

# Use of ISO 9000 and Baldrige Award Criteria in Supplier Quality Evaluation

BY

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## IN BRIEF

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Purchasing and materials managers are increasingly concerned with ISO 9000 registration, both as a prerequisite for participation in global markets and in supplier selection. The ISO 9000 guidelines link certification requirements to quality-related corporate issues, and can be used as a screening tool for companies when assessing a supplier's process conformance. However, many important areas of quality management are not addressed by ISO 9000. The Malcolm Baldrige Award criteria, on the other hand, provide a comprehensive framework within which to conduct an evaluation of suppliers' quality systems.

The similarities and differences between the two frameworks are compared in a map that is validated using survey data from 314 North American organizations. The results suggest that ISO 9000 registration criteria fail to measure key areas of quality management, including strategic planning, employee involvement, quality results, competitive benchmarking, and customer satisfaction. Based on these results, the implications for the design of supplier quality measurement and evaluation systems are discussed.

## INTRODUCTION

The role of quality in supplier evaluation and selection has emerged as a primary dimension of performance. For example, several studies have found that quality is the major issue for many professional buyers for several reasons: first, higher product quality can yield lower total costs;<sup>1</sup> and second, it permits many firms to compete on a global basis.<sup>2</sup> This is especially true in the case of supplier partnerships. Many North American firms are carefully selecting suppliers based on their quality capabilities, then forming long-term relationships in order to continuously improve processes through joint problem-solving activities.<sup>3</sup> In measuring and assessing their suppliers' quality management systems, purchasing managers are increasingly turning to established quality auditing and measurement systems. Two audit frameworks often applied are the ISO 9000 criteria and the Malcolm Baldrige Award criteria.



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This study compares the criteria applied within each measurement system. In doing this, the authors attempt to provide purchasing managers with a set of guidelines that can be used to determine how and when each quality measurement system can be applied in the design of supplier quality evaluation systems.

From the outset, managers must recognize that each of the two systems is based on a different set of objectives. Because the two programs are designed for different purposes, they measure different things in different ways. The ISO 9000 criteria represent model guidelines which promote the broad participation and qualification of as many companies as possible. Therefore, this program can be viewed as a set of absolute standards that test the qualifications of the applicants to ensure conformance quality. As such, it provides a common basis for an independent and transferable supplier qualification system. On the other hand, the basic purpose of the Baldrige Award criteria is to select a winner of the award and to enhance competitiveness. The criteria are a set of relative and competitive standards in terms of overall measurements, which attempt to rank order the applicants. The Baldrige Award's strategy is to create an evolving body of knowledge in the United States by encouraging the learning and sharing of competitive knowledge.<sup>4</sup>

Not surprisingly then, the criteria of the two programs are applied in very different ways. The ISO 9000 criteria are recognized as the required quality standard for the European Economic Community (EC), and many other parts of the global marketplace will likely adopt these standards. The EC is developing 1,500 safety, health, environmental, and quality standards that are to be consistent throughout its member countries.<sup>5</sup> ISO 9000, and its EC counterpart EN 29000, is not required by all EC directives, but many EC customers do require adherence to such international quality process standards. Experts predict that if a firm plans to export to the EC, its buyers likely will have to require ISO 9000 as part of their supplier certification procedure.<sup>6</sup> For this reason, an increasing number of purchasing managers believe the ISO 9000 standards define the foundation on which companies can build a working system that truly meets the objectives of Total Quality Management (TQM), and many are requiring their suppliers to apply for registration. Nevertheless, the ISO 9000 standards have some obvious limitations. Their criteria address only standards related to quality assurance, which include variables related to design, process control, documentation, and supplier assessment and control. Such factors, while critical, are considered to be only a single dimension of total quality management.

Another serious criticism of the ISO 9000 standards is that, although they provide an indicator

that a supplier has complied with process requirements, in no way do they guarantee that the supplier produces quality products or services that actually meet customer requirements.<sup>7</sup> Registration ensures that a quality system is in place but provides no absolute measures of quality results or customer satisfaction. One European manager interviewed in the course of this research went so far as to describe ISO 9000 as "one more set of papers for technocrats to place their stamp of approval on."

A more comprehensive set of quality-related criteria is provided by the Malcolm Baldrige National Quality Award. The Malcolm Baldrige Award is a competition that implies an organization excels not only in quality management, but also in quality achievement. The Baldrige Award application provides a broad framework for implementing a quality program and establishes benchmarks suitable for monitoring and measuring quality progress. Companies such as Honeywell, Motorola, Southwest Bell, Cummins Engine, and many others require that suppliers use modified versions of the Baldrige criteria for quality measurement and evaluation. Because the Baldrige criteria are much broader, a number of firms consider the ISO 9000 criteria as a subset of the Baldrige Award (many companies label their ISO 9000 implementation team "category five," after the Baldrige's *Quality Assurance* category).<sup>8</sup>

Despite the appeal of the Baldrige Award, its criteria have also come under heavy fire. Following an article in the *Harvard Business Review*,<sup>9</sup> a group of practitioners and quality experts expressed their concern over the limited scope of the Baldrige Award. Specifically, the major concern was that the award failed to include measures of financial performance, innovation, long-term planning, and public responsibility. The president of the American Quality Foundation claims the Baldrige Award itself does not meet the criteria for sustained global competition.<sup>10</sup> The process of applying for the Baldrige Award has also been criticized as being too costly; critics claim the Baldrige Award can be "bought" at a price of somewhere around \$500,000!<sup>11</sup>

To address this set of conflicting views and issues, the authors undertook a comprehensive assessment of both the ISO 9000 standards and the Baldrige Award application. The study begins by reviewing the scope of each framework within the context of supplier evaluation, and develops a systematic set of cross-references for comparing the criteria. The mapping of the two sets of measures

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is tested using the results of a quality survey completed by 314 North American quality managers. Finally, some observations are offered regarding the appropriate application of each instrument in supplier evaluation for companies dealing with different types of sourcing relationships.

**HOW WERE THE TWO PROGRAMS AND THEIR CRITERIA DEVELOPED?**

**ISO 9000**

The ISO 9000 series of quality standards was developed by the International Standards Organization (ISO) in 1987, and has since become the international quality standard.<sup>12</sup> The series was adopted by the European Community (EC) without change and is published as the European Norm (EN) 29000 series.<sup>13</sup> One feature of the EC union is the selection of a single standard of assurance that a product was produced in a quality-controlled production process. This standard, ISO 9000, is similar to a contract between a purchaser and supplier — assurance that a product was produced in a quality-controlled production process. This standard, ISO 9000, is similar to a contract between a purchaser and supplier — and compliance of an organization to the standard is monitored by independent third parties.

ISO 9000 is in fact a series of international standards that apply to the relationship between purchasers and suppliers. ISO 9000 identifies the basic attributes of a manufacturer's quality management system and specifies practical procedures and approaches to ensure that its products and services are produced in accordance with the process standards specified by the firm. The ISO 9000 series is actually made up of five separate standards:

- ISO 9000
- ISO 9001 • ISO 9002 • ISO 9003
- ISO 9004

ISO 9001, 9002, and 9003 are *models* (that is, conformance standards for quality assurance systems) and relate to supplier-customer relationships. ISO 9000 and 9004 are *guidelines* and relate to the development of quality systems within the company. ISO 9001 is the most comprehensive and applies to facilities that design, develop, produce, install, and service their own products. ISO 9002 applies to firms that provide goods or services consistent with the specifications furnished by the customer. ISO 9003 applies to final inspection and test procedures only.

ISO 9000 registration requires a series of steps which in turn affect organizational structure. *First*, a firm determines which standards in the series are applicable to its situation. *Next*, a company-specific quality manual is developed, which provides a specific set of policies related to the implementation of quality standards. *Finally*, a full assessment follows, executed by an on-site team that verifies:

- There is a procedure in place to measure quality
- There is a review process to monitor quality
- There are qualified staff to carry out these policies

The ANSI/ASQC Q90-94 standards are technically equivalent to the ISO 9000-9004 series, but incorporate customary American language usage and spelling. The ANSI/ASQC Q94, Quality Management and Quality Systems Elements Guidelines are outlined in Table I.

Perhaps the best way to recognize the character of the ISO 9000 process is to relate it to the concept of Total Quality Management (TQM). *ISO 9000 describes and defines the fundamental nature of work processes necessary for an organization to achieve the objectives of TQM.* Thus, ISO 9000 is a critical first step in implementing a TQM system. ISO 9000 implementation forces managers to reexamine all their business processes, and identify any discrepancies between what employees are actually doing and what the documentation states is being done. In cases when a discrepancy exists, there are three possible actions:

1. Retrain appropriate employees, with respect to their process activities
2. Change the documentation to reflect what employees are actually doing

**TABLE I** **ANSI/ASQC Q94 CRITERIA**

0.0	Introduction
1.0	Scope and Field of Application
2.0	References
3.0	Definitions
4.0	Management Responsibility
5.0	Quality System Principles
6.0	Economics: Quality-Related Cost Considerations
7.0	Quality in Marketing
8.0	Quality in Specification and Design
9.0	Quality in Procurement
10.0	Quality in Production
11.0	Control of Production
12.0	Product Verification
13.0	Control of Measuring and Test Equipment
14.0	Nonconformity
15.0	Corrective Action
16.0	Handling and Post-Production Functions
17.0	Quality Documentation and Records
18.0	Personnel
19.0	Product Safety and Liability
20.0	Use of Statistical Methods

### 3. Reengineer the entire process, retrain the employees, and change the documentation

The authors observed firsthand the effects of ISO 9000 implementation at several organizations. A computer manufacturer described how the biggest cost associated with implementation was training. All individuals in the plant had to explicitly understand their process documentation — and there were over 200 people in the facility. When the auditing team arrived at the facility, it first spent two full days reviewing the documentation. The team then proceeded to interview employees at random, and followed the trail of a random customer through all of the processes — order entry, design, material purchasing, manufacture, assembly, inspection, and so on. This was done to determine whether the quality system documentation actually reflected employees' actions in practice. In the first audit, at least three discrepancies were found, and the audit team "failed" the facility; it had to wait another six months before attempting another audit. In the ensuing audit, all discrepancies were corrected, and the facility became officially registered. The cost of an audit for a small company is approximately \$50,000. This does *not* include training costs, which may range as high as \$100,000-\$200,000 for a medium-sized facility. Once a company becomes registered, it must continue to be audited (usually annually) to maintain registered status.

Because of the growing acceptance of ISO 9000 as a common standard of quality assurance, it has been adopted by various industries as a pre-qualifying criteria for awarding business. For example, the "big three" automotive companies have joined forces to create QS 9000, which replaces Chrysler's Pentastar Award, GM's Targets for Excellence, and Ford's Q1 Audit. QS 9000 certification requirements are described in the Quality System Requirements document, and include all 20 categories contained within ISO 9001.<sup>14</sup> The requirements apply to all *internal* and *external* suppliers of production and service parts and materials for those firms. The application of this common system allows one company's supplier survey results to be used as a baseline for joint planning and tracking of the supplier's continuous quality improvement.

#### **The Malcolm Baldrige Quality Award**

In 1987, former President Ronald Reagan signed the Malcolm Baldrige National Quality Improvement Act, which established a national award to recognize quality improvement among manufacturing, service, and small businesses. The award criteria were developed by a group of recognized quality professionals including Dr. Joseph M. Juran, who helped create the award through congressional testimonies. Since then, the criteria have become an operational definition of TQM, and the wide distribution of the application guidelines has exposed many managers to the Baldrige definition of TQM.

The Baldrige criteria are often used as a template for a thorough TQM system, and one of the important effects of the award is the creation and diffusion of useful TQM practices. Over 180,000 applications were distributed in 1991 alone.

Continuous improvement is the basic, and perhaps most important, tenet of the Baldrige criteria. In each of the 28 major criteria items, companies are asked how they plan to improve in that area. The criteria are both process and results oriented. The award criteria are intended to address many company operations, processes, strategies, and requirements.

However, the Baldrige Award does not include in its evaluation all areas of management. For example, financial performance is a particularly difficult area to evaluate because it generally depends on the magnitude of revenues, price, and cost, all of which are difficult to assess across industries.<sup>15</sup>

While the process to receive the award lasts one year from the time of application to the time of award announcement, it typically takes a company 8 to 10 years to develop a quality system that is competitive for the award.<sup>16</sup> The Baldrige Award is composed of seven separate, weighted categories:

- leadership
- information and analysis
- strategic quality planning
- human resource utilization
- quality assurance of products and services
- measurement of quality results
- customer satisfaction<sup>17</sup>

These are described in detail in Table II (see page 6). A total of 1,000 points are possible on the application. To be a contender for the award, a company should be capable of scoring above 700 points. The top companies, with scores of 700 or more, typically have balanced and outstanding performance across the board. The highest score to date on a Baldrige application has been in the mid-800 point range. Each company that applies for the Baldrige Award receives a feedback report that describes the findings of the Board of Examiners relative to the company's strengths as well as its areas for improvement.

Many companies are using the Baldrige Award criteria in designing systems for supplier quality assessment; companies such as Cummins Engine, Motorola, Pacific Bell, Alcatel, and Honeywell all use modified versions of the Baldrige Award to conduct in-depth studies of their major suppliers' quality systems. A similar scoring system is used, and trained assessors may spend several days visiting a supplier's facilities to rate its continuous improvement efforts.

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TABLE II

MALCOLM BALDRIGE AWARD — 1,000 POINTS POSSIBLE

**1.0 Leadership (90 points):** Examines senior executives' personal leadership and involvement in creating and sustaining a customer focus and clear and visible quality values. Examines how the values and expectations are integrated into the company's management system, including how the company addresses its public responsibilities and corporate citizenship.

- 1.1 Senior Executive Leadership (45)
- 1.2 Leadership System and Organization (25)
- 1.3 Public Responsibility and Corporate Citizenship (20)

**2.0 Information and Analysis (75 points):** Examines the scope, validity, analysis, management, and use of data and information to drive quality excellence and improve competitive performance. Examines the adequacy of the company's data, information, and analysis system to support improvement of the company's customer focus, products, services, and internal operations.

- 2.1 Management of Information and Data (20)
- 2.2 Competitive Comparisons and Benchmarking (15)
- 2.3 Analysis and Use of Company-Level Data (40)

**3.0 Strategic Quality Planning (55 points):** Examines the company's planning process and how all key quality requirements are integrated into overall business planning. Examines the company's short- and longer-term plans and how quality and performance requirements are deployed to work units.

- 3.1 Strategy Development (35)
- 3.2 Strategy Deployment (20)

**4.0 Human Resource Development and Management (140 points):** Examines how the work force is enabled to develop and utilize its full potential, in alignment with the company's performance objectives. Examines the company's efforts to build and maintain an environment conducive to performance excellence, full participation, and personal and organizational growth.

- 4.1 Human Resource Planning and Evaluation (20)
- 4.2 High-Performance Work Systems (45)
- 4.3 Employee Education, Training and Development (50)
- 4.4 Employee Well-Being and Satisfaction (25)

**5.0 Process Management (140 points):** Examines the key aspects of process management, including customer-focused design, product and service delivery processes, support services, and supply management involving all work units, including research and development. This category examines how key processes are designed, effectively managed, and improved to achieve higher performance.

- 5.1 Design and Introduction of Products and Services (40)
- 5.2 Process Management: Product and Service Production and Delivery (40)
- 5.3 Process Management: Support Services (30)
- 5.4 Management of Supplier Performance (30)

**6.0 Business Results (250 points):** Examines the company's performance and improvement in key business areas: product and service quality, productivity and operational effectiveness, supply quality, and financial performance indicators in these areas relative to those of competitors.

- 6.1 Product and Service Quality Results (75)
- 6.2 Company Operational and Financial Results (130)
- 6.3 Supplier Performance Results (45)

**7.0 Customer Focus and Satisfaction (250 points):** Examines the company's systems for customer learning and for building and maintaining customer relationships. Examines levels and trends in key measures of business success—customer satisfaction and retention, market share, and satisfaction relative to competitors.

- 7.1 Customer and Market Knowledge (30)
- 7.2 Customer Relationship Management (30)
- 7.3 Customer Satisfaction Determination (30)
- 7.4 Customer Satisfaction Results (100)
- 7.5 Customer Satisfaction Comparison (60)

**MAPPING THE ISO 9000 AND THE BALDRIGE CRITERIA**

A comparison of the two sets of criteria helps a potential user understand the circumstances in which application of each quality measurement system is appropriate. A comprehensive review of the ISO 9000 standards and the Baldrige Award was conducted, followed by the creation of a matrix in which the authors assigned simple relationships (direct, indirect, or none) across criteria items. Criteria items of the two programs which were identical in their function and purpose were assigned a "direct" relationship (D). Items which were similar but not identical in their function and purpose were assigned an "indirect" relationship (I). For example, if an ISO 9000 criteria item did not include all the material in a Baldrige Award criteria item, an indirect code was assigned. Finally, those criteria items which exhibited no similarities were assigned "No relationship," and the corresponding cell in the matrix was left blank. The authors independently developed the matrix, and then compared their mappings. Any differences were discussed and the criteria were compared again; in this way, all differences were eventually resolved. The results of this mapping procedure are shown in Table III; the Baldrige criteria (in columns) are mapped against the ISO 9000 criteria (in rows).

Following the coding of relationships, an analysis was performed to validate the mapping results. A list of items related to each of the Baldrige criteria (1.0 through 7.0) and the ISO 9000 criteria (Items 4.0 through 20.0) was pre-tested through a set of interviews with managers in 14 North American and European manufacturing organizations in order to improve the clarity and content of each measure. Subsequently, a survey was designed.<sup>18</sup>

A list of 3,000 quality directors and vice presidents was obtained from the American Society of Quality Control; from this list 1,469 manufacturing firms in the following industries were identified as sample firms for the validation study.

- Automotive
- Chemical
- Computer
- Construction
- Electronics
- Consumer products
- Defense products
- Medical devices
- Packaging
- Pharmaceutical products
- Semiconductor
- Paperboard products
- Telecommunications

**TABLE III** MAPPING OF CRITERIA FOR ISO 9000 AND THE BALDRIGE AWARD

		Malcolm Baldrige National Quality Award																								
ISO 9000		1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	4.1	4.2	4.3	4.4	5.1	5.2	5.3	5.4	6.1	6.2	6.3	7.1	7.2	7.3	7.4	7.5	
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20.0																										

D = Direct Relationship  
 I = Indirect Relationship  
 "Blank" = No Relationship



Two mailings, with one follow-up reminder, produced 314 usable surveys, for a 21 percent response rate.

To ensure consistency in measuring the Baldrige criteria, different scales were selected to measure different aspects of each criterion. The scales were shown to be sufficiently valid and reliable.<sup>19</sup> Single measures of each of the ISO 9000 criteria were used to identify the extent of documentation for items of the ISO 9000 standards. The correlations between each of the Baldrige Award criteria and the appropriate ISO 9000 criteria were then compared with the original matrix of proposed relationships

**ISO 9000 AND THE BALDRIGE AWARD — SIMILARITIES AND DIFFERENCES**

A set of correlations between the Baldrige and the ISO criteria are shown in Table IV. Note in Table IV that the shaded areas represent predicted matrix relationships showing strong correlations. The cells which contain a number but are not shaded indicate that a relationship was predicted, but the correlation between the two variables was weak.

In examining Tables III and IV, it is clear that several critical areas of the Baldrige Award criteria are not included in ISO 9000 requirements. The first of these is Strategic Quality Planning (items 3.1 and 3.2). Although these items are indirectly addressed by ISO 9000 criterion 4.0 (Management Responsibility), the correlation is low (0.24). In addition, ISO

9000 fails to fully assess the extent to which a supplier's planning processes and quality requirements are integrated into the firm's overall business planning. This criterion is particularly important for companies evaluating a supplier for a potential long-term partnering relationship.<sup>20</sup> In such cases, a purchasing manager must determine whether the supplier is integrating quality requirements into overall business strategy development, business decisions, and innovation in all aspects of company operations, thereby making it a viable long-term partner.

Another area of the Baldrige framework that is largely missing in the ISO 9000 criteria is *Business Results: Product and Service Quality Results, Company Operational and Financial Results, and Supplier Performance Results* (Baldrige criteria items 6.1, 6.2, and 6.3 respectively). The correlations between these items and the associated ISO 9000 items were close to zero. These factors determine how a supplier assesses the quality and performance of its systems, processes, practices, products, and services. They also compare the supplier's current quality levels with those of competitors.

ISO 9000 does not address a company's approach to selecting data and information for competitive comparisons and world-class benchmarks to support quality and performance planning, evaluation, and improvement. Most important, ISO 9000 makes no provisions for continuous improvement, which is perhaps the most important tenet of the Baldrige criteria. For each of the 28 major items in the Baldrige assessment, the company is asked how it plans to improve in that area.

These comparisons make it clear that even with ISO 9000 registration, there may be no tangible evidence of quality excellence and quality improvement. ISO 9000 registration does not guarantee excellent product quality, while the Baldrige Award provides and uses quality assessments and results, business process and support service results; competitive comparisons and benchmarks; and continuous improvement practices to recognize and foster excellent quality practices. ISO 9000 can only ensure that a quality system exists, but cannot guarantee its functionality.

**TABLE IV** CORRELATIONS BETWEEN THE BALDRIGE AND THE ISO 9000 CRITERIA

		Malcolm Baldrige National Quality Award							
ISO 9000		1.0	2.0	3.0	4.0	5.0	6.0	7.0	
4.0		0.28		0.24					Management Responsibility
5.0		0.46	0.50		0.43	0.53	0.01	0.33	Quality System Principles
6.0		0.33				0.41	0.01		Economics
7.0		0.48				0.55	0.01	0.51	Quality in Marketing
8.0		0.38			0.40	0.58		0.35	Quality in Specification and Design
9.0		0.40	0.51		0.46	0.56	0.01		Quality in Procurement
10.0		0.37				0.53			Quality in Production
11.0		0.44			0.40	0.53			Control of Production
12.0		0.32				0.42			Product Verification
13.0		0.31				0.38	0.01		Control of Measuring Equipment
14.0		0.44				0.53	0.00		Nonconformity
15.0		0.44	0.49			0.53			Corrective Action
16.0		0.35	0.39			0.45	0.01	0.28	Handling Functions
17.0		0.24	0.34			0.37			Quality Records
18.0		0.43			0.52	0.51			Personnel
19.0		0.44						0.35	Product Safety and Liability
20.0			0.55			0.57	0.00		Statistical Methods

0.46 = Predicted relationship, strong correlation  
 0.24 = Predicted relationship, weak correlation

The Baldrige Award argues strongly for customer-driven organizations; it recognizes that suppliers will not be able to survive the global market if they cannot routinely guarantee their customers that the product or service provided is exactly as promised. It also requires evidence of this support in criteria items 7.1 through 7.5: *Customer and Market Knowledge, Customer Relationship Management, Customer Satisfaction Determination, Customer Satisfaction Results, and Customer Satisfaction Comparison*. These items measure how the firm provides effective management of its relationships with its customers and uses information gained from customers to improve customer relationship management strategies and practices. They also describe the company's explicit and implicit commitments to customers regarding its products and services. These same items measure the company's methods for determining and benchmarking customer satisfaction.

On the other hand, ISO 9000 requires the marketing function to establish a continuous customer information monitoring and feedback system (criterion 7.0); it acknowledges that information pertinent to the quality of a product or service should be collected, analyzed, interpreted, and communicated in accordance with defined procedures. Such information is helpful in determining the nature and the extent of product or service problems in relation to customer experiences and expectations. In addition, the feedback may provide clues to possible design changes as well as appropriate management action. Although these provisions indirectly attempt to assess the level of customer satisfaction, and there is a significant correlation between the two sets of factors (0.51), the assessment clearly is limited in scope. ISO 9000 requires no tangible measures of customer satisfaction results, and no follow-up on customer complaints or assessment of changing customer needs.<sup>21</sup> These comparisons are summarized in Table V.

On the other side of the coin, it should be noted that the Baldrige Award has been criticized as a quality assessment tool by many managers. In the past, *Quality and Operational Results* (item 6.0) has been judged to be weak because it does not

provide a strong assessment of business results. As a result of this criticism, however, this element was changed significantly in the 1995 Baldrige Award criteria. Additionally, the Baldrige Award offers little direct assessment of the following factors:

- Innovation
- Research and development
- Financial performance
- Business ethics
- Environmental protection
- Waste management
- Cost reduction
- Productivity improvement
- Customer retention<sup>22</sup>

It is also claimed that the Baldrige Award provides little incentive to implement world-class practices such as Quality Function Deployment and the Taguchi methods.<sup>23</sup> Finally, the Baldrige Award provides less detail in the process control area than does ISO 9000.

### IMPLICATIONS FOR PURCHASING PROFESSIONALS

Given the results of this study, what are the implications for using ISO 9000 criteria and Baldrige criteria in supplier quality assessment? The analysis provides evidence that ISO 9000 is indeed a good stepping stone to establish process conformance, but is not in itself a foundation for the integration

TABLE V  
A COMPARISON OF BALDRIGE AND ISO 9000 COVERAGE

Baldrige Items Covered by ISO 9000	Baldrige Items NOT Covered by ISO 9000
<ul style="list-style-type: none"> <li>• Senior Executive Leadership</li> <li>• Management for Quality</li> <li>• Scope and Management of Quality and Performance Data and Information</li> <li>• Human Resource Management</li> <li>• Employee Education and Training</li> <li>• Employee Performance and Recognition</li> <li>• Design and Introduction of Quality Products and Services</li> <li>• Process Management—Product and Service Delivery Processes</li> <li>• Production and Delivery Processes</li> <li>• Process Management—Business Processes and Support Services</li> <li>• Supplier Quality and Results</li> <li>• Future Requirements and Expectations of Customers</li> </ul>	<ul style="list-style-type: none"> <li>• Public Responsibility</li> <li>• Competitive Comparisons and Benchmarks</li> <li>• Analysis and Uses of Company-Level Data</li> <li>• Strategic Quality and Company Performance Planning Process</li> <li>• Quality and Performance Plans</li> <li>• Employee Involvement</li> <li>• Employee Well-Being and Morale</li> <li>• Quality Assessment</li> <li>• Product and Service Quality Results</li> <li>• Company Operational Results</li> <li>• Business Process and Support Service Results</li> <li>• Customer Relationship Management</li> <li>• Commitment to Customers</li> <li>• Customer Satisfaction Determination, Results, and Comparison</li> <li>• Continuous Improvement</li> </ul>



of Total Quality Management. It is clear that many of the Baldrige criteria are not included within the ISO 9000 audit, but use of the ISO 9000 criteria nevertheless can be helpful to purchasing organizations seeking to evaluate supplier quality. In particular, ISO 9000 criteria can be useful as a pre-qualifying instrument for documenting processes of suppliers that are just initiating their quality improvement efforts. This is an important initial step in the supplier selection process, as demonstrated by the application of QS 9000 in the automotive industry.

In tracking a supplier's continuous improvement efforts, however, a broader set of criteria is required. Research has shown that organizations typically proceed through a series of stages as they establish TQM initiatives.<sup>24</sup> In the early stages of TQM program development, suppliers enter the *awareness stage*. This level is characterized by an acknowledgment of the importance of quality, although employees are often confused and have a lack of commitment to process change. *Process mapping* and *process ownership* are successive stages of development. Once the business mission is defined, the issues and processes that have the

***ISO 9000 criteria can be useful as a pre-qualifying instrument for documenting processes of suppliers that are just initiating their quality improvement efforts.***

greatest impact on achieving the mission are identified. The process owner defines the boundaries and forms the improvement team, which uses process mapping to develop a common understanding of the process. Process mapping involves the identification of the sequence of activities that occur when a customer order is processed. The final stage, *quality culture*, represents the farthest point along the spectrum, in which the principles of TQM are fully integrated into daily decisions throughout every functional activity in the product and process value chain.

Both the ISO standard and the Baldrige Award criteria can be useful as supplier evaluation tools at different stages of a supplier's progression toward total quality. For non-critical suppliers, a pre-qualification audit may suffice. In such cases, ISO 9000 measures can document the supplier's conformance to its process quality standards. This tool can help ensure that all processes are well understood, and that all employees are well trained and understand management's expectations regarding these processes. For example, in cases where the item obtained from a supplier is of low-dollar usage or is purchased in small quantities, it may not be necessary to conduct a full-scale quality audit on the level of the Baldrige criteria. In addition, ISO 9000 registration may provide sufficient evidence that quality system documentation is in place, as determined by a third-party assessor.

Once a supplier is pre-qualified and its processes are established, purchasing managers may want to use measures contained within the Baldrige framework to establish a baseline for continuous improvement. In addition, as a supplier seeks to progress toward its quality improvement objectives, the Baldrige criteria can provide an indication of the effectiveness of suppliers' efforts to reengineer processes and ensure that initiatives are carried across functional boundaries. Such assessments are particularly important for critical high-dollar or high-volume items. Purchasing managers seeking to establish long-term partnerships and strategic alliances with key suppliers may want to integrate these measurements with their long-term contracts, as a safeguard for assurance of continuous process improvement and dedication to customer satisfaction.

### CONCLUDING OBSERVATIONS

The analysis in this article demonstrates that the Baldrige Award criteria are more comprehensive than the ISO 9000 standards in assessing quality improvement. While many multinational organizations are seeking ISO 9000 registration, or have a TQM program in place, few have developed a comprehensive comparison of the ISO 9000 and the Baldrige criteria. An attempt has been made in this study to demonstrate the benefits of merging these two complementary streams of internal quality assessments through the development and application of a unified conceptual framework. The application of each set of criteria in supplier evaluation and selection has also been discussed.

A close look at both sets of criteria reveals that satisfying the basic ISO 9000 standard typically is less difficult than scoring well on the Baldrige Award criteria. The ISO 9000 international standard is somewhat of a common denominator in the field of quality, which provides assurance that an organization's policies and procedures are being followed in practice. However, many U.S. firms are under the misconception that ISO 9000 registration is the foundation for a TQM program. This study substantiates the view that the ISO 9000 criteria are really a subset of the requirements for full implementation of a TQM program. ISO 9000 certification ensures that a quality system is in place, but *does not guarantee* the functionality of that system.

Companies in the early stages of TQM development should view the ISO 9000 initiative as a first step in the evolution of a fully developed quality system. Such an approach not only qualifies an organization to operate in the EC and other international markets, it also prepares the organization for applying the Baldrige application criteria. Following ISO 9000 certification, organizations should then pursue the implementation of a more fully integrated TQM program using the Baldrige application

as a template for business process reengineering and continuous improvement. Accordingly, purchasing managers wishing to pre-qualify suppliers may wish to apply the ISO 9000 criteria. To progress beyond this screening level, however, a comprehensive framework similar to the Baldrige Award criteria is required to identify projects for reengineering and establish benchmarks for continuous improvement.

#### REFERENCES

1. "Quality is Still Number 1," *Purchasing*, vol. 114, no. 5 (1993), p. 20; Paul D. Larson, "Buyer-Supplier Cooperation, Product Quality, and Total Costs," *International Journal of Physical Distribution and Logistics Management*, vol. 23, no. 7 (1994), pp. 39-45.
2. Elizabeth Wilson, "The Relative Importance of Supplier Selection Criteria: A Review and Update," *International Journal of Purchasing and Materials Management*, vol. 30, no. 3 (Summer 1994), pp. 35-40.
3. Ian Stuart, and P. Mueller, Jr., "Total Quality Management and Supplier Partnerships: A Case Study," *International Journal of Purchasing and Materials Management*, vol. 30, no. 1 (Winter 1994), pp. 14-20.
4. Curt W. Reimann, and Harry S. Hertz, "Understanding the Important Differences Between the Malcolm Baldrige National Quality Award and ISO 9000 Registration," *Production and Operations Management*, vol. 3, no. 3 (Summer 1994), pp. 171-185.
5. *Business Week*, "10,000 New EC Rules," September 7, 1992, pp. 48-50.
6. Richard L. Pinkerton, "The European Community-EC 92: Implications for Purchasing Managers," *International Journal of Purchasing and Materials Management*, vol. 29, no. 2 (Spring 1993), pp. 19-26.
7. R.W. Peach, "Creating a Pattern of Excellence," *Target*, vol. 6, no. 4 (1990), p. 15.
8. K. Hockman, "Does the Baldrige Award Really Work?" *Harvard Business Review*, Jan.-Feb. (1992), p. 126-148.
9. David A. Garvin, "How the Baldrige Award Really Works," *Harvard Business Review*, Nov.-Dec. (1991), pp. 80-93; Hockman, op. cit., 1992.
10. J. Bowles, and J. Hammond, *Beyond Quality* (New York: Productivity Press, 1991)
11. Hockman, op. cit., 1992.
12. G. Watson, *Assessing Quality Maturity: Applying Baldrige, Deming, and ISO 9000 for Internal Assessment* (International Benchmarking Clearinghouse: 1992), pp. 56-80.
13. *American National Standard, Quality Management and Quality System Elements-Guidelines, ANSI/ASQC Q94-1987* (Milwaukee, WI: American Society for Quality Control, 1987), pp. iii-21.
14. In addition, QS 9000 includes customer requirements that are specific to the automotive manufacturer, but are conducted by an independent third-party registrar (the same party which registers companies for ISO 9000 certification).
15. The Baldrige Award does make provisions for operational results.
16. Robert Handfield, and Soument Ghosh, "Creating a Total Quality Culture Through Organizational Change: A Case Analysis," *Journal of International Marketing*, vol. 2, no. 4 (1994), pp. 15-30.
17. *Malcolm Baldrige National Quality Award 1994 Application Guidelines* (Milwaukee, WI: The Malcolm Baldrige National Quality Award Consortium, Inc., 1994)
18. For details of the measures and survey development, see R. Handfield and S. Ghosh, "An Empirical Test of Linkages between the Baldrige Criteria and Financial Performance," *Decision Science Institute Conference Proceedings*, November 1995.
19. Ibid.
20. Stuart and Mueller, op. cit., 1994.
21. W.B. Smith, Jr., "Total Customer Satisfaction as a Business Strategy," *Quality and Reliability Engineering International*, vol. 9 (1993), pp. 49-53.
22. Garvin, op. cit., 1992.
23. G. Taguchi, and D. Clausing, "Robust Quality," *Harvard Business Review*, Jan.-Feb. (1990), pp. 65-75.
24. Handfield and Ghosh, op. cit., 1994.