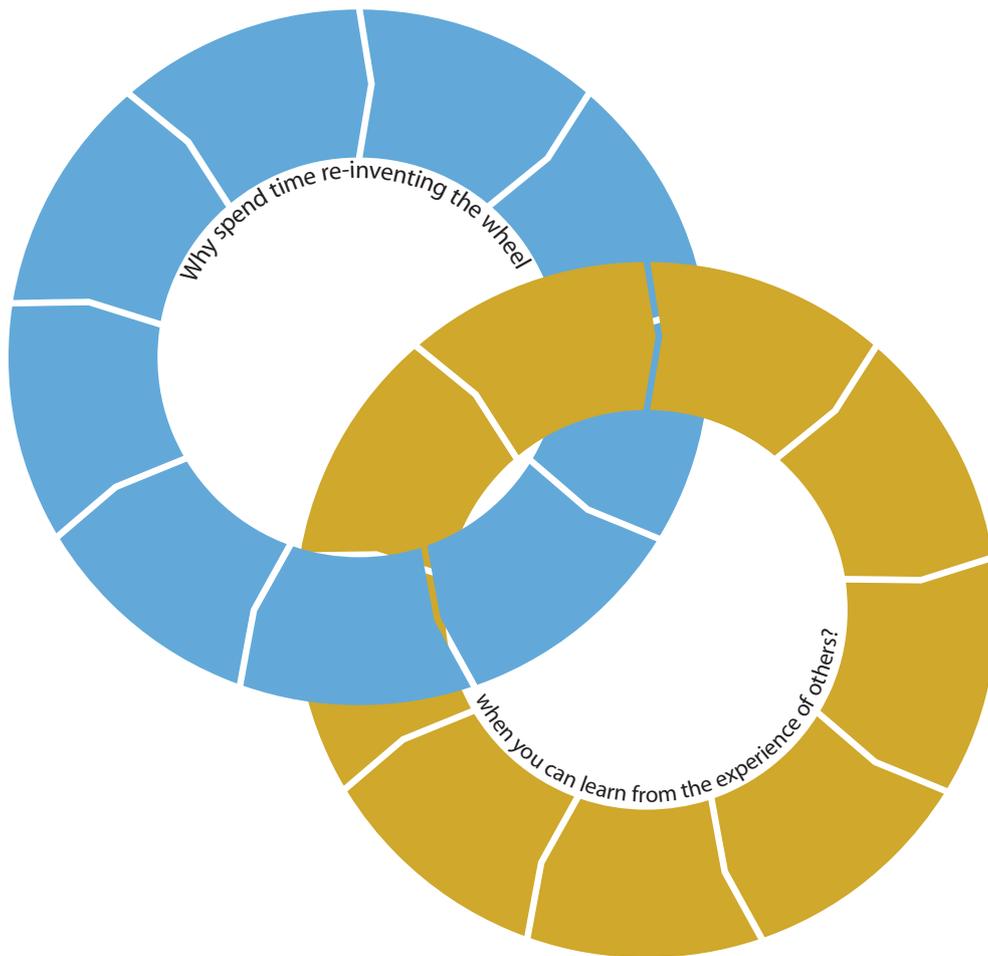
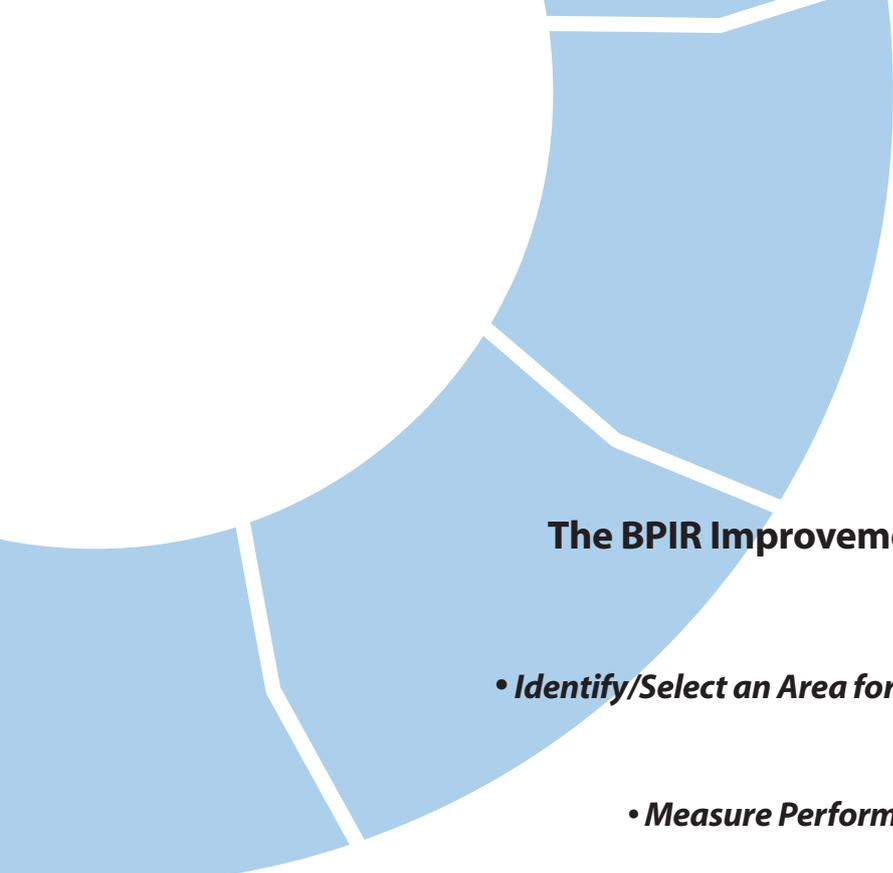


# Total Quality Management





## **The BPIR Improvement Cycle**

- ***Identify/Select an Area for Improvement***

- ***Measure Performance***

- ***Benchmark Performance***

- ***Identify a Relevant Improvement Approach or Strategy***

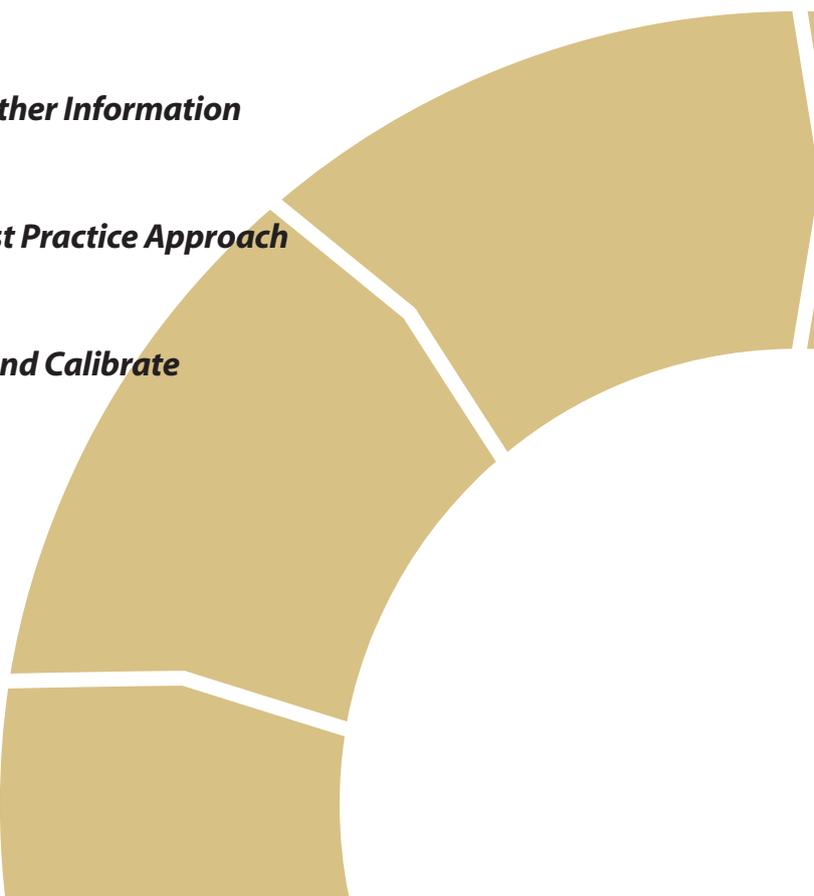
- ***Learn How to Implement***

- ***Identify Best Practice Organisations***

- ***Research Further Information***

- ***Implement a Best Practice Approach***

- ***Review and Calibrate***



## Welcome to Volume 4, Issue 7, of the BPIR.com Management Brief series

BPIR.com Management Briefs provide best practices, innovative ideas and research data on topics and tools that will help you to stay up-to-date on the latest international business trends and practices. Most of the topics for the Management Briefs are chosen by our members, who submit their suggestions through the members' Research Request Service. Read and absorb, and then pass on to your staff and/or colleagues so they can do the same.

### Total Quality Management: The Definition

Total Quality Management (TQM) is a management philosophy and operating approach that aims to consistently exceed the current and future expectations of all stakeholders (i.e., customers, employees, shareholders and the community). TQM is based on continuous improvement in all processes, goods and services, as a result of the creative involvement of all stakeholders.

### The Stage

In today's business world, quality management is a key competitive issue. The delivery of products and services that meet specifications and are "fit for purpose" has become a basic requirement of customers. However, customers increasingly want much more than basic quality. These escalating expectations are cross-sectoral. Whilst higher expectations began in manufacturing and are associated with manufactured products, they now apply to all sectors including the service industry, government agencies and even charitable organisations. To meet these higher expectations there are tools, techniques and methodologies, which when integrated together are powerful drivers of organisational change. Total Quality Management (TQM) provides this integrated approach. When applied, with strong leadership support, TQM leads to continuous improvement in managements systems, processes, products and services, and results in delighted customers and stakeholders.

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### Quality and Principles of TQM

There are several opinions as to how “Quality” should be defined. Traditionally, most definitions have viewed quality as the attributes of a product or service. Commonly, these definitions have taken one of the following generic forms:

- Quality is conformance to product specifications
- Quality is product reliability
- Quality is fitness for purpose

However, according to Williams, Griffin, and Attaway<sup>[1]</sup>, quality has evolved from its traditional internal perspective to one that is customer-centric. Quality is now defined as “meeting or exceeding customer expectations.” Adopting this view of quality does not invalidate the need to continue providing products and services that are reliable or built to specification. It does imply, however, that the products need to provide customers with added value.

Total Quality Management (TQM) is the management of initiatives and programmes that are aimed at achieving the delivery of quality products and services. Several studies have attempted to identify the key principles of TQM. Among these, Douglas and Judge<sup>[2]</sup>, Beer<sup>[3]</sup>, Agus<sup>[4]</sup> and Mann<sup>[5]</sup> have attempted to identify the key principles of TQM. These key principles include the following:

- Top management team involvement: Top management should act as the main driver for TQM and create an environment that ensures its success
- TQM training: Employees should be continually and adequately trained on the methods and concepts of quality
- Focus on the customer: Product attributes that contribute to value, which leads in turn to customer satisfaction, must be addressed in a quality-oriented system
- Management by fact: Decisions should be taken on the basis of fact, which should be supported by a measurement of performance, where possible
- Use of TQM methods: The use of appropriate tools and techniques ensures that non-conformances are identified, measured and responded to consistently

- Continuous improvement of processes: Organisations should continuously work towards doing things right the first time, every time
- Development of a team culture: All employees must be trained to work together in an environment that nurtures individual initiative
- Involvement and empowerment of employees: Employees should be encouraged to be pro-active in identifying and addressing quality-related problems.

It is important to note that the work carried out in the 1980s to identify the key principles of TQM led to them becoming the underpinning principles or core concepts of all major Business Excellence Models. These are also known as TQM Models and include models such as the Baldrige Criteria for Performance Excellence and the EFQM Excellence Model. Developed in the late 1980s and early 1990s, these models have been continually refined each year. In the USA, many have credited the Baldrige Criteria as being a key contributor to the dominance of the American economy in the 1980s and 1990s.

For further information about the models discussed above, as well as other similar models, refer to the Management Brief issue entitled “Business Excellence.” This can be accessed at [BPIR.com](http://BPIR.com) together with many other Management Brief reports..

The core concepts of the Baldrige Criteria for Performance Excellence<sup>[6]</sup> are as follows:

- Visionary leadership
- Customer-driven excellence
- Organizational and personal learning
- Valuing employees and partners
- Agility
- Focus on the future
- Managing for innovation
- Management by fact
- Social responsibility
- Focus on results and creating value
- Systems perspective

The fundamental principles underpinning the EFQM Excellence Model<sup>[7]</sup> are:

- Results orientation
- Customer focus
- Leadership and constancy of purpose
- Management by processes and facts
- People development and involvement
- Continuous learning, innovation and improvement
- Partnership development
- Corporate social responsibility

## Historical Development of TQM

According to Beer<sup>[3]</sup> and Conti<sup>[8]</sup>, TQM gained prominence in western countries in the 1980s as a response to the competitive advantage gained by Japanese companies, particularly in the automobile and electronics industries. However, the roots of modern quality management can be traced back to the early 1920s, when statistical theory was first applied to product quality control. This concept was further developed in Japan in the 1940s and 1950s, and was led by “quality gurus” such as Deming, Juran and Feigenbaum.

### *Inspection*

Inspection involves measuring, examining and testing products, processes and services against specified requirements to determine conformity. During the early years of manufacturing, inspection was used to decide whether a worker’s job or a product met the requirements and was, therefore, acceptable. The theories of F. W. Taylor, published in “The Principles of Scientific Management” in 1911<sup>[9]</sup>, led to the emergence of separate inspection departments in industry. From these inspection departments arose an important new idea, defect prevention, which in turn led to quality control. Inspection still has an important role in modern quality practices. However, it is no longer seen as the answer to all quality problems. Rather, it is one tool within a wider array.

### *Quality Control and Statistical Theory*

Quality Control was introduced to detect and fix problems along the production line, and aimed to prevent the manufacture of faulty products. Statistical theory played an important role in this area. In the 1920s,

Dr W. Shewhart developed the application of statistical methods to the management of quality. He produced the first modern control chart and demonstrated that variation in the production process leads to variation in products. Therefore, eliminating variation in the process would lead to a consistently high standard of end product.

### *Quality in Japan*

In the 1940s, Japanese products were perceived as cheap, shoddy imitations. Japanese industrial leaders recognised this problem and aimed to produce innovative, high quality products. They invited quality gurus, such as Deming, Juran, and Feigenbaum, to advise on how to achieve this aim. In the 1950s, quality control and management developed quickly and became a main theme of Japanese management. The idea of quality did not stop at the management level. Quality circles at employee level started in the early 1960s. A quality circle is a volunteer group of workers that meet to discuss issues aimed at improving aspects of their work. A by-product of quality circles was employee motivation and involvement.

### *Total Quality*

The term “Total Quality” was used for the first time by Feigenbaum, in a paper published in 1956<sup>[10]</sup>. Feigenbaum described a total quality system as “one which embraces the whole cycle of customer satisfaction from the interpretation of his requirements prior to the ordering stage, through to the supply of a product or service at an economical price and on to his perception of the product after he has used it over an appropriate period of time”. At this time, Japan’s exports to the USA and Europe were beginning to increase significantly, as a result of its comparatively cheaper prices and higher quality.

### *Total Quality Management*

In the 1980s and 1990s, there began a new phase of quality control and management, which became known as Total Quality Management (TQM). Having observed Japan’s success at quality development, western companies started to introduce their own quality initiatives. TQM was developed as a catchall phrase for the broad spectrum of quality-focused strategies, programmes and techniques during this period, and became the centre of focus for the western quality movement. Initial TQM definitions were customer-focused. However, as time progressed—and in particular following the development of business excellence models—the definitions became broader and focused on all stakeholders

## Quality Awards and Excellence Models

In 1987, the development of the Malcolm Baldrige Award in the United States provided a major step forward in quality management. The Baldrige Criteria for Performance Excellence, on which the award was based, represented the first clearly defined and globally recognised TQM model. (Other similar models were developed before or shortly after, such as the Australian and Canadian models, but they did not have the same international impact.) The Baldrige Criteria were developed by the United States government to encourage companies to improve their competitiveness. In 1992, the EFQM Excellence Model was developed by the European Foundation of Quality Management to promote quality throughout Europe.

## Quality and Cost

According to Williams, Griffin and Attaway <sup>[1]</sup>, research across diverse industries has found that the direct and indirect costs associated with quality problems often far exceed the investment costs needed for quality improvements. It was this philosophy that led Phil Crosby <sup>[11]</sup> to introduce the phrase “Quality is Free,” implying that investments made to improve quality would pay for themselves. One of the basic key approaches to the collection and presentation of the cost of quality, as specified in British Standard BS 6143, is the Prevention, Appraisal, Failure (PAF) Model <sup>[12, 13, 14]</sup>. This model is summarised as follows:

- **Prevention costs** are the costs associated with the planning and operation of a quality management system to reduce the failure and appraisal costs. Typical prevention costs include the cost of training, supplier quality assurance and quality system implementation.
- **Appraisal costs** are the costs associated with verification activities to ensure conformance to requirements. They include the cost of incoming materials inspection, in-process inspection and process control activities.
- **Internal failure costs** are the costs associated with non-conformance of product or service before transfer of ownership to the customer. They include the cost of scrap, re-work and re-inspection.
- **External failure costs** are the costs associated with non-conformance of product after transfer of ownership to the customer. They include costs of product return, warranty claims, complaints investigation and lost future sales.

## Implementation of TQM

There is no single approach to the implementation of TQM. Each organisation needs to develop a programme that is suited to its own needs, taking into account a multitude of factors, including product type, its stage of organisational development, resources available, organisational culture, and customer requirements. It is very likely that organisations planning for TQM will seek external assistance with quality training and strategy. Different perspectives to the implementation of quality exist and are summarised below:

Foster <sup>[13]</sup> suggests that there are different functional perspectives on quality, describing these as:

- A supply chain perspective: Many important quality-related activities are part of supply chain management. These include supplier qualification, acceptance sampling and conformance rates.
- An engineering perspective: Product and process design involves activities associated with developing a product from concept development to final design and implementation. This involves quality-related activities such as Statistical Process Control (SPC), Design of Experiments (DOE), reliability, and Failure Modes Effect Analysis (FMEA).
- An operations perspective: Operations management uses the “systems view” that underlies modern quality management thinking.
- A strategic management perspective: Quality-related goals, tactics and strategies should be part of the organisation’s strategic plan.

Evans and Lindsay <sup>[12]</sup> put forward a different approach that is based on applying total quality at three levels:

- The organisational level: Quality concerns centre on meeting customer requirements and the organisation should seek customer input on a regular basis. Customer-driven performance standards should be implemented.
- The process level: Organisations are classified as functions or departments, such as marketing, design and product development, and emphasis is placed on improving cross-functional performance.
- The performer/job level: Standards for output are based on quality and customer service requirements that originate at organisational and process levels.

Oakland <sup>[14]</sup> proposes a model that is based on three Cs (culture, communication and commitment) and four Ps, which are:

- **Planning:** The development and deployment of policies and strategies; setting up appropriate partnerships and resources; and designing in quality.
- **Performance:** Establishing a performance measurement framework; carrying out self-assessment, audits, reviews and benchmarking.
- **Processes:** Understanding, management, design and redesign; quality management systems; continuous improvement.
- **People:** Managing the human resources; culture change; teamwork; communications; innovation and learning.

According to Kehoe <sup>[15]</sup>, the quality development of an organisation involves systems, techniques and people. While each organisation has a unique journey, most organisations will progress successively through the following three stages of development:

- A systems orientation
- An improvement orientation
- A prevention orientation

For each of these stages, different tools, techniques and methodologies are applicable. The following provides examples of the types of tools, techniques, and methodologies that may be used through Kehoe’s quality development stages. These examples are drawn from many experts, including Kehoe.

### **Systems Orientation**

A systems orientation indicates the starting point of the quality journey. At this stage, the emphasis is on implementing “mechanistic” systems and trying to interest people in quality. The typical characteristics of this stage are as follows:

- Teamwork is limited to specific problems
- Management style reflects an awareness of TQM
- Customers are defined and their requirements are determined
- Techniques such as acceptance sampling are used to sort conforming from non-conforming products

- Quality systems such as ISO9000: 2000 and environmental systems such as ISO14001 are implemented.

### **An Improvement Orientation**

An improvement orientation implies that considerable progress has been made with respect to the culture and deployment of tools and techniques. The typical characteristics of this stage are as follows:

- Teamwork involves the establishment of improvement teams
- Management style reflects involvement in TQM activities
- Processes are improved to exceed customer requirements, leading to improved customer service
- Business excellence self-assessments are deployed
- Improvement tools including the seven quality control tools (see Figure 1) are implemented.

<b>7 Quality Control Tools (Improvement Orientation)</b>	<b>7 Management Tools (Prevention Orientation)</b>
Flow Charts	Affinity Diagrams
Tally Charts	Inter-Relationship Diagrams
Histograms	Tree Diagrams
Pareto Analysis	Matrix Diagrams
Cause & Effect Diagrams	Matrix Data Analysis
Scatter Diagrams	Process Decision Charts
Control Charts	Arrow Diagrams

**Figure 1: Tools Typically Used at the Improvement and Prevention Orientation Stages** <sup>[12,15]</sup>

### **A Prevention Orientation**

A prevention orientation represents a mature stage of quality development, where the emphasis is on defect prevention and sustainability. The typical characteristics of this stage are as follows:

- Organisational structure is team-based
- Management style reflects commitment to TQM and its sustainability
- Customer relationships are developed and customer loyalty develops
- People are rewarded and recognised for appropriate behaviour and values

- Advanced prevention-based quality tools and methodologies such as benchmarking, Failure Modes and Effect Analysis (FMEA), reliability analysis, design of experiments, the seven management tools (see Figure 1, page 5) and total preventative maintenance are deployed
- External recognition is received through winning business excellence awards.

For further information on any of the tools discussed in this section, go to the member's area of the BPIR.com web site, where more than 900 improvement tools are described, together with case study examples of their implementation.

- 1) Organisations that more effectively managed both people and processes dramatically outperformed their competition. These better performers had average employee turnover rates of only 7.6%, were 73% more likely to be among the top third of their industry in applying quality principles, and had a 60% probability of being in the top third in their industry in financial performance;
- 2) In these organisations, employees' efforts were aligned to business strategy; employees had the ability to deliver customer value, and; employees were highly connected and committed to their organisation. <sup>[16]</sup>

## Survey and Research Data

### Human Factors Have a Positive Impact on TQM

In 2005, the American Society of Quality commissioned a survey to assess the impact and effectiveness of quality principles, practices and techniques. The society received responses from 2041 members and customers. Four areas were measured: a) the extent to which employees incorporated quality principles and tools into their daily decision making; b) the effectiveness with which the organisation's employees were trained and provided with quality related skills; c) the effectiveness with which the organisation recognised and rewarded people for applying quality principles, and; d) the extent to which top leadership embraced quality principles. The survey revealed that:

### High Awareness of TQM

In 2003, a study of five management "fads," which had been very popular in the second half of the twentieth century, was undertaken in the USA to determine whether these methods were still known or applicable. A group of 178 managers and non-managers were surveyed as to their familiarity with the following: Management by Objectives (MBO), Sensitivity Training (ST), Quality Circles (QCs), Total Quality Management (TQM), and Self-Managed Teams (SMTs). The following findings were reported (see Figure 2):

- 1) 75% of respondents were familiar with MBO (widely adopted in the 1970s) and 95% of those stated MBO was still applicable to management in the new millennium;

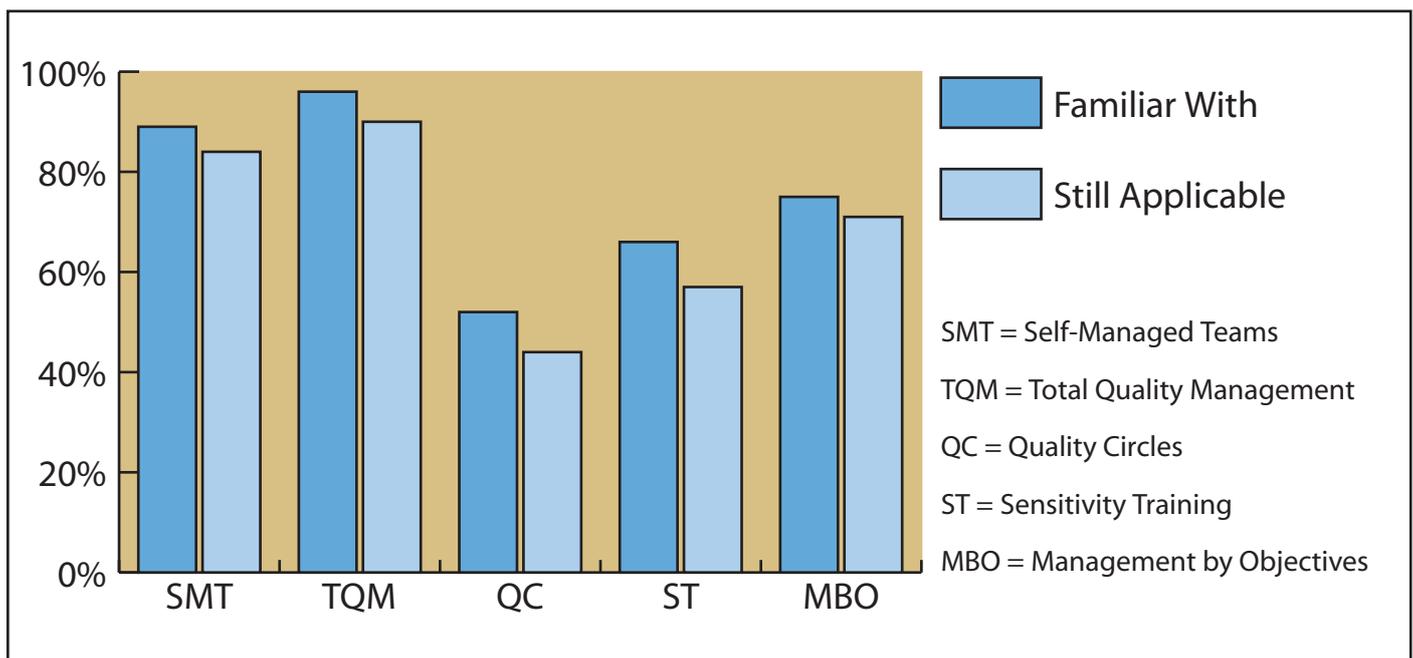
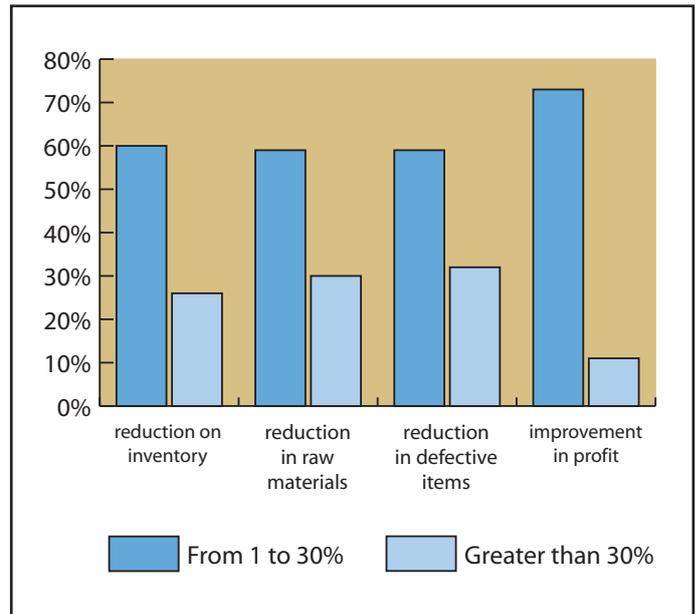


Figure 2: Familiarity with Management Methods

- 2) 66% of respondents were familiar with ST (popular in the 1960s as a technique for lowering barriers between managers and employees to promote more open communication) and 87% of those stated ST was still applicable;
- 3) 52% of respondents were familiar with QCs (which originated with the work of W. Edwards Deming and was popular in Japan; in the early 1980s, a study showed that QCs were present in more than 90% of Fortune 500 companies) and 85% of those stated QCs were still applicable;
- 4) 96% of respondents were familiar with TQM and 94% of them felt that TQM was still applicable to management today. These numbers indicated that TQM was still alive and well in the workplace;
- 5) 89% of respondents were familiar with the concepts of SMTs (which arose from QCs and TQM in the 1990s) and 94% of those felt that SMTs were still applicable. <sup>[17]</sup>

Greater than 30%, 36 firms (32%)  
 - % improvement in profit  
 From 1 to 30%, 84 firms (73%)  
 Greater than 30%, 12 firms (11%) <sup>[18]</sup>



**Figure 3: Performance Improvement in Small-Sized Chinese Manufacturing Organisations as a Result of TQM Use**

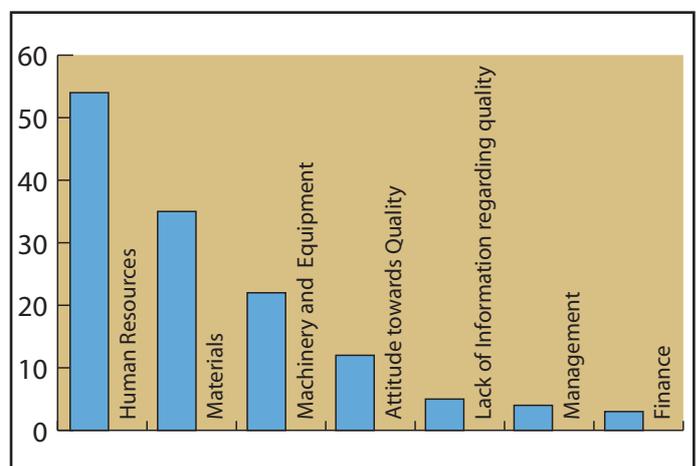
## TQM Improves Performance in Small-Sized Chinese Manufacturing Organisations

A 2003 survey examined the use of TQM by 112 small manufacturing firms in China and reported the following findings:

- 1) Profile information relating to the responding firms:
  - Top management initiating TQM, 62 firms (55%)
  - Perceived as a cost-saving tool, 49 firms (44%)
  - Perceived as a quality improvement programme, 36 firms (32%)
  - Perceived as a comprehensive management programme, 15 firms (13%)
- 2) Major reasons for adopting TQM
  - To improve long-term cost competitiveness, 65 firms (58%)
  - To be a long-term quality leader, 31 firms (28%)
- 3) Results reported by responding firms were (see Figure 3):
  - % reduction on inventory
    - From 1 to 30%, 68 firms (60%)
    - Greater than 30%, 29 firms (26%)
  - % reduction in raw materials
    - From 1 to 30%, 67 firms (59%)
    - Greater than 30%, 34 firms (30%)
  - % reduction in defective items
    - From 1 to 30%, 67 firms (59%)

## Barriers to TQM Implementation Identified

A study published in 2002 examined responses from 78 Indonesian manufacturers and identified 11 barriers to TQM implementation (51.28% of respondent companies were either ISO 9000 or ISO 14000 certified, or both). Some of the barriers that were identified, together with the numbers of organisations citing the barrier, were as follows (see Figure 4):

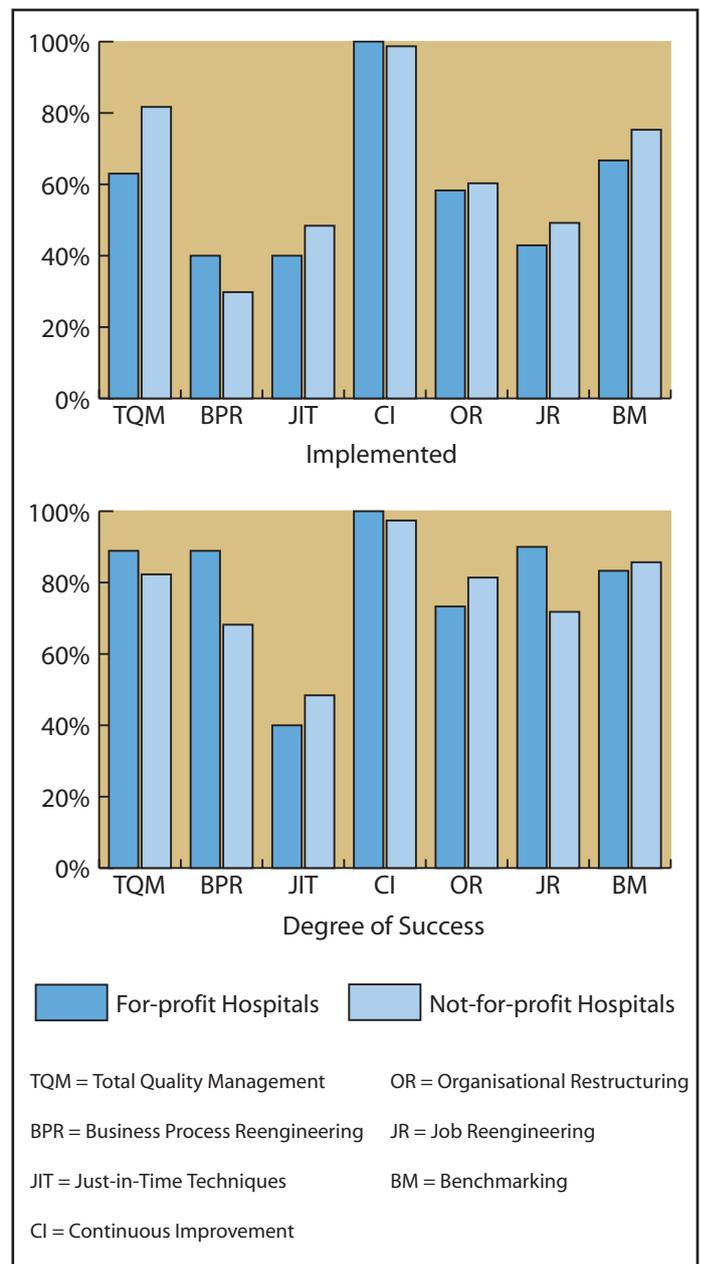


**Figure 4: Barriers to Implementation**

- 1) Human resource factors (54 respondents). These factors included insufficient education levels, poor skills, poor understanding of quality management, poor assimilation of the quality work culture, non-conformance with procedures, low worker morale, industrial action, high worker turnover and absenteeism;
- 2) Materials (35 respondents). These factors included raw materials not conforming with the specification, unscheduled deliveries, and difficulty in obtaining imported materials;
- 3) Machinery and Equipment (22 respondents). These included the poor condition of production machinery, downtime, poor coordination spare part procurement for equipment, and ineffective maintenance programmes, all of which made production processes inefficient;
- 4) Attitude towards Quality (12 respondents). Among these factors were the difficulty in changing the mindset of employees with regards to quality, and a belief that quality is an added cost;
- 5) Lack of information regarding quality (5 respondents);
- 6) Management (4 respondents). These factors included a lack of commitment in the leadership to implement TQM, which filtered down to each level of workers for whom the manager was a role model, and structural problems that caused a high turnover at management level;
- 7) Finance (3 respondents). These factors included a lack of sufficient funds to mobilise TQM-driven activities such as training programmes, and the lack of funds to provide quality resources. <sup>[19]</sup>

## TQM Used in Hospitals

In 2002, an empirical investigation (110 completed and returned surveys from a mail out of 304) of the effectiveness of contemporary managerial philosophies in hospitals in Tennessee, USA, found that Total Quality Management (TQM), Continuous Improvement (CI), Just-in-Time techniques (JIT), Business Process Reengineering (BPR), Organisational Restructuring (OR), Job Reengineering (JR), and Benchmarking (BM) were all reported as having a positive impact. Of the respondents, 85.3% reported a positive level of impact on operating efficiency as a result of implementing quality programmes, and 88.4% reported a positive impact on clinical effectiveness. Programmes implemented and the extent of their success in for-profit and not-for-profit facilities are shown in Figure 5 <sup>[20]</sup> :



**Figure 5: TQM Used in Hospitals**

## Example Cases

Valuable lessons can be learned from the following organisations:



### *Pick Salami and Meat Processing Company, Hungary* *TQM earns company international recognition*

In 1993, the management at Pick Meat, a Hungarian salami and meat processing company, embarked on a three-year project to implement ISO 9001, as well as Hazard Analysis and Critical Control Point (HACCP), and Quality Analysis and Critical Control Point (QACCP). The management team also wanted to put in place essential elements of TQM, including teams, an idea system, and structured documentation of processes that were accessible by intranet. A permanent team was made responsible for the whole TQM effort and other teams formed that encompassed procurement, production, sales and marketing, management systems, IT and human resources. A process of gathering customer and stakeholder comments and integrating them into the system was initiated. A plan-do-check-act (PDCA) cycle, considered essential to business management, was designed and included a company organised customer club, made up of frequent users of Pick products to provide structured feedback. Feedback was facilitated through surveys and pools, two-way communication, a toll-free customer service line, a three-language web site and feedback related to quality awards. In its quality drive Pick paid special attention to the protection of the environment, the reduction of any nuisances associated with its operations and initiated good manufacturing and hygiene practices (GMP and GHP), well-developed plant processes, well-organised technology and detailed documentation of the processes, products and means of production. The company's ISO 9001 system was registered in 1995, and later improved and audited to ISO 9001:2000. Pick achieved improved financial performance, improved market performance and good feedback from customers, consumers, employees and society. As well as its numerous historical successes, including a Certificate of Merit at the 1935 World Expo in Brussels, Pick has also won the Hungarian National Quality Award in 1999, and was recognised for excellence by the European Foundation for Quality Management in 2001 and 2002.<sup>[21]</sup>



### *Fine Papers, South Africa* *TQM has positive impact on paper manufacturer*

Fine Papers, a South African subsidiary of Sappi Limited, London, consisted of three mills, Enstra, Stanger and Adamas. The implementation of both TQM and Reliability Centred Maintenance (RCM) at the Enstra mill, an uncoated paper manufacturing unit, achieved a positive impact on availability, reliability, quality and the elimination of waste. However, quality was still variable and needed to be inspected throughout the process. As a further improvement, Statistical Process Control (SPC) was introduced, process standards were developed, and capability studies carried out. As a result, production processes were simplified, quality was in-built at source and a move from inspection to prevention was achieved. However, something was still lacking and the mill decided to implement Total Productive Maintenance (TPM). TPM is an approach that improves product and process reliability, which are important concepts in TQM. As part of the implementation of TPM:

- 1) A multi-disciplinary team, chaired by the production superintendent, was formed and this enabled supplier issues such as non-conformance with specification of raw materials to be addressed immediately; the supplier could be brought to the meeting if required.
- 2) Autonomous maintenance tasks that enhanced and built on RCM methodologies were identified as: a) set-up; b) minor adjustments; c) machine cleaning (to clean is to inspect, which is a basic premise); d) bolting (operators checking if bolts were tight).
- 3) Identified training issues could also be addressed immediately by the human resources representative.
- 4) Operational level day-to-day proactive problem identification and solving was carried out using tools like the “five whys” to check whether other possible causes of failure had been addressed—or whether failure could have been prevented and what was needed to prevent possible reoccurrence of the failure.
- 5) Any problems identified were put on a gap list. Any gap that could not be closed by the Strategic Business Unit team was then passed to the team at the next level, which was known as the focus team.

6) A third-level team, called the integration team, was set up to solve problems at the systemic level and a fourth level team, the strategic team, chaired by the general manager and comprising all the heads of departments, was made responsible for strategic issues and the entire productivity journey.

Staff agreed that TPM helped the company as a result of its structured and systematic solution approach. <sup>[22]</sup>



**Neptune Limited, UK**  
*Teamwork used to sustain TQM*

Neptune (UK) Limited, a precision machining company, obtained accreditation to British Standard 5750 Part 2: ISO 9002 in October 1987, and this provided the company with the opportunity to move towards achieving a synergy between best practice and motivated employees. The organisation set out to create a focused teamwork environment throughout the company to sustain its TQM drive. Neptune employees were used to working independently, so to change the culture to one of interdependence, the company made a strategic decision to develop Self-Directed Work Teams (SDWT). To do this Neptune used in-house employee education sessions involving multi-disciplinary groups (including the shop floor, directors, managers and office staff) to break down barriers. The resulting benefits included:

- 1) Improved communications between work section members.
- 2) Work section barriers were broken down.
- 3) Improved awareness of:
  - a. the contribution teamwork made towards the achievement of corporate and personal targets
  - b. the significance and benefits of preparation and planning
  - c. the need to manage time and work to strict deadlines
  - d. the importance of managing resources.
- 4) An internal/external customer culture was developed.
- 5) Conflicts were reduced.

Neptune employees now value the benefits that are inherent in a SWDT environment, including the opportunity to participate, learn different job skills and feel like an organisational asset. <sup>[23]</sup>



**Automotive Springs Manufacturer, UK**  
*TQM helps SME auto manufacturer reduce defectives*

A UK manufacturer of automotive springs began implementing a total quality programme in the early 1990s. The manufacturer established systems that included training, quality assurance, and a comprehensive data collection and measurement system linked with business and departmental objectives. The measurement system, under the Quality Operating System (QOS), monitored three major performance indicators: parts per million (ppm), failure to meet customer demand, and Due Date Performance (DDP). Operatives were empowered to carry out improvements throughout the cell manufacturing set up; the use of quality tools helped mould a culture of quality consciousness amongst employees. Self-assessment was carried out and advanced quality planning tools, Statistical Process Control (SPC), and a Quality Assurance (QA) system were implemented. The quality implementation framework had three main components:

- 1) Organisational elements affected by TQM implementation.
- 2) Quality initiatives to improve the organisational elements.
- 3) The goal or aim of the whole process.

The company reduced its defectives from 5,661ppm in January 1998, to 1,082 ppm in January 1999. These were further reduced to 478ppm in April 1999. In March 1999, the company achieved certification to the third edition of QS 9000. <sup>[24]</sup>



**RPG Enterprises, India**  
*TQM saves millions of dollars in quality costs*

In 1996, the management of RPG Enterprises, a large business house in India, determined that quality management was to be the major competitive tool to take the company to global leadership. To facilitate, encourage and motivate staff towards quality excellence throughout the group the company initiated the RPG Quality Awards. The awards' criteria and system measured results in terms of customer satisfaction, employee satisfaction, business results and impact on society. As a result of their implementation, the following results occurred:

- 1) Increased quality awareness among the group's companies and made TQM an important topic

within the group. Staff started talking about the awards, their eligibility, the criteria, the application and selection process, the winners and their achievements;

- 2) Generated healthy competition among the group companies;
- 3) Provided direction and created a uniform TQM culture throughout the group;
- 4) Recognised contributions made by individual units and motivated managements and employees to work towards improvements on a continuing basis;
- 5) Improved performance of the company in both financial and non-financial areas;
- 6) Improved business results which enhanced the competitive position among domestic and global players;
- 7) The award criteria provided checklists that helped group companies focus their attention on items they might not have otherwise thought of;
- 8) The award criteria provided benchmarks for measuring company performance and individual performance;
- 9) The advantages of corporate quality awards were increasingly recognised by management within the group;
- 10) Contributed to greater improvement efforts all round and helped RPG's TQM initiative; In 1996 the company saved US\$ 0.2 million in poor quality costs from 52 successful TQM projects. In 2000 the company saved US\$ 24.4 million in poor quality costs from 2520 successful TQM projects.<sup>[25]</sup>

## Measure and Evaluate Business Excellence

The following performance measures can be used to evaluate the impact of TQM or quality management:

**Annual Cost of Quality:** This refers to the total cost of quality-related activities as a percentage of total sales. This measure provides a quantitative value of the actual cost of running quality systems. Among others, quality-related activities should include the following: cost of quality-related training, prevention and inspection processes (costs associated with conformance), operating quality control,

warranty/guarantee-related costs, scrap and rework and rectifying poor quality products (costs associated with non-conformance).

**Product Quality (First-Time Pass Ratio):** First-pass ratio measures the percentage of the product passing all quality requirements without rework. With a high first-pass ratio, costly rework is reduced, allowing production staff to focus on generating the product, not on fixing it or finding the causes of imperfections. Organisations with a high first-pass ratio often have relatively lower overheads, since they can generate more product out of the same equipment before shifting to a new manufacturing set-up.

**Sales Ratio:** This is the ratio of the total cost of quality to the net sales value

**Process Capability:** This is the ratio of the process specification to its natural variability. It is found by dividing total product specification range (i.e., upper tolerance – lower tolerance) by total effective range (i.e., six standard deviations). For the process to be very capable, this ratio must be much greater than 1.

**Defect Rate:** This refers to the number of products found to be defective as a percentage of total product volume, or the number of parts defective per million parts. This measure provides an indication of the effectiveness of deployed quality systems.

**Product Quality (Perceived):** This refers to the quantification of survey results. It provides a measure of customer perceptions of the quality of the product or service.

**Cost of Quality (Internal Labour Costs):** This refers to the percentage of direct labour spent on internal failure issues, or the percentage of quality staff direct labour spent on internal failure issues, or the percentage of non-quality staff direct labour spent on internal failure issues. These measures provide a quantitative indication of the impact of internal quality failures on direct labour. The measure could also be tailored to track the cost of this labour or to measure other employee segments.

**Product Reliability (First Month):** This is the percentage of the product that is faulty within its first month of sale. This measure is an indicator of product quality. The first month's operation is the most critical for all products in terms of customer perceptions.

**Training (Quality):** This refers to the percentage of training relating to quality matters. This measure provides an indication of the focus upon quality within the organisation.

**Organisational Excellence Performance:** This is the organisational excellence score, which is typically based on assessment via a Quality Award framework such as the Baldrige Model or the EFQM Excellence Model.

**Product/Service Quality:** This refers to the number of orders not meeting the agreed product or service specification as a percentage of the total number of orders. This is a measure that indicates the effectiveness of the quality system.

## Summary

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Over time, the perception and application of quality has evolved from a focus on product and statistical quality assurance to a focus on meeting or exceeding the expectations of all stakeholders associated with a product or service. As a result, models such as the EFQM Excellence model and the Baldrige Criteria for Performance Excellence are now commonly used as frameworks to assist in the implementation of TQM tools and techniques.

TQM has been adopted all over the world by organisations in different sectors. The success of TQM has been due to its ability to engage people in a culture of continuous improvement. This has led to the reduction or elimination of quality problems, thereby having a positive impact on customer satisfaction and financial performance. The versatility of TQM means that there are always some tools and techniques that are relevant and useful for all departments and processes within an organisation. TQM provides a total approach to performance improvement.

For TQM to deliver results, it needs to be sustainable. Sustainability requires the commitment of senior management and the involvement of the whole organisation. It is also important to understand that achieving success in TQM involves a journey through different stages of development, for which different tools and techniques are likely to be required. Teamwork is a key facilitator of success in TQM, and strategies need to be put in place to encourage employees to work in teams. Finally, TQM lends itself to the appropriate use of performance measures, which are necessary to evaluate the success of any improvement initiative.

## References

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To access and read the articles and reports below go to the HTML Reference List for the Management Brief in the BPIR.com members area.

1. Williams, M., Griffin, M. and Attaway, J. (2001). **Observations on quality**. Risk Management. October. Pp. 51-52.
2. Douglas, T and Judge, W. (2001). **Total Quality Management Implementation and Competitive Advantage: The Role of Structural Control and Exploration**. Academy of Management Journal. Vol. 44, No. 1. pp. 158.
3. Beer, M. (2003). **Why Total Quality Management Programmes Do Not Persist: The Role of Management Quality and Implications for Leading a TQM Transformation**. Decision Sciences. Vol. 34, No. 4. pp. 623.
4. Agus, A. (2005). **The Structural Linkages between TQM, Product Quality Performance and Business Performance: Preliminary Empirical Study in Electronic Companies**. Singapore Management Review. Vol. 27, No. 1. pp. 87.
5. Mann, R.S and Kehoe, D.F. (1994). **The Quality Improvement Activities of TQM**. Quality World Technical Supplement, March pp 44-56.
6. Baldrige Criteria for Performance Excellence: [www.quality.nist.gov](http://www.quality.nist.gov).
7. EFQM Excellence Model: [www.efqm.org](http://www.efqm.org)
8. Conti, T. (2005). **Quality and Value: Convergence of Quality Management and Systems Thinking**. Proceedings of the ASQ World Conference of Quality and Improvement. Pp. 149.
9. Eldred, E. scanned copy of F.W. Taylor (1911) **The Principles of Scientific Management**. Available at: <http://socserv.mcmaster.ca/econ/ugcm3113/taylor/sciman>
10. Feigenbaum (1956) **Total Quality Control**. Harvard Business Review.
11. Crosby, P. (1983). **Quality is Free: The Art of Making Quality Certain**. New American Library Publishers.
12. Evans, J. and Lindsay, W. (2002). **The Management and Control of Quality**. Southwestern – Thomson Learning Publishers.
13. Foster, T (2007). **Managing Quality**. Pearson – Prentice Hall Publishers.
14. Oakland, J. (2003). **TQM**. Butterworth Heinemann Publishers.
15. Kehoe, D. (1996). **The Fundamentals of Quality Management**. Chapman & Hall.
16. Kostman, J and Schiemann W. (2005). **People Equity: The hidden driver of Quality**. Quality Progress. Vol. 38, No. 5. pp. 37-42.
17. Gibson, J., Tesgne, D. And Blackwell, C. (2003) **Management Fads: Here Yesterday, Gone Today?** S.A.M. Advanced Management Journal. Vol. 68, No. 3. pp 12.
18. Lee, C. (2004). **Perception and Development of Total Quality Management in Small Manufacturers: An Exploratory Study in China**. Journal of Small Business Management. Vol. 42. No. 1. pp. 102.

19. Amar, K. and Zain, Z. (2002). **Barriers to implementing TQM in Indonesian manufacturing organisations.** The TQM Magazine. Vol. 14, No. 6. pp. 367 – 372
20. Yasin, M., Zimmerer, L., Miller, P. And Zimmerer, T. (2002). **An empirical investigation of the effectiveness of contemporary management philosophies in a hospital operational setting.** International Journal of Health Care Quality Assurance. Vol. 15, No. p. pp. 268-276.
21. Molnar, P. (2003). **Hungary's journey to business excellence.** Quality Progress. Vol. 36, No. 2. pp. 55 – 65.
22. Van der Wal, R. and Lynn, D. (2002). **Total productive maintenance in a South African pulp and paper company: a case study.** The TQM Magazine. Vol. 14, No. 6. pp. 359 –366.
23. Irani, Z., Choudri, J., Love, P, and Gunasekaran, (2002). **Sustaining TQM through self-directed work teams.** International Journal of Quality and Reliability Management. Vol. 19, No. 5. pp. 596 – 609.
24. Yusof, S and Aspinwall, E. (2001). **Case studies on the implementation of TQM in the UK automotive SMEs.** International Journal of Quality and Reliability Management. Vol. 18, No. 7. pp. 722 – 744.
25. Rau, R. (2002). A journey to corporate excellence. Proceedings of the ASQ's Annual Quality Congress. Pp. 329-336.

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