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Understanding the Essentials of Total Quality Management: A Best Practice Approach – Part 2

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UNDERSTANDING THE ESSENTIALS OF TOTAL QUALITY MANAGEMENT: A BEST PRACTICE APPROACH – PART 1

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ABSTRACT
This paper presents an overview of the fundamentals of TQM. It provides an in depth review of the essentials of TQM. It explores the quality factors identified by the quality gurus, empirical researches results, experts and consultants contributions and the models of excellence in Japan, USA and Europe. This paper also presents the various issues related to TQM implementation and stressed by quality gurus and writers as being essential for successful implementation of TQM. This involves presenting more than 100 examples of successful experiences of case study organisations in their implementation of TQM. The effort involves understanding the implementation processes with a focus on how and why these processes are implemented. This helps researchers to synthesise the key quality factors for successful TQM implementation process. Part one discusses the “hard” quality factors of TQM in key areas, stressed in implementation case studies and supported by quality gurus and writers and empirical studies, related to suppliers management, systems and process management, benchmarking, organizing for quality, cost of quality, self-assessment, quality control techniques, and customer management.
INTRODUCTION
Factors as top management commitment and leadership, people management, policy and strategy, partnership and resources management and management of processes, are generally considered as the initial inputs to the implementation of TQM. According to the European Foundation for Quality Management (1999), these factors are called the enablers. In this model of excellence, essentially customer satisfaction (results), employee satisfaction (results) and a favourable impact on society (results) are achieved through leadership driving and strategy, people partnership, resources and processes, which lead ultimately to excellence in business results (key performance results). The enablers deliver the results, which in turn drive innovation and learning (Oakland, 2000). This suggests that the quality factors can be classified as “soft” and “hard” quality factors. Leadership and employee involvement are intangible and difficult to measure quality factors. However, cost of quality, statistical process control and quality management systems impact the internal efficiency of the organization.

Wilkinson (1992) highlights that it is practical to refer to the experience at Black and Decker (UK) and the Co-operative Bank plc. to classify the quality factors along “soft” and “hard” criteria. Factors like leadership, employee involvement and quality policy development have long-term nature and some of them are difficult to measure. These factors have an impact on maximizing wide-wide support and involvement in attaining the quality goals of an organization. Such factors are considered as internal marketing issues (Wilkinson, 1992). They include:

- Senior executives commitment and involvement, actively demonstrated.
- Comprehensive policy development and effective deployment of goals.
- Entire workforce commitment to quality goals of the organization.
- Supervisors, unit heads and divisional managers assume active new roles.
- Empowerment.
- Effective communication.
- Teamwork.
- System for recognition and appreciation of quality efforts.
- Training and education.

These “soft” quality factors are long-term issues, something that cannot be switched on and off. These quality factors must be addressed accordingly in the implementation plan. There is a good chance that the TQM process will end up in failure if there is insufficient attention to “soft” factors (Wilkinson, 1992).

The implementation of the “soft” quality factors must be supported by tools and systems “hard quality factors” to achieve the goals. These “hard” quality factors include:

- Benchmarking.
- Managing by processes.
- Self-assessment.
- Quality control tools.
- Cost of quality process.
- Documented quality management system.
- Supplier management.
- Customer management.

These “soft” and “hard” quality factors reflect the total quality management model proposed by Oakland (2000). The “soft” quality factors are expected to be rated highly in terms of criticality and emphasis in TQM implementation process. The “hard” quality factors are considered as tactics rather than strategies (Black, 1993).

This review of the available literature is based on such classification of “soft” and “hard” quality factors that are reflected in the sets of criteria of the European Quality Model. The attempt is to provide landmarks for total quality management (TQM).

“HARD” QUALITY FACTORS
Supplier Management
Supplier quality management is an important aspect of TQM since materials and purchased parts are often a major source of quality problems (Zhang et al., 2000).

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). According to Besterfield (1994) on the average, 40 percent of production cost is due to purchased materials; therefore, supplier management is extremely important. It follows that a substantial portion of quality problems will be due to the supplier. In order for both parties to succeed and their business to grow, a partnership is required. The supplier should be treated as an extension of the production process. Flood (1993) states that companies should treat their supplier as long-term business partners.
Many authors advocate that companies must establish supply chain partnerships to motivate suppliers to provide materials needed to meet customer expectations (Harrison et al., 1996; Kumar, 1996; Lambert et al., 1996; Clifton, 2001; Jabnoun, 2000; Thakur, 2002). Wong et al., (1999) state that partnership with suppliers will lead to quality results from the supply chain. According to Kanji and Wong (1999) the creation and enhancement of the customer-supplier partnership is a major quality practice. This is also emphasized by Wong and Fung (1999).

The quality gurus believe that supplier should be viewed as an integral part of the organization’s business operations (Ishikawa, 1985; Deming, 1986; Crosby, 1989). Crosby (1989) states that one of the most important parts of the quality improvement process is the relationship between supplier and buyer. In his letter to the 3rd Shanghai International Symposium on Quality, Juran (1998) (in Sun, 2000) said that there is a universal set of actions that are the essential elements of quality management. These elements include, among others, partnering with suppliers. Feignebaum (1998) (in Sun, 2000) suggested in his speech in the same symposium ten principles of quality management, one of them is that, quality is implemented in a complete system connecting customers and suppliers. Crosby (1998), (in Sun 2000) stated in his speech that management must describe the responsibilities of employees, suppliers, and customers. Genna (1997) states that the idea of adding value to products and services is keenly linked to customer satisfaction, although not every company realizes it. He suggests that steps such as on-time shipment and defect-free can improve the supplier product quality, as well as, help to provide the same quality to the ultimate customers.

Quality management is based on prevention rather than detection. This is emphasized by Eshennawy et al., (1992) when they consider that managing suppliers is a major issue to be addressed to have a complete total quality management organization.

The Philip's Group created a long-term business partnership with its suppliers. They coined the phrase “Comakership” to describe the new approach. Comakership simply means working together towards a common goal. It is based on the principle that both parties can gain more through co-operation than by separately pursuing their own interests. Comakership means establishing a long-term business partnership with each supplier-base operation. It pushes a desire for both parties to continuously improve the product and to clearly understand their responsibilities. The Philip’s Group found that to develop Comakership considerable changes in behaviour and attitudes were required from both customers and supplier. Customers have to prepare to develop plans and procedures for working with suppliers and allocated time and resources to this. Supplier for their part must accept full responsibilities for their products and not depend on their customer's inspectors (Flood, 1993). Rank Xerox, TI Rayleigh and Locas all adopted a comarkership approach with their supplier to improve quality (Flood 1993). At Toyota and Nissan, full-time specialized management consulting groups provide suppliers with assistance to improve their production and to achieve total quality in their products and services. At least one consultant works with four to six suppliers. All of this supplier assistance is free of charge (Dyer et al., 1993).

Deming (1986) considers the reduction in the supplier base will minimize total cost. Basterfield (1994) says that single sourcing with a large contract will create better quality at a lower cost (also Dyer et al., 1993). Companies worldwide realize that optimising operations within the four walls of their enterprises is not enough to achieve business excellence. They understand that the involvement of suppliers, which is critical to improve quality and meet customer specifications, can enhance their performance (Kanji and Wong, 1999).

Organizations world-wide are using teams to improve the quality of their products and services and recognize that this teamwork should include suppliers (Wong, 2000). At shorts Brothers-UK, they motivate suppliers to initiate total quality by providing training services and joint involvement teams. This is done as the company reduces the supplier base and builds long-term relationships with a number of preferred suppliers (Oakland et al., 1994).

Adopting single sourcing strategy requires supplier selection criteria. Basterfield (1994) suggests that effective selection requires the supplier to be knowledgeable of the purchaser's quality philosophy and requirements. The supplier must demonstrate technical capability and capacity to provide quality products, and of particular importance, is the credibility of the supplier. He continues a well-designed checklist with weights (for supplier’s ability to provide quality products as
evidenced by quality system and improvement programme, supplier's control of its suppliers, and suppliers accessibility) will aid in evaluation and selection. Quality-oriented companies no longer have cost as the primary criterion for selecting suppliers and are being more proactive in developing long-term relationship with their suppliers by extending technical support and training to suppliers to improve the process, quality and productivity of their suppliers (Rao et al., 1999; Clifton, 2001; Thakur, 2002). Easton (1993,1998) states that many Baldrige Award applicants started quality programmes with their supplier (concerned with supplier rating and qualification systems, supplier quality systems audits, joint design teams, join quality improvement teams, training, and supplier recognition schemes) to spread gradually the quality movement throughout their entire supplier chain.

The report of the U.S General Accounting Office identified the establishment of close supplier relationships by high-scoring Baldrige Award applicants as a key feature, which contributed to improved organizational performance (G.A.O, 1991). A study conducted by Wong (2000) reveals that working together with suppliers can be very useful for improving customer satisfaction. The findings indicate that supplier satisfaction will help increase the level of customer satisfaction. Other recent studies support these findings (Dayton, 2001; Lau and Idns, 2001, Martinez-lorente et al., 1998; Thiagarajan et al., 2001).

During the early 1980s the production of Jaguar cars reached its lowest point as confidence and identity slowly ebbed from this most prestigious of car marques. A critical in depth review of the business was carried out by the purchasing manager of Jaguar cars. Findings pointed to the necessity for Jaguar to address its internal controls, its dealer network and to enlist the support of its suppliers to improve overall quality of the vehicles. The initial task was to identify the problem components from the warranty figures. Following this a supplier conference was held with managing directors and chairpersons of the companies concerned to discuss the issues. Multifunctional task forces were set up involving the suppliers. Each had a specific role, which clearly identified the suppliers' responsibilities to quality. Poor suppliers were dropped. Components were resourced in the relentless quest for quality. A single source supplier strategy was implemented and care was taken to involve the supplier at the concept stage (Flood, 1993). Jaguar claim that a single-source strategy was progressive and during the reduction of the supplier base, quality improved, creating better value for money whilst trust and stability were built into the relationships. With the mutual benefits of larger contracts, both Jaguar and its suppliers committed themselves to quality, acknowledging this as a merit of long-term commitment. Another feature of Jaguar’s new approach was the introduction of a “Supplier of the Year” award (Flood 1993).

Accredited Quality Management System

Quality systems are designed to provide both the support and mechanism for the effective conduct of quality-related activities in an organization. It is a systematic means to manage quality in an organization (Kolka, 2002). According to James (1996) the quality-oriented organization ensures that a quality management system is in place and working effectively. The ISO 9000 series certification can be defined as the starting point for entering the competition. The ongoing journey towards TQM must deliver the competitive advantage (van der Weile and Brown, 1998) (also see Quazi and Padibjo, 1997; Williams, 1997; Stahan, 2002; Kolka, 2002, Shiply, 2002). Since the Publication of the ISO 9000 series of standards in 1987, they are used by many companies and organizations as an important milestone to mark their quality journeys.

Crosby (1989) considers systems as the communication centres of operations. Quality systems offer organizations a framework for quality control processes to achieve quality assurance through prevention of failure. Therefore, a quality system must communicate the standards of organizational practice through documented procedures and records. According to Oakland (2000) the aim of the quality system is to provide support to people by addressing the issues of process inputs (materials, information, equipment, methods) to ensure consistent process outputs. The organizations that implement ISO 9000 voluntarily are doing so because they expect these standards to help them do things better and to provide real benefit (ISO, 1999)

Accredited quality management system (such as the BS EN ISO 9000) forms a major pillar supporting the development and operation of TQM in an organization (James, 1996). The origins and basis of commercially oriented quality system standards have evolved over the past thirty years or so. Much of the initial development was for military projects in the United States (James, 1996). Conti (1999) states that among the issues
that rightly call for international standards are: Liberalization of trade, people’s safety and environment protection. The basis for the development of BS EN ISO 9000 can be squarely placed on its military background. The change came about 1984 when the British Standards Institution (BSI) managed to convince the International Standards Organization (ISO) “based in Geneva, Switzerland” to develop a generic quality management standard for world-wide use, based on its revised standard of 1979. Up to twenty-six countries were initially involved and all produced clones in 1987, when the new BS EN ISO 9000 standard was finally published. The result depicted a minimum standard that was acceptable to the countries involved (James, 1996).

In repositioning ISO 9000:2000 to focus more on quality management, the authors have sought underpin this change with an emphasis on eight quality management principles (ISO, 1999):

- Customer focus
- Leadership
- Involvement with people
- Process approach
- System approach to management
- Continual improvement
- Factual approach to decision making
- Mutual beneficial supplier relationships

ISO 9000 is in fact a family of standards developed to assist organizations implement and operate effective quality management systems; ISO 9000 describes the fundamentals of quality management systems; ISO 9000 specifies requirements for quality management systems; whilst ISO 9004 provides guidance on quality management systems (Russell, 2000; Kolka, 2002).

According to Holland (1996) the Director and General Manager of standards-British Standards Institution- “about 100,000 ISO 9000 certificates have been issued in more than 90 countries around the world. It is fast becoming the standard for international trade certificates are being gained at the rate of 15000 every year. Companies having ISO 9000 range from one man businesses to multinationals with thousand of employees”. This is evident from the number of registered organizations by the end of 1999. According to the International Standards Organization (2000) the total ISO 9000 Certification worldwide to the end of 1999 is 343, 643. According to Osman (1996), the Lloyd’s Register Quality Assurance (LRQA) Study conducted in 1992 revealed the following benefits of ISO 9000 certification:

1. Better management control.
2. Ensured consistency of system-company-wide.
3. Productivity gains and increased efficiency.
4. Staff motivation and cost reduction.
5. Ability to open doors to previously closed market segments.
6. Maintaining or expanding market share.
7. Valuable marketing tool.

The study also revealed that external market pressure was the principal driving force behind the majority of decisions to obtain certification. The most important factor is being the increased ability to tender for work from which they would otherwise be excluded. The need to increase or maintain market share was the second most important ranking factors. Other priorities included better anticipation of customer needs and enhanced marketing efforts. However, the benefits associated with internal improvements were given a less important priority as a reason for seeking certification. It is worth mentioning that this study was based on interviews with 400 quality managers and senior managers from a cross-section of LRQAS customer base of a wide range of companies of different size and industry type. Osman (1996) compares the results of the (LRQA) study with the study conducted by the UK Department of Trade and Industry (DTI) in 1991. He says that many of the findings of LRQA study are supported by the DTI study. The DTI study found that certification brings operational efficiency and increase export sales, gained marketing advantage, increase in profit after two years and an average investment payback of less than two years. Other studies are in accordance with the findings of the pervious two studies (Beatie et al., 1999; Quazi et al., 1998; McAdam et al., 1999; Zhu et al., 1999, Dick, 2000; Casadesus and Gimenez, 2000; Beskese et al., 2001; and Calisir et al., 2001). Another benefit is related to the product image problem. Huarng et al., (1999) state that obtaining the ISO 9000 certificate may prove to be another example of how firms can overcome their product image problem. We believe this lesson is crucial to many firms in the developing countries that share this problem. Many organizations consider ISO 9000 certification as the first step in the implementation process of TQM (Oakland et al., 1994). The ISO 9000 registration programme of Tioxide Group Ltd - UK - helped the company to achieve a higher profile through the active involvement of everyone. They felt that they were
in a bitter position to meet the specific requirements of customers and improve their strategic relationships (Oakland et al., 1994).

A documented quality system as part of a TQM strategy can contribute to TQM by managing the organization’s processes in a consistent manner (Zhang et al., 2000). Beattie and Sohal (1999) state that most firms will operate ISO 9000 concurrently with another quality activity, usually TQM. (See also Beattie et al., 1999; Quazi et al., 1998; McAdam et al., 1999; Zhu et al., 1999; Beskese et al., 2001). Kanji (1998b) says that ISO 9000 could be integrated with TQM for the development of a TQM process. He proposed an approach to improve quality by examining the organization’s processes in terms of process definition, process improvement and process design. Once the meanings of the three concepts are determined, then steps for process innovation (ISO 9001) can begin. From the point of view of strategic management, it follows that ISO 9000 must be integrated with human and managerial aspects to become a fundamental part of TQM. The integration of ISO 9000 with TQM generally allows the firm to capture increased profits along the path of quality improvement (Liao et al., 1995 in Huarng et al., 1999). The introduction of ISO 9000 has influenced to a great extent the development of organizational efforts towards quality assurance (Khan and Hafiz, 1999). Oakland (2000) states that to the foundation framework of the customer-supplier chain, processes and the “soft” outcomes of TQM must be added to the first hard management necessity—a quality system based on any good international standard.

The European Air Catering Services - UK - decided to implement Quality Management System based on the ISO 9000 quality standard. The leader of the implementation process of ISO 9000 explained that the system was viewed as a means not an end:

"Although achieving registration to ISO 9002 standard was my ultimate goal, I nevertheless, wanted to implement a system which was flexible, contributed to our goal of continuous improvement and did not require excessive resources in order to maintain it" (Whitford and Bird, 1996).

ISO 9000:2000 is seen to provide complementary rather than competing approaches to the Excellence models such as the EFQM and MBNQA. Russell (2000) states that standards such as ISO 9001:2000 provide complementary rather than competing approaches. Tonk (2000) states that the Baldridge criteria and the ISO 9000:2000 set of quality management systems also attempt a grand unification under which to subsume all of the quality requirements and functional demands of a given organization. This is possible because both the Baldridge criteria and ISO 9000:2000 are customer, process and continuous improvement oriented. According to McTeer and Dale (1996) ISO 9000 quality system standards are applicable to all types of business, whether they are manufacturing industries, such as chemicals, electronics, paper pulp, or steel, or service, such as banking, insurance, medicine or transportation.

D2D is among the first in Europe to gain ISO 9000 and pilot the environmental standards BS 7750 (Zairi, 1999b). Nearly all Philips organizations are ISO 9000 certified, which lays the foundation for continuous improvement or “Let’s make things better”, all the time (Oakland, 2000).

At IBM, the ISO 9000 standards have proven to be a template for the creation of a sound quality system, regardless of whether the target market is located in the United States or overseas. By embarking on the ISO 9000 journey, it is reasonable to expect lower costs, improved customer satisfaction, greater brand loyalty, and stronger market performance associated with this quality effort. The ISO 9000 quality process can be an important step on the road to total quality management.

Dr. Jack E. Small,  
Director ISO 9000,  
IBM, USA.

ISO 9000 was the first goal on our quality journey. With a network of depots all over the United Kingdom, we needed a degree of standardization to help us identify best practice and to make sure we are pulling in the same direction. ISO 9000 certification gave us that and is the foundation from which all future quality initiatives have been developed.

Tony Curely,  
Group Internal Controller,  
TNT UK, European Quality Prize winner in 1996.

Organizing for Quality
The integration of marketing, design, purchasing, operations, and quality assurance is necessary for success in TQM. This was suggested by Feignbaum (1961) when he pointed out that the lack of integration of new design control, incoming material control, product control and
improvement are the main cause of the high cost of non-quality operation. Juran (1974) sees organization for quality in terms of structure and people. This requires the determination of activities to be performed, the responsibilities associated with the activities, dividing the work into jobs, determining job responsibilities and authority, inter-job relations and channels of communication. Ishikawa (1985) supports the use of cross-functional management. According to him, this can be done through the use of committees. Juran (1991) emphasizes this suggestion. According to him the cross-functional nature of TQM requires a suitable infrastructure to support training, project development, and teamwork. Crosby (1989) considers the success of the quality improvement process dependent on effective and systematic implementation. Oakland (1989) describes the Department Purpose Analysis which involves determining key tasks for the department, describing the key processes, including the involved customers and suppliers and subsequent prioritising improvement actions at departmental levels. Feigenbaum (1961) identifies the role of the quality department in three major activities: quality planning, process control and quality design and development. Juran (1974) recommends a greater role for the quality department that involves all quality programme, including analysis of projects, quality planning, coordination, control and providing consultations within the organization.

Moren-Lozon et al., (1998) developed an integrated model for strategic management, organizational design and quality management. They classified quality organization into the Quality Assurance (characterized conformity) and the TQM organization (characterized by internal and external customer satisfaction, continuous improvement and employee involvement) indicating low formalization and centralization organizational structure (see Jabnoun, 2000). Oakland (2000) states that authority must be given to those charged with following TQM through with actions that they consider necessary to achieve the goals. The commitment will be continually questioned and will be weakened, perhaps destroyed, by failure to delegate authoritatively. For this, Oakland (1993, 2000) proposes a quality structure of three-tiers. The purpose of this TQM structure is to achieve employee participation. A disciplined and systematic approach to continue improvement may be established in a TQM or Business Excellence “Steering Committee” or Council. The Committee/Council should meet at least monthly to review strategy, implementation progress, and improvement. It should be chaired by the CEO, who must attend every meeting. The council members should include the top management team and the chairmen of any “site” TQM steering committees or process quality teams, depending on the size of the organization. The objectives of the council are to:

- Provide strategic direction on TQM for the organization.
- Establish plans for TQM on each site.
- Set up and review the process quality teams that will own the key or critical business processes.
- Review and revise quality plans for implementation.

The process quality teams (PQTs) and any site TQM steering committees should also meet monthly, shortly before the senior steering committee/council meetings. Every senior manager should be a member of at least one PQT. This system provides the “top-down” support for employee participation in process management and development, through either a quality improvement team or a quality circle programme. It also ensures that the commitment to TQM at the top is communicated effectively through the organization. Oakland (2000) says the three-tier approach of steering committee, process quality teams and quality improvement teams allows the first to concentrate on quality strategy, rather become a senior problem-solving group. Progress is assured if the process quality team chairmen are required to present a status report at each meeting.

The process quality teams or steering committees control all the quality improvement teams and have responsibility for:

- The selection of projects for the quality improvement teams.
- Provide an outline and scope for each project to give to the quality improvement teams.
- The appointments of team members and leaders.
- Monitoring and reviewing the progress and results from each quality improvement team project.

Oakland (2000) points out that the process quality teams must be given the authority to represent their part of the organization in the process. The members must feel that they represent the team to the rest of the organization. In this way the process quality team will gain knowledge and
respect and be seen to have the authority to act in the best interests of the organization, with respect to their process. A case example of a three-tier structure is a quality structure introduced at a major British construction machinery manufacturer (Goulden 1995, cited in Thiagarajan and Zairi, 1997a). The structure is made up of a plant quality council, steering groups and cross-functional/multilevel project teams. Overall strategy and management of the quality programme is provided by the council. The steering groups sponsored and supported individual teams ensuring the required resources were made available. Members of the teams came from areas closely associated with the project.

Oakland and Porter (1994) consider that one of the responsibilities of senior management at the early stage of initiating the TQM programme is the set up of a quality organizational structure. Such structure is needed to create a framework, which will enable quality improvement to develop and flourish (also Easton, 1993). They consider the quality organizational structure as a key element in ensuring successful implementation of TQM.

At Shorts Brothers, a total quality structure was formed at the beginning of the implementation process. A quality council headed by the Chief Executive Officer was established, two divisional councils headed by their respective vice-presidents and eighteen cross-functional quality teams headed by senior managers. Total quality secretariat was established to take a leading role in assisting the quality council to develop a total quality strategy and to coordinate quality improvement initiatives (Oakland et al., 1994).

The nature of the organization affects the appropriateness of the organizational structure. Moreover, the structure may change according to the degree of TQM maturity of the organization. This is highlighted by the case of Thomas Cork SML. A quality council was established to initiate a total quality process. Once the initiatives got off the ground, the council's functions were taken over by the management committee (Oakland et al., 1994).

Smith (1994) recommends the need to have a full time post to manage the quality process. Many organizations have realized the importance of the contribution a senior, qualified director of quality can make to the prevention strategy (Oakland 2000). In large organizations, then, it may be necessary to make several specific appointments or to assign details to certain managers. Smaller organizations a part-time quality manager could be appointed if the cost of employing a full-time quality manager is not justified. The following actions may be deemed to be necessary (Oakland, 2000):

Assign a quality director, manager or coordinator to be responsible for the planning and implementation of TQM. Depending on the size and complexity of the organization, and its previous activities in quality management, the position may be either full- or part-time, but it must report directly to the Chief Executive.

Appoint a quality management adviser to advise on the "technical" aspects of planning and implementing TQM. This is a consultancy role, and may be provided from within or without the organization, full- or part-time.

In the case of Davy International-Stockton-UK a steering committee was formed when the TQM initiative commenced and a TQM manager was appointed. The steering committee chaired by the Managing Director was established to promote and control the launch of TQM at Stockton. The committee ensures that the annual programme of TQM activities is implemented and that an infrastructure is maintained to effectively action ideas submitted by individuals. It also monitors the activities of the formal improvement teams set up to investigate company-wide areas for improvement (Whitford and Bird, 1996). AT&T-USA starts by identifying the key business processes that are critical for achieving customer satisfaction. Then they map the key business processes against the functional organization. The repair process would be mapped to Billing, Maintenance, Repair, Distribution, Manufacturing, Product Design, and Product Management. This is done by the quality council. Then a major stakeholder of the process who is committed to its improvement is assigned as process owner. This person puts together a cross-functional team consisting of middle managers from each of the functional organizations (Rao et al., 1996).

The Royal Philips Electronics is managed by the Board of Management, which also looks after the general direction and long-term strategy of the Philips group as a whole. The Supervisory Board monitors the general course of business of the Philips group, advises the Board of Management and supervises its policies. These policies are implemented by the Group Management Committee, which consists of the members of the
Managing By Processes

Throughout and beyond all organizations, whether they be manufacturing concerns, banks, retail stores, universities, hospitals or hotels, there is a series of quality chains of customer and suppliers that may be broken at any point by one person or one piece of equipment not meeting the requirements of the customer, internal or external. The concept of internal and external customers-suppliers forms the core of total quality (Oakland, 2000). A key part of any total quality strategy is the management of processes (Porter and Parker, 1993). According to Ahire et al., (1996) all activities of an organization must be planned and executed to improve processes that lead to manufacturing quality products. However, quality must be incorporated into these activities with a clear customer focus (Feigenbaum, 2002).

All organizational activities can be considered as processes. Therefore, if the aim of the TQM initiative is to achieve overall quality performance, then process management appears to be an essential requirement. Juran (1974) suggests that the quality of the product and service depends on the quality of design and the quality of conformance. Process management is the concern of quality of conformance. A number of activities that can be followed to support business process management. Some of these activities include methods for determining processes' capability to meet requirements, design and control of processes, planning, quality systems and methods for product or service design. One important matter in process management is to ensure that process capability can meet production requirements (Zhang et al., 2000).

The importance of customer focus is evident from the fact that it is assigned the highest weight among the Malcolm Baldrige Award criteria (NIST, 1999) and the European Quality Award (EFQM, 1999). According to Kanji (1995) operating through vertical functional structures prevents people within the organization from understanding their role in the process of providing customer satisfaction. A more functional approach, without active management of processes provides barriers to customer satisfaction (Kanji, 1995). Oakland (1993) believes that process management is the key to get employees responsible for what they are doing in relation to customer satisfaction. D2D trained everyone in process management and improvement, and shown how they are part of a supplier-process-customer-chain. Customer-care training was delivered to everyone to reinforce this and to re-emphasize that the supplier-process-customer chains are interdependent and the processes all support the delivery of products or services to customers. Part of everyone’s training was to emphasize that all work is a process and that all activity can be modelled as a supplier-process-customer chain. Almost 3500 people received this process training. Processes were owned in D2D by the people responsible for the output of the process. All processes were developed and refined, and measures of the performance of the processes agreed between customers and suppliers. The agreed standard took into account the full customer requirement, at the most cost-effective method of operation, in comparison with competitors and benchmark standards (Oakland, 2000).

Many companies realized the importance of understanding the notion made by Deming (1986) of the internal customer-supplier as being absolutely critical to a quality transformation. When Thomas Cork-SML UK, initiated their programme of Total Quality Management, they experienced needs and expectations exercise to determine who the next internal “immediate” customers are? What are their requirements? Do I have the capabilities to satisfy their requirements? Who are my immediate suppliers? What are my requirements? (Oakland et al., 1994).

The quality-oriented organization makes customer satisfaction its main focus. To deliver quality products, process owners must determine who their customers are (both internal and external), as well as the needs, requirements and expectations of those customers (McAdam et al., 2002; Feigenbaum, 2002). Then they must ensure that process outputs meet customer needs (Rao et al., 1996). To achieve customer satisfaction, Oakland (1993, 2000) emphasizes the importance of managing the internal-supplier relationship as the first step to support the process management. This is found in each organization represented by an intricate structure of both internal customer and internal supplier. Any weak link or break in this relationship may influence the relationship between the firm and its external customer. This means that process management considers that managers and
process owners should control and improve organizational outputs (good, services, ideas, and information) by controlling process inputs (the flow of activities). This means that process management is not considered by the boundaries of department. Zairi (2000) states the creation of customer-supplier chains is an important task otherwise internal fragmentation will affect the external customer. Through a process of translating the customer-supplier chain at all levels, better focus can be achieved and ultimately all work carried out will be of value.

Many quality organizations learned the importance of applying clearly defined customer-focus approaches to manage processes rather than the conventional functional approach of management. ICL and Shell Chemicals-UK are of such companies (Sinclair 1994). At shorts Brothers - UK - the concepts of the internal customer-supplier was understood by everyone in the company, recognizing the importance of satisfying the internal customer as a means for the company to achieve its quality quest (Oakland et al., 1994). Based on the experience of shorts Brothers, McAdam (1996) states that process management (process-based approach) improves customer satisfaction and overcomes the problems associated with management through functional-based approach.

**Benchmarking**

Xerox 1979, as it is known today, formally developed the benchmarking process. The word is derived from the benchmark used by surveyors to indicate “a mark in stone or metal, or other durable material firmly fixed in the ground, from which differences of level are measured as in surveys or tidal observations” (Rao et al., 1996). Zairi and Ahmed (1999) state that to trace the history of benchmarking is to trace the history of humankind. Utilizing knowledge from different sources to advance and improve has been fundamental in the development of civilization. Over the years, it has become a study of processes and a significant strategic tool integrated to TQM (Zairi, 1994). For Zairi (1994) TQM is the wheel for improvement conducting an internal value adding activities for the end customer, whereas, benchmarking is the external activity aimed at identifying opportunities to ensure that the improvement wheel is turning in the right direction towards achieving high standards of competitiveness. Many authors see benchmarking as a vital tool in the development of TQM (Sinclair et al., 2000, 2001; McAdam et al., 2002). According to Oakland (2000) benchmarking measures an organization’s operation, product and service against those of its competitors. It will establish targets, priorities and operations leading to competitive advantage. For Dow et al., (1999) benchmarking can be seen as a “hard” quality practice providing some systematic analysis of the achievement of quality goals. Benchmarking has also been demonstrated to be a catalyst for the success of a number of other organization change intervention, for example business process re-engineering (Thor et al., 1999), improved operational performance and general changes in organizational thinking and action (Cassell et al., 2001).

Benchmarking at Xerox evolved as a sophisticated methodology for process improvement. Several companies picked up the methodology and used it to compare themselves against the competition (Whitford & Bird, 1996; Rao et al., 1996). A systematic and ongoing process for measuring products, services, and practices against external partners to achieve improved performance (Rao et al., 1996). Xerox view benchmarking as a structured approach for looking outside the organization. They consider it to be a learning experience that can help set realistic performance goals and identify the practices to be put in place in order to achieve them. They define Benchmarking as

“A continuous, systematic process of evaluating companies recognized as industry leaders, to determine business and work process that represent best practices, establish rational performance goals”. (Zairi, 1994).

Companies that have been benchmarking have recognized the significant advantages that result. These are:

- Convince employees that challenging goals can be achieved by setting targets on the basis of hard data, not intuition (Bogan and English 1994).
- Facilitate the implementation of process improvements. The benefits of benchmarking include reduced cycle time and reduced cost for implementing the process improvement (Bogan, 1994 in Rao et al., 1996).
- Increase awareness of the benefits to be derived from using new technology. Bar coding is a technology that was used by food chains five years before other manufacturing industries began to adopt it. If these companies had been using benchmarking, the implementation of the new technology could have been much more rapid (Rao et al., 1996).
Zairi (1994) identifies four essential types of benchmarking:

1. Competitive benchmarking: Comparison with primary competitors. GTE USA measured defect rates and found that its Japanese competitors had defect rates a hundred times less. This benchmark motivated them to devise plans to improve their process and close the gap (Rao et al., 1996). When they wanted to enter the electronic-typing business, Products Division at Xerox benchmarked IBM. Xerox entered the market in late 1981, and by 1983 it was the market leader with a 20 percent market share (Rao et al., 1996).

2. Functional benchmarking: Comparison with similar functions or processes within the same broad industry leaders as partners. Unipart, a manufacturer of car components UK, has an information-sharing scheme with Yutaka Gigen a counterpart in Japan (Bowen, 1993).

3. Generic Benchmarking: Comparison with similar functions or processes regardless of type of industry. A recent example of this type is the development of the just in time (JIT) production management system. This system aims to eliminate waste in a production process by reducing inventory. The idea came to Taiichi Ohno of Toyota Manufacturing after he saw how inventory was managed in an American supermarket (Rao et al., 1996).

4. Internal Benchmarking: Comparison within the set up of one's own corporation (sister organizations or branch offices). It involves an evaluation of practices where knowledge about the processes is uncovered, usually by members of another department or group. Rank Xerox used this approach of benchmarking with great success. Best practices experience was transmitted to all twenty different operating companies in Europe (Smith, 1994).

Yellow Pages (YP) is a division of British Telecommunication PLC (BT). YP's primary aim is to be the business Information Bridge between buyers and sellers. YP uses the Business Excellence Model and was among the nine finalists for the 1998 European Quality Award for Business Excellence. YP won one of the prizes of the EFQM. YP has 42 benchmarking projects in progress of various types and complexity. The company has 10 years of experience using benchmarking. YP encourages people to use benchmarking mainly through the circulation of the company's policy and brochure. The company designs benchmarking studies using financial, non-financial and operational performance indicators. The benchmarking model used at YP involves 12 steps:

1. Ensure management commitment.
3. Selecting your targets.
5. Start Partnership Selection.
7. Preparation for site visits.
8. The site visit
9. Identify practical solutions and plan action.
10. Implement.
11. Keep in touch.
12. Continuous improvement.

This model is followed in every case, although it is the project manager's responsibility to decide if all the steps are followed (Simpson and Kondouli, 2000). Nadkarni (1995) reports that all Baldrige Award winners applied various types of benchmarking to identify the best practices. Motorola conducts benchmarking against 125 companies.
Large companies see benchmarking as important tool for an increased rate of improvement (Carman, 1993). Companies like British Airways, Federal Express and the Royal mail consider benchmarking as a vital component of their total quality programmes (Bank, 1992). Zairi (1994) points out that in order to have a process-driven benchmarking, it has to involve both the outputs and information on how those outputs are achieved. He cautions that focusing on outputs only (cost-driven benchmarking), while often leads to cost reduction, may commit people to unrealistic quality improvement goals. Jarrar and Zairi (2000) state that benchmarking or best practice management is increasing being recognized as a powerful performance improvement effort for processes, business units, and for entire corporations. Dervitsiotis (2000) states that it is noticeable that not only consulting firms but also organizations such as the American Productivity and Quality Centre, and the European Foundation for Quality Management are seriously engaged in the promotion of and training in benchmarking as a fundamental approach to achieve business excellence.

**Self-Assessment**

Measuring consumer satisfaction and quality costs provide a tool to assess the performance of the process. Assessing the company's TQM initiative is another important aspect as it identifies areas of weakness within the process. Zairi (1994) considers self-assessment as an effective technique to measure the culture of quality within the organization. According to Conti (1999) the objective of self-assessment is to diagnose, maximizing the ability to identify weaknesses that are obstructing the achievement of targets and improvement of performance in general. Self-assessment promotes business excellence by involving a regular and systematic review of processes and results. It highlights strengths and improvement opportunities, and drives continuous improvement (Oakland, 2000). If a process of continuous improvement is to be sustained and its pace increased it is essential that an organization monitors on a regular basis what activities are going well, those which have stagnated, and what needs to be improved. Self-assessment provides such a framework (Van der Wiele et al., 1997).

The introduction of various quality awards has provided impetus for the implementation of TQM (Sinclair et al., 2001). Considerable research has been carried out in to the format of the EFQM model of Business Excellence and its use as a tool for Self-assessment (Hakes, 1998; van der Weile, 1996). The introduction of internationally respected quality awards (Deming Prize, 1951; MBNQA, 1987; and the EQA, 1991) has provided the opportunity for firms to assess their performance. Using the models of total quality management (TQM) and business excellence, which underpin these awards, the strengths and areas for improvement of their approaches to business improvement (Wilkes and Dale, 1998; McAdam et al., 2002). Since the award criteria of MBNQA (1999) and the EQA (1999) are generic and well documented, they serve most often as the model for self-assessment (Kuery 2000). The Baldrige Award criteria can be used to assess the organization's total quality management system. Thousands of organizations use the criteria for this purpose, a few hundred organizations actually apply for the award, of course, and the European Quality Award assessment model can be used for this purpose also. Zairi (1994) states that self-assessment can help organizations in measuring performance of processes and enablers and their relationship with results, providing the opportunity to benchmark and compare like for like, providing the opportunity to take a broader view of how TQM is impacting on various business operations, measuring financial and non-financial areas, measuring internally and externally, including objective assessment through third party involvement, measuring for improvement rather than for hard control, creating the desire to do better and perhaps even win awards, and sharing information on successful quality strategies and the benefits derived from implementation of these strategies. It seems that tools as the Balanced Scorecard and EFQM and Baldrige framework are acting as a catalyst to the measurement revolution (Stone and Banks, 1997).

Black et al., (1996) argue that the awards criteria provide a more accepted tools to measure progress towards TQM than those suggested by others like Saraph et al., (1989), as the critical factors were defined on the basis of literature based knowledge and defined by only a small number of assessors. Oakland (2000) considers the assessment of an organization progress using an accepted set of criteria (such as Baldrige Award and the European Quality Award) is most valuable. Tioxide Group Ltd. used the European Quality Award criteria for self-assessment (Oakland et al., 1994). Van der Wiele et al., (1996) report that in their study of the 117 leader European organizations they found training to be one of the important initiatives to support the self-assessment process. In Tioxide Group Ltd, Approximately four hundred employees...
have been trained on quality audits, which produced a team of professional auditor’s (Oakland et al. 1994). Hewlett-Packard (HP) has its own proprietary self-assessment model, Known as the Quality Maturity System (QMS). Its has been mapped against the US Baldrige Quality Award Model and the Business Excellence Model (BEM), for which there has been found to be a 93 percent overlap. Self-assessment, using the Hewlett-Packard Peer review teams, caused the spread of best practice within the company and the reviews act as facilitators of cross-fertilization and improvement across the global organization. There are global databases, for example, for exchanging information. In the first three years of quality and self-assessment using the QMS, a lot of cost (waste) was taken out of the organization. This moved on to address the issues of growing the business (three years) and finally into the customer focus (three years). The Business Excellence Model is integrated into the business planning cycle and the self-assessment outputs feed the annual planning process. It is used very much to drive strategic business improvement. Training of new managers in the QMS, BEM and self-assessment is conducted to keep the whole approach alive in Hewlett-Packard (Oakland, 2000).

Simpson et al., (1998) describe how self-assessment works; British Telecom Northern Ireland (BTNI) entered the 1994 UK Quality Award on the crest of a ware. In 1993, BTNI had been the first operational unit of BT to achieve ISO 9000 registration. To continue the improvement process, BTNI had adopted self-assessment in 1993, winning both the BT Group and Northern Ireland Quality Awards within 12 months. Having entered the Quality Award with realistic expectations of winning, BTNI had to accept the need for organizational change when it was not selected as a winner. BTNI decided to re-enter the 1996 UK Quality Award. With notable organizational improvements in place and a more professional approach to the award process, the disappointment felt at not winning was, if anything, even more acute than in 1994. However, it is a tribute to the professionalism of the BTNI management that these feelings soon dissipated and, buoyed up by winning 1996 Northern Ireland Quality Award and winning the 1997 UK Quality Award.

Hakes (1998) reports the following benefits of self-assessment:

1. It produces an objective identification of current strengths and areas of improvement.

2. Provides a useful analysis of an organization’s capability, which is of real interest to potential customers.

3. It helps to create a vision in order to counter an organization tendency to skip from one initiative to the next. Overall, self-assessment is predominantly used for strategic management and action planning, or as a basis for improvement projects.

In this regard, Oakland (2000) concludes that:

There have been many recent developments, and there will continue to be many more, in the search for a standard or framework against which organizations may be assessed or measure themselves, and carry out the so-called “gap analysis”. To many organizations the ability to judge progress against an accepted set of criteria would be most valuable and informative.

**Cost of quality**

Management in its pursuits of quality improvement, customer satisfaction, market share and profit enhancement uses quality costs as the economic common denominator, which forms the basic data for TQM. A quality cost programme provides warning against oncoming dangerous financial situations. Quality costing is one measurement technique that has often been used to help justify the adoption of quality improvement efforts to senior managers (Sinclair et al., 2001). A number of world-class organizations do employ quality-costing measures as an indication of internal quality performance (Dale et al., 1999). According to Besterfield (1994) Quality costs are defined as those costs associated with the non-achievement of product or service quality as defined by the requirements established by the company and its contracts with customers and society. Simply stated, it is the cost of poor products or services.

Juran is often given credit for coining the concept of quality costs. He addressed the economics of quality in the first quality control handbook (1951) in which he used the famous analogy of “Gold in the Mine”. He proposed that an optimal quality level could be found where the losses due to defects were equal to the cost of quality control. The “cost of poor quality of an organization is the difference between the actual operating cost and what the operating cost would be if there no failures in its system and no mistakes by its staff (Bland et al., 1998). Krishnan et al., (2000) state that according to the American society for Quality Control (ASQC),
quality costs are a measure of costs specifically associated with the achievement or non-achievement of product or service requirements established by the company and its contracts with customers and society. Harrington (1999) states: “whether it is called quality cost or poor quality cost, it is designed to reduce the cost associated with poor quality”. According to Besterfield (1994) the cost of poor quality can exceed 20 percent of revenues in manufacturing companies and 35 percent of revenues in services companies. Managers needed the information to obtain a greater commitment to the benefits of quality and were aware that a positive cost trend would prove the economic value of quality (Suresh et al., 2000). The traditional cost of quality model began to evolve with Masser (1957) who subdivided quality costs into prevention, appraisal and failure costs. Freeman (1960) and Feigenbaum (1961) further developed the cost of quality model (Rao et al., 1996). Reporting and understanding quality costs became a requirement in 1963 for US government contractors and subcontractors. The American Society for Quality Control formed the Quality cost committee in 1961. Lending further validity to the concepts. In 1967 this committee published quality costs—what and how, which established the traditional model of Prevention, Appraisal, Failure (PAF) model of quality costs (Rao et al., 1996). The analysis of such cost can be used to persuade management of the need for improvement, as well as measuring the results of improvement process. Heizer and Render (2001) provide the following definitions of the PAF model:

- **Prevention Costs:**
  Costs associated with all activities designed to prevent defects in products or service. These include the direct and indirect costs related to quality training and education, pilot studies, quality circles, quality engineering’s, quality audits, supplier capability surveys, render technical support, process capability analysis and new product reviews. These costs are used to build awareness of the quality programme and to keep the costs of appraisal and failure to a minimum.

- **Appraisal Costs:**
  The costs associated with measuring and evaluating the product or service quality to ensure conformance. These include the cost of inspection, test or audit of purchases, manufacturing or process operations, and finished goods or services. The direct and indirect costs of the various tests and inspections to determine the degree of conformity are included in this category.

- **Internal Failure Costs:**
  Costs incurred prior to the shipment of the product or the delivery of the service. These costs are associated with defects that are found prior to customer delivery. They include the net cost of scrap, spoilage, rework and overhead, failure analysis, supplier rework and scrap, re-inspection and retest, down time due to quality problems, opportunity cost of product classified as seconds or other product downgrades.

- **External Failure Costs:**
  The costs of discovered defects occurring after product shipment or service delivery. These costs include warranty charges, customer complaint adjustments, product recalls, allowances, and product liability. They also include the direct and indirect costs such as labour and travel associated with the investigation of customer complaints, warranty field inspection, tests and repairs.

The prevention and appraisal costs are known as conformance costs and defined as those costs incurred to insure that the manufactured products or delivered services conform to specification. Whilst the internal and external failure costs are known as non conformance costs which are associated with products or services that do not conform to the customer’s requirement (Rao et al., 1996).

There are several well-documented field based US studies (Carr, 1992; Carr and Tyson, 1992; Carr, 1995) which outline the various innovative techniques utilized by such companies as IBM, Xerox, Tennant, Ford, Westinghouse, Pacific Bell and others. These companies employ cost of quality calculation as an integral part of their quality programme. They are flexible with the use of quality cost definitions, comfortable with cost estimations and practical with presenting the information. Xerox applied the cost of quality principles to its US sales and marketing group realizing an outstanding cost of quality savings of $53 million in the first year. The improvements were relatively painless. Line managers, initially skeptical of cost of quality, began to appreciate the value of this tool. Over the subsequent four years Xerox achieved over a $200 million savings in quality costs. Xerox made cost of Quality as integral part of its Leadership, Through Quality Programme and defines quality as 100 percent customer satisfaction (Rao et al., 1996). Shorts Brothers involved the workforce in the cost of quality projects to motivate employees towards the company’s TQM initiative. Achieving savings persuaded employees to realize the benefits of TQM (Oakland et al., 1994).
Having said that, it is apparent that quality cost measurements serve as an analytical tool, a means to determine when, where, and how quality costs are spent. They also serve to gain management attention and to help coordinate and communicate quality costs throughout the organization. According to Tatikonda and Tatikonda (1996) relevant cost of quality reports inform, motivate, communicate, coordinate, prioritize, and measure performance. Such reports monitor progress of quality projects, assess benefits of quality programmes, and link quality effort with productivity increases. Oakland (2000) adds that the analysis of quality-related cost is a significant management tool that provides a method of assessing the effectiveness of the management of quality; and a means of determining problem areas, opportunities, savings, and action priorities.

**Quality Control Techniques**

Juran (1978) and Taguchi (1983) argue that a sound design quality planning is needed to minimize in-production quality problems. However, when products are being produced on the shop floor, variations in the manufacturing process (such as raw materials quality, machine conditions, worker skills...etc.) contribute to a variation in product quality. This indicates that the role of quality control in manufacturing is as critical as the design quality of products and process (Ahire et al., 1996).

Statistical process control (SPC) techniques are used to detect assignable causes contributing to the variation in quality, to provide useful information for product design, and to determine process capability (Ahire et al., 1996). Statistical process control is one of the cornerstones of the model for TQM developed by the European Centre for Total Quality Management (Sinclair and Zairi, 2000). Statistical Process Control is not only a tool kit; it is a strategy for reducing variability, part of never-ending improvement (Oakland, 2000). Although most statistical techniques have been used in the manufacturing environment, they can be used in non-manufacturing industry, for example the service sector (Xie and Gho, 1999). SPC helps quality-oriented firms to monitor quality variations and to investigate critical areas where improvements are needed (Deming, 1986).

The aim of statistical process control and control charts is first to achieve a stable process and then to reduce successively process variation (Stenberg and Deleryd, 1999). Ebrahimpour et al., (1992), suggest that to use the SPC tools effectively, production workers should have an adequate knowledge regarding their usage. In this regard, Deming (1986) states: “Management's new job is embodied in the 14 points. It is necessary for management to learn some rudiments of statistical theory and applications. Education in simple but powerful statistical techniques is required of all people in management, all engineers and scientists, inspectors, quality control managers, management in the service organizations of the company, such as accounting, payroll, purchase, safety, legal department, consumer service, consumer research. Engineers and scientists need rudiments of experimental design. Deming (1986) adds: “It is essential, however, in industry and in service to understand the distinction between a stable system and an unstable system, and how to plot points and conclude by rational methods whether they indicate a stable system. The point might show (e.g.) weekly figures on sales, quality incoming and outgoing, complaints of customers, inventory, absenteeism, accidents, fires, accounts receivable, beneficial days.”

Stenberg and Deleryd (1999) reported the following major advantages of SPC based on a study of 83 Swedish organizations:

- Lower rejection and quality costs.
- Process and product improvement.
- Better process comprehension.
- Possibility to control the processes.
- Quality insurance and higher tractability.

Among the techniques that form the core of statistical process control, control charts are perhaps the most important and widely used tools (Chinna et al., 2000). Juran (1974) emphasizes the importance of quality control tools to achieve both low-defect production and to improve quality. The skills and techniques developed to assure the quality of output have been well documented since the early work of statistical procedures to provide guides to produce good parts and to disclose the cause of variations (Modarress and Ansari, 1989). Ishikawa was the author of two of the best-known books on quality: What Is Total Quality Control? The Japanese Way (1985) and Guide to Quality control (1982). The 1982 work was originally published in Japan in 1968 and describes the basic tools that have been found most useful in the improvement of quality by Japanese quality circles. It became a popular text for quality circle members and leaders who wanted to refine their understanding and use of those tools. In spite of its simplicity, the book has received wide praise from statisticians. Ishikawa's
book covers the following tools: Histograms, Check sheets, Pareto diagrams, Graphs, Scatter diagrams, Cause and effect diagrams, and control charts. Quality practitioners refer to these tools as the seven basic tools or seven basic statistical tools for quality improvement. These tools are simple and find applications in both service and manufacturing activities (Rao et al., 1996). At Crnaud Metalbox PIC, the statistical process control was seen as an important vehicle for wider participation in teamwork. It provided the total quality programme a new boost. Also at Tioxide Group Ltd, Statistical quality control was considered as one of the major elements in the total quality strategy development process (Oakland et al., 1994).

Another statistical quality control tool to focus on customer satisfaction is six-sigma (Munro, 2000). Harry and Schroeder (2000) in Munro (2000) define the six-sigma strategy as “a disciplined method of using extremely rigorous data gathering and statistical analysis to pinpoint sources of errors and ways of eliminating them”. Six-sigma is a popular approach to drive out variability from processes using powerful statistical tools and techniques. Although originally introduced by Motorola in 1986 as a quality performance measurement, six-sigma has evolved into a statistically oriented approach to process and product quality improvement (Coronado and Antony, 2002). In January 2000 Ford Motor Co. publicly announced that it would be the first automaker to use six-sigma to focus on customer satisfaction (Munro, 2000).

**Customer Management**

Customers are an economic asset. They’re not on the balance sheet, but they should be (Claes Fornell, 1994 in Kanji et al., 2000). Deming calls for total transformation of existing management methods to achieve a culture of continuous improvement for continual customer satisfaction. TQM requires that all efforts in the organization focus on customer satisfaction through a customer-oriented right-first-time and every time approach. TQM is concerned with systematic proactive review and measurement of the processes that add value to the customer satisfaction. This strategic approach is the route to success in the marketplace.

*A manufacturer is not through with his customer when a sale is completed. He has only then started with his customer.*

*Henry Ford*

*My life and Work (1922), p. 41*
According to Nadkarni (1995) focusing on customer satisfaction was a major reason of the success of Baldrige Award winners. To achieve customer satisfaction process, companies should cover a number of issues. These issues include methods of determining customer satisfaction, providing centres for customer inquiry, formal improvement process for customer satisfaction, and use of customer satisfaction data positively. Customer satisfaction requires identifying the customer’s needs in order to design the appropriate product or service (Spring et al., 1998). Armed with knowledge of “what” the customer wants, product designers need a clear enumeration of the “hows”. A relatively new technique, Quality function Deployment (QFD) has emerged, which effectively relates the “whats” and “hows” of product design, and in so doing translates the voice of the customer from the marketer’s language. (Zairi, 1994, Rao et al., 1996). QFD was developed in 1972 at Mitsubishi’s Kobe Shipyard. Ford and Xerox first used the technique in the United States in 1986. Since then the technique has gained wide acceptance in the United States, having been adopted by such companies as Hewlett-Packard, Digital Equipment, Eaton Controls, Texas Instruments and the US Army (Rao et al., 1996). Zairi (1994) states the QFD is a method of designing and optimising the process of developing new products based on the wants of the customers. QFD is a multi attribute measurement method that incorporates a significant organizational behaviour component. That is to build the House of Quality—a big part of QFD personnel from engineering manufacturing, marketing, and sales must convene to hammer out a mutually agreed upon work plan (Rao et al., 1996). The combination of various customers’ preferences to develop an optimum product design is a fundamental component of implementing a quality function deployment (QFD) project (Lowe and Ridgway, 2000). They add, the success of a QFD project depends upon the identification of a group of customers’ true requirements and the translation of these requirements into technical targets for a new product design (Also see Oakland, 2000; Jabnoun, 2000).

QFD is per se a powerful integrative device. In essence QFD promises to provide better products at more favourable cost (Moura e Sa and Saraiva, 2001). QFD is extremely intuitive, does not incorporate statistics (a strength and a weakness), and results in a prioritised list of specific product design targets. QFD involves the development of four "Matrices" or "Houses" which step down the product design and manufacturing process into ever-increasing levels of specificity. The four "Matrices", "Houses" are

1. The planning Matrix or House of Quality: sets forth the product design specifications or engineering characteristics, in terms of their relative importance and target values to be achieved in design and manufacturing.

2. The Product Deployment Matrix in which design specs from the planning matrix are stepped down on the subsystem and component level. Critical relationships between component and product characteristics are flagged.

3. The Component Development Matrix, which illuminates the exact parameters of component design.

4. The Operator Instruction Sheet, the final key document, defines operational requirements, the process plan checkpoints, and the quality plan chart (Heizer and Render, 2001, Rao et al., 1996).

According to Dawson and Askin (1999) the fundamental tenet of QFD is that increasing customer satisfaction should be the goal. When organizations direct their efforts towards meeting the customer’s needs, internal conflict is minimized. Therefore, product designers need to know how to make tradeoffs in selecting design characteristics, which result in the highest level of customer satisfaction. The larger the contribution, the more influence the design characteristics have on customer satisfaction (Franceschini and Rupil, 1999).

Most of the descriptions of QFD, which have reached the literature, speak favourably of the technique. On the other hand, (Burrows, 1991 in Rao et al., 1996) reports “horror stories of frustrating, time-wasting days in front of wall-size QFD matrices... Many companies (Including Digital corporation) have ended up with 100 by 100 matrices-that’s 10000 cells to fill in—wasting months of precious time. He adds, similarly, a QFD veteran at Hewlett-Packard sounds a cautionary note: It’s worse to oversell (QFD) than to give people a realistic view of what it can do.

Having said that, then, it is apparent that without understanding customers, there can be no customer satisfaction (Crosby 1989). A variety of tools and techniques can be used by organizations to measure customer satisfaction. Taylor, (1995) mentions customer surveys, close up interview, service visit teams, advisory panels
and focus groups as techniques to be used to measure customer satisfaction. The most commonly used technique is the customer surveys (Oakland et al., 1994). They report that at Shorts Brothers, regular consultation with customer representatives is conducted to measure customer satisfaction and customers are invited to participate in multidisciplinary design teams. Nadkarni (1995) reports that the Selection Corporation (Baldrige Award winner) calls on each of its 120 customers to enquire about the level of satisfaction associated with their products and services. IBM, DuPont, AT&T and Panasonic have stopped creating products with just the buyer in mind and have started considering the end user as well (Thiagarajan and Zairi, 1997a). These cases not only emphasize the importance to measure customer satisfaction, but highlight also what Deming (1986) recommended. He recommended frequent and continued direct interaction with customers to determine the level of satisfaction. Xerox organizes a Visitor Quality Day for customers every six weeks (Nadkarni, 1995; Rao et al., 1996). Garvin (1983) pointed out that the quality leaders in Japan had a clear understanding of what the customers want through extensive data collection concerned with the customer. Some companies consider listening and responding to the customer as religion. The chief Executive Officer of GTE directions (Baldrige Award winner- 1994) attributes the company’s success to this religion (Bemowski, 1995).

As cited in Andre and Sariva (2000), There are several studies that bring to evidence the benefits, in terms of business results, that derive from a high level of customer satisfaction, namely decrease of failure-related cost (Garvin, 1988; Crosby 1979), increase of products mix provided to customers with enterprises and brand’s prestige in the market (Anderson and Weitz, 1989), easier acquisition of new customers (Fornell, 1992), increases of loyalty and reduction of product’s price elasticity (Garvin 1988; Reicheld, 1996). In this regard, it should be stressed that in all the above types of contribution to business results customer loyalty plays a decisive role. Loyalty contributes to business results in two essential ways: increase in the number of customer and profit by customer (Andre and Savira, 2000).

Recently, efforts are devoted in several countries to find the customer satisfaction index. The American customer satisfaction index measures the quality of goods and services as experienced by those that consume them (Anderson and Fornell, 2000). Many countries are interested in their Consumer satisfaction index. In this regard Anderson and Fornell (2000) state: “The National Quality Research Centre at the University of Michigan Business School has deployed national systems for measuring customer satisfaction in Sweden (1989) and the US (1994). It has conducted pilot studies in Taiwan, New Zealand, Korea and Brazil; gained approval to launch national indices in Malaysia, Canada and Brazil; and worked with 15 European Union countries to introduce the European Customer Satisfaction Index in 1999”.

ISSUES IN IMPLEMENTATION

Total Quality Management and national culture
TQM implementation does not require a redesign of the country’s culture, rather it requires adherence to its principles, practices and techniques (Juran 1993). Ziani (1996) concluded (from a benchmarking study of 22 critical factors of TQM conducted in several countries of major cultured differences) that not all of the critical factors are relevant in generic sense. He reported that the fundamental factors that were found absolutely essential to successful TQM implementation is top management commitment, clear mission statement and focus on the customer needs. Kano (1993) points out that culture should be considered when initiating a TQM programme although, he stresses culture is not a barrier to TQM implementation process. Ali (1997) concludes that there does not appear to be a clear impediment to TQM implementation resulting from the nature of culture in the Middle East. Kruger (1999) states that there are many case studies demonstrating that total quality management is not limited only to Japanese business organizations and their particular culture, but can be successfully realized in the USA, the UK, Germany, and elsewhere. He adds:

“Total quality management is a universal business strategy which is not culture-bound. At the same time, however, it is useful to consider the quality heritage of national business cultures.

Kruger (1999) concludes that the basic concept of total quality management is universal and equally applicable in any country.

TQM failures
TQM is a philosophy, which emphasizes that continuous improvement is a process with customer satisfaction as its ultimate goal. According to Gatchalian (1997) surveys show that successes in TQM implementation are only within the range of 20 to 35 percent of those who
Poor inter-organizational communication.

1. Lack of time to devote to quality initiatives.
2. Inadequate empowerment at all levels.
3. Resistance of top management to educate themselves regarding TQM.
4. Erratic ways of quality programme implementation.
5. Erratic but unsustained enthusiasm for TQM.
6. Jolting but unsustainable enthusiasm for TQM.
7. Inadequate empowerment at all levels.
8. Management of communication strategies not fully in place.
9. Quality improvement teams not functioning effectively.

Salegan and Fazel (2000) conducted a study with a primary objective of determining the extent to which the obstacles represent major barriers to TQM implementation. A survey was used after refining a questionnaire to assume content validity and mailed to 2000 randomly selected manufacturing firms listed by Dun and Bradstreet. The survey was addressed to company presidents and CEOs, who were asked to forward it to other executives if necessary. They received 109 useable responses to the survey. The study reveals the following obstacles in rank order based on mean ratings and ranks of managers’ responses in TQM companies:

1. Lack of time to devote to quality initiatives.
2. Poor inter-organizational communication.
3. Lack of real employee empowerment.
4. Lack of employee trust in senior management.
5. Politics and trust issues.
7. Lack of strong motivation.
8. View of the quality programme as a quick fix.
10. Lack of leadership.
11. Lack of customer focus.
12. Lack of a company wide definition of quality.

**Gestation period**

TQM is a strategy for change in an environment where the accepted paradigms are subject to constant challenge. It is a strategy concerned with developing an organizational culture in which people are able to meet these challenges (Dale and Lascelles, 1997). Therefore, it is generally acknowledged that the longer organizations work at TQM, the more successful they will be (Thiagarajan and Zairi, 1997b). Man (1992) considers two to three years into implementation as the period after which the tangible benefits of TQM are likely to be evident (See also Thiagarajan, 1996). It does take time for TQM to develop and evolve in any organization (Taylor, 1998). Two American studies concluded that organizations that have implemented TQM for more than two years are more likely to have successful TQM initiatives. The first study (Quality Progress, 1994) reported that organizations with active TQM implementation for more than two years are more likely to have very successful initiatives as opposed to those that have implemented TQM for less than two years. The second study (DDI, 1994) examined 536 TQM organizations and revealed that organizations with more than three years of implementation had significantly better successes than organizations with less than two years of implementation in three TQM aspects: customer satisfaction and retention, operational results and organizational climate. In this regard, Dale et al., (1997) state: "Total quality management is a long-term process. It can take an organization years to put the fundamental principles, procedures and systems into place, create an organizational culture which is conducive to continuous improvement and change the values and attitudes of its people, with considerable effort and intellectual input by the senior management team, and clear strategic direction and framework". Hendricks and Singhal (1999) confirm that the benefits of TQM are achieved over a long period. A close examination of the evidence provided in their study reveals that even after effective implementation, it still takes a couple of years before financial performance starts to improve.
CONCLUSION
Most of the previous literature reviews tend to be presented in anecdotal manner. This comprehensive literature review, however, is more systematic in presenting the vast array of literature on TQM and its major components.

This paper attempted to present the body of literature by linking in all the major elements in a coordinated and supportive approach. That is the effective manipulation of the "soft" factors must be supported by the "hard" factors.

This systematic effort of covering theory, concepts and applications makes a contribution to understanding the importance of each quality factor and how each factor is implemented, and what benefits have been derived from the implementation of each quality factor.

Moreover, the effort was extended to discuss further implementation issues related to cultural differences, the need for gestation period and why some TQM implementation attempts fail.
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