
Strategic quality management, Malcolm Baldrige and European quality awards and ISO 9000 certification

Core concepts and comparative analysis

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Introduction

Reduction of variation, continuous improvement of products and services to meet customers' needs, costs of quality or costs of poor quality, breakthrough projects, zero defects, cross functional management, systematic approach to quality, and strategic focus to quality with respect to customer satisfaction, competitiveness, profitability, quality planning, and organization-wide commitment are the major concepts that are introduced by the quality gurus like Deming, Juran, Crosby, Feigenbaum, Ishikawa and Garvin. The advancement of these concepts over a period of time covering the latter part of the twentieth century paved the way for the evolutionary development of quality management, namely, from inspection, to statistical quality control, to quality assurance, to total quality control and finally to total or strategic quality management.

Successful implementation of strategic quality management is not an easy task. As Deming stated, "Everyone doing his best is not the answer. It is necessary that people know what to do. Drastic changes are required. The responsibility for changes rests on management"[1]. Thus, Deming put the responsibility for continuous improvement of products and services to meet customer needs and to stay ahead of competition squarely on management. In fact, the major emphasis of Deming's philosophy on quality management is that top management must orient themselves to innovate and commit resources constantly to support innovation and continuous improvement[2]. Building

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quality into products and services, breaking down department and worker-supervisor barriers, developing long-term partnerships with suppliers, restoring pride of workmanship, ceasing dependence on mass inspection, and removing numerical quotas and targets and concentrating instead on improving processes are the leadership issues that management must pursue in developing strategies for managing quality. He has further stated that the management must look for the variation due to “common causes” and find ways to reduce it as a basis for continuous improvement[2].

With the definition of quality as “fitness for use” via product features that are possessed by a product or service which are intended to meet customer needs, and product deficiencies that result in product or service dissatisfaction by customers, Juran advocated an impressive managerial process for top management consisting of quality planning, quality control and quality improvement[3]. This process is called the Juran trilogy and can be used effectively in managing quality. It begins with quality planning (design for quality) to determine the intended customers and their needs. The planners should then proceed to develop product as well as process designs responding to these needs. Like Deming, Juran emphasized the significance of quality improvement. However, in attracting top management attention, he introduced the concept called the costs of poor quality (COPQ) and advocated that quality improvement should be aimed at reducing continuously the COPQ that would result from product deficiencies while at the same time developing product features that meet customer needs. He has recommended the third component, namely quality control, as a means of accomplishing this goal. The costs of poor quality (COPQ) are those costs which would disappear if all products and processes were perfect – no deficiencies[3]. It is the purpose of quality improvement to reduce COPQ to zero and hence eliminate the chronic waste due to product deficiencies. According to Juran, chronic waste must provide the basis for opportunities to improve quality; consequently, quality improvement efforts should begin with identifying a “vital few” as areas to improve quality as breakthrough projects aimed at addressing chronic waste problems.

Like Deming and Juran, Crosby stated that effective quality management, to be practical and achievable, must start at the top[4]. After noting the misconceptions and attitudes held by managers about quality, he defined quality as “conformance to requirements”, in the sense that any product or service that has consistently produced its design specifications is of high quality. To change the attitudes and perceptions, he launched it as a cultural revolution, emphasizing defect prevention over detection, recognition of quality as a genuine first among equals, doing things right the first time, and organization-wide involvement to develop quality improvement strategies[4]. In order to implement quality plans, he sought the support of management participation and attitude, professional quality management, original programmes, and recognition. Crosby stated that zero defects should be the management standard. He further advocated the costs of quality and quality management maturity grid as a means to improve quality. The quality management maturity grid is a self-assessment tool to examine where the

operation in question stands from a quality standpoint. Regarding the costs of quality, Crosby said that if quality is improved, total costs would eventually fall, which led to his most famous claim that “quality is free”[4].

Feigenbaum, in introducing “total quality control” (TQC) for the first time in the 1950s, defined it as an “effective system for integrating the quality deployment, quality maintenance, and quality improvement efforts of the various groups in an organization so as to enable marketing, engineering, production and service at the most economical levels which allow for full customer satisfaction”[5]. He argued for the managerial and technical implementation of customer-oriented quality (voice of customer), changes in the basic attitudes of people required for a positive approach, infrastructure of a modern business organization, systems approach to quality systems and the focus of business strategic planning to foster business growth and strategic quality leadership. Thus, according to him, TQC requires effective ways to integrate the efforts of large numbers of people, with large numbers of machines, and huge quantities of information[5].

Ishikawa has further intensified the concept of TQC in advancing the Japanese approach to total quality control and advocated the company-wide quality control (CWQC) emphasizing that everyone in every division in the company must study, practise, and participate in quality control[6]. Personal responsibility of senior management, customer focus, prevention over inspection, employee involvement, and total organizational participation are central to Japanese company-wide quality control[7]. The goal of such CWQC should be continuous improvement with focus on producing products that customers really want. He strongly promoted the use of quality circles at all levels and cause-and-effect diagrams, and cross functional teamwork in addressing quality improvement efforts. Ishikawa believed mainly in the use of simple methods to work together on solving problems and removing barriers to improvement, co-operation, training and education. Thus, he advocated the use of tools of quality, including check sheets, histograms, Pareto diagrams, cause-and-effect diagrams, control charts, binomial probability plots, graphs, and scatter diagrams.

Garvin, while focusing on the strategic potential of quality, wanted to recognize the eight dimensions of quality, namely, performance, features, reliability, conformance, durability, serviceability, aesthetics and perceived quality as the basis for developing strategic options[8]. Companies must decide which subset of these dimensions differentiate their products or services from the competitors. Then he introduced the framework of strategic quality management emphasizing that quality must be defined from the customer's point of view. He further elaborated it by stating that quality should be linked with profitability on both the market and cost sides. It should be linked with the strategic planning process requiring organization-wide commitment. Also, quality should be viewed as a company weapon[9].

Definition of strategic quality management

As mentioned earlier, these important views can be used to define strategic quality management. Even though Garvin introduced the term and elaborated it in terms

of five elements, he did not define it in a compact form. Juran, on the other hand, defined SQM as a systematic approach for setting and meeting quality goals throughout the company[3]. The BSI Standards defined it as a management philosophy and company practices that aim to harness the human and material resources of an organization in the most effective way to achieve the objectives of the organization[10]. Both these definitions are very broad and appear to stress only the importance of management process in achieving an organization's goals. They do not describe the basic elements and how they fit together to achieve quality improvement goals and objectives. In this regard Juran's definition also falls short even though he included the accomplishment of quality goals. In addition, the BSI used the term total quality management (TQM) instead of strategic quality management. As long as they recognize the strategic importance of quality and quality planning, both terms can be used interchangeably. In this sense, we recognize the significance of strategic value of quality as Garvin did in implementing the quality improvement strategies, and use in this paper the terms "total" and "strategic" interchangeably. Also, we shall make an attempt to define SQM embracing all the important views of the quality gurus that are mentioned above which are significant and different.

Thus we define the strategic quality management as a comprehensive and strategic framework linking profitability, business objectives, and competitiveness to quality improvement efforts with the aim of harnessing the human, material and information resources organization-wide in continuously improving products or services that will allow the delivery of customer satisfaction. This definition, as mentioned earlier, describes the basic elements which are required and emphasizes the need for the management process in accomplishing the quality improvement goals and objectives.

The core concepts of strategic quality management

As in the case of the definition of SQM, we can identify certain core concepts from the significant contributing factors that are promoted by the quality gurus in one form or another in managing quality. As such they should be fundamental in developing the strategic as well as operational strategies to improve continuously the quality of products or services. We identify them as:

- customer focus;
- leadership;
- continuous improvement;
- strategic quality planning;
- design quality, speed and prevention;
- people participation and partnership; and
- fact-based management.

Customer focus

As all the quality gurus stated, quality must be defined by the customer. The quality process is a continuous loop that begins, ends, and begins again with the

customer. Thus the focus on quality must be from a process-driven discipline to a customer-driven discipline. All product or service attributes that contribute value to the customer and lead to customer satisfaction need to be addressed.

Juran and Crosby have underscored this concept by defining quality as “fitness for use” and “conformance to requirements” respectively. Ishikawa, on the other hand, advanced the concept of CWQC with the goal of producing products or services that customers want. Similarly, Garvin highlighted customer focus from a strategic viewpoint. Thus customer focus must be the overall goal of all quality objectives and strategies in implementing strategic quality management.

Leadership

All senior managers must create clear and visible quality values and high expectations and build them into the way the organization operates. This requires their personal commitment and involvement in substantial proportions. They must take part as role models in the creation of strategies, systems, and methods for achieving excellence in quality. Also, as Crosby said, the senior managers should position their companies in such a way that inspection, testing, checking, and analysis are not necessary[11]. In addition, they should encourage leadership at all levels of management, particularly, in maintaining close relationships among the many divisions in an organization, communicating quality goals and objectives vertically down the organization, educating employees about making quality their first priority, and spreading the concept of continuous improvement on an organization-wide basis[12].

It goes without saying that all quality gurus have not only emphasized this core concept but also demanded that senior managers must demonstrate the leadership role they play in creating and communicating quality values and expectations and establishing the quality culture in their organizations in achieving the quality excellence. As Juran pointed out, stunning results cannot be achieved without the active and personal leadership of senior managers[13].

Continuous improvement

Continuous improvement is the cornerstone of SQM and requires well-designed and well-executed management of all systems and processes. Do it right today, and better tomorrow should be the guiding principle. Enhancing value to the customer through new and improved products and services; getting consistently uniform products and services by benchmarking; reducing variation, COPQ, and waste; reducing the number of defects (six-sigma quality or better); improving responsiveness and cycle time performance; and improving productivity and effectiveness in the use of all resources should be the objectives for continuous improvement of all operations and of all work unit activities of the organization. This means promoting organizations to be “learning organizations”, taking initiatives to try something and taking correcting actions spontaneously, if something goes wrong.

According to Deming and Juran, the baseline for continuous improvement is the control of processes and the reduction of variation and waste. Juran has identified the sporadic vs. chronic wastes related to the systems and processes which are used to produce products, and found that 85 per cent of the problems are due to chronic waste and only 15 per cent are due to sporadic waste[14]. He then focused on chronic waste and the corresponding COPQ as the potential opportunities for continuous improvement. Deming later on revised these numbers to 94 per cent for common causes and 6 per cent for special causes (Deming prefers to call them special vs. common causes whereas Juran refers to them as sporadic vs. chronic wastes)[14]. Both of them urged unequivocally that only the management must be responsible for implementing necessary actions in constantly improving the quality due to common causes.

Strategic quality planning

As Garvin stated, strategic quality plans are the glue holding together an organization's quality improvement efforts[15]. Achieving excellence in quality and market leadership requires a strong future orientation and a willingness to make long-term commitments to customers, employees, stockholders, suppliers and the community. The quality goals as well as the strategic and operational plans need to reflect these commitments. They should be developed in concrete terms and highly focused. Also, they need to address training, employee development, supplier development, technology evolution and other relevant factors that bear on quality[16]. They need to embody the short-term and long-term needs. In addition, the goals should be integrated into the overall corporate business strategies. As Juran stated, "as long as TQM isn't an essential part of the business plan, we can forget obtaining results", thus underscoring the importance of this aspect (personal communication of Van Nuland). Communicating the goals and objectives to all employees in the organization is extremely useful in motivating them to rally round and making quality their top priority.

Garvin was among the first to recognize the importance of the strategic planning process in formulating quality improvement strategies. He particularly emphasized that quality planning must be integrated into the overall corporate strategic planning process of the organization[9]. Juran, on the other hand, has built quality planning into the Juran trilogy as one of the three managerial processes in developing the products, systems and processes required to meet customer needs. He has further stressed the need for developing *stretch goals*, the goals which cannot be met by using the pedestrian pace of the ordinary learning curve; something extraordinary is needed to accomplish excellence in quality[13].

Design quality, speed and prevention

Design quality, and error and defect prevention should be the major aim of quality systems. In order to accomplish this, we need to build quality into products and services and into the processes that produce them. Innovative

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applications of technology, well-designed and well-integrated systems and processes, and planning of new products or services based on concurrent or simultaneous engineering are some of the creative concepts and tools that need to be encouraged. A major design issue is the design-to-introduction cycle time (speed). To meet the demands of more rapidly changing markets, organizations need to focus increasingly on this issue to achieve shorter product and service introduction time using cross functional management.

As Crosby emphasized, “do it right the first time” and “defect prevention over detection” and hence “zero defects” must be the standard in establishing systems and processes related to all quality activities[4]. Also, the concept of Big Q involving all products and services, all processes including manufacturing as well as support systems, all internal and external customers, and all costs of poor quality in reducing errors, defects, and cycle time, as well as in improving response time, market share, productivity and profits must be adopted[3]. Well-planned supplier quality management must be integrated into company quality plans. Two of Deming’s principles, namely, ceasing dependence on inspection and improving constantly and forever the system of production and service to improve quality must be invoked in support of this core concept[2].

People participation and partnership

The word “people” in this core concept refers to the employees who are hired by the company under unionized or non-unionized agreements, as well as the vendors who supply material and components. As Ishikawa pointed out, all employees must work together to achieve quality and productivity objectives so that the product or service meets customer satisfaction. This requires a fully committed, well-trained and involved work force in all quality activities. Necessary actions to formulate and implement people (employee) strategies for creating a quality culture and changing the organizational structure to do the “right things right the first time and every time” are to be seriously considered. Innovative strategies related to multi-functional employee (MFL) programmes, self-managed teams (SMTs) of workers programmes, participative management programmes (PMPs) and quality circles (QC) must be encouraged to improve employee skills and knowledge, performance and flexibility to solve quality related problems. Reward and recognition systems, quality of work-life environment consisting of safety, health, wellbeing and morale, education and training to reinforce full participation should be part of the system. Training should be reinforced through on-the-job applications of learning, involvement and empowerment[16].

Similar strategies should be developed to communicate quality requirements to suppliers and unions in building partnerships with them to elevate their quality performance. The building of such partnerships should address long-term objectives for mutual investments and evaluate progress and methods to accommodate to changing conditions. To effect positive changes, it is necessary not only to let vendors understand the need for quality systems and processes

to supply quality material and/or components, but also to equip them with the necessary knowledge, skills and tools.

This core concept is perhaps the most difficult, but significant one to address. According to Juran, there is an inherent conflict between the functional organization and multifunctional processes[13]. We need multifunctional processes to get things done in accomplishing quality objectives. Therefore, we need to find ways to integrate traditional (vertical) hierarchies, which exist in corporations, with multifunctional (horizontal) processes to reduce conflicts and make workers more productive. This is the reason why Deming underscored the importance of breaking down the barriers between departments, driving out the fear among workers to work effectively, and removing barriers that rob hourly workers as well as engineers and managers of their pride of workmanship, and establishing instead the multifunctional processes to improve quality of products and services.

Equally important is the recognition of the fact that suppliers or vendors play a significant role in providing quality material and/or components. We should develop long term (win-win) relationships between corporations and their suppliers. Also, as Deming suggested, select a few suppliers who can work together as partners in producing the products or services that customers want.

Fact-based management

Accomplishing the quality and performance goals of the organization requires that process management be based solidly on reliable information, data and analysis. Operations and decisions need to be based on factual information about performance indicators, projections and trend analyses. These indicators should reflect the characteristics of products, services, processes and operations the company uses to evaluate performance and to track progress on customer satisfaction, employee satisfaction, and the company's operational results. Fine-tuned information systems that support these activities as well as survey-feedback-action (SFA) systems should be in place. The strategies to invest in information technology and tools for diagnosing and solving quality improvement problems need to be seriously considered.

The use of statistical techniques and the evaluation of quality strategies needs objective data. Also, it requires a clear understanding of such measures as customer satisfaction, employee satisfaction, response time, or cycle time, etc., to establish measurement standards. Without this it is very difficult to observe reliable data and evaluate quality strategies. In addition to observing data to evaluate the quality plans, one needs to observe the data over a certain time period to develop trends, projections and benchmarks in order to evaluate whether or not the pre-established desired levels are achieved. Also, one needs to examine the company's quality and operational results in relation to its competitors. Such an analysis is an effective tool in examining the company's position relative to its competitors. In addition, systematic cross-checking and regular reviews need to be conducted to ensure that the information provided supports effective management of the company's quality plans.

Thus these seven core concepts are pivotal in accomplishing the basic aims of strategic quality management, namely, satisfying the customer, continuously improving the processes and systems in increasing the quality of products and services and staying ahead of competition. We can think of these core concepts as the spokes of a wheel which is climbing the quality hill, the basic goal of which is to improve value forever to customers and compete strongly in the marketplace. This scenario is shown in Figure 1, where LDR represents the leadership core concept; SQP, strategic quality planning; DQSP, design quality, speed and prevention; PP&P, people participation and partnership; FBM, fact-based management; CI, continuous improvement; and CF, the customer focus core concept respectively.

As mentioned earlier, the seven core concepts are clearly based on the preachings of the quality gurus. In addition, Van De Wiele and Dale *et al.*, in an extensive survey conducted mainly in the UK and The Netherlands, found that satisfying external customers, reducing costs, partnership between an organization and its customers, each person satisfying their internal customers (employees), employee involvement and development, team work, improving process capability, each person dedicated to continuous process improvement, quality of working life, and partnership between organization and the suppliers were the ten most important aspects of TQM out of the 15 they asked participants to rank on a five-point scale from 1 (not important at all) to 5 (very

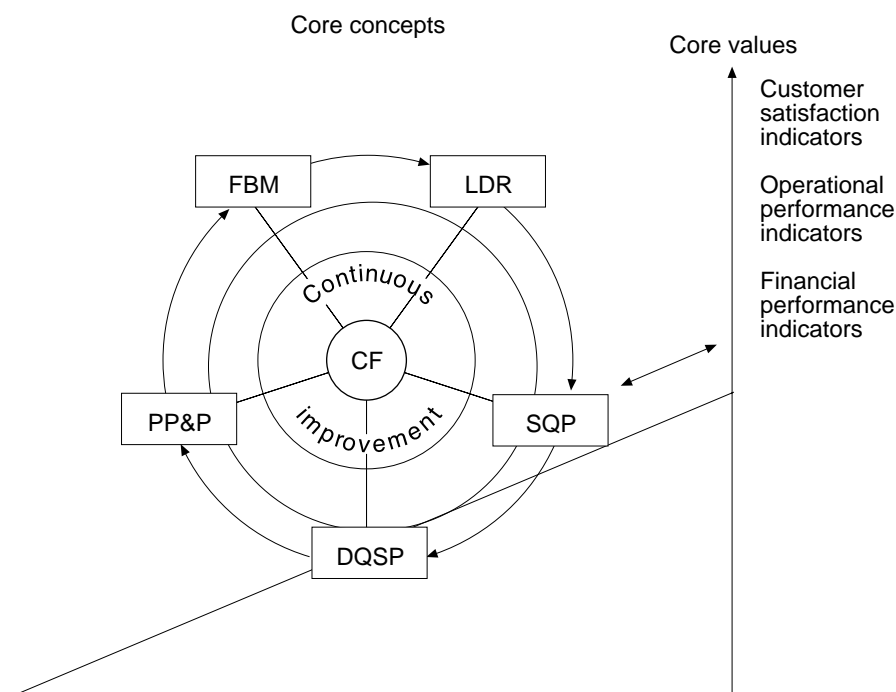


Figure 1.
The wheel of seven core concepts

important)[17]. The other five aspects included in the survey are participative management, process management, each person has a designated responsibility for improvement, horizontal integration, and policy deployment. The lowest mean rank of 3.28 for policy deployment and the highest mean rank of 4.84 for satisfying external customers among all these 15 clearly indicate that they all are important factors of TQM. Figure 2 illustrates the comparison between the seven core concepts and these 15 aspects.

The leadership and fact-based management core concepts appear to be left out explicitly in terms of the comparison. This is not because they are not important but Van De Wiele and Dale *et al.* did not include them as two of the 15 factors. We are confident that they would have come out as important as other factors shown in Figure 2 had they been included among them. In fact, both the Malcolm Baldrige National Quality (MBNQ) and the European Quality Awards have included leadership and fact-based management as two of the seven (in the case of the MBNQ Award) and nine (in the case of the European Quality Award) criteria respectively[18,19]. The comparative analysis between these two awards with the seven core concepts as shown in Figure 7 (see page 28) clearly indicates that they are embodied in the criteria of both awards and are extremely useful in implementing quality improvement strategies to achieve excellence in quality and possibly to win the awards. Also, the Malcolm Baldrige National Quality Award (MBNQA) winners have clearly demonstrated their creativity in developing innovative strategies, systems and processes embracing these seven core concepts in improving the quality of their products or services as well as their company's operational performance. In fact, the study, which was published by the General Accounting Office (GAO) of the United States Federal Government, based on the 20 MBNQA winners and semifinalist companies indicated this strong relationship[15].

Juran's lessons for developing strategies for world-class quality, namely, implementation of stretch goals and benchmarking, adoption of the Big-Q concept, development of necessary infrastructure, implementation of multifunctional processes, demonstrated leadership and incorporation of quality plans into corporate business plans all depend on these seven core concepts[13]. Therefore, any company planning to develop and implement quality improvement efforts must clearly understand these seven core concepts and use them as an integrating model in developing relevant strategies. It is interesting to note that the 12-step implementation programme of TQM suggested by Oakland[20] can be linked in terms of these seven core concepts.

Core values of strategic quality management

Associated with the seven core concepts are the core values which will be measured by carefully developing and implementing the necessary quality improvement strategies. These core values as shown in Figure 1 basically include customer satisfaction and the company operational performance results, such as cycle time, on-time delivery, defective parts per million,

		Core concepts						
		Customer focus	Leadership	Continuous improvement	Strategic quality planning	Design quality and prevention	People participation and partnership	Fact-based management
Van De Wiele, Dale <i>et al.</i>	Satisfying external customers	●						●
	Reducing costs		●	●				●
	Partnership between an organization and its customers	●	●					
	Each person satisfying their internal customers (employees)						●	
	Employee involvement and development		●				●	
	Teamwork						●	
	Improving process capability		●	●			●	●
	Each person dedicated to continuous process improvement				●			●
	Quality of working life		●	●				●
	Partnership between organization and suppliers		●				●	●
	Participative management				●			●
	Process management				●		●	●
	Each person has a designated responsibility for improvement							●
	Horizontal integration		●	●				●
Policy deployment		●	●	●			●	

Figure 2.
Core concepts *versus*
Van De Wiele, Dale *et al.*
survey

reliability, employee satisfaction, absenteeism, market share, sales per employee, and return on assets, etc. as they relate to quality improvement plans.

Implementation framework of SQM

Figure 3 describes the implementation process of SQM. The senior management (leadership (LDR)) of the organization must start with quality initiatives with sound strategic quality planning (SQP). Design quality, speed and prevention (DQSP), people participation and partnership (PP&P) and fact-based management (FBM) together, as a system, must address well-defined and well-designed processes and planning of new products or services with zero defects as the standard. Attention should also be given to employee and supplier involvement and participation, training and education, rewards and recognition as well as quality of work life environment, evaluation of performance and tracking progress based on reliable information, data and analysis, benchmarking and competitive analysis with major focus on continuous improvement (CI), in order to satisfy customer focus (CF) and satisfaction. The successful implementation of the framework based on these seven core concepts must generate impressive core values such as customer satisfaction and company operational and financial performance results including cycle time, absenteeism, and market share, etc. In other words, the framework described in Figure 3 must be the results-oriented process.

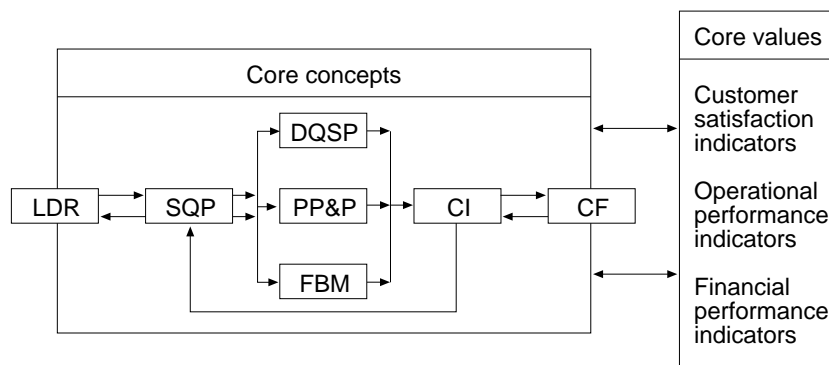


Figure 3.
Implementation
framework of SQM

As mentioned above, two prestigious awards, namely, the Malcolm Baldrige National Quality Award in the USA and the European Quality Award (EQA) in Western Europe, were established recently with a view towards increasing the quality awareness and competitiveness in their respective countries[18,19]. We shall now describe the major characteristics of these awards and compare them along with the ISO 9000 certification process in the following sections.

The Malcolm Baldrige National Quality and European Quality Awards

The Malcolm Baldrige National Quality Award

The Malcolm Baldrige National Quality Award promotes three important characteristics, namely, awareness of quality to increase competitiveness,

understanding the requirements for excellence in quality, and sharing the information and benefits derived from successful quality strategies that are employed by the companies (considering 1994 MBNQA criteria only) [18]. Seven categories of criteria are included in evaluating the company's overall strategic and operational strategies employed in implementing quality improvement efforts. These are:

- (1) leadership;
- (2) information and analysis;
- (3) strategic quality planning;
- (4) human resource development and management;
- (5) management of process quality;
- (6) quality and operational results;
- (7) customer focus and satisfaction.

As shown in the dynamic relationships among these criteria in Figure 4, the primary focus of the award is on customer focus and quality and operational results. As Jennett[21] stated, the award is not given for a specific product or service, nor is it an endorsement of a company's product or service. It is given to those companies that have world-class systems for managing their people and processes. Each system must ensure continuous improvement in its product or service and provide a way of satisfying and responding to its customers. The seven categories are divided into several examination items. The examination items are further subdivided into several areas, each assigned with certain points with an overall total of 1,000 points[18].

As shown in Figure 4, the senior executive leadership provides the driving force (driver) to create the values, expectations, goals, and the systems in order to guide and sustain the pursuit of quality excellence in satisfying customer requirements and corporate performance improvement. Management of process quality, human resource development and management, strategic quality planning, and information and analysis provide a system to develop well-defined and well-designed processes for meeting customer satisfaction and corporate performance requirements. The quality and operational results category, on the other hand, provides the fact-based framework for measuring the progress (measures of progress) and challenging actions in delivering the improved customer value and company performance. The basic aim (goal) of the quality process as shown earlier in Figure 1 should be the delivery of ever-improving value to customers, which is reflected in the customer focus and satisfaction category.

The relative importance of these seven categories in terms of category point values and the associated percentages are shown in Table I. It will be seen that customer focus and satisfaction carries the most weight. Together with this, the quality and operational results, human resource development and management, and the management of process quality carry almost 80 per cent with the balance

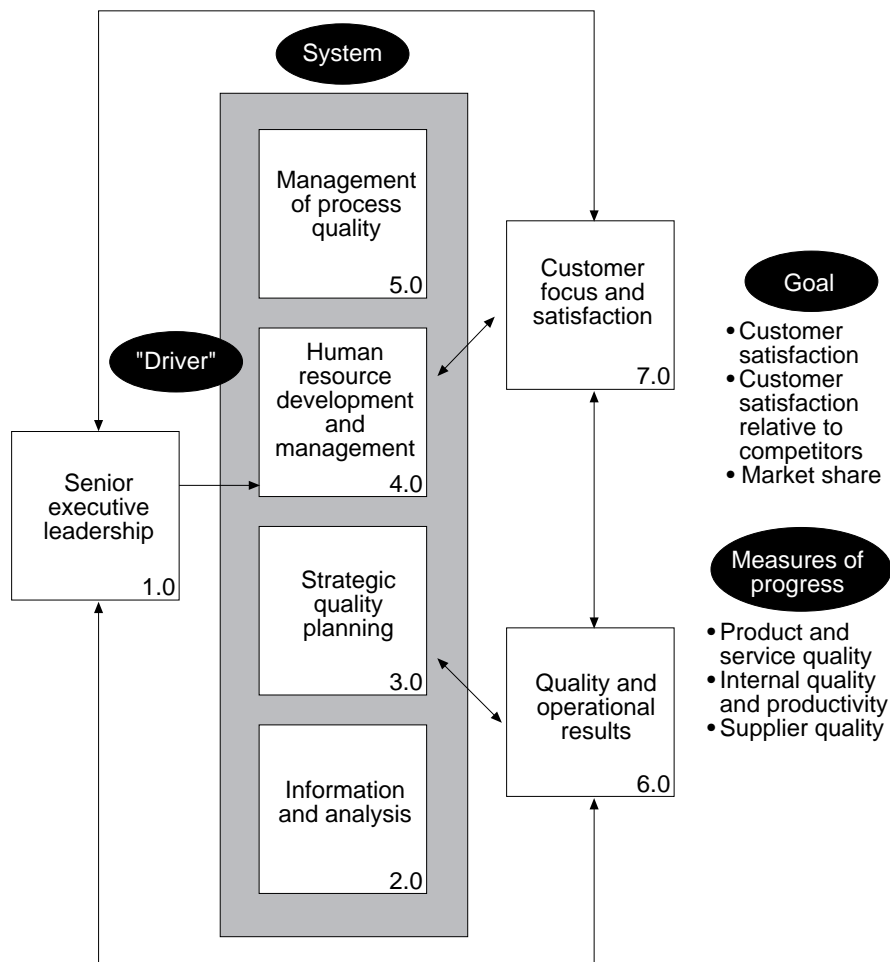


Figure 4.
Dynamic relationships
among the seven
categories

distributed among the leadership, information and analysis, and strategic quality planning categories. It should be noted that the examination items and their relative importance in terms of point values have been changed over the years based on the feedback from applicants, board of examiners and other quality experts. The overall focus of the seven categories, however, is not changed.

Most companies use Malcolm Baldrige Award criteria as a quality blueprint to improve their quality to the point where they are as competitive as possible in the marketplace without competing for the award. Furthermore, as Reimann[22] stated, the award can be adapted to the needs of any organization. The MBNQA, as Garvin[15] said, not only codifies the principles of quality management in clear and accessible language, but also provides companies with a comprehensive framework for assessing their progress towards the new paradigm of management and such commonly acknowledged goals as

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Table I.
Relative percentages of
the seven categories

Category	Point value	Percentage
1.0 Leadership	95	9.5
2.0 Information and analysis	75	7.5
3.0 Strategic quality planning	60	6
4.0 Human resource development and management	150	15
5.0 Management of process quality	140	14
6.0 Quality and operational results	180	18
7.0 Customer focus and satisfaction	300	30
Total point values	1,000	100

customer satisfaction and increased employee involvement. Knotts *et al.*[23], in their study involving *Fortune* 500 industrial and service firms, found that this is true. In particular, the respondents indicated that the MBNQA criteria were very useful as an internal assessment tool and if followed, they will provide quantifiable results.

The European Quality Award

The European Foundation for Quality Management (EFQM) established the European Quality Award (EQA) for the first time in 1992, mainly to accelerate the acceptance of quality as a strategy for global competitive advantage, to stimulate and assess the development of quality improvement activities, and to recognize the companies in Western Europe that demonstrate excellence in the management of quality as their fundamental process for continuous improvement (considering 1994 EQA criteria only)[24]. The EQA is also supported by the European Committee of the European Organization for Quality. This award consists of nine criteria for evaluation, namely:

- (1) leadership;
- (2) policy and strategy;
- (3) people (employee) management;
- (4) resources;
- (5) processes;
- (6) customer satisfaction;
- (7) people (employee) satisfaction;
- (8) impact on society; and
- (9) business results.

The dynamic relationships among these nine criteria are described in Figure 5. As can be seen from the Figure, the EQA criteria describe the processes and the

people including the leadership, people management, policy and strategy, resources, and processes categories as the enablers that will accomplish the results which include customer satisfaction, people (employee) satisfaction, impact on society and business results.

As in the case of the MBNQA, the European Foundation for Quality Management has assigned a certain number of points for each of these nine criteria as shown in Table II. Like the MBNQA, the EQA gives the maximum weight to customer satisfaction. This is followed by business results, processes, leadership, people management, people satisfaction, resources, policy and strategy and impact on society, in order of importance.

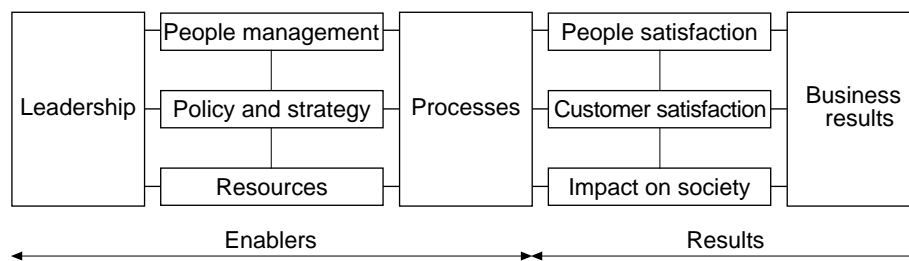


Figure 5.
Dynamic relationships
among the nine criteria

Criterion point	Value	Percentage
1.0 Leadership	100	10
2.0 People management	90	9
3.0 Policy and strategy	80	8
4.0 Resources	90	9
5.0 Processes	140	14
6.0 People satisfaction	90	9
7.0 Customer satisfaction	200	20
8.0 Impact on society	60	6
9.0 Business results	150	15
Total point values	1,000	100

Table II.
Relative percentage of
the nine criteria

Comparison between Malcolm Baldrige and European Quality Awards

Before we compare these awards, we shall explain some of the criticisms that were lodged against MBNQA. This will enable us to understand more about the MBNQA and to compare it with the EQA with a better perspective. The MBNQA was mainly criticized on three major deficiencies[15,25], namely, that the award:

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- (1) requires enormous expenditures on the application and preparation for site visits, giving rise to the notion that MBNQA “can be bought”;
- (2) does not reflect outstanding or even exceptionally good product or service quality; and
- (3) fails to predict a company’s competitiveness and financial success.

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Even though these deficiencies appear to be plausible, the criticisms, as Garvin[15] said, reflect deep misunderstandings. First, some MBNQA winners (such as Xerox) who spent large sums of money did not do so to “bring home a prize” but have invested in their long-term commitments for developing a new set of quality goals and implementing appropriate quality improvement strategies. Furthermore, no company can buy a system or a process and install it to achieve quality excellence in its products or services, and to win the award. According to Peterson, former chairman of the board and CEO, Ford Motor Company, “buying off-the-shelf solutions or force-fitting the company to the criteria are forms of self-deception and mismanagement”[25]. In addition, the study conducted by the GAO has further indicated that there was no “cookbook” approach to implementing a quality management system[15]. The 20 companies that participated in the GAO study have employed different practices and techniques.

Second, the MBNQA is not designed to reward product or service quality excellence only. In fact judging from the seven MBNQA criteria, the product or service excellence area corresponds to only 250 points out of a total of 1,000. The remaining 750 points are assigned to other important aspects such as management of systems, processes, and planning. It is possible, as Garvin argued, that the companies which won the award (for example, the Cadillac Division of General Motors) may have performed extremely well in these areas as opposed to the product excellence area.

In fact, as Garvin did, one way is to compare the MBNQA with two possible extreme situations: at one extreme, to design an award to reward only product or service excellence (traditional quality control); at the other extreme, to design an award to reward overall corporate management excellence and not for quality management alone. According to Garvin[15], the MBNQA is neither too narrow (as in the case of product or service excellence) nor too broad (as in the case of corporate management excellence), it is positioned firmly in between these two extremes. Here, we fully agree with Garvin. The major purpose of the MBNQA is to promote awareness of quality to increase competitiveness. Any set of criteria to evaluate companies for the award should be related only to quality management and not to overall corporate management that encompass marketing, R&D, finance, etc. in addition to quality management. Otherwise, it would be difficult to determine whether or not the competitiveness of a company is increased only as a result of quality improvement strategies employed based on quality management.

It is also a misunderstanding to criticize the MBNQA in that it fails to predict a company’s financial success. The companies that won the award might not

have performed well financially because of other reasons such as design problems (at Motorola), depressed demand (at Cadillac), or other related problems (for example at Federal Express). As Garvin[15] stated “winning [the MBNQA] is neither a necessary nor a sufficient condition for financial success”. Companies can be financially successful if they implement a one-of-a-kind production process or a production facility located abroad for reaping manufacturing benefits over costs, even though they fall short on MBNQA criteria. Thus winning the award is not a necessary condition for financial success. On the other hand, it is not a sufficient condition for financial success either, since the award criteria do not include such important aspects of management as innovative R&D, sound financial planning or creative marketing

The award winners are as vulnerable as other companies to economic recessions and shifts in technology and market conditions. However, they are far better positioned relative to others to recover fully when the economy improves. Thus the MBNQA can be a strong predictor of long-term survival and a leading indicator of future profitability[15]. In fact, according to the GAO study, the MBNQA winners and semifinalists performed well on several important operational and financial measures such as market share, return on assets, productivity, customer satisfaction, and employee relations[15]. These are the kinds of indicators that suggest future profitability. In addition, the study conducted by Knotts *et al.*[23] also concluded that the MBNQA criteria measure performance that improves competitive position. The results of this study have further indicated that the award has altered the US conscience regarding the benefits and processes necessary to achieve quality. Thus the benefits far outweigh the criticisms made against the MBNQA.

We shall now compare the Malcolm Baldrige and the European Quality Awards. As seen from Tables I and II both awards are based on a points system (see Figure 6). They are almost similar in the sense that both awards give maximum weight to customer satisfaction, 30 per cent or 300 points in the MBNQA and 20 per cent or 200 points in the EQA. The quality and operational results in the MBNQA and the business results in the EQA have the next highest weight. It should be noted that the business results criterion includes financial measures such as profits, cash flows, working capital, liquidity, and shareholder returns. The MBNQA, on the other hand, does not include them in the quality and operational results criterion as the award criteria do not cover the organization's financial performance. As one of the judges of the award pointed out, financial performance does not belong in the MBNQA. If it is included, then it might overshadow the quality and operational results that are observed as a result of the quality improvement strategies that were employed.

The EQA considers human resource development and management strategies in two separate criteria as people (employee) management and people satisfaction with a total of 180 (= 90 + 90) points or 18 per cent, whereas they are considered as one criterion in the MBNQA with 150 points or 15 per cent. Thus the human resource development and management criterion receives the

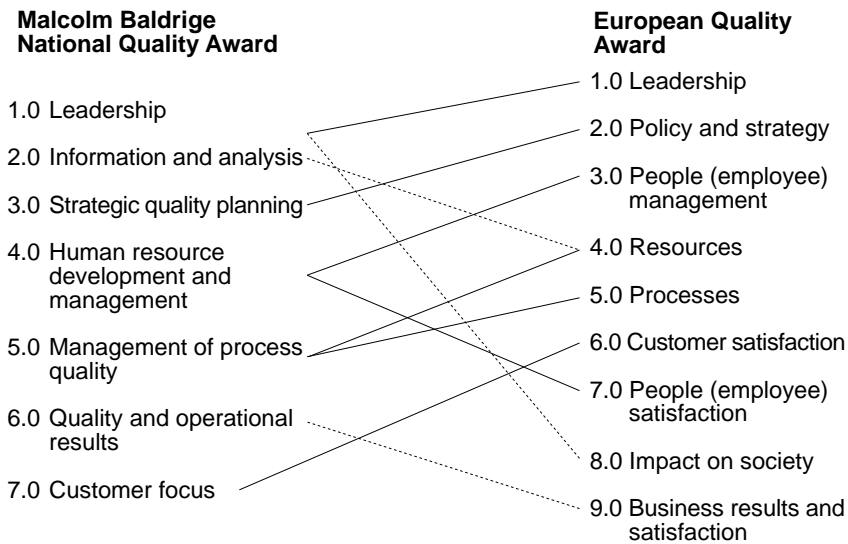


Figure 6.
Comparison between
MBNQA and EQA

third largest weight in both the awards. Processes criterion in the EQA (with 14 per cent) and the management of process quality criterion in the MBNQA (with 14 per cent) received the fourth highest weight. Leadership, resources (in the EQA) or information and analysis (in the MBNQA), and policy and strategy (in the EQA) or strategic quality planning (in the MBNQA) criteria are rated as the fifth, sixth and seventh ranked criteria with respect to their point values. It should be noted, however, that the order in which these criteria are ranked is the same as described above even though the point values (or the corresponding percentages) are not exactly the same.

In addition to the above analysis, we should note that the MBNQA does not specifically consider the impact on society criterion included in the EQA. Even though the MBNQA includes some of the related aspects such as business ethics, public health and safety, environmental protection, and waste management in the leadership criterion, the EQA by including the impact on society as one of the nine criteria, covers more aspects, for example, preservation of global resources, organization's involvement in the community in terms of charity, education and training, and sports and leisure, etc., in a more detailed fashion.

Similarly, the resources criterion in the EQA covers financial, information, and material resources as well as alternative and emerging technologies. The MBNQA, on the other hand, covers only the management of quality and performance data and analysis, and the related issues in the information and analysis criterion. The material resources and the alternative and emerging technologies are included in the management of process quality criterion of the MBNQA. As mentioned earlier, the MBNQA does not consider financial resources as formally as they are considered in the EQA. This is one of the

major differences between the two awards. Also, consideration of human resource development and management into two categories, as in the EQA, may make it easier to understand the award criteria better and that would help in preparing the written reports for application. Figure 6 illustrates the cross-relationships among the criteria of both awards where the broken lines indicate the inclusion of more aspects in resources, impact on society, and business results criteria of the EQA as discussed above. The solid lines indicate the identical nature among the criteria of both awards.

Based on these observations, we can conclude the following.

- Both the MBNQA and EQA are results-oriented awards.
- Both awards give maximum weight to customer satisfaction results. Thus, customer focus and satisfaction is the overall goal of both the awards.
- The MBNQA criteria do not include financial performance whereas it is included in the EQA criteria.
- The EQA, by including the impact on society as one of the nine criteria, covers more aspects such as preservation of global resources in a more detailed fashion than the MBNQA.
- The MBNQA and EQA are neither product nor service excellence awards, nor are they corporate management excellence awards. Both are positioned between these two extremes.
- Because of the inclusion of financial performance in the criteria, the EQA is more broad-based than the MBNQA.

As mentioned earlier, the seven core concepts are clearly embedded in the MBNQA and EQA criteria as shown in Figure 7, where the broken lines indicate the inclusion of more aspects in the resources, the impact on society, and the business results criteria of the EQA.

The ISO 9000 standards

The ISO 9000 quality assurance standards, consisting of ISO 9000, 9001, 9002, 9003 and 9004, were first issued in 1987 and revised in 1994 by the International Organization for Standardization (ISO). These standards are based on the concept that certain minimum characteristics of a quality management system could be usefully standardized, giving mutual benefit to suppliers and customers alike[26,27]. The major purpose of these standards is to provide an effective quality system reflecting a company's practices of producing goods and services that conform to specified requirements in order to enhance and facilitate trade.

ISO 9000 describes the guidelines for use of a particular standard whereas ISO 9004 describes the guidelines for establishing an internal quality management system within the broad and general context of total quality management. The other three standards, ISO 9001, 9002 and 9003, are the

**Malcolm Baldrige
National Quality
Award**

Core concepts

**European Quality
Award**

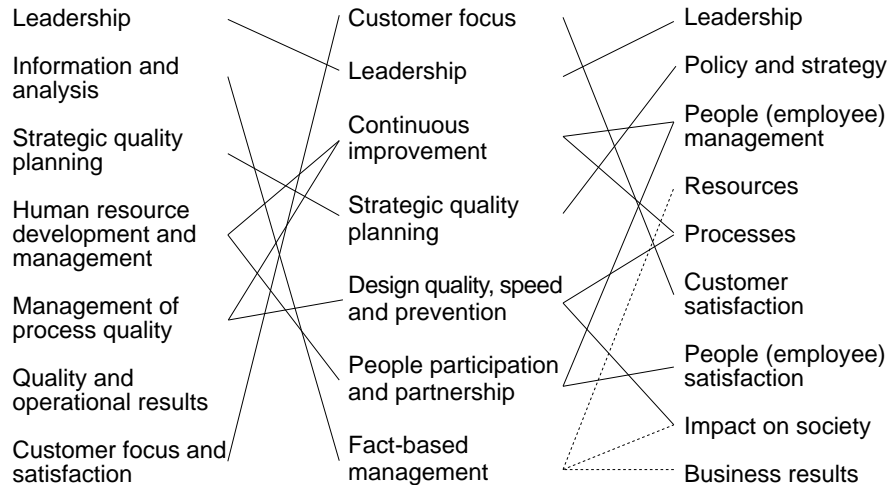


Figure 7.
Comparison of core
concepts, MBNQA and
EQA

generic standards containing minimum requirements for establishing and maintaining a documented quality system to instil confidence in customers that the intended products or services meet customer requirements. In other words, these three are the contractual standards between suppliers and customers. Of the three, ISO 9001 is the most comprehensive standard, including all activities in all stages, namely design/development, production, installation, and servicing. Similarly, if a company is engaged in production, installation and servicing only, then it can use ISO 9002 to establish and maintain a documented quality system, whereas it can use ISO 9003 if it is engaged only in final inspection and test.

From the date of publication, the adoption of ISO 9000 standards was phenomenal. Originally they were adopted by the European Community (EC), requiring that anyone doing business with the EC should have the ISO 9000 certification. This was followed by the European Free Trade Association (EFTA) member countries and later by several other countries including USA, Japan and China under exactly similar or equivalent names.

The registration (or certification) process consists of an audit of the implementation of company's documented quality system after it has been verified and seen to conform to the requirements of the applicable ISO 9000 standard. The audit is conducted by an independent third party organization such as the British Standards Institute or Lloyd's Registered Quality Assurance, usually selected by the company that applies for certification. Depending on the number and the nature of the nonconformances found during the audit, the company is either recommended or rejected for certification.

Since it is the most comprehensive standard of the three, we shall consider ISO 9001 and compare it with the Malcolm Baldrige and European Quality Awards. ISO 9001 consists of 20 elements. Interested readers can refer to the 1994 International Standard to learn the importance of each one of these 20 elements in demonstrating the conformance of product or service to specified requirements[27].

Based on these 20 elements and their importance, the ISO 9001 standard provides a systematic and comprehensive framework for establishing and maintaining a documented quality system that increases the level of confidence in meeting customer requirements. We can identify certain core concepts and core values in the framework that are fundamental in implementing the quality assurance system for successful certification. As in the case of the strategic quality management, the core concepts of the ISO 9001 framework consist of conformance, documentation, design quality and prevention, and inspection and testing. We shall now explain the significance of these core concepts.

Core concepts of ISO 9001

Conformance. Conformance is the cornerstone of the ISO 9001 standard. Management must establish and maintain at all times an effective documented quality system to provide confidence in customers in producing goods and services which satisfy the specified requirements. Any product that does not conform to these specified requirements must be prevented from being inadvertently used. Therefore, necessary documented procedures should be established for identification, documentation, evaluation, segregation and disposition of such nonconforming products. Nonconformances must be based on objective evidence only. Procedures should also include notification of nonconforming products to the personnel concerned. If gaps are found between the actual and the planned activities, relevant procedures or work instructions must be improved. Also, if a new procedure is needed to satisfy the requirements of the applicable standard, but does not exist, it must be defined and documented.

In addition, corrective and preventive actions are required in investigating the root causes of nonconforming products by analysing the processes and systems, work instructions, service and customer reports, and finding solutions to prevent reoccurrence. Employees and management must thoroughly understand the systems and processes involved so that corrective actions can be implemented effectively to prevent the occurrence of potential future defects or errors.

Documentation. Document what you do and do what you document should be the major aim of documentation[28]. The documentation should consist of preparing a quality manual that adequately covers all relevant aspects of the quality system, procedures for describing general instructions and job organization, and detailed work instructions covering all technical requirements and other relevant data. It should be noted, however, that these procedures and work instructions are not wish-lists based on what would be

preferred, but rather what is necessary and what must be done as well as what must not be done. We need to check how the written procedures and work instructions compare with the requirements of the applicable ISO 9000 standard. As Lamprecht[29] said, “document what you say you do and not what you think you do or, worse yet, what you used to do. Outdated procedures are a sure way of being issued a nonconformance notice”.

As mentioned earlier, management must provide confidence in customers that an effective quality system is in place indicating that they can supply products and services that conform to specified requirements. The only way to accomplish this aim is to develop, implement and maintain a well-planned and well-integrated documented quality system. Such a system must include the organization's quality policies and objectives, management responsibility and authority, procedures and work instructions related to all departments, and all functions. The personnel who use the procedures must be made aware of the limitations in applying them. Also, they must know what to do if a situation warrants a design change. In addition, management must establish and maintain documented procedures for appropriate document review and approval, distribution, provision of a master list or an equivalent document, and approval of all changes and modifications. Obsolete documents must be promptly removed from all points of issue or use or otherwise identify.

Design quality and prevention. One of the major goals of the ISO 9001 standard is to provide a product or service that customers want. The design quality and prevention core concept must ensure this goal. Doing the job “right the first time” rather than “redoing until right” and building customer requirements into the design must be the priority. All quality improvement efforts that are related to eliminating waste processes and components that do not add value to the product or service should be formulated and implemented. Developing innovative systems and processes and analysing root cause conditions and corrective action plans, work operations, and criteria for workmanship must be seriously considered. Necessary design and development planning, documenting work instructions, assigning required resources and qualified personnel, co-ordinating the design, technical, and support interfaces among different groups or departments should also be seriously considered.

In addition, assessing information systems and their management and evaluating technology and technical support needs such as CAD/CAM, CIM, SPC, JIT, and testing and measuring for effective design and production must be seriously investigated to build quality and to prevent errors or defects in manufacturing products or services. Supplier quality management based on acceptance inspection, product review and evaluation, and constructive feedback must also be considered[30].

A system for regular reviews and verifying that the design output is meeting the design input requirements, and evaluation and approval as well as the new issue of design changes must be clearly defined. As mentioned by Soslow[31], management must provide adequate resources and trained personnel to carry out verification activities related to product designs, processes and installations.

Inspection and testing. Inspection and testing is another crucial core concept for establishing and maintaining an effective ISO 9001 quality assurance system. Management must ensure that the incoming product is not used or processed until it has been inspected or otherwise verified as conforming to specified requirements. Procedures for inspecting and testing, which may be specified in the quality plan, releasing products only after inspection and testing, final inspection and testing before final despatch, and identifying nonconforming products must be clearly defined and documented. Also, identifying the necessary measurements made and the accuracy required, and selecting appropriate inspection, measuring and test equipment must be established. In addition, establishing and maintaining calibration procedures, ensuring suitable environmental conditions for calibrations, inspections, tests, and measurements, and for maintenance of inspection, measuring and test equipment should be seriously investigated in developing proper procedures.

Inspection and test records must be maintained and must be readily accessible for all appropriate personnel. The necessary information systems requirements in collecting and storing inspection, test and measurement data must be identified. Data and information issues such as security, availability and accessibility must also be addressed. All procedures related to these activities must be clearly defined and documented.

Core values of ISO 9001

There is one and only one core value for ISO 9001, namely, conformance to specified requirements. Management must provide a documented quality system that increases the level of confidence in producing goods or services that customers want. The company operational results as in the case of MBNQA and EQA are not considered when recommending ISO 9001 registration.

The way that the above four core concepts are important and form the basis for developing and maintaining an effective quality system can be explained as follows. Of the 20 requirements which are directly involved with respect to their significance in developing the quality system, conformance is central to ten requirements, documentation to 17, design quality and prevention to six, and inspection and testing to three requirements respectively. Thus, a thorough understanding of these four core concepts, not only by the senior management responsible for implementing the system, but also all others who develop the corresponding procedures and detailed work instructions is extremely useful in applying them in planning, establishing and maintaining a documented quality system. In addition, the experiences of successful ISO 9001 or ISO 9002 registration at Du Pont, UCB Chemical Sector, Dow Corning, Union Carbide and other companies clearly indicate that these four core concepts are extremely important in developing and implementing an effective quality system[28,30,32-35].

In addition to these core concepts, the importance of leadership, customer focus and fact-based management must be recognized in establishing and maintaining a documented quality system. These are not as strongly advocated

in ISO 9001 as they are in satisfying the MBNQA and EQA criteria. For example, senior management must make a commitment to define quality policies and objectives, specify delegation of authority and responsibility and allocate sufficient resources in implementing a quality system. It is recommended that management should conduct reviews periodically to ensure its continuing suitability and the effectiveness of the quality system against changing technology and market conditions, regulatory requirements and customer expectations. However, management is not as personally involved, dedicated and expected to demonstrate leadership in formulating and implementing quality improvement strategies as it is in the case of the MBNQA and EQA. The same is true in committing to the goal of customer focus and satisfaction. All managers have to do is to establish and maintain a documented quality system that would instil confidence in producing goods and services that customers want. Thus the documented quality system is a contract between the company and the customer. There is no need to examine critically the company's relationships with customers and its knowledge of customer requirements and of key quality factors that determine market competitiveness.

Quality records of management reviews, internal quality audits, inspection and tests, calibration, training, and nonconformances reflect the data at the time of their occurrence to demonstrate the achievement of quality and to provide evidence that activities are carried out as planned. It is not necessary to observe them over a period of time to conduct analysis for trends, projections or benchmarking. Also, there is no need to compare the results with those of competitors. This is another difference between ISO 9001 requirements and the Malcolm Baldrige and European Quality Awards criteria.

Comparison of ISO 9001 with the MBNQA and EQA

As mentioned earlier, the ISO 9001, 9002 and 9003 standards are generic contractual quality assurance standards representing the minimum requirements for an effective quality system to ensure that the product or service consistently meets customer requirements. They are written for all suppliers regardless of their industry base, company size, or what division of a company is being registered. Consequently, they are not set high and therefore can be thought of as the lowest common denominator of an effective quality system meant for all industry and service groups – one that does not contain vital technological and competitive elements[36,37]. As Juran pointed out, they do not require any evidence of a satisfactory track record of performance – e.g. in product quality or delivery[38]. Similarly, human resource development and management, and strategic quality planning are not covered at all in ISO 9001 requirements in planning and implementing the quality system.

Based on these observations, we can compare the Malcolm Baldrige and European Quality Awards with the ISO 9001 standard as follows:

- The MBNQA and EQA are awards whereas the ISO 9001 is a contractual quality assurance standard that can be satisfied by registration.

- Both the MBNQA and EQA and the ISO 9001 standard are results-based awards/standards.
- The major purposes of the MBNQA and the EQA are to promote quality awareness, to increase competitiveness, to understand the requirements of excellence in quality, and to recognize companies for outstanding quality management and achievement. In addition, the MBNQA requires that award-winning companies should share information on their successful strategies with other companies. On the other hand, the major purpose of ISO 9001 is to implement an effective quality system to provide confidence in customers that the intended products and services consistently conform to specified requirements.
- Both the MBNQA and EQA emphasize two factors of competitiveness; namely, delivery of ever improving value to customers and improvement of the company's overall operational performance. The EQA also focuses on a company's financial performance. ISO 9001, on the other hand, focuses only on conformance to specified requirements in establishing and maintaining the company's documented quality system.
- ISO 9001 gives considerable importance to the role of inspection and testing. As explained earlier, it is one of the core concepts that is fundamental in developing and implementing a documented quality system. The MBNQA and EQA, on the other hand, emphasize that inspection and testing be replaced by prevention in demonstrating excellence in quality of products or services.
- As mentioned above, people participation and partnership, and strategic quality planning are not considered at all in ISO 9001 requirements whereas they play a most important role in formulating and implementing quality improvement strategies to satisfy the MBNQA and EQA criteria.
- Continuous improvement, plays a central role in planning and implementing quality improvement efforts to satisfy the MBNQA and EQA criteria, whereas it is not emphasized as much in satisfying ISO 9001 requirements. As stated by Hyman Katz, corporate vice president, Pall Corporation, continuous improvement beyond the minimum requirements of ISO 9001 is necessary in order to achieve total quality[26].
- Similarly, customer focus, leadership, and fact-based management are important for ISO 9001 only up to establishing and maintaining a documented quality system to ensure confidence in customers that the intended products or services conform with specified requirements. There is no need to examine critically the company's relationships with customers and its knowledge of customer requirements as the MBNQA and EQA criteria emphasize in customer focus. Similarly, all senior management has to do is to make a commitment in establishing and maintaining a documented quality system in observing ISO 9001

requirements. It is not required to observe the data over a period of time to conduct analysis for trends, projections or benchmarking. Also, there is no need to compare the results with those of competitors in satisfying ISO 9001 requirements. On the other hand, all these three core concepts, as explained earlier, play a vital role in implementing quality plans to satisfy the MBNQA and EQA criteria. The relationship between ISO 9001 and the seven core concepts is described in Figure 8. As you will see in the Figure, the overlap between the seven core concepts of SQM and the four core concepts of ISO 9001 is the design quality and prevention as discussed in the following item.

- The only major overlap between the ISO 9001 standard and the MBNQA and EQA criteria is in design quality, speed and prevention. However, it should be noted that the requirements of ISO 9001 do not refer to the technical specifications of the products, but instead to the systems that produce them, instilling confidence that the products or services consistently have the quality that customers expect. As Reimann and Hertz, and others have pointed out, they are designed to complement technical and service requirements[39,40]. In addition, the ISO 9001 requirements do not require speed or cycle time to become competitive in bringing products or services faster to the market place. On the other hand, they play a dominant role in satisfying MBNQA and EQA criteria.

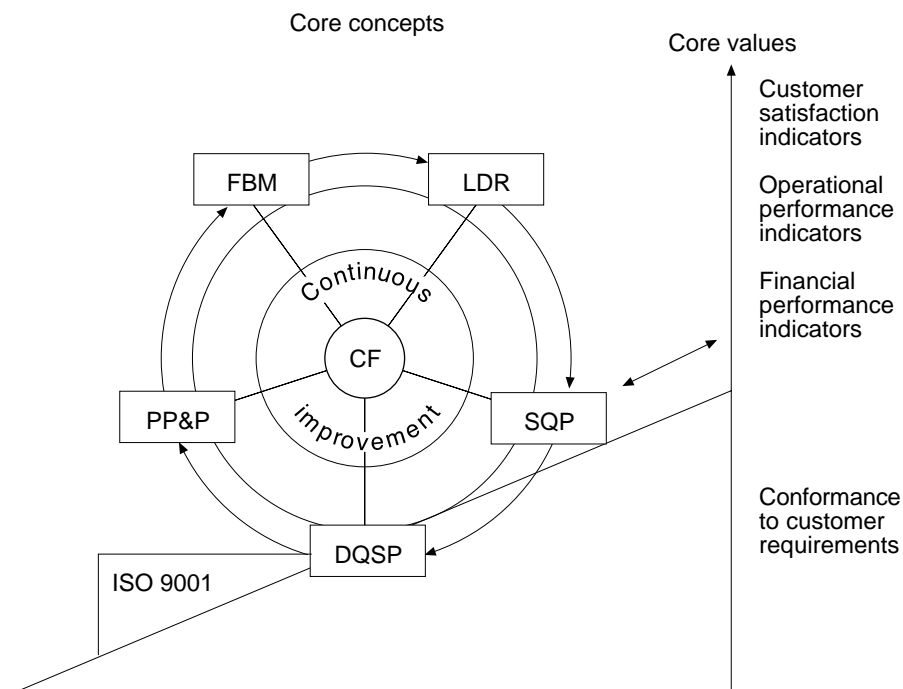


Figure 8.
Overlap between SQM
and ISO 9001

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- In addition to inspection and testing, conformance and documentation play a vital role in planning and implementing an effective documented quality system that satisfies ISO 9001 requirements. On the other hand, they are not emphasized in the MBNQA and EQA criteria.
 - Total quality management is not required under ISO 9001 registration[30].
 - ISO 9001 requirements do not contain vital technological and competitive elements[35].

Thus, the MBNQA and EQA criteria are farther-reaching and broader than the ISO 9001 requirements. Also, the ISO 9001 quality assurance standard falls short of SQM in focusing and implementing quality improvement strategies in delivering ever improving value to customers and the improvement of a company's overall operational performance. This does not mean that ISO 9001 is not desirable; the fact that it is being used for registration all over the world should underscore its definite value. We should also note that the emphasis of ISO 9001 in addressing process control issues is much stronger than the award criteria. However, one should understand the basic differences between the ISO 9001 and Malcolm Baldrige and European Quality Awards (and differences between the ISO 9001 and SQM) as described above. Also, as Lofgren, president of the Registrar Accreditation Board (RAB), explained, neither set of criteria alone will assure total quality; but together, the MBNQA and EQA criteria and ISO 9001 requirements complement each other[26].

In pointing out the differences between the MBNQA and ISO 9001 standard, Reimann and Hertz[38] noted two misconceptions; namely, that they both cover the same requirements and both address improvement, relying on high quality results and hence, both are forms of recognition. Consequently, many believe that they are equivalent and choose one or the other. For the 12 differences as stated above, these conclusions are not correct. The basic purposes of the MBNQA and the ISO 9001 standard are different. The core concepts that are central in developing and implementing quality systems based on the MBNQA criteria as well as the requirements of the ISO 9001 standard are different except for design quality, speed and prevention. The same is true in comparing the ISO 9001 standard with the European Quality Award. As explained earlier, both Malcolm Baldrige and European Quality Awards address factors reflecting competitiveness; namely, customer focus, continuous improvement, competitive comparisons and benchmarking, fact-based management, people participation and partnership, strategic quality planning and its integration with overall corporate business plans, and public responsibility. Senior management must also be actively involved and demonstrate leadership in developing and implementing quality improvement strategies. These significant factors are not considered in the ISO 9001 requirements.

It should be emphasized, however, in the words of Hyman Katz, that the ISO 9000 requirements "certainly belong in a total quality process. ISO 9000 provides a comprehensive approach to documenting quality processes and assessing their performance"[26]. Thus ISO 9001 can provide a foundation for

SQM as illustrated in Figure 8. Companies can document processes and procedures for an effective quality system which can be taken as a platform for continuously improving the quality of products or services that customers want. Such an integration can provide an efficient implementation of quality improvement strategies involving SQM in a gradual progression.

From the experiences of MBNQA winners, we find that a lot of time and effort, and considerable initial costs, are required in formulating and implementing quality plans to satisfy the award criteria. Even though it is too early to find evidence, the amount of time, effort and cost would be the same in the application of the EQA criteria. The ISO 9001 registration process, however, involves much less time and effort. It also involves much less cost. Therefore, we recommend that companies should attempt first getting ISO 9001 registration and then try to develop and implement quality improvement strategies to satisfy the MBNQA and EQA criteria. If companies are located in the USA, they can follow ISO 9001 first, then the MBNQA path; on the other hand, companies located in Western Europe can follow ISO 9001 registration and the EQA path. Companies in other countries can obtain ISO 9001 registration first, and then attempt to develop and implement SQM strategies by following the seven core concepts. If they have local awards based on these seven core concepts and hence TQM but with different names (like MBNQA and EQA), then they can follow ISO 9001 registration and their local award path.

Conclusions

After observing the significant contributions of the quality gurus like Deming, Juran, Crosby, Feigenbaum, Ishikawa and Garvin, we have defined strategic quality management as a comprehensive and strategic framework linking profitability, business objectives and competitiveness to quality improvement efforts with the aim of harnessing the human, material and information resources organization-wide in continuously improving products or services that will allow the delivery of customer satisfaction. For the reasons explained earlier in the paper, the words “strategic” and “total” are used interchangeably. Also, seven core concepts, namely, customer focus, leadership, continuous improvement, strategic quality planning, design quality, speed and prevention, people participation and partnership, and fact-based management that are central to formulating and implementing quality improvement strategies based on strategic or total quality management are introduced. These seven core concepts are then compared with the Malcolm Baldrige and European Quality Award criteria. Similarly, the MBNQA and EQA are compared with the requirements of the ISO 9001 quality assurance standard. As in the case of TQM, four core concepts, namely, conformance, documentation, design quality and prevention, and inspection and testing are identified and are compared with the core concepts of TQM.

As explained earlier, the quality system based on the ISO 9001 standard can provide a foundation for SQM as illustrated in Figure 8. Companies can document policies, processes and procedures for an effective quality system to

complete the ISO 9001 registration process successfully. Then they can use the resulting quality system as a platform for continuously improving the quality of products or services that customers want. Such an integration can provide an efficient implementation of quality improvement strategies that are central to SQM in a gradual progression. As shown in Figure 3, one can develop an SQM implementation model based on the seven core concepts.

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