sector with respect to bench marking with key suppliers (gap = 0.16).

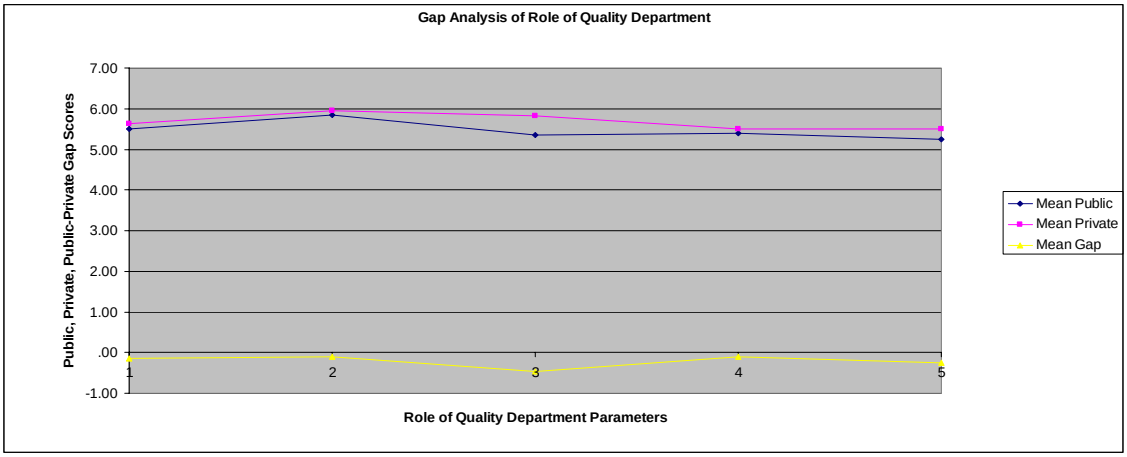
Table 5.6

Gap Analysis of Role of Quality Department (TM)

Sl. No	Statements	Mean		
		Public Sector	Private Sector	Gap
6.1	Visibility of Quality Department.	5.50	5.64	-0.14
6.2	Quality department's access to organizational top management	5.85	5.95	-0.10
6.3	Autonomy of Quality department	5.35	5.82	-0.47
6.4	Amount of co-ordination between the quality department and other departments	5.40	5.50	-0.10
6.5	Effectiveness of the quality department in improving quality	5.25	5.50	-0.25
Overall Mean		**5.47**	**5.68**	**-0.21**

Figure 5.6

Gap Analysis of Role of Quality Department (TM)



Role of Quality Department was assessed on five parameters by the top managers. Gap was highest with respect to autonomy of quality department. Private sector has more autonomy than public sector.

Table 5.7

Gap Analysis of Training (TM)

Sl. No	Statements	Mean		
		Public Sector	**Private Sector**	**Gap**
7.1	Specific work skills training given to hourly employees throughout the organization.	4.70	5.45	-0.75
7.2	Quality-related training given to hourly employees throughout the organization.	4.65	5.41	-0.76
7.3	Quality-related training given to managers and supervisors throughout the division.	5.00	5.36	-0.36
7.4	Training in “total quality concept" throughout the organization.	4.80	5.27	-0.47
7.5	Training in basic statistical techniques in the organization as a whole.	4.75	4.77	-0.02
7.6	Training in advanced statistical techniques in the organization as a whole.	4.30	4.32	-0.02
7.7	Commitment of the organizational top management to employee training.	5.15	5.59	-0.40
7.8	Availability of resources for employee training in the organization.	4.85	5.14	-0.29
Overall Mean		**4.77**	**5.16**	**-0.39**

Gap analysis of the training parameter was done with respect to eight statements. The gap was highest with respect to quality-related training given to hourly employees throughout the organization followed by specific work skills training given to hourly employees throughout the organization.

Figure 5.7

Gap Analysis of Training (TM)

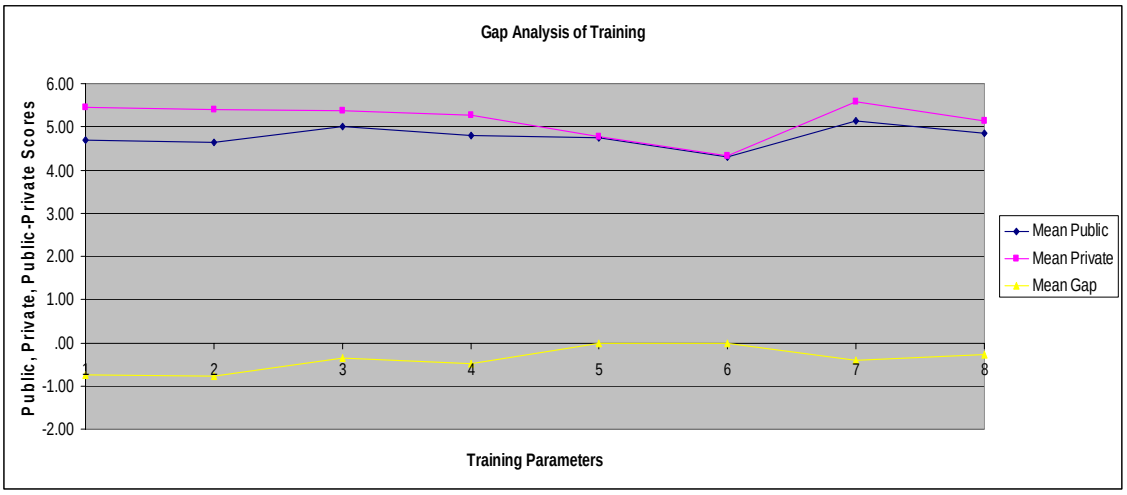


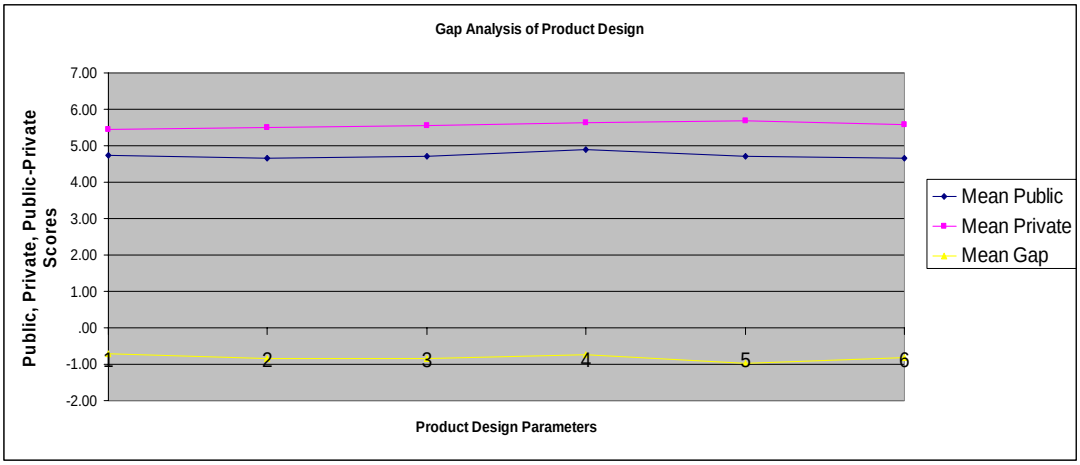
Table 5.8

Gap Analysis of Product Design (TM)

Sl. No.	Statements	Mean		
		Public Sector	Private Sector	Gap
8.1	Thoroughness of new product /service design review before the product/service is produced and marketed.	4.75	5.45	-0.70
8.2	Co-ordination among affected departments in the product/service development process.	4.65	5.50	-0.85
8.3	Quality of new products/services emphasized in relation to cost or schedule objectives.	4.70	5.55	-0.85
8.4	Clarity of product/service specifications and procedures.	4.90	5.64	-0.74
8.5	Extent to which implementation /producibility is considered in the product/service design process.	4.70	5.68	-0.98
8.6	Quality emphasis by sales, customer service, marketing, and PR personnel.	4.65	5.59	-0.82
Overall Mean		**4.72**	**5.56**	**-0.84**

Figure 5.8

Gap Analysis of Product Design (TM)



Product design was evaluated on six statements. The gap was highest with respect to co-ordination among affected departments in the product/service development process and quality of new products/services emphasized in relation to cost or schedule objectives.

Table 5.9

Gap Analysis of Process Management (TM)

Sl. No.	Statements	Mean		
		Public Sector	Private Sector	Gap
9.1	Use of acceptance sampling to accept/reject lots or batches of work.	4.90	5.55	-0.65
9.2	Amount of preventive equipment maintenance.	4.95	5.50	-0.55
9.3	Extent to which inspection, review or checking of work is automated.	4.40	4.68	-0.28
9.4	Amount of incoming inspection, review or checking.	5.15	4.82	0.33
9.5	Amount of in-process inspection, review or checking.	5.15	5.00	0.15
9.6	Amount of final inspection, review or checking.	5.60	5.77	-0.17

9.7	Stability of production schedule/work distribution.	5.05	5.23	-0.18
9.8	Degree of automation in the process.	4.25	4.91	-0.19
9.9	Extent to which process design is "fool-proof" and minimizes the chances of employee errors	4.45	5.23	-0.78
9.10	Clarity of work or process instructions given to employees	4.80	5.45	-0.65
Overall Mean		**4.87**	**5.21**	**-0.34**

Process design variable was assessed on ten statements. The gap was highest with respect to extent to which process design is "fool-proof" and minimizes the chances of employee errors followed by use of acceptance sampling to accept/reject lots or batches of work.

Figure 5.9

Gap Analysis of Process Management (TM)

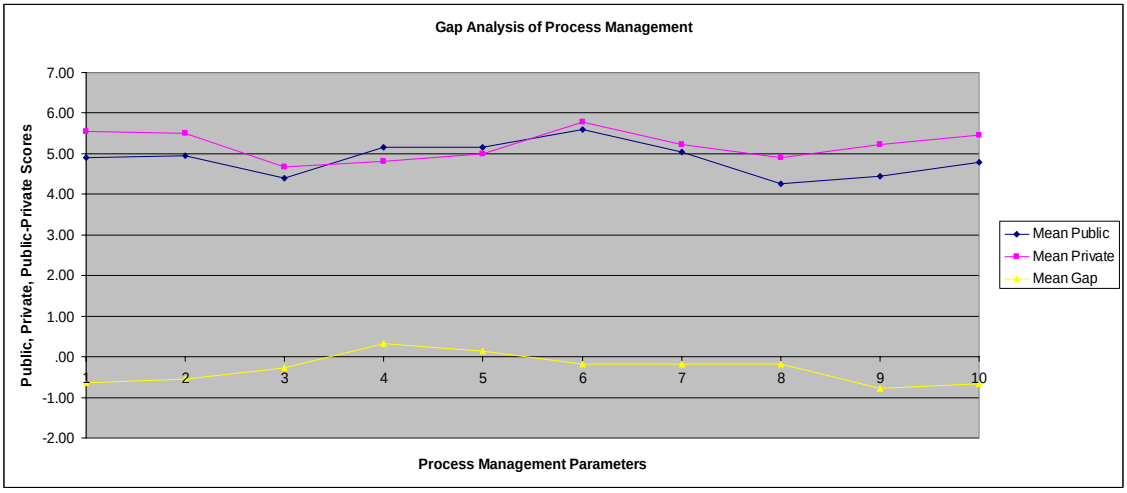


Table 5.10

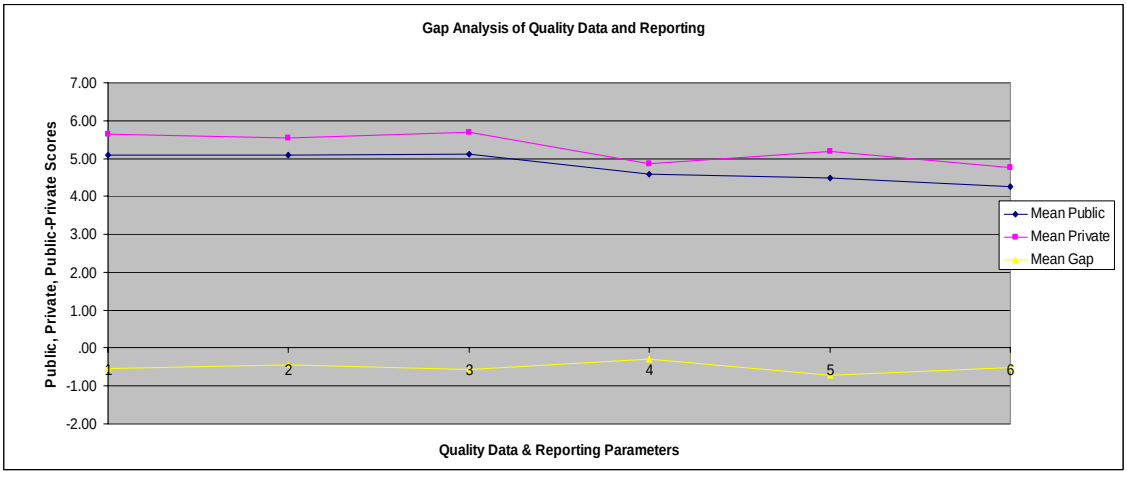
Gap Analysis of Quality Data and Reporting (TM)

Sl. No.	Statements	Mean		
		Public Sector	Private Sector	Gap
10.1	Availability of quality data in the organization.	5.10	5.64	-0.54
10.2	Timeliness of quality data.	5.10	5.55	-0.45
10.3	Extent to which quality data are available to managers and supervisors.	5.11	5.68	-0.58
10.4	Extent to which quality data are used to evaluate supervisorial and managerial performance.	4.58	4.86	-0.28
10.5	Extent to which quality data are displayed at employee work stations.	4.47	5.18	-0.71
10.6	Publication/preparation of booklets, articles, video films and other quality training aids, etc.	4.26	4.77	-0.51
Overall Mean		**4.77**	**5.28**	**-0.51**

Quality data reporting was assessed on six parameters. The gap was highest with respect to extent to which quality data are displayed at employee work stations followed by extent to which quality data are available to managers and supervisors.

Figure 5.10

Gap Analysis of Quality Data and Reporting (TM)



5.3 Gap Analysis – Quality Managers Evaluation

The following tables depict the quality heads evaluation of variables and the gap between public and private sector units.

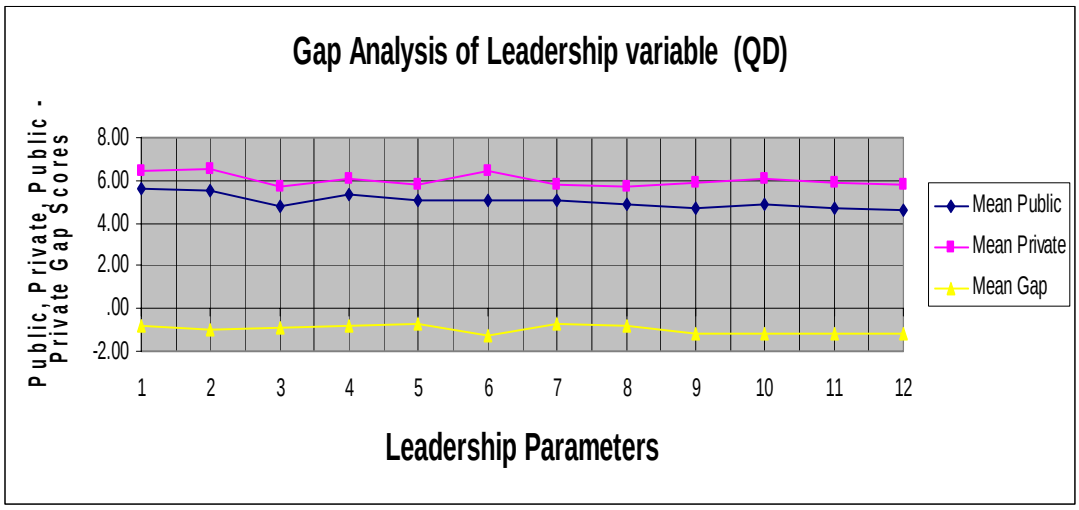
Table: 5.11

Gap Analysis of Leadership (QD)

Sl. No.	Statements	Mean		
		Public Sector	**Private Sector**	**Gap**
1.1	Responsibility for quality performance	5.60	6.40	-.80
1.2	Supports long-term quality improvement process	5.50	6.50	-1.00
1.3	Quality goals and policy are understood within the organization	4.80	5.70	-.90
1.4	Importance attached to quality in relation to cost and schedule objectives	5.30	6.10	-.80
1.5	Frequency of review of quality issues in the meetings	5.10	5.80	-.70
1.6	Degree to which it considers quality improvement as a way to increase profits	5.10	6.40	-1.30
1.7	Participation by major department heads in the quality improvement process	5.10	5.80	-.70
1.8	Comprehensiveness of the goal-setting process for achieving quality within the organization	4.90	5.70	-.80
1.9	Identification and provision of appropriate resources in a timely manner to support total quality	4.70	5.90	-1.20
1.10	Selection of priority quality projects based on customer evaluation of performance	4.90	6.10	-1.20
1.11	Selection of priority quality projects based on reliable data concerning deficiencies in goods and services	4.70	5.90	-1.20
1.12	Selection of priority quality projects based on reliable data concerning the status of internal quality culture	4.60	5.80	-1.20
Overall Mean		**5.03**	**6.01**	**-.98**

Figure: 5.11

Gap Analysis of Leadership (QD)



Gap between public and private sectors with respect to leadership involvement in quality efforts was assessed by heads of quality. Gap analysis pointed that private sector scores higher than public in all parameters and it is high with respect to supporting long-term quality improvement process. The mean response scores are 5.50 and 6.50 respectively for public and private sectors. The overall mean gap is -0.98. The gap is highest with respect to statement 1.6 (degree to which it considers quality improvement as a way to increase profits).

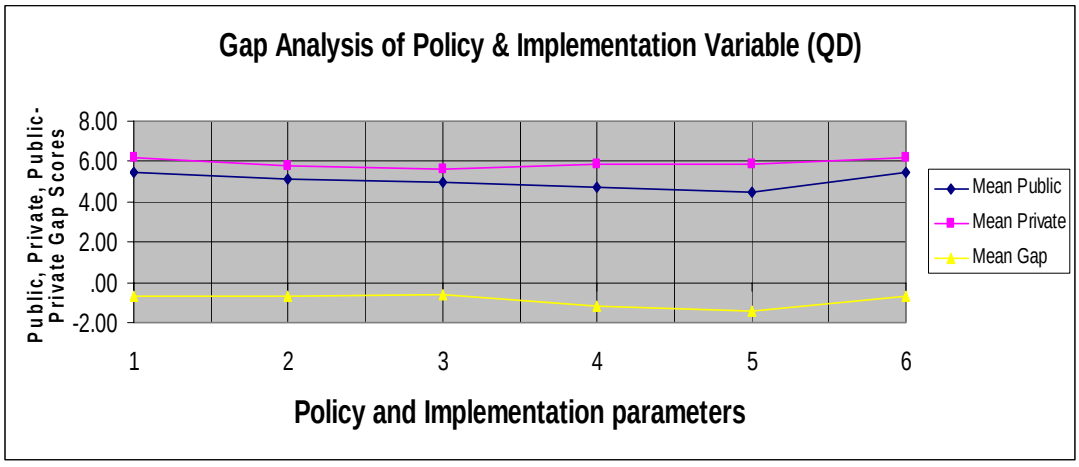
Table: 5.12

Gap Analysis of Policy and Implementation (QD)

Sl. No.	Statements	Mean		
		Public Sector	Private Sector	Gap
2.1	Organization's mission, vision, values, policy and targets are communicated to all the employees.	5.50	6.20	-.70
2.2	Organization's quality vision is the basis for strategic planning and decisions throughout the organization.	5.10	5.80	-.70
2.3	Organization's strategy for quality is based on solid scientific information about customers' needs and satisfaction.	5.00	5.60	-.60
2.4	Quality is an important KRA of all employees.	4.70	5.90	-1.20
2.5	Quality results are benchmarked against the best in the industry.	4.50	5.90	-1.40
2.6	Quality policy/ manual/ procedures are maintained as per Quality Management Systems.	5.50	6.20	-.70
Overall Mean		**5.05**	**5.93**	**-.88**

Figure: 5.12

Gap Analysis of Policy and Implementation (QD)



Gap between policy and implementation was assessed by the quality heads of public and private sector units. Policy and implementation variable was assessed on six parameters and private sector has scored higher than public sector. The overall mean scores are 5.05 and 5.93 respectively for public and private sectors. The overall mean gap is -.88. The gap was highest with respect to statement 2.5 (quality results are benchmarked against the best in the industry) followed by statement 2.4 (quality is an important KRA of all employees).

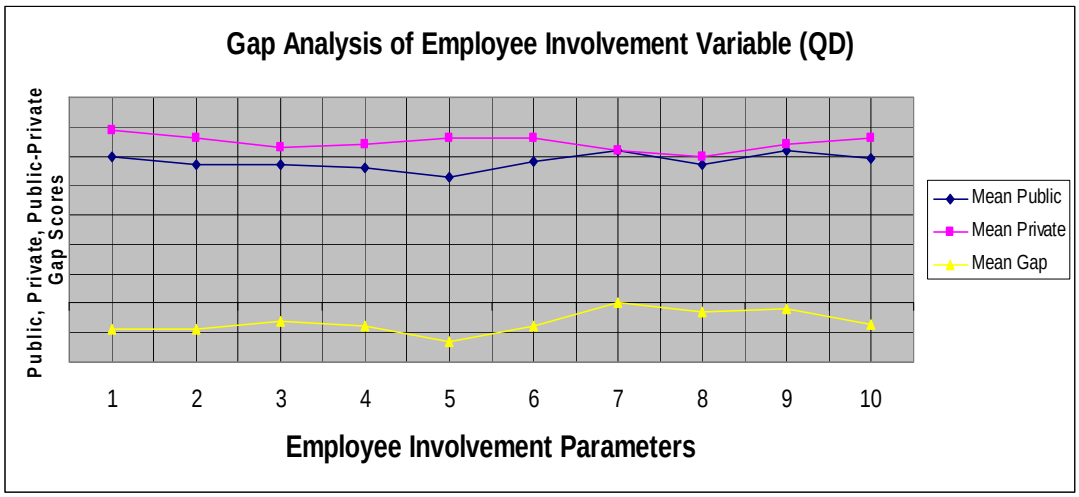
Table: 5.13

Gap Analysis of Employee Involvement (QD)

Sl. No.	Statements	Mean		
		Public Sector	Private Sector	Gap
3.1	Extent to which employee involvement-type programmes are implemented in the organization.	5.00	5.90	-.90
3.2	Effectiveness of employee involvement-type programmes in the organization.	4.70	5.60	-.90
3.3	Extent to which employees are held responsible for error-free output.	4.70	5.30	-.60
3.4	Amount of feedback provided to employees on their quality performance.	4.60	5.40	-.80
3.5	Degree of participation in quality decisions by hourly/non-supervisory employees.	4.30	5.60	-1.30
3.6	Extent to which building quality awareness among employees is ongoing.	4.80	5.60	-.80
3.7	Extent to which employees are recognized for superior quality performance.	5.20	5.20	.00
3.8	Extent to which processes designed for merit rating, compensation and promotion incorporate performance with respect to quality as a major factor.	4.70	5.00	-.30
3.9	Aiming at training of all the personnel in the organization.	5.20	5.40	-.20
3.10	Recognition and appreciation of the efforts and success of individuals and teams in the organization.	4.90	5.60	-.70
	Overall Mean	**4.81**	**5.46**	**-.65**

Figure: 5.13

Gap Analysis of Employee Involvement (QD)



The gap between employee involvement of public and private sectors was assessed by the quality heads and private sector scored high on all nine parameters except one parameter, where it was the same for both the sectors. Extent to which employees are recognized for superior quality performance on this parameters, it was the same score for both public and private sectors. The overall mean was 4.81 for public sector and 5.46 for private sector. The mean gap is -.65. The gap is highest with respect to statement 3.5 (degree of participation in quality decisions by hourly/non-supervisory employees.

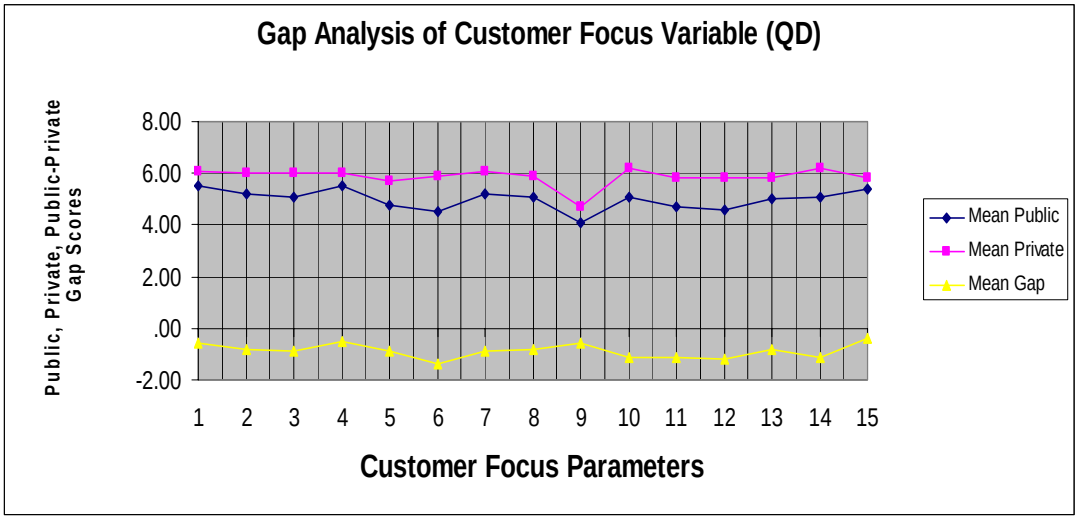
Table: 5.14

Gap Analysis of Customer Focus (QD)

Sl. No.	Statements	Mean		
		Public Sector	**Private Sector**	**Gap**
4.1	Establishing valid customer requirements & expectations.	5.50	6.10	-.60
4.2	Development and use of customer satisfaction measures.	5.20	6.00	-.80
4.3	Creating partnerships with key customers.	5.10	6.00	-.90
4.4	Linking customer requirements to the development of new products and services.	5.50	6.00	-.50
4.5	Developing and communicating policies and procedures to remedy service errors.	4.80	5.70	-.90
4.6	Empowering everyone in the Organization to delight the customer.	4.50	5.90	-1.40
4.7	Gathering continuous feedback from customers	5.20	6.10	-.90
4.8	Anticipating customers' future needs	5.10	5.90	-.80
4.9	Offering TQM training to customers	4.10	4.70	-.60
4.10	Information provided to the customers/ consumers through informative labeling, brochures and other product literature.	5.10	6.20	-1.10
4.11	Establishing and participating in joint improvement teams with customers.	4.70	5.80	-1.10
4.12	On-time delivery	4.60	5.80	-1.20
4.13	Product availability	5.00	5.80	-.80
4.14	Accessibility of key staff	5.10	6.20	-1.10
4.15	Follow up with the customers	5.40	5.80	-.40
	Overall Mean	**4.99**	**5.87**	**-.88**

Figure: 5.14

Gap Analysis of Customer Focus (QD)



The gap between public and private sectors with respect to customer focus was evaluated on fifteen parameters by the quality heads and in most of the aspects private sector scored higher than public sector. The highest score was with respect to accessibility of key staff and information provided to the customers through various means. The overall mean scores are 4.99 and 5.87 respectively for both public and private sectors. The mean gap is -.88. The gap was highest with respect to statement 4.6 (empowering everyone in the organization to delight the customer) followed by statement 4.12 (on-time delivery).

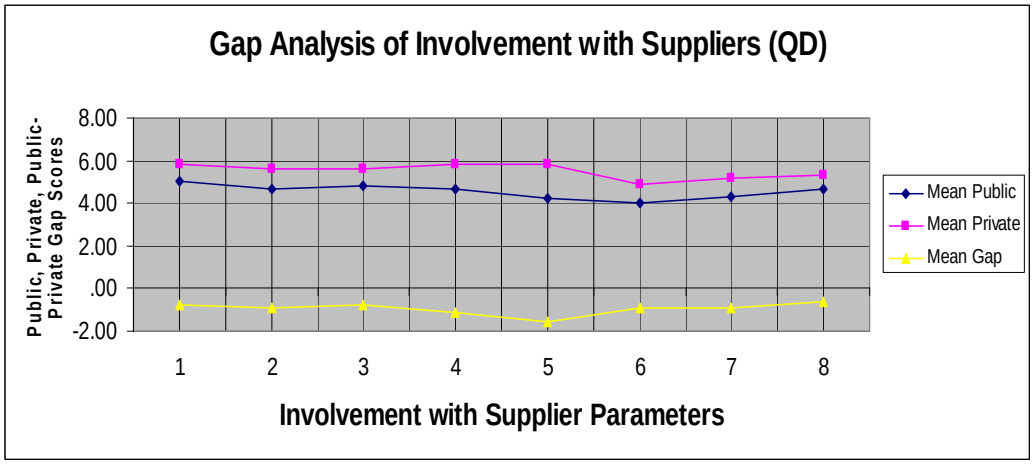
Table: 5.15

Gap Analysis of Involvement with Suppliers (QD)

Sl. No.	Statements	Mean		
		Public Sector	Private Sector	Gap
5.1	Establishing and participating in joint improvement teams with suppliers	5.00	5.80	-.80
5.2	Evaluating, recognizing and rewarding the efforts and achievements of suppliers	4.70	5.60	-.90
5.3	Involving the supplier in product/service development process	4.80	5.60	-.80
5.4	Creating partnerships with key suppliers	4.70	5.80	-1.10
5.5	Anticipating suppliers' future requirements	4.20	5.80	-1.60
5.6	Offering TQM training to suppliers	4.00	4.90	-.90
5.7	Benchmarking with key suppliers to learn how competitors are operating	4.30	5.20	-.90
5.8	Gathering continuous feedback from suppliers	4.70	5.30	-.60
	Overall Mean	**4.55**	**5.50**	**-.95**

Figure: 5.15

Gap Analysis of Involvement with Suppliers (QD)



The gap with respect to involvement with suppliers was evaluated by the quality heads of both public and private sector. Private sector scores high on all parameters. The overall mean scores are 4.55 and 5.50 respectively for both public and private sectors. The mean gap is -.95. The gap was highest with respect to statement 5.5 (anticipating suppliers' future requirements) followed by statement 5.4 (creating partnerships with key suppliers).

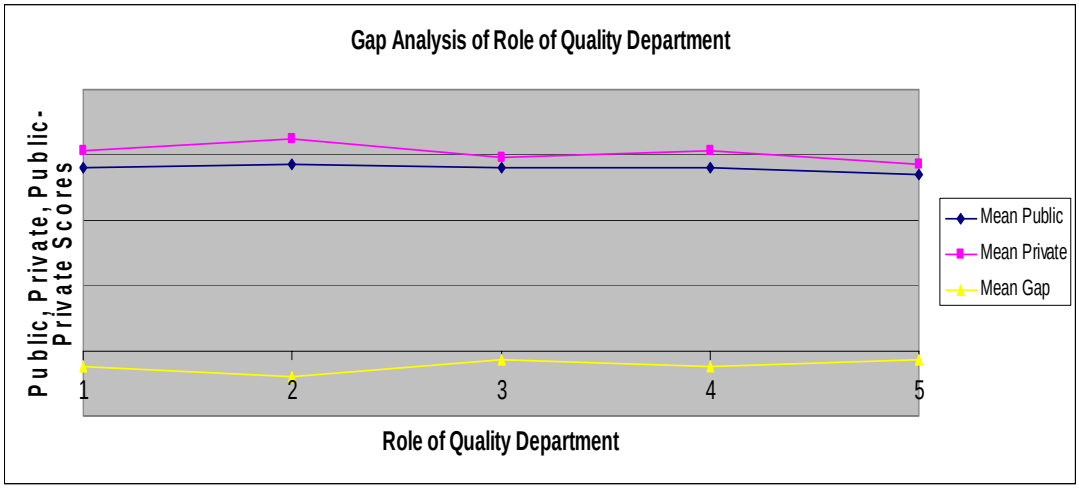
Table 5.16

Gap Analysis of Role of Quality Department (QD)

Sl. No.	Statements	Mean		
		Public Sector	Private Sector	Gap
6.1	Visibility of Quality Department.	5.60	6.10	-.50
6.2	Quality department's access to organizational top management.	5.70	6.50	-.80
6.3	Autonomy of Quality department	5.60	5.90	-.30
6.4	Amount of co-ordination between the quality department and other departments.	5.60	6.10	-.50
6.5	Effectiveness of the quality department in improving quality.	5.40	5.70	-.30
	Overall Mean	**5.58**	**6.06**	**-.48**

Figure 5.16

Gap Analysis of Role of Quality Department (QD)



Gap analysis with respect to role of quality department revealed that the gap was highest with respect to quality department's access to organizational top management followed by visibility of quality department and amount of co-ordination between the quality department and other departments

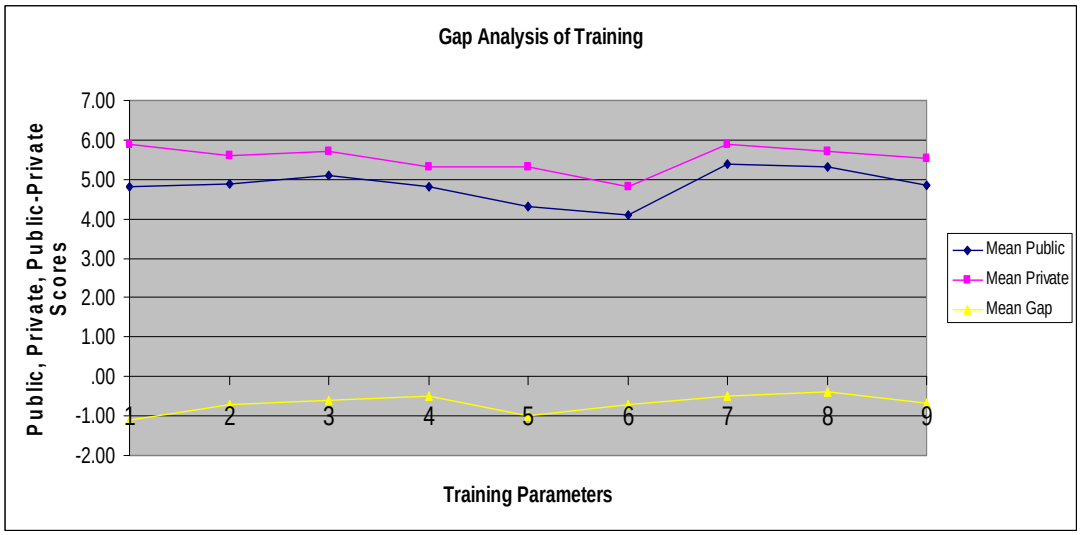
Table 5.17

Gap Analysis of Role of Training (QD)

Sl. No.	Statements	Mean		
		Public Sector	**Private Sector**	**Gap**
7.1	Specific work skills training given to hourly employees throughout the organization.	4.80	5.90	-1.10
7.2	Quality-related training given to hourly employees throughout the organization.	4.90	5.60	-.70
7.3	Quality-related training given to managers and supervisors throughout the division.	5.10	5.70	-.60
7.4	Training in “total quality concept" throughout the organization.	4.80	5.30	-.50
7.5	Training in basic statistical techniques in the organization as a whole.	4.30	5.30	-1.00
7.6	Training in advanced statistical techniques in the organization as a whole.	4.10	4.80	-.70
7.7	Commitment of the organizational top management to employee training.	5.40	5.90	-.50
7.8	Availability of resources for employee training in the organization.	5.30	5.70	-.40
	Overall Mean	**4.84**	**5.53**	**-.69**

Figure 5.17

Gap Analysis of Role of Training (QD)



Gap analysis pertaining to training was assessed on eight parameters. The gap was highest with respect to specific work skills training given to hourly employees throughout the organization followed by training in basic statistical techniques in the organization as a whole.

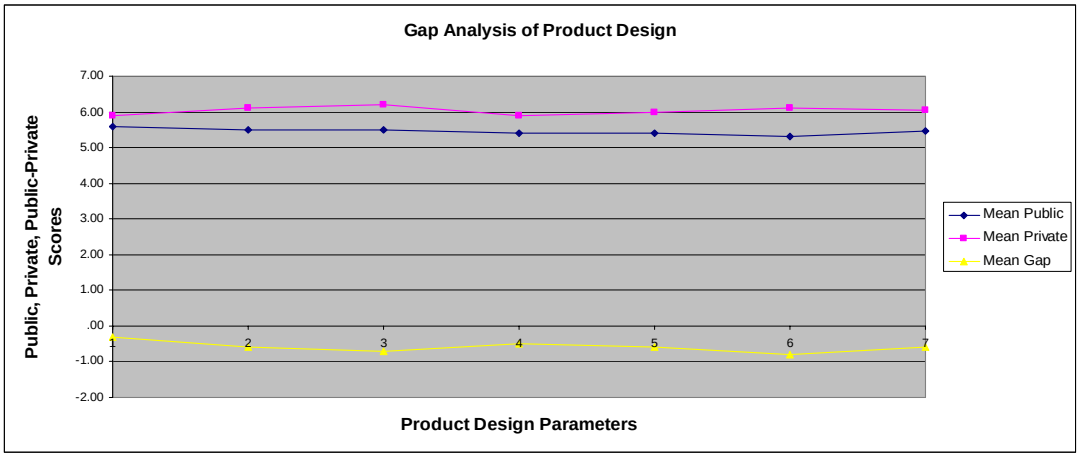
Table 5.18

Gap Analysis of Product Design (QD)

Sl. No.	Statements	Mean		
		Public sector	Private sector	Gap
8.1	Thoroughness of new product /service design review before the product/service is produced and marketed.	5.60	5.90	-.30
8.2	Co-ordination among affected departments in the product/service development process.	5.50	6.10	-.60
8.3	Quality of new products/services emphasized in relation to cost or schedule objectives.	5.50	6.20	-.70
8.4	Clarity of product/service specifications and procedures.	5.40	5.90	-.50
8.5	Extent to which implementation /producibility is considered in the product/service design process.	5.40	6.00	-.60
8.6	Quality emphasis by sales, customer service, marketing, and PR personnel.	5.30	6.10	-.80
	Overall Mean	**5.45**	**6.03**	**-.58**

Figure 5.18

Gap Analysis of Product Design (QD)



Product design was assessed on six parameters. The gap was highest with respect to quality emphasis by sales, customer service, marketing, and PR personnel followed by quality of new products/services emphasized in relation to cost or schedule objectives.

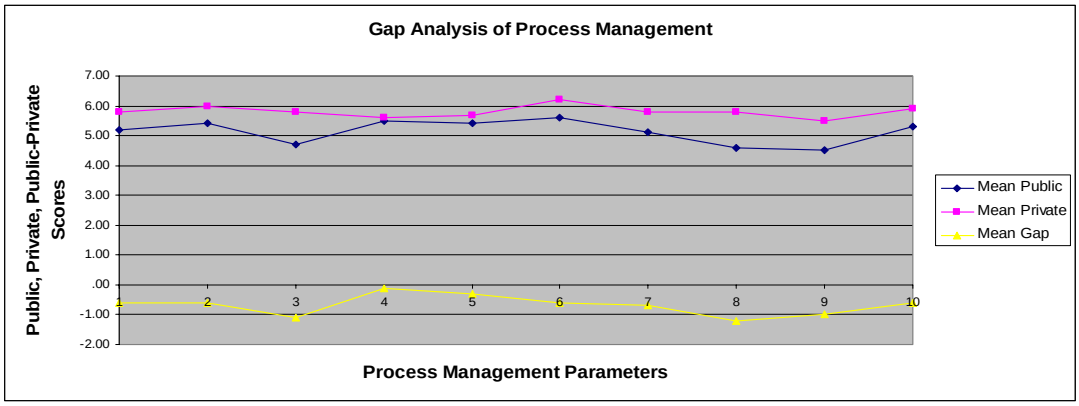
Table 5.19

Gap Analysis of Process Management (QD)

Sl. No.	Statements	Mean		
		Public Sector	Private Sector	Gap
9.1	Use of acceptance sampling to accept/reject lots or batches of work.	5.20	5.80	-.60
9.2	Amount of preventive equipment maintenance.	5.40	6.00	-.60
9.3	Extent to which inspection, review or checking of work is automated.	4.70	5.80	-1.10
9.4	Amount of incoming inspection, review or checking.	5.50	5.60	-.10
9.5	Amount of in-process inspection, review or checking.	5.40	5.70	-.30
9.6	Amount of final inspection, review or checking.	5.60	6.20	-.60
9.7	Stability of production schedule/work distribution.	5.10	5.80	-.70
9.8	Degree of automation in the process.	4.60	5.80	-1.20
9.9	Extent to which process design is "fool-proof" and minimizes the chances of employee errors	4.50	5.50	-1.00
9.10	Clarity of work or process instructions given to employees	5.30	5.90	-.60
	Overall Mean	**5.13**	**5.81**	**-.68**

Figure 5.19

Gap Analysis of Process Management (QD)



Process management was evaluated by quality heads on ten parameters. The gap was highest with respect to degree of automation in the process followed by extent to which inspection, review or checking of work is automated.

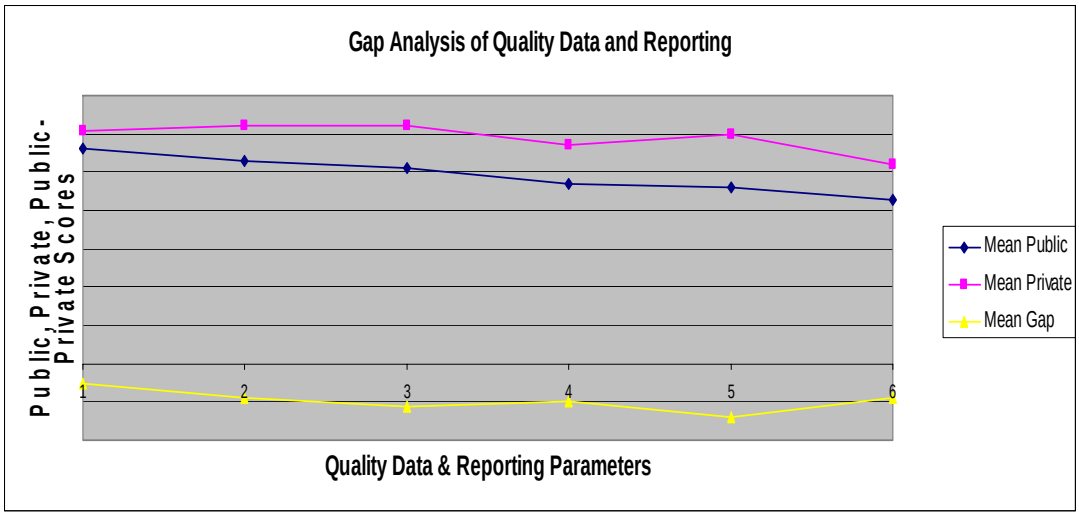
Table 5.20

Gap Analysis of Quality Data and Reporting (QD)

Sl. No	Statements	Mean		
		Public Sector	Private Sector	Gap
10.1	Availability of quality data in the organization	5.60	6.10	-.50
10.2	Timeliness of quality data.	5.30	6.20	-.90
10.3	Extent to which quality data are available to managers and supervisors.	5.10	6.20	-1.10
10.4	Extent to which quality data are used to evaluate supervisorial and managerial performance.	4.70	5.70	-1.00
10.5	Extent to which quality data are displayed at employee work stations.	4.60	6.00	-1.40
10.6	Publication/preparation of booklets, articles, video films and other quality training aids, etc.	4.30	5.20	-.90
	Overall Mean	**4.93**	**5.90**	**-.97**

Figure 5.20

Gap Analyses of Quality Data and Reporting (QD)



Quality data and reporting was assessed on six parameters. The Gap was highest with respect to extent to which quality data are displayed at employee work stations followed by extent to which quality data are available to managers and supervisors.

5.4 Gap Analysis – Employees' Evaluation

The following table projects employee evaluation of variables and the gap between public and private sector units:

Table: 5.21

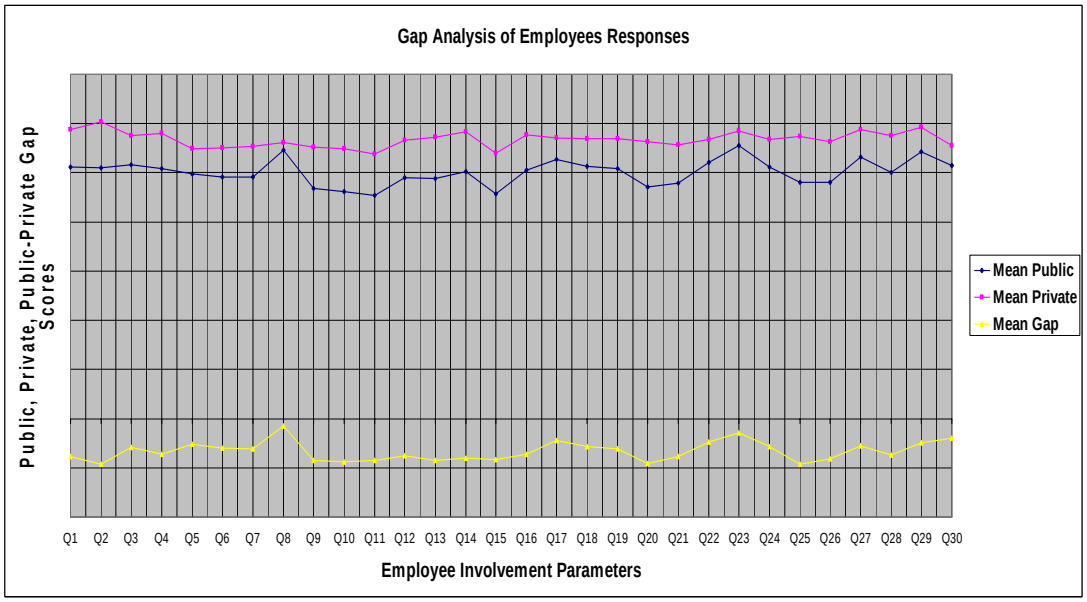
Employees Gap Analysis

Sl. No.	Statements	Mean		
		Public Sector	Private Sector	Gap
1	There is a strong commitment to quality at all levels of this organization.	5.11	5.87	-0.76
2	Continuous quality improvement is an important goal of this organization.	5.10	6.03	-0.93
3	Top management tries to make this organization a good place to work.	5.17	5.75	-0.58
4	Top management sets clear goals for quality improvement.	5.08	5.80	-0.72
5	There is a strong spirit of cooperation in this organization.	4.98	5.50	-0.51
6	We use statistical tools to check on the quality of work or services.	4.91	5.50	-0.59
7	The materials and supplies we need are delivered on time and as ordered.	4.92	5.53	-0.61
8	Our organization has embraced the team concept.	5.47	5.61	-0.15
9	Work problems are being solved through team meetings.	4.67	5.51	-0.84
10	Resources are available for employee training in our organization.	4.61	5.49	-0.87
11	There is some kind of employee training going on in our organization.	4.54	5.39	-0.84
12	I have supplies/ tools/ equipment ,I need to do my work well.	4.90	5.65	-0.75
13	I have new and interesting things to do in my work.	4.88	5.72	-0.84
14	My work challenges me.	5.03	5.83	-0.80
15	Praise and recognition for outstanding performance is given in this organization.	4.56	5.40	-0.83

16	I feel free to discuss problems with my superiors.	5.05	5.77	-0.72
17	I am treated with respect by my superiors.	5.27	5.70	-0.44
18	Employees in this organization treat each other with respect.	5.13	5.69	-0.56
19	I am asked for my inputs.	5.08	5.69	-0.61
20	My superior gives credit to people when they do a good job.	4.71	5.62	-0.91
21	My superior gives me feedback on how well, i am doing.	4.79	5.56	-0.77
22	Co-workers in my work unit are like a family.	5.21	5.68	-0.48
23	I fully understand the goals, policies and objectives of this organization.	5.55	5.84	-0.29
24	The actions of the management are always consistent with the goals, policies and objectives of the organization.	5.11	5.68	-0.57
25	Employees' suggestions and recommendations are welcomed by the management.	4.81	5.74	-0.93
26	The management has a sincere concern for the employees.	4.81	5.62	-0.81
27	The quality of work of in this organization is excellent.	5.32	5.87	-0.55
28	The working conditions in this organization are excellent.	5.01	5.75	-0.74
29	The organization has the best reputation in this area as a good place of work.	5.43	5.92	-0.50
30	If I could find another job with the same pay, I would rather stay here.	5.15	5.54	-0.39
11.1	Productivity	5.53	5.44	0.09
11.2	Cost reduction	4.84	5.26	-0.42
11.3	Quality of service	5.27	5.59	-0.32
11.4	Customer satisfaction	5.50	5.58	-0.08
Overall Mean		**5.04**	**5.65**	**-0.61**

Figure: 5.21

Employees Gap Analysis



Employees of the manufacturing organizations evaluated the TQM practices and the degree of involvement of employees in the TQM effort. The gap was highest with respect to statement 25 (employees suggestions and recommendations are welcomed by the management) and statement 2 (continuous quality improvement is an important goal of this organization) followed by statement 20 (my superior gives credit to people, when they do a good job).

5.5 Gap Analysis – Suppliers Evaluation

The following table projects supplier evaluation of variables and the gap between public and private sector units.

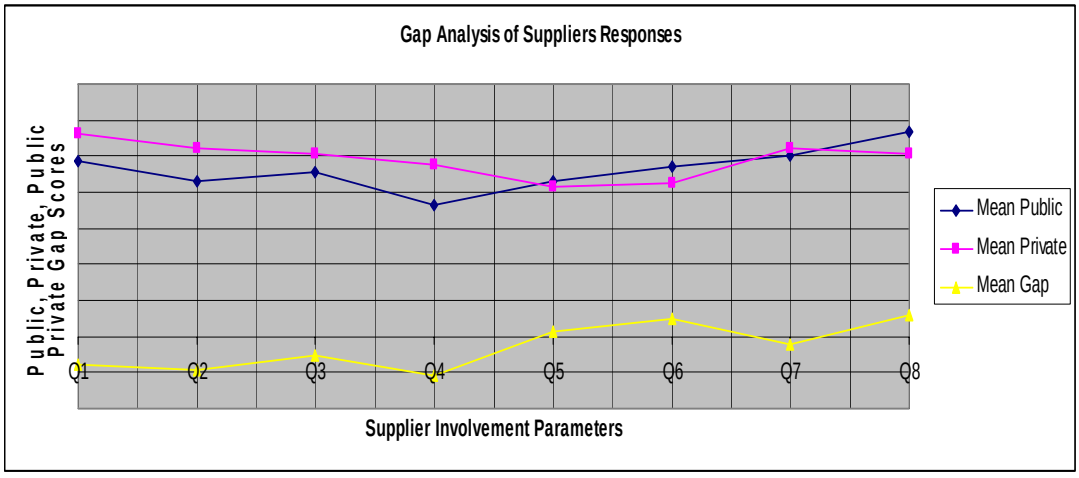
Table 5.22

Suppliers Gap Analysis

Sl. No.	Statements	Mean		
		Public Sector	Private Sector	Gap
5.1	Establishing and participating in joint improvement teams with suppliers	4.86	5.62	-0.76
5.2	Evaluating, recognizing and rewarding the efforts and achievements of suppliers	4.29	5.23	-0.95
5.3	Involving the supplier in product/service development process	4.57	5.08	-0.51
5.4	Creating partnerships with key suppliers	3.67	4.75	-1.08
5.5	Anticipating suppliers' future requirements	4.29	4.15	0.13
5.6	Offering TQM training to suppliers	4.71	4.23	0.48
5.7	Benchmarking with key suppliers to learn how competitors are operating	5.00	5.23	-0.23
5.8	Gathering continuous feedback from suppliers	5.67	5.08	0.59
Overall Mean		**4.63**	**4.92**	**-0.29**

Figure 5.22

Suppliers Gap Analysis



Suppliers of the organization evaluated the TQM practices of the manufacturing organizations. The gap between public and private sectors was maximum with respect to statement 4 (creating partnerships with key suppliers) followed by statement 2 (evaluating, recognizing and rewarding the efforts and achievements of suppliers). Public sector scores marginally higher that private sector with respect to statement 8 (gathering continuous feedback from suppliers).

5.6 Gap Analysis – Customer Evaluation

The following table depicts customer evaluation of variables and the gap between public and private sector units:

Table: 5.23

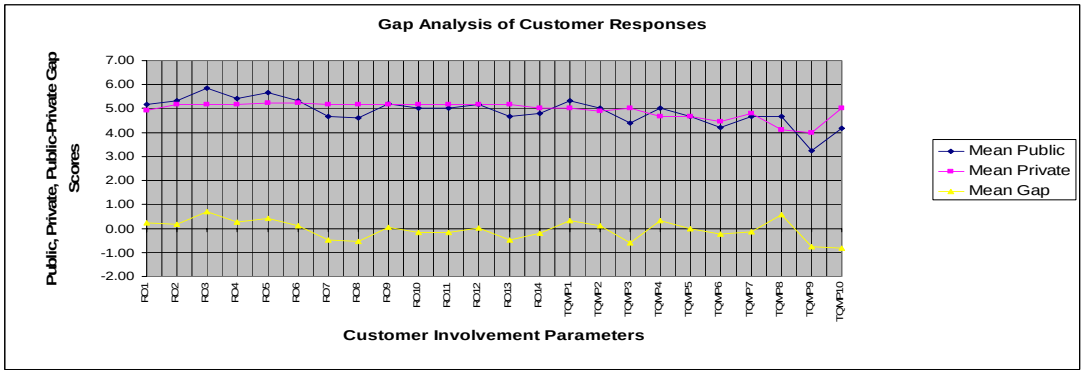
Customers Gap Analysis

Sl. No.	Parameters	Mean		
		Public sector	Private sector	Gap
7.1	Price	5.17	4.92	0.24
7.2	Value for money	5.33	5.15	0.18
7.3	Product quality	5.86	5.15	0.70
7.4	Consistency	5.43	5.15	0.27
7.5	Durability, maintainability and reliability	5.67	5.23	0.44
7.6	Responsiveness, flexibility	5.33	5.23	0.10
7.7	Product training	4.67	5.15	-0.49
7.8	Sales support; and	4.60	5.15	-0.55
7.9	Technical support	5.20	5.15	0.05
7.10	On-time delivery	5.00	5.15	-0.15
7.11	Product availability	5.00	5.15	-0.15
7.12	Accessibility of key staff; and	5.17	5.15	0.01
7.13	Follow up with the customers	4.67	5.15	-0.49

7.14	Redressal mechanism including time of response	4.80	5.00	-0.20
8.1	Establishing valid customer requirements & expectations	5.33	5.00	0.33
8.2	Development and use of customer satisfaction measures	5.00	4.89	0.11
8.3	Creating partnerships with key customers	4.40	5.00	-0.60
8.4	Linking customer requirements to the development of new products and services	5.00	4.67	0.33
8.5	Developing and communicating policies and procedures to remedy service errors	4.67	4.67	0.00
8.6	Empowering everyone in the organization to delight the customer	4.20	4.44	-0.24
8.7	Gathering continuous feedback from customers	4.67	4.80	-0.13
8.8	Anticipating customers' future needs	4.67	4.10	0.57
8.9	Offering TQM training to customers	3.25	4.00	-0.75
8.10	Information provided to the customers/consumers through informative labeling, brochures and other product literature	4.17	5.00	-0.83
	Overall Mean	**4.88**	**4.94**	**-0.06**

Figure: 5.23

Customers Gap Analysis



Customers of the various manufacturing organizations evaluated the TQM practices. The gap between public and private sector was highest with respect to statement 10 (information provided to the customers/consumers through informative labeling, brochures and other product literature) followed by statement 9 (offering TQM training to customers) and statement 3 (creating partnerships with key customers).

5.7 Conclusion

Gap analysis was performed to study the extent of gap between public and private sectors with respect to important variables like Leadership, Policy and Implementation, Employee Involvement, Involvement with Suppliers and Customer Focus. Private sector has outscored the Public sector on most of the parameters.

CHAPTER VI
CRITICAL FACTORS AFFECTING TQM – MANAGERS' PERCEPTIONS

6.1 INTRODUCTION

The present chapter aims to develop and measure managers' perceptions of critical factors affecting TQM. The second half of the chapter will discuss the correlation and examination of interrelationship between TQM factors and performance of study organizations. Factor Analysis was conducted to ascertain the important factors affecting TQM implementation.

Nunnally (1967) and Sellitz *et al.* (1976) postulated that when a measuring instrument is developed, the subjects should be those for whom the instrument is intended. The Quality Manager and the General Manager of a business unit are likely to be the "thought" leaders with respect to quality management in their business unit and therefore their participation was solicited. Since the primary objective of this research is to identify factors that are significant for TQM implementation, quality heads, functional heads, general managers and vice presidents were selected since they are leaders in the TQM implementation process. Totally 60 managers were interviewed for the study, of which 33% of the survey respondents were Quality Managers of the units, while 50% were General Managers and 17% of the respondents were Vice Presidents or Location Heads of the respective units. Each manager evaluated the extent of quality management in his/her business unit by rating each measurement item on a Seven point Likert scale, where 1 indicated very very low and 7 indicated very very high levels. Eighty six statements pertaining to the identified 10 variables (Table 6.3) were evaluated on 7 point scale. Data was then analyzed by using Factor analysis.

Factor analysis provides the tools for analyzing the structure of interrelationships (correlations) among a large number of variables by defining sets of variables that are highly inter-related. Two tests indicate the suitability of the data for structure detection. They are:

i. Kaiser-Meyer-Olkin Measure of Sampling Adequacy.

ii. Bartlett's Test of Sphericity.

6.2 The Kaiser-Meyer-Olkin Measure of Sampling Adequacy is a statistic that indicates the proportion of variance in your variables that might be caused by underlying factors.

High values (close to 1.0) generally indicate that a factor analysis may be useful with your data. If the value is less than 0.50, the results of the factor analysis probably won't be very useful.

6.3 Bartlett's test of sphericity tests the hypothesis that your correlation matrix is an identity matrix, which would indicate that your variables are unrelated and therefore unsuitable for structure detection

Small values (less than 0.05) of the significance level indicate that a factor analysis may be useful with data.

The results for the above tests in case of **public sector** are as follows:

Table 6.1

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.866
Bartlett's Test of Sphericity	Approx. Chi-Square	281.714
	df	45
	Sig.	.000

The results for the above tests in case of **private sector** are as follows:

Table 6.2

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.856
Bartlett's Test of Sphericity	Approx. Chi-Square	328.489
	df	45
	Sig.	.000

The 10 variables instrument was subject to principal component varimax rotation. Communalities indicate the amount of variance in each of the ten variables that is

accounted for. Extraction communalities are estimates of the variance in each variable accounted for by the components. The communalities of the ten variables included in the study are all high, which indicates that the extracted components represent the variables well Table 6.4. The VARIMAX rotated factor matrix for the 10 variables is presented in Table 6.5 and 6.6. The factor loadings are given in Table 6.7 and 6.8. This analysis indicates that TQM implementation clusters around four factors in public sector and three factors in private sector. These factors are fundamental to the implementation of TQM process.

As indicated in the table (refer table 6.5) four components or factors were identified to explain the variable to the tune of 90.7 per cent i.e., these 10 variables are significantly organized around 'four factors' and these four factors incorporate the holistic paradigm of TQM practices in the public sector with nearly 91 per cent explanation to the TQM practices. The first component or factor is most highly correlated with Training (X_7), Employee involvement (X_3) and Quality data and reporting (X_{10}). This factor accounted for nearly 70.64 per cent of the total variance suggesting that these factors are extremely important in implementation of TQM practices. "TQM begins and ends with education and training" (Ishikawa). Deming (1986) stresses the importance of education and training for continual updating and improvement. Education and training are one of the most important elements in successful implementation of TQM (Mann, 1992). The present research confirms that education and training are an integral and essential part of the TQM initiative. Investment in education and training is vitally important for TQM success. Employees should be regarded as valuable, long-term resources, worthy of receiving education and training throughout their career. (Zhang 2000)

Employee involvement in quality efforts improves the level of quality. Participation is decisive in inspiring action on quality improvement (Juran and Gryna, 1993). Involvement may enable the employees to improve their personal capabilities, increase their self-respect and commit themselves to the success of their organizations. Methods such as cross-functional teams, quality circles, voluntary teams, and suggestion activities can be used for encouraging employee participation.

Availability and the use of quality data is an essential ingredient of a strong quality programme (Deming, Juran, Crosby). The Malcolm Baldrige Award also places lot of importance on availability and use of quality data to employees and managers.

The second component is most highly correlated with Product/service design (X_8), Top management involvement with suppliers (X_5) and Customer focus (X_4), accounting for 8.15 per cent of the total variance. Product design is an important dimension of quality management. For complex products, errors during product development cause about 50 per cent of fitness-for-use problems (Juran and Gryna, 1993). Sound product design gives the company a strong competitive edge over the others.

Supplier quality management is an important aspect of TQM and organizations should establish long-term co-operative relations with their suppliers, often participate in supplier quality activities, have detailed information concerning supplier performance, give feedback on the performance of suppliers' products, regularly conduct supplier quality audits, and regard product quality as the most important factor for selecting suppliers.

To achieve quality, it is essential to know what customers want and to provide products or services that meet their requirements (Ishikawa, 1985). The customer should be closely involved in the product design and development process; with inputs at every stage of the process so that there is less likelihood of quality problems once full production begins (Flynn et al., 1994). The ultimate measure of company performance is customer satisfaction, which may very well predict the future success or failure of an organization (Kanji and Asher, 1993).

The third component is most highly correlated with Policy and implementation (X_2) and Leadership (X_1), accounting for 6 per cent of the total variance. Organization's vision, mission and quality policy are its reflections towards its quality commitment. They play an important role in the quality effort of an organization. Leadership is one of the essential pre-requisites of a TQM programme. High levels of quality performance have always been accompanied by an equally high organizational commitment to the goal.

Finally, the fourth component is most highly correlated with Role of quality department (X_6) and Process management/operating procedures (X_9), accounting for remaining 5.85 per cent of the total variance. The quality department should be visible, autonomous and have direct access to top management for effective implementation of TQM practices. A key part of any total quality strategy is the management of processes. Good process management plays an important role in improving the level of quality.

In case of private sector, three components or factors were identified to explain the variable to the tune of 87.1 per cent, i.e., these 10 variables are significantly organized around 'three factors' and these three factors incorporate the holistic paradigm of TQM practices with nearly 87 per cent explanation to the TQM practices. The first factor is highly correlated with Quality data and reporting, Process management, Leadership, Product and service design, Training, Involvement with Suppliers and Policy and Implementation. These factors account for Seventy percent variance.

The second factor is highly correlated with Role of quality department and customer focus.

The third factor is highly correlated with Employee involvement accounting for five percent variance.

Table 6.3

Critical Dimensions Identified for TQM Practices

Sl. No.	Item	Definitions
1	Leadership (X_1)	Acceptance of quality responsibility by general managers and department heads; evaluation of top management on quality; participation by top management in quality improvement efforts; specificity of quality goals; importance attached to quality in relation to cost and schedule and competitive quality planning.
2	Policy and implementation (X_2)	The organization's mission, values, vision and strategies related to Total Quality.
3	Employee involvement (X_3)	Implementation of employee involvement and quality circles; employee participation in quality decisions openly; responsibility of employees for quality; recognition for superior quality performance.
4	Customer focus (X_4)	The organization's identification of customers' needs; and achievements as perceived by the customer.
5	Involvement with suppliers (X_5)	Fewer dependable suppliers; reliance on supplier process control; strong interdependence of supplier and customer; purchasing policy emphasizing quality rather than price; supplier assistance in product development.

6	Role of quality department (X_6)	Visibility and autonomy of the quality department; the quality. Department's access to top management; use of quality staff for consultation; coordination between quality department and other departments; effectiveness of quality departments.
7	Training (X_7)	Provision for statistical training, trade training, and quality related training for all employees.
8	Product Design (X_8)	Thorough scrub-down process; involvement of all affected departments in design reviews; emphasis on producibility; clarity of specification; emphasis on quality, not roll-out schedule; avoidance of frequent redesigns.
9	Process management/ operating procedures (X_9)	Clarity of process ownership, boundaries, and steps; less reliance on inspection; use of statistical process control; selective automation; foolproof process design; preventive maintenance; employee self-inspection.
10	Quality data and reporting (X_{10})	Use of quality cost data; feedback of quality data to employee and managers; timely quality measurement; evaluation based on quality performance; quality data availability.

Source: Saraph *et al.*'s (1989), Rajiv Gandhi National Quality Award (2007)

Table 6.4

Extraction Communalities of TQM practices of Selected Public and Private Organizations in Karnataka

Variable	Communality-Extraction (public sector)	Communality- Extraction (private sector)
Leadership (X_1)	0.888	0.831
Policy and implementation (X_2)	0.890	0.878
Employee involvement (X_3)	0.858	0.940
Customer focus (X_4)	0.924	0.868
Involvement with suppliers (X_5)	0.908	0.841
Role of quality department (X_6)	0.929	0.918
Training (X_7)	0.924	0.886
Product Design (X_8)	0.955	0.754
Process management / operating procedures (X_9)	0.911	0.892
Quality data and reporting (X_{10})	0.884	0.905

Extraction: Principal Component Analysis.

Table 6.5

Factor Analysis - Total Variance Explained and Identification of Components (Public Sector)

Components/Factors	Extraction Loadings		
Component	Eigen values	% of Variance	Cumulative %
I	7.064	70.64	70.64
II	0.815	8.15	78.79
III	0.608	6.08	84.86
IV	0.585	5.85	90.71
V	0.261	2.69	93.32
VI	0.228	2.28	95.60
VII	0.166	1.66	97.26
VIII	0.148	1.48	98.74
IX	0.068	0.68	99.42
X	0.058	0.58	100.00

Extraction Method: Principal Component Analysis.

Rotation: Varimax Method

It is obvious from the above Table 6.5 that Factor-I is able to explain the variance in the resultant variable to an extent of 70 percent, followed by second, third and fourth factors. Thus, more than 90 percent variation is explained by the four factors. Hence, the policy makers of the study, public sector organizations should keep in the mind about these four factors while designing the Quality policy.

Table 6.6

Factor analysis - Total Variance Explained and Identification of Components (Private Sector)

	Initial Eigen values		
Component	**Total**	**% of Variance**	**Cumulative %**
1	7.004	70.036	70.036
2	1.130	11.303	81.339
3	.579	5.791	87.130
4	.435	4.354	91.485
5	.311	3.112	94.597
6	.198	1.982	96.579
7	.142	1.422	98.001
8	8.051E-02	.805	98.806
9	7.165E-02	.716	99.522
10	4.777E-02	.478	100.000

The factor analysis of private sector organizations reveals that the first factor is able to explain the variance to the extent of 70 percent, followed with second, third and fourth with 11, 5, and 4 percent respectively. 95 percent of variance is explained by five factors. Therefore, the top managements of these organizations should keep in mind these five factors, while designing the Quality Policy.

Table 6.7

Rotated component Matrix (Factor loadings) (Public Sector)

	Component/Factors			
	I	II	III	IV
Training (X_7)	0.829			
Employee involvement (X_3)	0.782			
Quality data and reporting (X_{10})	0.769			
Product Design (X_8)		0.795		
Involvement with suppliers (X_5)		0.736		
Customer focus (X_4)		0.606		
Policy and implementation (X_2)			0.807	
Leadership (X_1)			0.781	
Role of quality department (X_6)				0.866
Process management / operating procedures (X_9)				0.624

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Rotation converged in 7 iterations.

Table 6.8

Rotated component Matrix (Factor loadings) (Private Sector)

	Component/Factors		
	I	II	III
Quality data and reporting (X_{10})	0.867		
Process management / operating procedures (X_9)	0.851		
Leadership (X_1)	0.830		
Product Design (X_8)	0.823		
Involvement with suppliers (X_5)	0.817		
Training (X7)	0.817		
Policy and implementation (X_2)	0.786		
Role of quality department (X6)		0.894	
Customer focus (X4)		0.819	
Employee involvement (X3)			0.818

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Rotation converged in 7 iterations.

Figure 6.1

Factors Affecting TQM Implementation in Public Sector Units

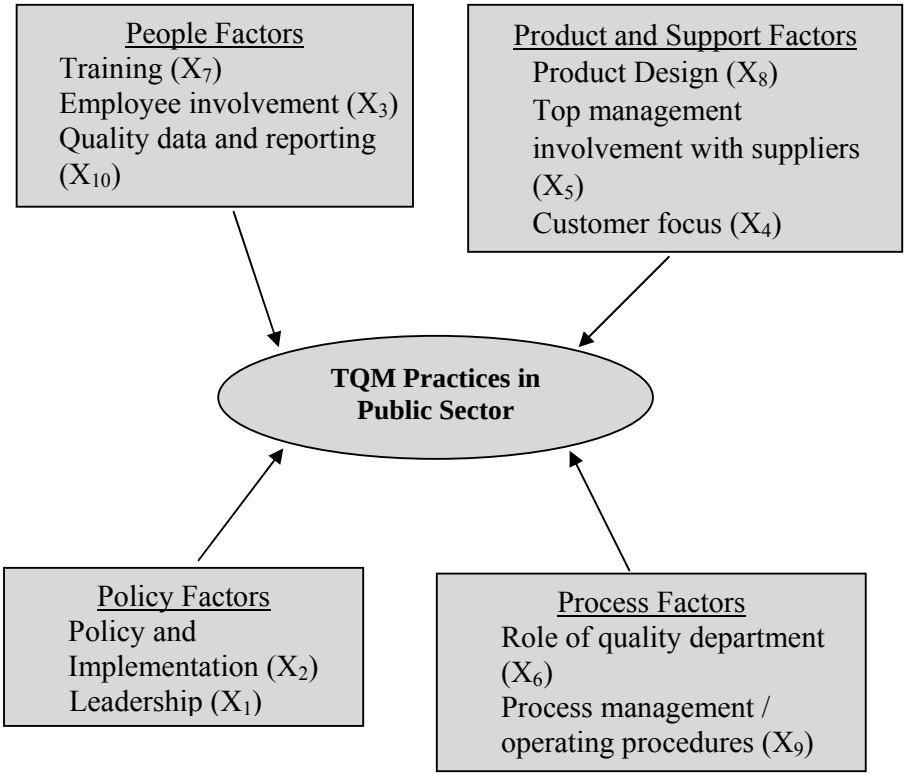
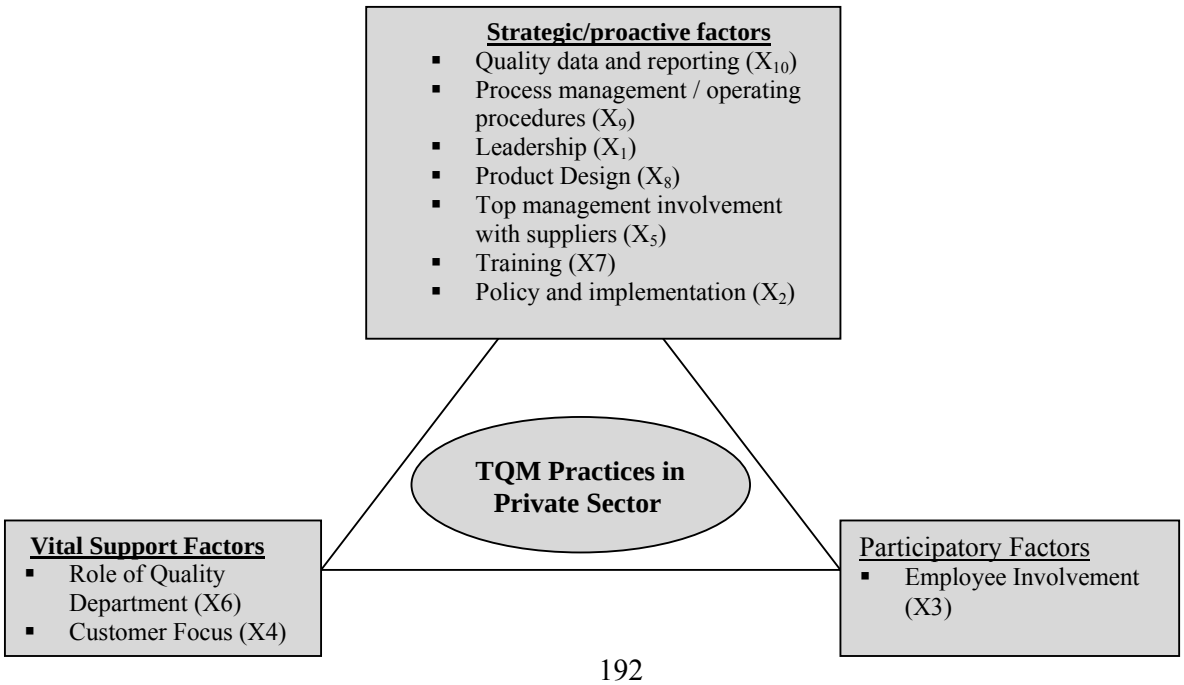


Figure 6.2

Factors Affecting TQM Implementation in Private Sector Units



A comprehensive review of TQM literature revealed ten important factors for effective TQM implementation. As far as the implementation of these 10 factors in public sector manufacturing units is concerned, the researcher has placed these ten variables under 4 factors which could be classified as People factors, Product factors, Policy Factors and Process factors. The extremely important factors calling for immediate attention are People factors comprising of Training, Employee involvement and Quality data and reporting. The second set of factors which are very important are Product Factors comprising of Design, Involvement with suppliers and customer focus. Factors which are moderately important are policy and implementation and leadership and the last set of factors which are important are Role of quality department and process management procedures. In case of the private sector the ten variables were categorized under three heads, namely, strategic factors, vital support factors and participative factors.

An integration and strong emphasis of all the above factors will lead the effective implementation of TQM practices in both the sectors.

6.4 Relationship Among TQM Parameters – Comparison Between Public and Private Organizations

Correlation provides answers to three basic questions about two variables or two sets of data in a research. First it tells, whether there is any relationship between two variables and if so, what is the direction of relationship and subsequently the magnitude of the relationship.

Correlation Analysis of TQM With Various Groups

For examining the inter-relationship between TQM and various parameters in public and private sector units separately for the leadership and quality management groups, correlation coefficient was calculated.

The variables included for identifying the relationship with TQM are leadership (X_1), policy and implementation (X_2), employee involvement (X_3), customer focus (X_4), to Involvement with suppliers (X_5), role of quality department (X_6), training (X_7), product design (X_8), process management / operating procedures (X_9) and quality data and reporting (X_{10}).

The combined TQM parameters, viz., Productivity, Cost reduction, Quality of service and Customer satisfaction, were correlated with various organizational and other factors, which influence the implementation of TQM in the top management category.

6.4.1 Quality Managers –Private sector

From the correlation matrix (Appendix A6), it is evident that there exists significant association between leadership and customer focus (.7216). We can also observe that there is significant association between leadership and TQM assessment. From this, we can infer that higher the emphasis on leadership variable, better the impact of TQM in terms of productivity, quality of service and customer satisfaction.

With respect to policy and implementation variable, we observe that there exists significant association of policy and implementation variable and Involvement with suppliers (.7388) as also role of quality department (.6625) and training (.6625). Higher emphasis of policy and implementation variable will result in better performance/ role of quality department and training and better ties with suppliers.

With respect to employee involvement, we observe that there are no significant associations of employee involvement variable with other variables in private sector.

In case of customer focus variable, we find that there exists significant association of customer focus variable with involvement with suppliers (.8870), role of quality department(.9216), training (.9216) , Process management and operating procedures(.70) and quality data and reporting(.7276).

In case of involvement with suppliers, there exists significant association with the role of quality department (.9749), training (.9749), process management and operating procedures (.7519) and quality data and reporting (.6787). Higher supplier involvement will result in better performance of these associated variables.

With respect to role of quality department, there exists significant association with process management and operating procedures (.7724) and quality data and reporting (.7366). Better functioning of quality department would ensure better process management and operating procedures and quality data and reporting.

With respect to role of training, we observe that there exists significant association with process management and operating procedures (.7724) and quality data and reporting (.7366).

With respect to process management and operating procedures, there is significant association with quality data and reporting and it has significant impact on the TQM assessment. Higher emphasis on this variable will result in better productivity, quality of service and customer satisfaction.

With respect to quality data and reporting, we observe significant association of this variable with TQM assessment.

6.4.2 Quality Management Group -Public Sector

In this case (Appendix A7,) we observe a significant association of leadership variable with policy and implementation (.8796), customer focus (.8157) and quality data and reporting (.7675).

In case of policy and implementation variable, we find a significant association of this variable with customer focus (.7254), role of quality department (.7299), training (.7299) and quality data and reporting (.8512).

Employee involvement shows significant association with involvement with suppliers (.6731), role of quality department (.9070), training (.9070), quality data and reporting (.6745) and TQM assessment (.6639).

With respect to customer focus, we observe significant association of this variable with process management (.6663) and quality data and report (.6991).

With respect to involvement of supplier, we observe that there is a significant association of this variable with role of quality department (.6720), training (.6720) and quality data and reporting (.7665).

As regards to the role of quality department, we find significant association of this variable with quality data and reporting (.7358) and TQM assessment (.7441).

Training variable has a significant association with quality data and reporting (.7358) and TQM assessment (.7441)

6.4.3 Top Management - Public Sector

In this case (Appendix A8), we observe that leadership variable is significantly associated with most of the factors except employee involvement and customer focus on all the other variables, i.e., involvement with suppliers, role of quality department, training, product/ service design, process management, quality data and reporting, there is high significant and TQM assessment positive association. This proves that higher emphasis on leadership will result in better functioning of these variables in public sector.

In case of policy and implementation, we observe significant association with involvement of suppliers (.6209), training (.5493) product service design (.7420), process management (.7382) quality data and reporting (.5623) and TQM assessment (.7082).

In case of employee involvement, we observe significant and positive association only with involvement of suppliers (.8641).In other cases, we observe a negative relationship.

In case of customer focus, we observe significant association with role of quality department (.9519). In case of other variables, there is an inverse relationship.

In case of involvement of suppliers, we observe positive and significant association with training, product service design, process management, quality data and reporting and TQM assessment.

Training variable is significantly associated with product service design process management, quality data and reporting and TQM assessment.

Product service design variable is associated with process management operating procedures, quality data and reporting and TQM assessment.

Process management, operating procedures is significantly associated with quality data and reporting and TQM assessment.

6.4.4 Top Management -Private Sector

In private sector (Appendix A9), we find leadership variable significantly associated with all variables except employee involvement. Leadership influences and impacts all the other variables in private sector.

In case of policy and implementation, we observe significant association of this variable with all the other variables.

With respect to employee involvement, there is significant association with all the variables except involvement with suppliers (.3883) and process management operating procedures (.3326). This proves that high employee involvement may not have significant impact on these variables.

With respect to customer focus, we find significant association of this variable with all the variables except process management and operating procedures (.3738).

Involvement of suppliers has significant association with all the variables except role of quality department (.3227).

Role of quality department has significant association with training and quality data and reporting.

Training has significant association with all the variables higher emphasis on training will result in better functioning of the other variables.

Product service design has significant association with process management operating procedures, quality data and reporting and TQM assessment.

Quality data and reporting has significant impact on TQM assessment.

We observe that almost all the variables in case of private sector have positive and significant impact on the TQM assessment score. A higher emphasis on these variables will result in better quality, productivity and customer satisfaction.

6.4.5 Employees

1. Thirty employee related variables were examined in order to identify association between the perception of employee and TQM
2. The list of variables is seen from the table given below.

Table 6.9

Correlation of TQM Assessment with various Parameters in Public and Private Sectors among Employees

Sl No	Statements	Public Sector	Private Sector
1.	Strong commitment to quality at all levels of this organization.	0.5979*	0.6051*
2.	Continuous quality improvement is an important goal organization.	0.6027*	0.6239*
3.	Top management tries to make this organization a good place to work.	0.6367*	0.4976*
4.	Top management sets clear goals for quality improvement.	0.6662*	0.7250*
5.	There is a strong spirit of cooperation in this organization	0.5392*	0.6806*
6.	We use statistical tools to check on the quality of work or services.	0.5522*	0.6173*
7.	Materials & supplies that we need are delivered on time and as ordered.	0.5590*	0.4105*
8.	Our organization has embraced the team concept.	0.2198	0.6760*
9.	Work problems are being solved through team meetings.	0.4987*	0.6246*
10.	Resources are available for employee training in our organization.	0.5443*	0.4969*
11.	Some kind of employee training going on in our organization.	0.5101*	0.5665*
12.	I have supplies/ tools/ equipment i need to do my work well.	0.5949*	0.5712*
13.	I have new and interesting things to do in my work.	0.4161*	0.5275*
14.	My work challenges me.	0.4234*	0.6937*
15.	Praise and recognition for outstanding performance is given.	0.5021*	0.6280*
16.	I feel free to discuss problems with my superiors.	0.5099*	0.5427*

17.	I am treated with respect by my superiors.	0.4640*	0.4745*
18.	Employees in this organization treat each other with respect.	0.5823*	0.6098*
19.	I am asked for my inputs.	0.6633*	0.6642*
20.	My superior gives credit to people, when they do a good job.	0.6628*	0.6400*
21.	My superior gives me feedback on how well i am doing.	0.5725*	0.6845*
22.	Co-workers in my work unit are like a family.	0.4739*	0.5052*
23.	I fully understand the goals, policies and objectives of organization.	0.4541*	0.5464*
24.	The actions of the management are always consistent with the goals, policies and objectives of the organization.	0.7014*	0.5633*
25.	Employees suggestions and recommendations are welcomed by the management.	0.5457*	0.5570*
26.	The management has a sincere concern for the employees.	0.5683*	0.5833*
27.	The quality of work in this organization is excellent.	0.5823*	0.6821*
28.	The working conditions in this organization are excellent.	0.5478*	0.7263*
29.	The organization has the best reputation in this area as a good place of work.	0.3744*	0.5826*
30.	If I could find another job with the same pay, I would rather stay here.	0.4668*	0.5602*

Except the statement that the organization has embraced the team concept in public sector units all the variables were found to have significant and positive relationship with TQM.

Top management commitment, training, work environment, organizational culture, relationship with superiors and peers have found to have significant effect on the TQM performance of the company from the employees perspective. Most of the variables were found to have significant and positive relationship with TQM. Employee relations, including empowerment in decision-making, proper recognition and compensation and team work are asserted to impact the firms' performance. Investment made in employee training and development, efficient communication mechanisms, employee work environment, flexibility and safety and employees' satisfaction can make a significant contribution to the TQM process. The study offers significant statistical support in this regard.

6.5 Conclusion

A comprehensive review of TQM literature revealed ten important factors for effective TQM implementation. As far as the implementation, these factors in public sector manufacturing units are concerned; the factors were classified and labeled as People Factors, Product Factors, Policy Factors and Process Factors. In case of the private sector the ten variables were categorized under three heads, namely, Strategic Factors, Vital support factors and Participative factors. An integration and strong emphasis of all the above factors will lead the effective implementation of TQM practices in both the sectors.

Correlation analysis performed revealed that:

The common parameters, which were found to influence the TQM practices positively and significantly in both public sector and private units were Leadership(X1), Policy and its implementation (X_2), involvement with suppliers (X_5), Training (X_7), Product/service design (X_8), Process management / operating procedures (X_9) and Quality data and reporting (X_{10}). This implies that higher level of these parameters could positively influence in the TQM parameters i.e, higher productivity, lower cost of production, better quality of service and higher consumer satisfaction.

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CHAPTER- VII

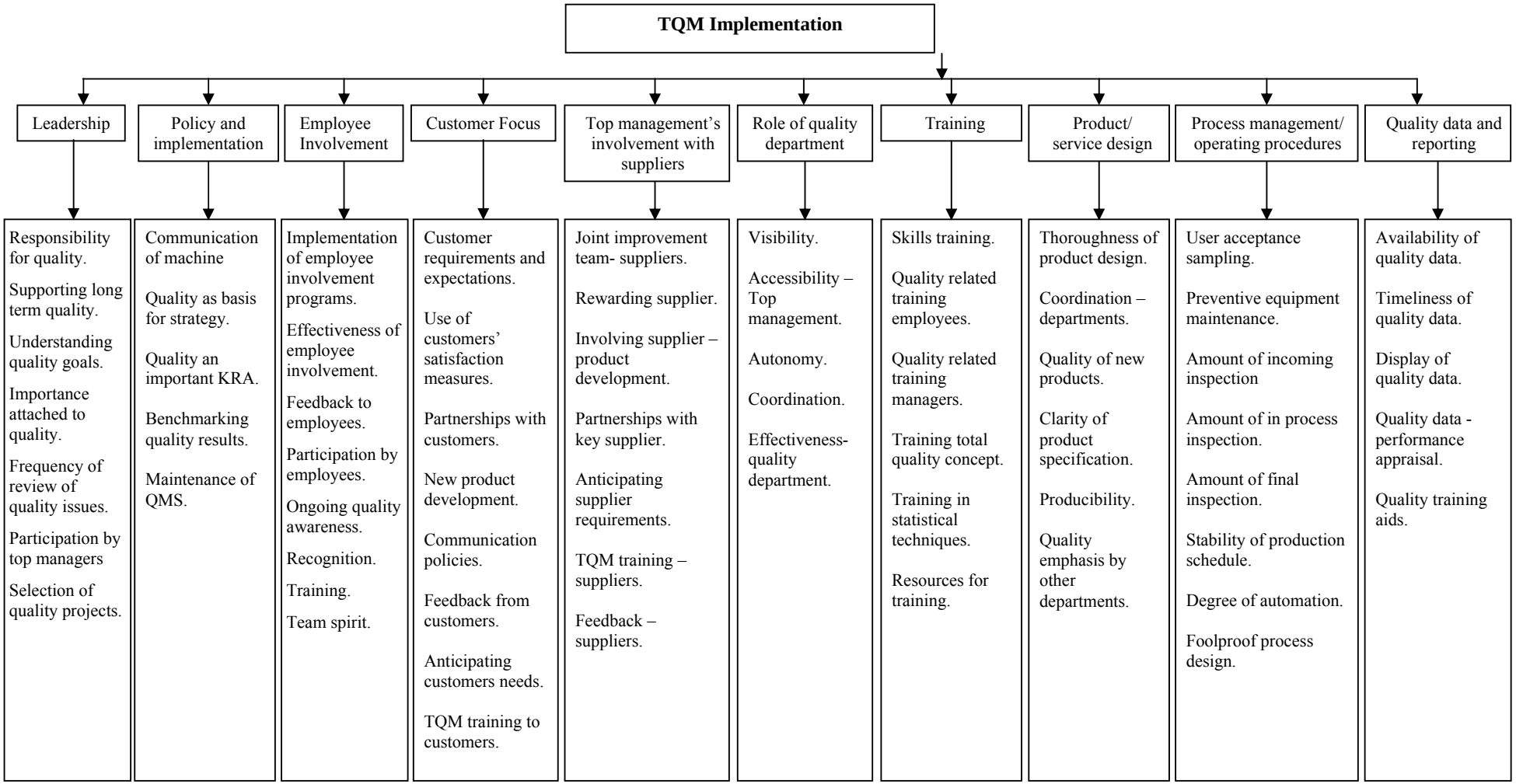
SUMMARY AND CONCLUSION

Based on the evaluation of TQM practices in the public and private sector manufacturing units (Figure 7.1), the present chapter reports the various conclusions that emerged from the study and based on the findings, suggestions are made at appropriate stages, which may be useful to the study companies, the industry and the Government as well.

7.1 Conclusions

- Forty percent of the organizations have around fifty employees in the quality department followed by thirty percent in less than hundred categories.
- Seventy percent of the organizations, both in public and private sector, are engaged in production of goods for both domestic and international clients, while thirty percent in both public and private sectors are engaged exclusively in domestic production.
- Thirty percent of the organizations represent 100 – 500 crores (annual sales) category. Organizations with annual sales of 1001-1500, 4001-4500 crores constitute fifteen percent each. Organizations with annual sales of 501-1000, 5001 and above crores constitute ten percent each. Organizations with Annual sales of 1501-2000, 2001-2500 crores constitute five percent each.
- Fifty percent of the organizations have adopted TQM in the last 11 to 15 years. While 0-5, 6-10 years of adoption of TQM practices constitute fifteen percent each. 16-20 and 21-25 years of adoption of TQM practices constitute 10 percent each. Most of the organizations embraced TQM philosophy in the last 11-15 years.
- Thirty Percent of the organizations have Assistant General Manager (AGM) designation for their quality head. Deputy General Manager (DGM) and General Manager Designations comprised 20 percent each. Head Quality was the designation for ten percent of the organizations and Assistant Vice President and Managing Director designation constituted 5 percent each.
- Twenty percent of the quality heads had work experience of 10-20 years, while forty percent had work experience of 21-30 years and above.
- Thirty percent of the organizations had their membership with QCFI.

Figure 7.1


TQM Implementation
Leadership
Responsibility for quality.
Supporting long term quality.
Understanding quality goals.
Importance attached to quality.
Frequency of review of quality issues.
Participation by top managers
Selection of quality projects.
Policy and implementation
Communication of machine
Quality as basis for strategy.
Quality an important KRA.
Benchmarking quality results.
Maintenance of QMS.
Employee Involvement
Implementation of employee involvement programs.
Effectiveness of employee involvement.
Feedback to employees.
Participation by employees.
Ongoing quality awareness.
Recognition.
Training.
Team spirit.
Customer Focus
Customer requirements and expectations.
Use of customers' satisfaction measures.
Partnerships with customers.
New product development.
Communication policies.
Feedback from customers.
Anticipating customers needs.
TQM training to customers.
Top management's involvement with suppliers
Joint improvement team- suppliers.
Rewarding supplier.
Involving supplier – product development.
Partnerships with key supplier.
Anticipating supplier requirements.
TQM training – suppliers.
Feedback – suppliers.
Role of quality department
Visibility.
Accessibility – Top management.
Autonomy.
Coordination.
Effectiveness-quality department.
Training
Skills training.
Quality related training employees.
Quality related training managers.
Training total quality concept.
Training in statistical techniques.
Resources for training.
Product/ service design
Thoroughness of product design.
Coordination – departments.
Quality of new products.
Clarity of product specification.
Producibility.
Quality emphasis by other departments.
Process management/ operating procedures
User acceptance sampling.
Preventive equipment maintenance.
Amount of incoming inspection
Amount of in process inspection.
Amount of final inspection.
Stability of production schedule.
Degree of automation.
Foolproof process design.
Quality data and reporting
Availability of quality data.
Timeliness of quality data.
Display of quality data.
Quality data - performance appraisal.
Quality training aids.

- More than twenty nine percent of the employees have a work experience ranging from 21-25 years. About thirteen percent of the employees have a work experience of 26-30 years. About eleven percent of the employees represent 31+ years work experience category. Eighteen percent constitute the 16-20 years of work experience. Eight percent constitute 11-15 years of work experience and less than five years work experience each. About Seven percent constitute 6-10 years of work experience in the organization.
- In the private sector units, more than forty nine percent of the employees have less than 5 years of work experience in the organizations, while about twenty percent have an experience of 6-10 years. About twelve percent have an experience of 11-15 years. 6.9 percent represent the 16-20 years category. About Six percent represent 21-25 years category, Five percent constitute the 26-30 years of experience category. 1 percent constitute 31 + years category.
- Public sector manufacturing units are predominantly using the quality tools like Pareto Charts, Check Sheets, Cause& Effect, Histogram, and Run Charts to an extent of 80-100 percent. However, the Private sector are using tools like Pareto Charts, Check Sheets, Histogram and Run Charts to an extent of cent per cent and Cause and Effect, Control charts and Statistical Process Control, Stratification, and Benchmarking very predominantly.

The aggregate percentage of quality tools in the entire sample, are predominantly using Pareto Charts, Check sheets, Cause & Effect Diagram, Histograms, Run Charts, Control Charts.

7.2 Assessment of Critical Variables

Assessment of critical variables by the quality heads and functional heads of the study organizations pointed out significant differences between public and private sector units. (t-test was used to compare the means of both public and private sector units). The parameters in respect of which the differences were significant at 5 % level are listed below for each of the critical variables.

Table 7.1

Assessment of Critical Variables

Critical Variables	Parameters
Leadership (X1)	1. Frequency of review of quality issues in the meetings
	2. Responsibility for quality performance
	3. Quality goals and policy are understood within the organization
	4. Participation by major department heads in the quality improvement process
Policy and Implementation (X2)	1. Organization's mission, vision, values, policy and targets are communicated to all the employees
	2. Quality policy/ manual/ procedures are maintained as per Quality Management Systems
	3. Organization's quality vision is the basis for strategic planning and decisions throughout the organization.
Employee Involvement (X3)	1. Extent to which employee involvement-type programmes are implemented in the organization
	2. Amount of feedback provided to employees on their quality performance
	3. Recognition and appreciation of the efforts and success of individuals and teams in the organization
Customer Focus (X4)	1. Establishing valid customer requirements & Expectations
	2. Empowering everyone in the organization to delight the customer
	3. Product availability
	4. Development and use of customer satisfaction measures
	5. Creating partnerships with key customers
	6. Anticipating customers' future needs
	7. On-time delivery
	8. Accessibility of key staff

Involvement with Suppliers (X5)	1. Creating partnerships with key suppliers
	2. Involving the supplier in product development process
Training (X6)	1. Quality-related training given to hourly employees throughout the organization.
	2. Training in basic statistical techniques in the organization as a whole.
Product Design (X8)	1. Thoroughness of new product/service design review before the product is produced and marketed
	2. Co-ordination among affected departments in the Product development process.
	3. Quality of new products/services emphasized in relation to cost or schedule objectives.
	4. Extent to which implementation is considered in the Product design process.
	5. Quality emphasis by sales, customer service, Marketing, and PR personnel.
Process Management and Operating Procedures (X9)	1. Extent to which process design is "fool-proof" and minimizes the chances of employee errors.
	2. Extent to which inspection, review or checking of work is automated.
	3. Amount of final inspection, review or checking.
	4. Degree of automation in the process.
	5. Clarity of work or process instructions given to employees.
Quality Data and Reporting(X10)	1. Extent to which quality data are displayed at employee work stations.
	2. Timeliness of quality data.
	3. Extent to which quality data are used to evaluate supervisorial and managerial performance.

Employees of both the sectors assessed TQM practices and the extent and degree of organization's involvement in these practices. There were significant differences

between public and private sectors in respect of all the parameters. This shows that employee involvement programmes are more effective in private sector.

Suppliers of the manufacturing organizations were asked to indicate their level of involvement in the TQM practices. There were no significant differences between public and private sectors with respect to any of the supplier involvement parameters.

Customers of the manufacturing organizations were asked to indicate their involvement in the TQM efforts of organizations. Significant differences were viewed between public and private sectors with respect to customer focus parameters of product quality and creating partnerships with key customers.

7.3 Factor Analysis

Factor Analysis was conducted to ascertain the underlying dimensions among the ten critical variables affecting TQM implementation. As far as the ***public sector*** manufacturing units are concerned, four underlying factors were revealed and these were labeled as People Factors, Product Factors, and Policy Factors and Process Factors. The critical variables comprising the identified factors are listed below in the decreasing order of explanation of variance.

People Factors Training, Employee Involvement and Quality Data and Reporting

Product Factors Product Design, Involvement with Suppliers and Customer Focus

Policy Factors Policy and Implementation and Leadership

Process Factors Role of Quality Department and Process Management

As far as the ***private sector*** units are concerned, three underlying factors were revealed and these were labeled as **Strategic Factors, Support Factors and Participative Factors.** The critical variables comprising the identified factors are listed below in the decreasing order of explanation of variance.

Strategic Factors Quality Data and Reporting, Process Management, Leadership, Product Design, Involvement with suppliers, Training and Policy and Implementation.

Support Factors Role of Quality department and Customer Focus.

Participative Factors Employee Involvement.

7.4 Correlation Analysis

The common parameters which were found to influence the TQM practices positively and significantly in both public and private units ,were Leadership(X1), Policy and its implementation (X_2) Involvement with suppliers (X_5), Training (X_7), Product/service design (X_8), Process management / operating procedures (X_9) and Quality data and reporting (X_{10}). This implies that higher level of these parameters could positively influence the TQM parameters, i.e., higher productivity, lower cost of production, better quality of service and higher consumer satisfaction.

- From the ***employees perspective*** Top management commitment, training, work environment, organizational culture, relationship with superiors and peers have found to have significant effect on the TQM performance. Most of the variables were found to have significant and positive relationship with TQM

Table: 7.1

Results of Hypothesis

Sl. No.	Hypotheses	Result
1.	There exists significant differences between public and private sector with respect to **Leadership** variable	Accepted
2.	There exists significant differences between public and private sector with respect to **Policy and implementation** variable	Accepted
3.	There exists significant differences between public and private sector with respect to **Employee involvement** variable	Accepted
4.	There exists significant differences between public and private sector with respect to **Customer focus** variable	Accepted
5.	There exists significant differences between public and private sector with respect to **Involvement with suppliers** variable	Accepted
6.	There exists significant differences between public and private sector with respect to **Role of Quality Department** variable	**Rejected**
7.	There exists significant differences between public and private sector with respect to **Training** variable	Accepted
8.	There exists significant differences between public and private sector with respect to **Product design** variable	Accepted

9.	There exists significant differences between public and private sector with respect to **Process management operating procedures** variable	Accepted
10.	There exists significant differences between public and private sector with respect to **Quality data and reporting** variable	Accepted

7.5 Summary

The study tried to evaluate and compare the TQM practices in public and private manufacturing sectors by taking into account ten critical variables affecting TQM implementation. A brief summary of the variables is presented in the below paragraphs.

Leadership

Lack of top management commitment is one of the reasons for the failure of TQM efforts. While its importance is unquestionable in both the sectors, it is far more challenging in the public sector, where it is constrained by factors like stiffer government control, large operations and worker unions. Status conscious and hierarchy bound middle level executives lacking initiatives is also a bottle neck to improvement process. Therefore, a strong leadership is essential in the public sector to change the mindset of people, in the TQM effort. Correlation analysis also reiterated this fact with the leadership variable significantly associated with most of the factors in the public sector.

Policy and Implementation

A company's programme, policies and systems are the practical representations of its attitudes towards quality (Garvin 1983). While most of the companies have excellent policies at place, implementation of these policies take back seat in public sector organizations, because of lack of articulation of critical factors that are needed for continual pursuance as a result, most TQM activities have become stand-alone types and the programmes have lost their defined objectives. Present study also highlights the fact that private sector units are taking effective steps in this regard.

Employee Involvement

A strong focus on employee involvement is critical to TQM. Recognizing the diversity of human skills through various employee involvement programmes and suggestion schemes will strongly reinforce the TQM efforts in both the sectors.

Customer Focus

Any improvement activity under TQM starts from view point of the customer. Private sector has outscored the public sector on most of the dimensions of customer focus.

Involvement with Suppliers

Creating partnerships with key suppliers is one dimension, where private sector scores higher than the public sector. Effective process management requires working collaboratively and closely with a few selected suppliers, who meet quality standards and specifications of the buyer and deliver the quality material just- in - time on a long-term basis. Successful supplier relationships will improve quality of the purchased materials and parts, reduce variability of the process, optimize the system, and contribute to effective process management. However, most of the companies accorded low priorities to suppliers' education, technical assistance and suppliers' involvement in the product development process.

Role of the Quality Department

Quality department plays pivotal role in devising and implementation of Quality policy. This was one of the most important variables in private sector influencing TQM practices. Almost all the companies had Quality departments. 30 Percent of the organizations have Assistant General Manager (AGM) as designation for their quality head. Deputy General Manager (DGM) and General Manager designations comprised 20 percent each. Head Quality was the designation for 10 percent of the organizations and Assistant Vice President and Managing Director designation constituted 5 percent each.

Training

"TQM begins and ends with education and training" (Ishikawa). This factor accounted for nearly 70.64 per cent of the total variance suggesting that it is one of the most crucial factors in the implementation of TQM practices in public sector. Technical training, statistical techniques training and quality related training should be further emphasized in both the sectors.

Product Design

Product design had significant association with TQM assessment in both the sectors highlighting the fact that it is the one of the crucial factors.

Process Management

Key aspects reviewed are process design, preventive equipment maintenance, inspection and automation. There were significant differences with reference to fool-proof process design and clarity of work or process instructions given to employees.

Quality Data and Reporting

Display of quality data and utilization of quality data to evaluate managerial performance was comparatively low in public sector. Publication of booklets, articles, video films and other quality training aids was very low in both the sectors.

7.6 Suggestions

The following suggestions were made based on evaluating the TQM practices in the state of Karnataka. Some of the suggestions were made on the basis of the interviews with Top Managers, Quality Managers, Employers, Suppliers and Customers.

7.6.1 Leadership

The following are the suggestions made with respect to Leadership

7.6.2 Top Management Commitment

Top management commitment is the first step and pre-requisite for a firm's TQM implementation efforts. Top managers need to demonstrate their commitment through their actions rather than words. Top management commitment can positively affect employees' commitment to TQM and culturally change people involved. If top management views quality as more important than cost, more important than meeting product schedules, employees' quality awareness is easily improved. To implement TQM, top managers should be committed to establishing a firm that continually views quality as a primary goal. If the organizational culture does not embody quality, any quality improvement effort is probably shallow and short-lived.

7.6.3 Top Management Participation

It is very difficult to improve product quality and quality management, if top managers do not lead and participate. Quality improvement involves making decisions and creates something that did not exist before. It is not sufficient for top managers to stand on the sidelines and shout "improve product quality and intensify quality management". There is no way that a manufacturing firm can implement quality improvement activities if the top managers are bystanders. Top management participation is crucial to a firm's quality improvement efforts; it helps in spreading quality consciousness throughout a firm.

7.6.4 Top Management Learning

Top managers need to improve their managerial abilities through continuous learning. To implement TQM, they must first know what it is. Learning TQM is an important step towards implementing it. Top managers should be modest enough to learn from their employees and value the ability of their creativity. Top managers also need to learn from other organizations' successful and unsuccessful experiences, as well as, modern management methods from foreign firms. Above all, top managers should combine these insights into an approach that fits the specific conditions, problems and challenges of their own firms. Through top management learning, a learning organization can be established. Finally, the effectiveness of leadership can be improved and the ability of decision-making enhanced.

7.6.5 Top Management Empowerment

Empowerment means giving permission to the workforce to unleash, develop and utilize their skills and knowledge to their fullest potential for the firm. Empowerment has many benefits such as increasing employees' motivation to reduce mistakes, increasing the opportunity for creativity and innovation, improving employee loyalty and allowing top and middle management more time for strategic planning. It is necessary to utilize the strategy of moving towards more humanistic management as the specific objective of improving quality management. The masses have boundless creative power. Top management needs to empower employees to solve various problems and should rely on employees wholeheartedly.

7.6.6 Top Management Encouragement

Top managers should strongly encourage employee involvement in quality management and improvement activities, attach great importance to employees' suggestions, take responsibility for employees' actions, as well as, those of people who report to them, and should be open and willing to listen to the voices of employees. When TQM is implemented, top managers must have more enthusiasm than their employees. This enthusiasm should be demonstrated by a positive attitude, especially, when employees are unwilling. Top managers should trust employees and believe that they can do things better, as well as, encourage them to list the firm's shortcomings and report their own working problems.

7.6.7 Top Management's Role Model

Top managers need to act as role models, leading by example. A Chinese proverb states "Example is better than precept". Employees always look to top managers for a standard of correct behaviour. The manner in which top managers conduct themselves is more influential than any instructions they may give or any discipline they may impose. Any infringement upon the firm's rules and values can negatively affect employees' satisfaction and commitment. It is vital that top managers handle matters impartially and set an example for their employees to follow. Their model role can positively affect employees' commitment, satisfaction, participation, confidence, initiatives and creativity.

7.6.8 Pursuit of Long-Term Business Success

Top managers should pursue long-term business success instead of short-term benefits. They should focus on product quality rather than yields. Hasty pursuit of short-term profits, short-term scales, and short-term production often results in quality being relegated to third place behind concerns for costs and delivery time. TQM requires long-term commitment and endurance; there are no quick fixes. TQM implementation requires investment. In return, it can lead to an impressive increase of overall business performance. Only after much effort and commitment, were the firms able to see the effects of their TQM implementation efforts.

7.7 Supplier Quality Management

The following are the various suggestions made with reference to supplier involvement

7.7.1 Partnership with Suppliers

Supplier partnership can be defined as a mutual, ongoing relationship between a buying firm and a supplying firm involving a commitment over an extended time period, and entailing sharing of information, as well as, sharing of the risks and rewards of the relationship. In modern businesses, the interdependence of buyers and suppliers has increased dramatically. The emphasis on inventory reduction provides a further focus on product quality received from suppliers. In this regard, firms should try their best to establish long-term partnership relations with their suppliers. The basic purchasing policy should place priority on mutual trust and understanding and aim at long-term stable business relationships on the basis of mutual survival and prosperity. Firms need to treat their suppliers as partners, as an extension of their own firms.

7.7.2 Supplier Selection Criteria

Firms must obtain from their suppliers information sufficient to judge, whether they have the capability to provide products and services that meet all fitness-for-use requirements. The selection of suppliers must be based on the reputation of the supplier, the investigation of its manufacturing facility and other relevant information about the suppliers. Total costs (e.g., incoming inspection, internal and external failure costs) should be taken into account during the selection process. In the end, only those suppliers, who can compete on quality, price and close working relationships with a firm can be kept in its supplier list.

7.7.3 Participation in Supplier Related Activities

Firms need to participate in supplier activities related to quality improvement. These activities may include, for example, supplier training and supplier quality improvement projects. Supplier training is undertaken by the purchaser in order to improve the suppliers' quality of products, services, processes and employees. Supplier quality improvement projects are also organized by the purchaser, to actively assist its suppliers in implementing quality management methods or providing technical assistance. Through participation in supplier's activities, the quality of suppliers' products and

services can be improved. Thus, non-value added incoming inspection activities can be reduced or avoided.

7.7.4 Supplier Performance Evaluation

Firms should frequently evaluate the performance of products and services that they receive from suppliers and give feedback on the performance of suppliers' products and services. In order to conduct supplier performance evaluation, the firm should have a supplier information system that stores detailed performance information about different suppliers. Supplier rating can be used in supplier performance evaluation. Supplier rating is an index of the actual performance of a supplier in terms of its product quality, service quality and delivery performance, among other criteria.

7.7.5 Supplier Quality Audit

Supplier quality audit is an assessment of a suppliers' product and service quality, quality control capability, manufacturing practice and quality assurance system. An audit consists of a visit to the suppliers' facility by a team of examiners from different departments such as quality, technology, production, purchasing and R&D. This team conducts the supplier quality audit in various areas. Supplier quality is monitored in order to ensure that products and services received from suppliers can meet the requirements.

7.7.6 Supplier Communication

Firms need to keep their suppliers informed of any change that they make in terms of design and production. Failure to provide adequate design change information to suppliers has been a distinct obstacle to supplier quality management. Such problems can be solved by setting up multiple channels of communication. Designers must communicate directly with designers, quality staff with quality staff, etc. In the single-channel approach, a specialist in the buyer's firm must work through the purchasing personnel, who in turn speak with the salesperson in the supplier's firm, to obtain information. Multiple channels are much better than the single channel.

7.8 Vision and Plan statement

The following are the suggestions made with respect to policy and implementation

7.8.1 Vision Statement

A vision statement comprises a detailed visualization of the desired future state of the overall business and serves as the target or objective for which all strategies, goals and standards are established. A vision statement should be clear and concise, which according to Hutchins (1990) should satisfy three fundamental criteria. It must address all levels, be stated in such a way that everyone believes in it and be aggressive and growth-oriented. The vision statement should be communicated to employees so that they understand the firm's values, aspirations and purposes. An effective vision statement tends to encourage employee commitment to quality improvement and make the workplace aware of the firm's philosophy. Once the vision statement is developed and agreed on, it should not be frequently changed. Otherwise, employees may be frustrated. Finally, Top Managers must become 'vision salespersons' and continually and consistently discuss and reinforce the vision of the firm.

7.8.2 Quality Policy

A quality policy is overall intentions and direction of an organization with regard to quality, as formally expressed by top management (ISO 8402, 1994). The quality policy involves statements that should be brief, clear and believable. It can be used as a touchstone for all employees to gauge, whether actions are in conformance with the standards and values of the firm's quality policy. The firm should set quality goals based on its quality policy, which should not be too often changed.

7.8.3 Overall Business Performance Plan

A firm should have overall business performance plans that describe its goals and objectives. Two kinds of overall business performance plans exist: Long-term and Annual. In fact, long-term performance plans are formed based on a vision statement, whereas annual performance plans are formed based on long-term performance plans and are the sum of different departmental annual targets and goals. Overall business performance plans achieve nothing, if firms do not have suitable strategies to realize them; they should be set in such a way that they are achievable. Setting unrealistic goals creates frustration and hurts employees' morale. If reasonable objectives are set, successes are more easily

reached. Various factors should be taken into account, when overall business performance plans are made.

7.8.4 Product Quality Goal

In order to improve product quality, firms should have detailed product quality goals. Quality goals are statements of the desired quality results to be achieved within a specified time. Tactical goals are short range (e.g., 1 year) and strategic goals are long range (e.g., 5 years). Quality goals may include, for example, performance, reliability, durability, conformity rate, defect rate, internal failure costs and external failure costs. Goals should be formulated in such a way that they can be realized through hard work. Setting unrealistic goals creates frustration and hurts morale. Based on continuous improvement, a high quality goal can finally be set up and can be realized practically.

7.8.5 Quality Improvement Plan

Quality improvement plans are activities that establish the objectives and requirements for quality and the application of quality system elements (ISO 8402, 1994). The plans should be made in such a way that they can be implemented in practice and should focus on eliminating the major problem areas. When quality improvement plans are drawn up, how to implement them should be well developed. Of course, firms need to arrange sufficient resources in order to ensure that the quality improvement plans can be implemented; they are useless if they cannot be implemented in practice. Note that merely drawing up plans at the start of every year without any follow-up action is insufficient.

7.8.6 Formulation of Vision and Plan

A successful process of formulating visions and plans demands a holistic and cross-functional approach. The alignment of visions, strategies, plans, policies, objectives, measurement and performance assessment at all levels is considered essential. Visions and plans cannot be formulated by imagination; the fuel for their formulation is the abundance, richness and quality of information available. Employees from different levels should be involved in making visions, strategies, policies and plan. This process helps employees think in terms of how their work supports the realization of the overall visions and various plans. A large gap should not exist between the vision and plan statement and a firm’s current practices.

7.9 Process and Control Improvement

The following are the various suggestions pertaining to process control and improvement

7.9.1 Shop Floor Control

Shop floor is the combination of workshops, production lines, and certain other facilities. A firm needs to keep its shop floor neat and clean at all times. Every employee of the firm should be assigned responsibility for cleaning one's own working area. In addition, the firm must pay sufficient attention to determining an appropriate temperature range and lighting intensity, reducing noise level, and improving air quality. Thus, employees can be in a good mood for work, are encouraged to care for the production facilities, and may be more productive and less liable to make mistakes. Good housekeeping can allow employees to notice and correct process problems more quickly. Good housekeeping can also counteract the accumulation of dust on moving parts and in lubricating oil, which may cause the parts to function erratically or jam, thereby giving rise to poor items.

7.9.2 Process Capability

Process capability measures the extent to which a firm's production systems can meet design specifications. As a machine wears out, its process capability may degrade to the point that it cannot hold the tolerances specified by engineering design. Therefore, the firm should study its process capability and calculate a process capability index in order to determine whether a process is stable, investigate any sources of instability, seek their causes, and take actions to eliminate them. Process capability information can provide designers with important information in setting realistic specification limits.

7.9.3 Equipment Maintenance and Innovation

Maintenance is the term that refers to the way in which a firm tries to avoid failure by taking care of its physical facilities. A maintenance system can be divided into two parts: Breakdown maintenance and preventive maintenance. Breakdown maintenance means to execute repair, when production equipment breaks down. Preventive maintenance, on the other hand, means to carry out maintenance activities regularly in order to prevent production equipment from breaking down. There are many benefits to conducting maintenance, such as enhanced safety, increased reliability, lower operating costs, longer life span, and higher ability to produce high quality products. All employees,

who use the operational equipment should take responsibility for maintenance tasks. In addition, it is also valuable to study how to use equipment effectively and efficiently. In order to improve the firm's production capabilities and enhance its competitive advantages, the firm needs to innovate its production equipment regularly.

7.9.4 Inventory Management

Inventory (incoming materials, unfinished products, and finished products) management determines how many inventories to keep. A firm needs to strengthen its inventory management by establishing an effective computerized inventory management system, which can identify items' quantity and location in the warehouse, automatically update stock records, generate purchase orders and inventory reports, forecast sales volumes and so on. Efforts should be made to reduce inventories and thus save capital. Purchasing materials can be optimized and reduced through various efforts such as improving relations with suppliers, organizing production effectively and efficiently, and enhancing the accuracy of forecasting. Organizing production effectively and increasing the accuracy of marketing forecast can optimize unfinished product inventories. The inventories of finished products can be reduced by improving relations with customers, organizing production according to orders, and improving the accuracy of forecasting customers' purchasing .

7.9.5 Inspection

Inspection refers to activities such as measuring, examining, testing and gauging one or more characteristics of a product or service and comparing these with specified requirements to determine conformity (ISO 8402, 1994). Note that inspection actually does not build quality; quality is built into the process. Inspection itself is not a value-added process, but a waste of human resources and cause of extra cost. If quality can be ensured, it is not necessary to implement inspections. In fact, defective products cannot be reduced merely by making improvements at the inspection stage, although such improvements may eliminate defects in delivered goods. When a defect shows up, the information should be sent back to the work stage so that processing can be corrected. Thus, defects occurring are prevented in the first place.

7.9.6 Use of Quality Tools

Quality tools play a key role in an organization-wide approach to continuous improvement, and their use is a vital component of any successful improvement process. The PDCA Cycle is composed of four basic stages: Plan, do, check, and act. It continues forever in a cycle of never-ending improvement. The seven QC tools are Pareto analysis, cause and effect analysis, stratification analysis, scatter diagram, check sheet, Histogram, and process control chart. The seven new tools are relations diagram, affinity diagram, systematic diagram, matrix diagram, matrix data analysis, process decision programme chart, and arrow diagram. Statistical Process Control (SPC) is the application of statistical methods to the measurement and analysis of variation in a process, and can judge the quality of processes. Such information can be used for process control and improvement.

7.10 Product Design

The following are the suggestions with respect to product design

7.10.1 Concurrent Engineering

Concurrent engineering emphasizes the establishment of cooperative relationships throughout the product design process. Representatives from the firm's different departments, as well as, external suppliers and customers, meet with the design staff to articulate the details of product design. Concurrent engineering can ensure that fewer problems occur during the subsequent production or assembly process. Note that the skills of the design engineers are critical to the success of new product design. Design engineers are required to have not only shop floor experience, but also marketing experience. They need to go out into the marketplace and acquaint themselves with customers' needs and expectations. Such information from only the marketing or sales department is not sufficient.

7.10.2 Engineering

Reliability is the ability of a product to function within given performance limits, under specified operation conditions, over a specified time period. Reliability deficiencies can result in impaired or lost performance, compromised safety and increased cost due to device repair, spare parts replenishment and maintenance. Reliability engineering helps to find the cause of failures, set overall reliability goals, identify critical parts, review the

design process, increase the failure resistance of the product and the tolerance of the product against failures, and achieve low failure rates.

7.10.3 Designing for Manufacturability

Designing for manufacturability focuses on simplifying a design to make it more producible. The emphasis is to reduce the total numbers of parts, of different parts, and of manufacturing operations. Key practices include the use of modular designs, avoidance of unnecessary parts, and design for ease of manufacturing and assembly. Designing for manufacturability reduces assembly errors and other sources of quality problems during manufacturing. To achieve such a goal, designers need to have additional experience in the manufacturing department to give them a better understanding of how to design parts for greater producibility. They should also spend time in field service work so that they are exposed to the actual conditions of use, the problems diagnosing field failures, and the difficulties encountered in making repairs.

7.10.4 Design of Experiments

Experimental design has been widely regarded as one of the most significant techniques used for new product design. Blake et al. (1994) state that "experimental design is a strategic weapon to battle competitors worldwide by designing robust products, reducing time to market, improving quality and reliability, and reducing life-cycle cost". The main advantage of adopting experimental design is that one obtains an amazing amount of information about a new product using a limited number of experimental runs. Through analyzing the information obtained from experimental design, various parameters relating to a new product can be easily and accurately determined.

7.10.5 Quality Function Deployment

The key aim of quality function deployment is to try to ensure that the final design of a product or service actually meets the needs and expectations of customers. Quality function deployment consists of a set of tools for building the voice of the customer into product design. It is a team tool that captures customer requirements and translates those needs into characteristics of a product or service. Quality function deployment uses matrix charts to define and prioritize customer wants and needs, and to focus efforts on meeting the customer's true desires.

7.10.6 Value Engineering

The purpose of value engineering is to reduce costs and prevent any unnecessary costs before producing the product or service. Value engineering tries to eliminate any costs that do not contribute to the value and performance of the product or service. It is usually conducted by project teams consisting of designers, purchasing staff, operations managers, financial experts, etc. Value engineering requires innovative and critical thinking and ideas.

7.10.7 Computer-Aided Design (CAD)

CAD can be interpreted as a method of designing a new product with the help of a computer. It is a system that enables design drawings to be constructed on a computer screen and subsequently stored, manipulated, and updated electronically. CAD systems provide the computer-aided ability to create and modify product drawings. The advantage of CAD systems is that their ability to store and retrieve design data quickly, as well as, to manipulate design details can considerably increase the productivity of the design activity. CAD systems can enhance the flexibility of the design activity, enabling modifications to be made much more rapidly. CAD can reduce the time-to-market, the number of designers needed to perform the same amount of work, and design errors. Through CAD, customized products can be made quickly and inexpensively.

7.11 Employee Participation

The following are the suggestions made with respect to employee involvement

7.11.1 Cross-Functional Team

A cross-functional team aims to solve or investigate cross-functional problems or improvement opportunities associated with many functions or departments. Sometimes people from external organizations, such as suppliers and customers, also participate. Top management usually delegates the team and is therefore committed to assigning it sufficient resources in the forms of time, money, and personnel. The team usually consists of professional staff and is normally disbanded after its task is finished. Team members are chosen according to their potential contribution. Through cross-functional teams, different people from different departments work together and learn from each other. Thus, problems can be easily solved. Cross-functional teams are effective in solving cross-functional problems.

7.11.2 Quality Control (QC) Circle

A QC circle is a small group of employees, usually from the same department, who volunteer to meet regularly (on working time or their own time) to discuss ways of improving the quality of their work. QC participants need to accept training for problem-solving techniques. The organizational environment should be supportive for implementing QC circles. More importantly, top management and supervisors should support QC circles, provide necessary resources for their activities, and recognize and reward participants. The benefits of QC circles can be measured in economic terms or by improvements of products, processes, and working environments. Implementing QC circles can also bring some intangible benefits, found in the form of improved communication within work groups and between workers and supervisory layers of the firm, increased employee commitment and motivation, and employees' enhanced understanding of the difficulties faced by the firm.

7.11.3 Within Functional Team

A within functional team aims to solve or investigate problems/opportunities within the same department and is normally disbanded after its task is complete. Team members are chosen according to their potential contribution. Within functional teams are different from QC circles, dealing with certain important issues or urgent problems. The major objective of such a team is to discuss and identify problems encountered, obtain facts and data regarding these problems, and develop feasible solutions. Problems may relate to quality, productivity, safety, and so on. A within functional team usually holds regular meetings during working time.

7.11.4 Information Communication

In order to stimulate employee participation, a firm should have an effective information communication channel. Information communication is a means by which employees share ideas, clarify thinking and create a common understanding. Communication can be conducted between different departments, top management and employees, supervisors and employees, and employees themselves. The firm needs to communicate its vision, strategies, policies, and business plans to its employees. Employees can access necessary information sources needed for conducting their jobs. Relevant information available is the basis for problem-solving and employee

participation. Many changes take place daily in a firm and it is important that they are communicated effectively to employees. Various means can be used to communicate, such as regular meetings, intranets, newsletters, posters, videos, and broadcasting.

7.11.5 Employee Suggestions

Employees have normally been working at a position for a long time and are very familiar with their work. It is easier for them to identify their working problems, find the causes of the problems, and develop solutions. Therefore, employees should be encouraged to submit their suggestions, which should be listened to and valued by the management. Since the solutions are suggested by the employees directly involved with the problem, implementation is usually ensured. Note that suggestions cannot be useful if they are not evaluated or implemented. In this regard, the firm needs to establish such a system that suggestions are carefully examined. After evaluation, some suggestions should be practically implemented. Since most suggestion programmes are oriented towards the lowest levels (the workers, who actually perform the work) in the firm, the role of the first-line supervisor is critical. Negative comments, attitudes, and feedback from the supervisor can quickly kill the interest and enthusiasm of employees. In addition, it is also important to recognize and financially reward employees, who submit good suggestions.

7.11.6 Improving Employee Commitment

The aim of improving employee commitment is to encourage employees to make more contributions to the success of the firm. Employee commitment can be established only on the basis of confidence among employees and management. Top management and supervisors should encourage and motivate employees to develop and utilize their full potential, trust and care for employees, encourage and support employees in job and career-related development/learning objectives, respect and value employees' talents and creativity, and treat employees as valuable resources of the firm. Every employee should be encouraged to function as a supervisor. Thus, employee commitment can be increased through responsibility. More importantly, they should be treated equally, fairly, and rationally. Employee commitment can be cultivated step by step; it is an incremental process.

7.11.7 Job Rotation

Job rotation means periodically moving individuals between different sets of tasks to provide some variety in their activities. Job rotation can increase skill flexibility and make a contribution to reduce job monotony. Through job rotation, employees can learn more work skills, know more processes, and understand more about the importance of their current jobs. As a result, the workforce becomes more diversified and multi skilled. Through job rotation, employees can have a better understanding of the influence of their jobs on the subsequent process. Thus, they can be stimulated to perform their current work better. Additionally, the partnership between employees (internal customers) is easily established.

7.12 Recognition and Reward

Various suggestions pertaining to employee recognition and reward programmes are discussed in the below paragraphs.

7.12.1 Recognition and Reward Programme

Firms should institute a serious recognition and reward programme. First, the recognition and reward must be consistent with organizational values and objectives. If individual or team efforts cannot contribute to the realization of the overall organizational objectives, they cannot be recognized and rewarded. Therefore, objectives of individuals or teams need to be continuously reviewed and updated. Second, criteria should be objective and measurable; otherwise, it is not easy to ensure that the recognition and reward can be conducted fairly. Third, the recognition and reward should be meaningful and fit the organizational culture. Otherwise, it is useless. Fourth, the programme should be approved by the workers' congress. Fifth, once the programme is approved, it should be strictly implemented. Otherwise, recognition and reward activities cannot effectively stimulate employee commitment, enthusiasm, and creativity. Finally, recognition and reward can be provided at several levels: Individual, team, department, or business unit.

7.12.2 Working Environment Improvement

The firm needs to continuously improve working conditions in order to recognize employee quality improvement efforts. For example, a clean working environment, a cordial and friendly atmosphere, a factory canteen, showers, and sports provisions are important ways to show recognition for employees' contributions to the firm. Firms also

need to maintain a work environment conducive to the well being, morale, and growth of all employees. The firm should improve workplace health, safety, and ergonomic factors; consider each person as an individual, a resource to benefit from rather than a commodity to be used. The firm should try its best to reduce employees' working strains and protect their health by providing suitable equipment, devices, or tools.

7.12.3 Salary Promotion

Salary level is an important factor affecting employee satisfaction and contributions. The salary range should be sufficiently wide to allow for adequate differentiation of salary based on performance. The most important requirement for an effective merit pay incentive programme is to measure performance against clearly defined objectives. However, other aspects of employees' performance should also be considered, such as attendance, positive work attitudes, or initiatives. The firm should pay more for employees, who have demonstrated knowledge, skills, and performance. Highly skilled employees must have high salaries; otherwise, their potential cannot be fully exercised. Salary promotion should be fair and rational. Otherwise, problems can be created. In a word, the firm should carry out diverse distribution forms with "to each according to his work" as the main form, and establish an effective incentive mechanism.

7.12.4 Bonus Scheme

In order to encourage employees (teams, departments, or business units) to make more contributions to the firm, a bonus scheme should be implemented. A bonus scheme offers monetary rewards to employees for meeting set targets. To ensure an effective bonus scheme, it is very essential to set up targets for different employees (teams, departments, or business units). These targets may be related to quality, yields, productivity, customer satisfaction, profits, and other performance measures. Note that such defined targets should be aligned with the overall organizational business objectives. The success or failure of a bonus scheme is highly dependent on the defined targets. Therefore, great attention should be given to identify major factors impacting the effect of a bonus scheme. The firm should move towards more performance-oriented pay. The principle of "distribution according to work" should be thoroughly implemented.

7.12.4 Position Promotion

Position promotion must be based on, for example, employees' capabilities, skills, performance, and contributions to the firm, and must not be based on the employees' personal relationships with the director of the firm. An effective and rational position promotion mechanism should be established. If position holders cannot fulfill their duties due to lack of skills, capabilities, performance, or support from their colleagues, more qualified personnel should take over. Every employee in the firm can see the hope of promotion opportunities if he or she performs well. Thus, employees' enthusiasm, creativity, and active participation are encouraged. In a word, the appointments and removals of managerial personnel must be done according to the principle of equal competition, fairness, and rationality.

7.12.5 Moral Award

Moral award can be used to recognize the quality performance of employees or teams. It may take the form of thank you note, oral praise, a letter of praise, sending an employee to a seminar or a conference, presentation of individual or team achievements, award certification, award ceremony, etc. Note that moral award is more effective with intellectuals than with manual line employees. Moral award should be fair and rational; otherwise, negative effects are created.

7.12.6 Penalty

In order to intensify the firm's management and establish a strict responsibility system at different levels and stages, the firm needs to have various kinds of rules and regulations, which can force employees to abide by work discipline. Evidence shows that penalties are effective in enhancing employees' commitment and responsibilities, adhering to various regulations, and sticking to work discipline. To have an effective penalty scheme the firm should set up penalty criteria, which should be approved by the workers' congress. More importantly, the firm should implement the penalty scheme seriously and impartially. Otherwise, penalty cannot be effective and negative effects can be created.

7.13 Education and Training

The following paragraphs discuss the various suggestions made with respect to training.

7.13.1 Education and Training Plan

The firm's education and training plan should be drawn up in line with the firm's strategies, objectives, available resources, current employees' skills, and employee job requirements. The firm needs to identify its short and long-term training needs, design training programmes that address technical and behavioural issues and have an evaluation system in place to check, whether the training and development programmes meet its objectives. It is important to arrange sufficient resources to implement the plan; otherwise, it is useless. In short-term, education and training costs money, while in long-term, it saves money. The firm should view employees as resources that can yield economic returns, and trained employees as investments of the firm. Employees should be regarded as valuable, long-term resources worthy of receiving education and training throughout their careers. People are the only real source of the firm's competitive advantage.

7.13.2 Team Learning

Team learning is a process through which a team creates knowledge for its members, for itself as a system, and for others. Teams learn through the collective learning of their members. Team learning can promote synergy, whereby teams produce extraordinary results and the individual members grow more rapidly than they could have otherwise. In today's competitive environment, it is especially critical that firms identify, develop and utilize individuals' talents to the fullest. Employees are developed through teamwork. Employees' skills are improved by working in teams. The firm needs to establish a good learning environment to encourage employees' effective learning. Highly skilled employees can obtain more opportunities for position promotion and higher pay. Thus, employees can have high motivation to learn. In addition, team members should be given more opportunities to present their learning experiences publicly, making it much easier for them to share their experiences.

7.13.3 Quality Awareness Education

Quality awareness education is designed to ensure that employees have a common understanding of the importance of concepts including product quality, service quality, process quality, and customer satisfaction. It aims to ensure that employees know their

roles within the firm, and to build a desired organizational quality culture. Quality awareness is a very important indicator in determining the final quality of a firm's offerings. It is obvious that employees need to accept quality awareness education regularly. Newly recruited employees specially need to accept such education extensively.

7.13.4 Training for Quality Management Knowledge

Employees need to accept education and training on quality management knowledge. This includes, for example, TQM, ISO 9000, the seven QC tools, the seven management tools, statistical process control, quality function deployment, and experimental design. To achieve a good training result, the training programme should be well designed. Different types of employees require different levels of training. Even for the same quality tool or technique, the learning objective is also different. The aim of training is to apply quality management knowledge in quality improvement activities. Therefore, it is critical to define the most appropriate quality management knowledge that is of particular benefit to the firm. More importantly, employees can use quality management knowledge that they have learnt in their practical work.

7.13.5 Job Training

Job training is specific training for different employees to meet the requirements of their jobs. Every employee in the firm needs to accept necessary job training so that they can perform their jobs better. Different employees need different skills and should accept different training. Therefore, the firm needs to develop criteria for job requirements and identify characteristics and skills needed by employees. For example, design engineers need to have not only new product development techniques, but also some knowledge of marketing, consumer behaviour, production, etc. Note that the development of employees' skills and capabilities should be harmonized with the development of technology in the firm. Job requirements should be continuously changed according to the new technology adopted. In order to make the firm more productive and competitive, managers should invest further in training employees, as this can result in more competent and, hopefully, more committed employees.

7.13.6 Formal Education Promotion

Today, a nationwide vocational and technical education and training network has been established. Various education and training institutions are available, such as worker-

staff colleges and TV universities. These institutions enroll part-time and full-time trainees and usually offer only a two or three-year college associate diploma. Firms should encourage their employees to study in such institutions in their spare time. For example, after employees successfully finish their studies, they can enjoy a higher salary scale. If possible, firms may partially or entirely cover their tuition fee.

7.14 Customer Focus

The following paragraphs discuss the various suggestions with respect to customer focus.

7.14.1 Customer Complaint Information

Customer complaint information is valuable for the firm in pursuing quality improvement and customer satisfaction. The firm needs to collect various pieces of complaint information from customers extensively, as well as, create a central complaint registration system, which registers various complaints from customers. Customer complaints should be resolved effectively and promptly. All complaints received need to be aggregated and analyzed for use in improvement. The firm that does not respond to customer complaints creates a negative corporate image. Customers may share their negative experiences with other existing customers or potential customers. Bad news travels faster than good news! The firm should see complaints as opportunities to improve the quality of products and services. After customer complaints are received, the firm needs to identify the "vital few" serious complaints that demand in-depth study to discover their basic causes and to remedy those causes.

7.14.2 Market Investigation

Faster and more flexible response to customers is now a more critical requirement. Without a sound and systematic process for listening to the customers, the firm cannot know what pleases the customers. Market investigation can help the firm ensure that there is a demand for the product and that the requirements and expectations of the customers can be met. Market investigation can obtain various suggestions for improving the quality of the firm's products and services. It is also essential to anticipate future customer requirements and expectations in order to develop such products in advance. The firm should be sensitive to changing and emerging customer and market requirements, competitors' offerings, and the factors that drive customer satisfaction and retention. Through market investigation, the strengths and weaknesses of the products and services

of a firm and its competitors can be identified. Such information can be used for benchmarking so as to determine the improvement areas of one's own firm. Obtaining valuable information through market investigation is vital to the success of the firm.

7.14.3 Customer Satisfaction Survey

The aim of the customer satisfaction survey is to obtain the customer satisfaction level with the products and services that the firm provides. Methods used to conduct the customer satisfaction survey include questionnaire surveys, formal and informal feedback from customers, personal interviews, telephone surveys, and seminars. Regular customer satisfaction surveys can track customer perceptions of the quality of a firm and its competitors. This information can be used to improve the quality of products, services, and processes. Finally, the firm needs to move from satisfying customers to delight them. In order to successfully conduct a customer satisfaction survey, a measurement instrument should be well developed, and should not be too frequently changed. Thus, the time dimension of customer focus efforts can be studied.

7.14.4 Quality Warranty

A quality warranty is a form of assurance that a product is fit for use or, failing this, that the user can receive some kind of compensation, for example, free repair, replacement or return, or monetary compensation. In this sense, a quality warranty constitutes a system for reducing user costs of poor quality. In fact, the commitment to quality warranty reflects the quality of the firm's products and services. Firms must provide a quality warranty on products sold to customers.

7.14.5 Customer Services

The firm needs to provide necessary assistance for the customers before purchasing, during the process of purchasing, and after purchasing. In order to improve sales efficiency and customer service quality, it is crucial that the firm computerizes its sales system and establishes its service standards. The survey showed that total customer service contributes to total customer satisfaction. Therefore, the firm should strictly fulfill contracts signed with its customers. Customers are at a great advantage today. They are more knowledgeable about the availability and quality of products and services. They demand ever more detailed information about products and services. Therefore, it is important that the firm develops an internet homepage in order to deliver customers'

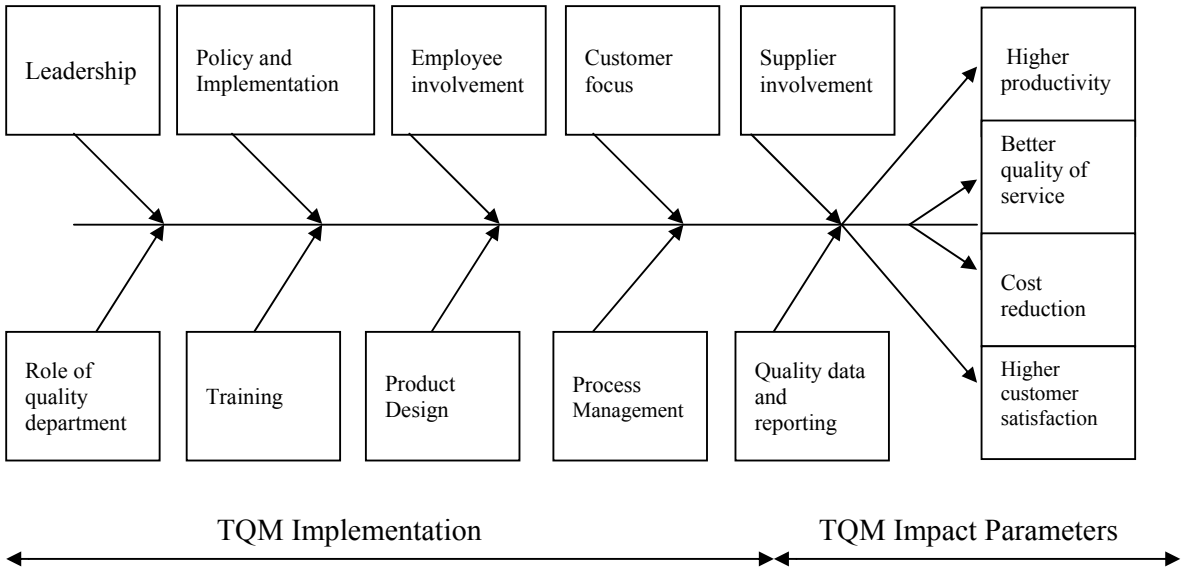
required information promptly. It is also important to improve the skills of sales and service personnel. Service quality is increasingly becoming a more important factor affecting customer satisfaction, customer retention, and customer loyalty.

7.14.6 Customer Information System

The firm should cater to the market and make timely adjustments in accordance with the customers' needs and wants. To do so, it needs a continuous flow of information on customer requirements and expectations. Information about existing and potential customers is critical to success. Therefore, a customer information system should be established. Such a system can be mainly used for several purposes: Collecting data on customers, demographics (age, sex, income level), preferences; collecting and storing customer feedback from sales visits, reports, customer satisfaction surveys, customer complaints, customer conferences, etc.; storing customers' order information; and recording various customer service activities.

Figure 7.2

A Framework of TQM



The above framework of TQM, which represents a fish bone diagram or cause and effect diagram was formulated on the basis of evaluation of TQM implementation practices in the manufacturing units of Karnataka and overall TQM assessment. The framework consists of the 10 critical variables of TQM and Impact of TQM with respect to productivity, quality of service, cost reduction and customer satisfaction. Firms can optimize their performance by paying attention to these critical variables. Firms are different in terms of their people, culture, history, goals, structure, products, services, technologies, processes and operating environments. Therefore, they should combine their own uniqueness with this model by developing their own ways to excellence. Firms can optimize the use of this model by blending it with the situations they operate in.

7.15 Conclusion

Private sector has out performed the public sector on almost all the critical variables, but we have to keep in mind that public sector remains distinct from the private sector on account of the following reasons:

1) While there are financial controls and targets, the primary goal is not maximizing profit.
2) Along with the different needs of customers, the public sector organizations have diverse range of stakeholders to serve.

Public sector units are beset with certain inherent constraints, which act as barriers in TQM implementation.

(i) Skill shortage due to lack of affective in-house training programmes.
(ii) Existence of organizational hierarchies and functional silos.
(iii) Resistance to change among top management.
(iv) Excessive government regulation.

From the study, we could infer that no two organizations have identical sets of strengths and weaknesses, so the TQM efforts also would not be the same. The mix of tools and the amount of time invested will vary from organization to organization. However, irrespective of the sectors, the common parameters, which were found to influence the TQM practices positively and significantly in both public and private units were Leadership(X_1), Policy and its implementation (X_2),Customer focus(X4) Involvement with suppliers (X_5), Training (X_7), Product/service design (X_8), Process management / operating procedures (X_9) and Quality data and reporting (X_{10}).

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APPENDIX A1

S. GAYATRI
DOCTORAL RESEARCHER

SCHOOL OF MANAGEMENT STUDIES
UNIVERSITY OF HYDERABAD
HYDERABAD

QUESTIONNAIRE FOR QUALITY DEPARTMENT

Dear Respondent,

I am S. Gayatri, a research scholar from School of Management Studies, University of Hyderabad, pursuing research on the topic "Evaluation of TQM Practices in India - A Comparative Study of Public and Private Manufacturing Units in Karnataka." Pursuance of the above topic of research involves collection of both primary and secondary data, which is purely for academic purpose and would be kept strictly confidential. I solicit your cooperation in this endeavor. For collecting the data, I have designed a questionnaire. I request your kind cooperation in filling up the questionnaire. Your valuable responses would help me a great deal in my research.

INSTRUCTIONS

- Read the statements carefully and rate each one based on the current TQM practices in your organization and the extent and degree of your/organization's involvement in these practices.
- Each statement is required to be rated on a seven point scale 1 to 7 (1- very very low; 2- very low; 3- low; 4- neither low nor high; 5-high; 6-very high; 7 very very high). Indicate the value in the box provided at the end of each statement.
- Before you fill in the questionnaire, please fill the form on organization profile.

Organization Profile

1. Name of the Organization :

2. Address :

3. Year of Establishment :

4. Type of Company : Public Sector / Private Sector

5. Total number of employees

Permanent	Casual	Managerial	Shop floor

6. Number of Employees in Quality Department

Permanent	Casual	Managerial	Support staff

7. Product Profile : Industrial Goods / Consumer Goods / Both

   1. Brands :

   2. Key customer(s) : Domestic / International / Both

S.No.	Domestic	International

8. Annual sales (in Rs) (last 5 years)

2004-05	2005-06	2006-07	2007-08	2008-09

9. In which year did the company adopt TQM philosophy?

10. Does your organization apply for any TQM awards like Deming prize, RGNQA etc?

Yes / No

If yes, which award(s) does it apply for?

11. List of awards and certifications received since inception of TQM practices

12. Organization structure for quality :

13. Designation of Chief of Quality in the Organization (Gender / Age / Experience / Qualification)

14. Do you have membership in professional bodies pertaining to quality (like QCFI, CII)

Yes / No

If yes, please specify

15. Please fill the following table pertaining to quality control tools. Specify the areas being used.

Tools of Quality Control	Areas being used
Pareto Charts	
Cause & Effect Diagram	
Stratification	
Check Sheets	
Histograms	
Scatter Diagrams	
Control Charts	
Run Charts	

Statistical Process Control	
Benchmarking	
Business Process Reengineering	
Six Sigma	
Others, Please Specify	

Please rate the following statements based on the current TQM practices in the organization and the extent and degree of your/organization's involvement in these practices (1-very very low; 2- very low; 3- low; 4- neither low nor high; 5-high; 6-very high; 7- very very high)

I. Leadership

Sl.No	Statements	(1- 7)
1.1	Extent to which the top business unit/organization executive assumes responsibility for quality performance	
1.2	Extent to which the top management supports long-term quality improvement process	
1.3	Extent to which quality goals and policy are understood within the organization	
1.4	Importance attached to quality by the organizational top management in relation to cost and schedule objectives	
1.5	Frequency of review of quality issues in organizational top management meetings	
1.6	Degree to which the organizational top management considers quality improvement as a way to increase profits	
1.7	Degree of participation by major department heads in the quality improvement process	
1.8	Comprehensiveness of the goal-setting process for achieving quality within the organization	
1.9	Identification and provision of appropriate resources in a timely manner to support total quality	
1.10	Selection of priority quality projects based on customer evaluation of performance	
1.11	Selection of priority quality projects based on reliable data concerning deficiencies in goods and services	
1.12	Selection of priority quality projects based on reliable data concerning the status of internal quality culture	

II. Policy and Implementation

Sl. No	Statements	(1- 7)
2.1	Organization's mission, vision, values, policy and targets are communicated to all the employees	
2.2	Organization's quality vision is the basis for strategic planning and decisions throughout the organization.	
2.3	Organization's strategy for quality is based on solid scientific information about customers' needs and satisfaction	
2.4	Quality is an important KRA of all employees	
2.5	Quality results are benchmarked against the best in the industry	
2.6	Quality policy/ manual/ procedures are maintained as per Quality Management Systems.	

III. Employee Involvement

Sl. No.	Statements	(1- 7)
3.1	Extent to which employee involvement-type programmes are implemented in the organization.	
3.2	Effectiveness of employee involvement-type programmes in the organization	
3.3	Extent to which employees are held responsible for error-free output	
3.4	Amount of feedback provided to employees on their quality performance	
3.5	Degree of participation in quality decisions by hourly/non-supervisory employees	
3.6	Extent to which building quality awareness among employees is ongoing	
3.7	Extent to which employees are recognized for superior quality performance	
3.8	Extent to which processes designed for merit rating, compensation and promotion incorporate performance with respect to quality as a major factor	
3.9	Aiming at training of all the personnel in the organization	
3.10	Recognition and appreciation of the efforts and success of individuals and teams in the organization	

IV. Customer Focus

Sl. No	Statements	(1- 7)
4.1	Establishing valid customer requirements & expectations	
4.2	Development and use of customer satisfaction measures	
4.3	Creating partnerships with key customers	
4.4	Linking customer requirements to the development of new products and services	
4.5	Developing and communicating policies and procedures to remedy service errors	
4.6	Empowering everyone in the organisation to delight the customer	
4.7	Gathering continuous feedback from customers	
4.8	Anticipating customers' future needs	
4.9	Offering TQM training to customers	
4.10	Information provided to the customers/consumers through informative labeling, brochures and other product literature	
4.11	Establishing and participating in joint improvement teams with customers	
4.12	On-time delivery	
4.13	Product availability	
4.14	Accessibility of key staff	
4.15	Follow up with the customers	
Kindly furnish the following data		
4.16	Customer Satisfaction Index	
4.17	Number and nature of customer complaints	
4.18	Redressal mechanism including time of response and final redressal	
4.19	Customer returns (by value and quantity)	
4.20	Warranty payments	

V. Involvement with suppliers

Sl.No	Statements	(1- 7)
5.1	Establishing and participating in joint improvement teams with suppliers	
5.2	Evaluating, recognizing and rewarding the efforts and achievements of suppliers	
5.3	Involving the supplier in product/service development process	

5.4	Creating partnerships with key suppliers	
5.5	Anticipating suppliers' future requirements	
5.6	Offering TQM training to suppliers	
5.7	Benchmarking with key suppliers to learn how competitors are operating	
5.8	Gathering continuous feedback from suppliers	

VI. Role of the quality department

Sl.No	Statements	(1- 7)
6.1	Visibility of Quality Department.	
6.2	Quality department's access to organizational top management	
6.3	Autonomy of Quality department	
6.4	Amount of co-ordination between the quality department and other departments	
6.5	Effectiveness of the quality department in improving quality	

VII. Training

Sl.No	Statements	(1- 7)
7.1	Specific work skills training given to hourly employees throughout the organization.	
7.2	Quality-related training given to hourly employees throughout the organization.	
7.3	Quality-related training given to managers and supervisors throughout the division.	
7.4	Training in "total quality concept" throughout the organization.	
7.5	Training in basic statistical techniques in the organization as a whole.	
7.6	Training in advanced statistical techniques in the organization as a whole.	
7.7	Commitment of the organizational top management to employee training.	
7.8	Availability of resources for employee training in the organization.	

VIII. Product/service design

Sl.No	Statements	(1- 7)
8.1	Thoroughness of new product/service design review before the product/service is produced and marketed.	
8.2	Co-ordination among affected departments in the product/service development process.	

8.3	Quality of new products/services emphasized in relation to cost or schedule objectives.	
8.4	Clarity of product/service specifications and procedures.	
8.5	Extent to which implementation/producibility is considered in the product/service design process.	
8.6	Quality emphasis by sales, customer service, marketing, and PR personnel.	

IX. Process management/operating procedures

Sl. No	Statements	(1- 7)
9.1	Use of acceptance sampling to accept/reject lots or batches of work.	
9.2	Amount of preventive equipment maintenance.	
9.3	Extent to which inspection, review or checking of work is automated.	
9.4	Amount of incoming inspection, review or checking.	
9.5	Amount of in-process inspection, review or checking.	
9.6	Amount of final inspection, review or checking.	
9.7	Stability of production schedule/work distribution.	
9.8	Degree of automation in the process.	
9.9	Extent to which process design is "fool-proof" and minimizes the chances of employee errors	
9.10	Clarity of work or process instructions given to employees	

X. Quality data and reporting

Sl. No	Statements	(1- 7)
10.1	Availability of quality data in the organization	
10.2	Timeliness of quality data.	
10.3	Extent to which quality data are available to managers and supervisors.	
10.4	Extent to which quality data are used to evaluate supervisorial and managerial performance.	
10.5	Extent to which quality data are displayed at employee work stations.	
10.6	Publication/preparation of booklets, articles, video films and other quality training aids, etc.	

XI. On a scale of 1 to 7 how would you assess the effects of TQM on the following :

(1- very very low; 2- very low; 3- low; 4- neither low nor high; 5-high; 6-very high; 7 - very very high)

Attributes	(1 - 7)
Productivity	
Cost reduction	
Quality of service	
Customer satisfaction	

TQM Impact Parameters

Productivity (P)

Improvement in labour productivity

Improvement in value added per employee.

Improvement in production capacity.

Quality (Q)

Reduction in defects during process.

Reduction in defects in final product.

Reduction in claims from customer.

Cost (C)

Reduction in cost of production.

Reduction in cost of manpower.

Reduction in total cost of supply of chain (supplier to customer).

Thank you so much for your time and support

APPENDIX A2

S. GAYATRI
DOCTORAL RESEARCHER

SCHOOL OF MANAGEMENT STUDIES
UNIVERSITY OF HYDERABAD
HYDERABAD

QUESTIONNAIRE FOR TOP MANAGEMENT

Dear Respondent,

I am S. Gayatri, a research scholar from School of Management Studies, University of Hyderabad, pursuing research on the topic "Evaluation of TQM Practices in India - A Comparative Study of Public and Private Manufacturing Units in Karnataka." Pursuance of the above topic of research involves collection of both primary and secondary data which is purely for academic purpose and would be kept strictly confidential. I solicit your cooperation in this endeavour. For collecting the data, I have designed a questionnaire. I request your kind cooperation in filling up the questionnaire. Your valuable responses would help me a great deal in my research.

INSTRUCTIONS

- Read the statements carefully and rate each one based on the extent and degree of involvement / current practices, in the organization.
- Each statement has to be rated on a seven point scale 1to 7 (1-very very low; 2- very low; 3- low; 4- neither low nor high; 5-high; 6-very high; 7 very very high)
  Indicate the value in the box provided at the end of each statement.

Name :

Designation :

Years of service in the organization :

Years of service in the present post :

Please rate the following statements based on the current TQM practices in the organization and the extent and degree of your / organization's involvement in these practices (1- very very low; 2- very low; 3- low; 4- neither low nor high; 5- high; 6- very high; 7- very very high.)

I. Leadership

Sl.No	Statements	(1- 7)
1.1	Extent to which the top business unit/organization executive assumes responsibility for quality performance	
1.2	Extent to which the top management supports long-term quality improvement process	
1.3	Extent to which quality goals and policy are understood within the organization	
1.4	Importance attached to quality by the organizational top management in relation to cost and schedule objectives	
1.5	Frequency of review of quality issues in organizational top management meetings	
1.6	Degree to which the organizational top management considers quality improvement as a way to increase profits	
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1.11	Selection of priority quality projects based on reliable data concerning deficiencies in goods and services	
1.12	Selection of priority quality projects based on reliable data concerning the status of internal quality culture	

II. Policy and Implementation

Sl.No	Statements	(1- 7)
2.1	Organization's mission, vision, values, policy and targets are communicated to all the employees	
2.2	Organization's quality vision is the basis for strategic planning and decisions throughout the organization.	
2.3	Organization's strategy for quality is based on solid scientific information about customers' needs and satisfaction	
2.4	Quality is an important KRA of all employees	
2.5	Quality results are benchmarked against the best in the industry	
2.6	Quality policy/ manual/ procedures are maintained as per Quality Management Systems.	

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3.7	Extent to which employees are recognized for superior quality performance	
3.8	Extent to which processes designed for merit rating, compensation and promotion incorporate performance with respect to quality as a major factor	
3.9	Aiming at training of all the personnel in the organization	
3.10	Recognition and appreciation of the efforts and success of individuals and teams in the organization	

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Sl.No	Statements	(1- 7)
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4.15	Follow up with the customers	

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5.2	Evaluating, recognizing and rewarding the efforts and achievements of suppliers	
5.3	Involving the supplier in product/service development process	
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5.7	Benchmarking with key suppliers to learn how competitors are operating	
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VI. Role of the quality department

Sl.No	Statements	(1- 7)
6.1	Visibility of Quality Department.	
6.2	Quality department's access to organizational top management	
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Sl.No	Statements	(1- 7)
7.1	Specific work skills training given to hourly employees throughout the organization.	
7.2	Quality-related training given to hourly employees throughout the organization.	
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7.8	Availability of resources for employee training in the organization.	

VIII. Product/service design

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Sl.No	Statements	(1- 7)
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9.5	Amount of in-process inspection, review or checking.	
9.6	Amount of final inspection, review or checking.	
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9.8	Degree of automation in the process.	
9.9	Extent to which process design is "fool-proof" and minimizes the chances of employee errors	
9.10	Clarity of work or process instructions given to employees	

X. Quality data and reporting

Sl.No	Statements	(1- 7)
10.1	Availability of quality data in the organization	
10.2	Timeliness of quality data.	
10.3	Extent to which quality data are available to managers and supervisors.	
10.4	Extent to which quality data are used to evaluate supervisorial and managerial performance.	
10.5	Extent to which quality data are displayed at employee work stations.	
10.6	Publication/preparation of booklets, articles, video films and other quality training aids etc	

XI. On a scale of 1 to 7 how would you assess the effects of TQM on the following

(1- very very low; 2- very low ;3- low; 4- neither low nor high; 5-high; 6-very high; 7 very very high)

Attributes	(1 - 7)
Productivity	
Cost reduction	
Quality of service	
Customer satisfaction	

APPENDIX A3

S. GAYATRI
DOCTORAL RESEARCHER

SCHOOL OF MANAGEMENT STUDIES
UNIVERSITY OF HYDERABAD
HYDERABAD

QUESTIONNAIRE FOR EMPLOYEES

Dear Respondent,

I am S. Gayatri, a research scholar from School of Management Studies, University of Hyderabad, pursuing research on the topic "Evaluation of TQM Practices in India - A Comparative Study of Public and Private Manufacturing Units in Karnataka." Pursuance of the above topic of research involves collection of both primary and secondary data, which is purely for academic purpose and would be kept strictly confidential. I solicit your cooperation in this endeavor. For collecting the data, I have designed a questionnaire. I request your kind cooperation in filling up the questionnaire. Your valuable responses would help me a great deal in my research.

INSTRUCTIONS

- Read the statements carefully and rate each one based on the current TQM practices in the organization and extent and degree of organization's involvement in these practices.
- Each statement has to be rated on a seven point scale 1 to7 (1- very very low; 2- very low; 3- low; 4- neither low nor high; 5-high; 6-very high; 7- very very high)

  Indicate the value in the box provided at the end of each statement.

Name :

Designation :

Years of service in the organization :

Years of service in the present post :

I. Please rate the following statements based on the current TQM practices in the organization and the extent and degree of organization's involvement in these practices:

Sl.No	Statements	(1- 7)
1.	There is a strong commitment to quality at all levels of this organization.	
2.	Continuous quality improvement is an important goal of this organization.	
3.	Top management tries to make this organization a good place to work.	
4.	Top management sets clear goals for quality improvement.	
5.	There is a strong spirit of cooperation in this organization	
6.	We use statistical tools to check on the quality of work or services.	
7.	The materials and supplies we need are delivered on time and as ordered.	
8.	Our organization has embraced the team concept.	
9.	Work problems are being solved through team meetings.	
10.	Resources are available for employee training in our organization.	
11.	There is some kind of employee training going on in our organization.	
12.	I have supplies/ tools/ equipment I need to do my work well.	
13.	I have new and interesting things to do in my work.	
14.	My work challenges me.	
15.	Praise and recognition for outstanding performance is given in this organization.	
16.	I feel free to discuss problems with my superior.	
17.	I am treated with respect by my superior.	
18.	Employees in this organization treat each other with respect.	
19.	I am asked for my inputs.	
20.	My superior gives credit to people when they do a good job.	

Sl.No	Statements	(1- 7)
21.	My superior gives me feedback on how well, I am doing.	
22.	Co-workers in my work unit are like a family.	
23.	I fully understand the goals, policies and objectives of this organization.	
24.	The actions of the management are always consistent with the goals, policies and objectives of the organization.	
25.	Employees suggestions and recommendations are welcomed by the management.	
26.	The management has a sincere concern for the employees.	
27.	The quality of work of in this organisation is excellent.	
28.	The working conditions in this organisation are excellent.	
29.	The organisation has the best reputation in this area as a good place of work.	
30.	If I could find another job with the same pay, I would rather stay here.	

II. What is the one most important factor that could be improved in order to help you to do your job better?

III. On a scale of 1 to 7, how would you assess the effects of TQM on the following:

(1- very very low; 2- very low ;3- low; 4- neither low nor high; 5-high; 6-very high; 7 very very high.)

Attributes	(1 - 7)
Productivity	
Cost Reduction	
Quality of Service	
Customer Satisfaction	

Thank you so much for your time and support

APPENDIX A4

S. GAYATRI
DOCTORAL RESEARCHER

SCHOOL OF MANAGEMENT STUDIES
UNIVERSITY OF HYDERABAD
HYDERABAD

QUESTIONNAIRE FOR CUSTOMERS

Dear Respondent,

I am S. Gayatri, a research scholar from School of Management Studies, University of Hyderabad, pursuing research on the topic "Evaluation of TQM Practices in India- A Comparative Study of Public and Private Manufacturing Units in Karnataka." Pursuance of the above topic of research involves collection of both primary and secondary data, which is purely for academic purpose and would be kept strictly confidential. I solicit your cooperation in this endeavour. For collecting the data, I have designed a questionnaire. I request your kind cooperation in filling up the questionnaire. Your valuable responses would help me a great deal in my research.

INSTRUCTIONS

- Read the statements carefully and rate each one based on the current TQM practices in the organization and the extent and degree of organization's involvement in these practices.
- Each statement is required to be rated on a seven point scale 1 to 7 (1- very very low; 2- very low; 3- low; 4- neither low nor high; 5-high; 6-very high; 7 very very high). Indicate the value in the box provided at the end of each statement.

Questionnaire- Customers

1. Customers Name :

2. Year of Establishment :

3. No. of Employees in the Organization

   Permanent :

   Casual :

4. Annual Sales :

5. Years of Association with the Organization :

6. Products Used :

7. Rank the Organization( ) the following attributes on a scale of 1 to 7

Sl.No	Attributes	(1- 7)
7.1	Price	
7.2	Value for money	
7.3	Product quality	
7.4	Consistency	
7.5	Durability, maintainability and reliability	
7.6	Responsiveness, flexibility	
7.7	Product training	
7.8	Sales support; and	
7.9	Technical support	
7.10	On-time delivery	
7.11	Product availability	
7.12	Accessibility of key staff; and	
7.13	Follow up with the customers	
7.14	Redressal mechanism including time of response	

8. Please, rate the following statements based on the current TQM practices in the organization ( ) and the extent and degree of the organization's involvement in these practices.

Sl.No	Statements	(1- 7)
8.1	Establishing valid customer requirements & expectations	
8.2	Development and use of customer satisfaction measures	
8.3	Creating partnerships with key customers	
8.4	Linking customer requirements to the development of new products and services	
8.5	Developing and communicating policies and procedures to remedy service errors	
8.6	Empowering everyone in the organization to delight the customer	
8.7	Gathering continuous feedback from customers	
8.8	Anticipating customers' future needs	
8.9	Offering TQM training to customers	
8.10	Information provided to the customers/consumers through informative labeling, brochures and other product literature	

9. Complaints, if any.

Thank you so much for your time and support

APPENDIX A5

S. GAYATRI
DOCTORAL RESEARCHER

SCHOOL OF MANAGEMENT STUDIES
UNIVERSITY OF HYDERABAD
HYDERABAD

QUESTIONNAIRE FOR SUPPLIERS

Dear Respondent,

I am S. Gayatri, a research scholar from School of Management Studies, University of Hyderabad, pursuing research on the topic "Evaluation of TQM Practices in India- A Comparative Study of Public and Private Manufacturing Units in Karnataka." Pursuance of the above topic of research involves collection of both primary and secondary data, which is purely for academic purpose and would be kept strictly confidential. I solicit your cooperation in this endeavour. For collecting the data, I have designed a questionnaire. I request your kind cooperation in filling up the questionnaire. Your valuable responses would help me a great deal in my research.

INSTRUCTIONS

- Read the statements carefully and rate each one based on the current TQM practices in the organization and the extent and degree of organization's involvement in these practices.
- Each statement is required to be rated on a seven point scale 1 to 7 (1- very very low; 2- very low; 3- low; 4- neither low nor high; 5-high; 6-very high; 7 very very high). Indicate the value in the box provided at the end of each statement.

Questionnaire for Suppliers

1. Name of the Supplier :

2. Year of Establishment :

3. No. of Employees in the Organization

   Permanent :

   Casual :

4. Years of Association with the organization :

5. Annual Sales :

6. Products Supplied :

7. Key Customers :

8. Are you a Certified Supplier : Yes / No

9. If Yes, under which Category? :

10. Please rate the following statements based on the current TQM practices in the organization ( ) and the extent and degree of organization's involvement in these practices.

Sl.No	Statements	(1- 7)
10.1	Involving the supplier in product/service development process	
10.2	Creating partnerships with key suppliers	
10.3	Anticipating suppliers' future requirements	
10.4	Giving supplier awards	
10.5	Offering TQM training to suppliers	
10.6	Benchmarking with key suppliers to learn how competitors are operating	
10.7	Gathering continuous feedback from suppliers	
10.8	Establishing and participating in joint improvement teams with suppliers	

Thank you so much for your time and support

APPENDIX A6

Correlation Matrix

Quality Heads
Private Sector

	x1	*x2*	*x3*	*x4*	*x5*	*x6*	*x7*	*x8*	*x9*	*x10*	*y*
Leadership (X_1)	1.0000										
Policy and implementation (X_2)	0.5942	1.0000									
Employee involvement (X_3)	0.5538	0.6025	1.0000								
Customer focus (X_4)	0.7216*	0.4399	0.2783	1.0000							
Involvement with suppliers (X_5)	0.6141	0.7388*	0.3473	0.8870*	1.0000						
Role of quality department (X_6)	0.6278	0.6625*	0.3905	0.9216*	0.9749*	1.0000					
Training (X_7)	0.6278	0.6625*	0.3905	0.9216*	0.9749*	1.0000	1.0000				
Product/service design (X_8)	0.2750	-0.1416	0.3207	0.2991	0.0824	0.2450	0.2450	1.0000			
Process management / operating procedures (X_9)	0.5637	0.5827	0.3025	0.7005*	0.7519*	0.7724*	0.7724*	0.1979	1.0000		
Quality data and reporting (X_{10})	0.6138	0.4571	0.3858	0.7276*	0.6787*	0.7366*	0.7366*	0.4278	0.9582*	1.0000	
TQM assessment (y)	0.7653*	0.4229	0.2981	0.5635	0.4387	0.5029	0.5029	0.5170	0.7002*	0.7488*	1.0000

* significant at 0.05 level =(.632).

APPENDIX A7

Correlation Matrix

Quality Heads
Public Sector

	x1	*x2*	*x3*	*x4*	*x5*	*x6*	*x7*	*x8*	*x9*	*x10*	*y*
Leadership (X_1)	1.0000										
Policy and implementation (X_2)	0.8796*	1.0000									
Employee involvement (X_3)	0.5625	0.6195	1.0000								
Customer focus (X_4)	0.8157	0.7254*	0.4377	1.0000							
Involvement with suppliers (X_5)	0.5337	0.6178	0.6731	0.5770	1.0000						
Role of quality department (X_6)	0.5832	0.7299*	0.9070*	0.5801	0.6720*	1.0000					
Training (X_7)	0.5832	0.7299*	0.9070*	0.5801	0.6720*	1.0000	1.0000				
Product/service design (X_8)	-0.2060	-0.3321	-0.2528	0.0817	-0.2009	-0.1091	-0.1091	1.0000			
Process management / operating procedures (X_9)	0.3938	0.5190	0.3706	0.6663*	0.2499	0.6069	0.6069	0.4480	1.0000		
Quality data and reporting (X_{10})	0.7675*	0.8512*	0.6745*	0.6991*	0.7665*	0.7358*	0.7358*	-0.1104	0.5343	1.0000	
TQM assessment (y)	0.3058	0.4580	0.6639*	0.1881	0.4034	0.7441*	0.7441*	0.1787	0.5045	0.6073	1.0000

* significant at 0.05 level (.632).

APPENDIX A8

Correlation Matrix

Top Management
Public Sector

	x1	*x2*	*x3*	*x4*	*x5*	*x6*	*x7*	*x8*	*x9*	*x10*	*y*
Leadership (X_1)	1.0000										
Policy and implementation (X_2)	0.6933*	1.0000									
Employee involvement (X_3)	-0.1263	-0.2408	1.0000								
Customer focus (X_4)	0.0350	-0.1633	0.8641*	1.0000							
Involvement with suppliers (X_5)	0.7601*	0.6209	-0.5243	-0.2621	1.0000						
Role of quality department (X_6)	0.0329	-0.1081	0.9033*	0.9519*	-0.3310	1.0000					
Training (X_7)	0.7583*	0.5493	-0.3482	-0.2143	0.7109*	-0.1749	1.0000				
Product/service design (X_8)	0.7417*	0.7420*	-0.5243	-0.2785	0.8881*	-0.2989	0.7482*	1.0000			
Process management / operating procedures (X_9)	0.7114*	0.7382*	-0.4994	-0.3018	0.7614*	-0.2667	0.8401*	0.8899*	1.0000		
Quality data and reporting (X_{10})	0.5827	0.5623	-0.3950	-0.2415	0.5981	-0.1663	0.8819*	0.7230*	0.8083*	1.0000	
TQM assessment (y)	0.4466*	0.7082*	-0.4250	-0.3970	0.5316	-0.3625	0.5536*	0.7105*	0.7012*	0.6127*	1.0000

* significant at 0.05 level(.444).

APPENDIX A9

Correlation Matrix

Top management
Private sector

	x1	*x2*	*x3*	*x4*	*x5*	*x6*	*x7*	*x8*	*x9*	*x10*	*y*
Leadership (X_1)	1.0000										
Policy and implementation (X_2)	0.8815*	1.0000									
Employee involvement (X_3)	0.4260	0.7210*	1.0000								
Customer focus (X_4)	0.5822*	0.7102*	0.8751*	1.0000							
Involvement with suppliers (X_5)	0.8213*	0.7699*	0.3883	0.5103*	1.0000						
Role of quality department (X_6)	0.4780	0.6556*	0.8340*	0.7810*	0.3227	1.0000					
Training (X_7)	0.8389*	0.9150*	0.5428*	0.5705*	0.7609*	0.5609*	1.0000				
Product/service design (X_8)	0.7429*	0.7543*	0.4510	0.5354*	0.7789*	0.3563	0.7737*	1.0000			
Process management / operating procedures (X_9)	0.7320*	0.7501*	0.3326	0.3738	0.7884*	0.4246	0.8820*	0.8077*	1.0000		
Quality data and reporting (X_{10})	0.8379*	0.8806*	0.5092*	0.4944	0.8408*	0.5870*	0.9060*	0.7511*	0.8854*	1.0000	
TQM assessment (y)	0.8076*	0.8715*	0.4782*	0.5505*	0.6401*	0.4201	0.8553*	0.6249*	0.7041*	0.7335*	1.0000

significant at 0.05 level(.444).

PAPERS PUBLISHED IN CONFERENCE PROCEEDINGS

1. Gayatri, S. & Raja Shekar, B. (2010) Factors affecting TQM implementation: A study of select Public Sector Units in the State of Karnataka, *National Seminar on Strategic Quality Management through Innovation and Value Creation, University of Hyderabad, India,* March 18-20.

2. Gayatri, S. (2012) Assessment of TQM Practices between Public and Private Sector Organizations in India – A Study, *International Academy of Business and Public Administration Disciplines (IABPAD) Winter Conference, Orlando, Florida*, Jan 2-5. (Accepted for Publication).