

# Measuring Quality Progress

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## Executive Summary

### Study Approach

This study by the American Productivity & Quality Center (APQC) was commissioned by Loral Space Information Systems, Inc. and the National Aeronautics and Space Administration (NASA) to evaluate internal assessment systems. APQC benchmarked approaches to the internal assessment of quality management systems in three phases.

The first phase included work conducted for the International Benchmarking Clearinghouse (IBC) and consisted of an in-depth analysis of the 1991 Malcolm Baldrige National Quality Award criteria.

The second phase was also performed for the IBC and compared the 1991 award criteria among the following quality awards: Deming Prize, Malcolm Baldrige National Quality Award, The President's Award for Quality and Productivity Improvement, The NASA Excellence Award (The George M. Lowe Trophy) for Quality and Productivity Improvement and the Shingo Shingo Award for Excellence in Manufacturing.

The third phase compared the internal implementation approaches of 23 companies selected from American industry for their recognized, formal assessment systems.

### Major Study Findings

1. All of the five quality awards considered in this paper have major differences in their award criteria and scoring guidelines. While the 1991 Baldrige Award Criteria were considered the most complete of the five awards, there is still room for improvement in the areas of process control and quality results.
2. The weighting of the categories among the various awards indicates their focus for applicant recognition: The Shingo Prize recognizes companies that focus on process control at the shop floor level with half of its points awarded in this area, while the Baldrige Award, President's Award and NASA Excellence Award, recognizes a broader area of quality performance. The Deming Application Prize uses a prescriptive criteria system but applies the same criteria to all areas of the company to achieve breadth of application for its criteria.
3. The 1992 Baldrige Award Criteria have strengthened the Examination Items noted as areas for improvement in paragraph 1 above.

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4. Of the 23 companies whose internal assessment programs were evaluated, five used self-assessment surveys, one used a combination of self-assessment survey with an internal Baldrige-like assessment, nine used the Baldrige Criteria and approach without modification, and eight customized the Baldrige process or criteria for their own internal application.
5. The biggest area for improvement in internal company assessment systems is the calibration of individual examiner scoring. One company reported point spreads greater than 400 points among examiners. This is consistent with the scores of individuals who have been initially selected for the Malcolm Baldrige National Quality Award (MBNQA) Board of Examiners, but who have not yet attended training. One intent of the MBNQA examiner training is to calibrate the Board of Examiners on recognizing the 50% level of performance using the scoring guidelines.

## Study Objective

### *Background*

In 1987 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 act did not describe the scoring system, judging process or criteria for evaluation of applications. These criteria have become an operational definition of Total Quality Management (TQM) and the wide distribution of the application guidelines has exposed many senior managers to the "Baldrige" definition of TQM.

The Malcolm Baldrige National Quality Award was not the first prestigious quality award. That distinction goes to the Deming Application Prize of the Union of Japanese Scientists and Engineers. Initiated in 1951 and named after the W. Edwards Deming, the American quality guru who helped to begin the Japanese quality movement, the Deming Prize has been long recognized as an indicator of excellence in business. In a 1983 study by Dr. Noriaki Kano of Deming Prize recipients business performance compared with that of non-Deming Prize companies, it was observed that the Deming Prize winners had a 3-6% range of advantage in annual return on net assets, a measure of business profitability, over the non-winners from the same industry during the decade of the 1970's.<sup>1</sup>

While the Deming Prize is focused on statistical process control as the fundamental building block of quality (see the summary of the award criteria in Appendix A), the Baldrige Award applies customer satisfaction as the foundation of quality and applies quality methods to business management. Other quality and productivity awards have been introduced to recognize improvement in particular areas, and have slightly different intent and criteria. These other awards include:

- ◆ The President's Award for Quality and Productivity Improvement
- ◆ The National Aeronautics and Space Administration Excellence Award for Quality and Productivity (The George M. Lowe Trophy)
- ◆ The Shigeo Shingo Prize for Excellence in Manufacturing

These awards have stimulated interest in a United States business community which thrives on competitive recognition. David A. Garvin, a Professor of Business Administration at the Harvard Business School and a member of the Board of Overseers for the Malcolm Baldrige National Quality Award from 1988 to 1990, has described the Baldrige Award as "*the* most important catalyst for transforming American business."<sup>2</sup> The award provides a framework for management to assess their progress for achieving quality results that produce competitive performance. Indeed, the General Accounting Office (GAO) has published a report that

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evaluates the business competitiveness of 20 companies who were high scorers on the 1988 or 1989 Baldrige Award applications. While the results of the GAO study were limited by the sample size, the GAO did conclude that there is a cause and effect relationship between the TQM practices embodied in the Baldrige Award Criteria and business performance as measured in terms of market share, productivity, and customer satisfaction.<sup>3</sup>

### *Purpose*

This study was conducted by the APQC's International Benchmarking Clearinghouse staff in conjunction with the APQC Consulting Group. It was commissioned as a project to help the National Aeronautics and Space Administration assess their approach and criteria for their Excellence Award for Quality and Productivity (The George M. Lowe Trophy.) The study analyzes the inter-relationships among the evaluation items of the Baldrige Award Criteria; assesses the similarities and differences among the various quality award criteria; and compares the approaches of different companies for incorporating internal self-assessment methods into their quality improvement approach.

### Benchmarking Methodology

This study was conducted by evaluating open literature and presentations made by companies at quality forums where they presented the details of their quality assessment approach. This study uses information that was presented from 1989 through the present and may not reflect the most current approach of any particular company. However, the company information is considered to be representative of self-assessment methods using the Baldrige Award criteria approach. The study findings include both a matrix comparing company approaches and a summary of best practices which contains a detailed description of a model approach for integrating the Baldrige Award criteria into a company-wide assessment program.

### Organizations Evaluated

The International Benchmarking Clearinghouse is a service operated by APQC to improve business competitiveness through a network of organizations dedicated to sharing improvement opportunities through benchmarking. During the design phase of the Clearinghouse, a survey of the 87 companies involved in establishing this benchmarking network was conducted. It was found that 74% of these companies were using the Malcolm Baldrige National Quality Award criteria for self-assessment, even though only 51% planned on applying for the award within the next five years. Of these companies 88% also ranked their competitive position as leaders in most of their markets.<sup>4</sup> Companies using benchmarking and applying the Baldrige Award criteria clearly perceive themselves as leaders in their respective markets.

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### *The Baldrige Award Process*

#### The Intention of the Baldrige Award

The Malcolm Baldrige National Quality Award is an annual Award to recognize U.S. companies that excel in quality management and quality achievement. The Award promotes: awareness of quality as an increasingly important element in competitiveness; understanding of the requirements for quality excellence; and, sharing of information on successful quality strategies and the benefits derived from implementation of these strategies. Up to two Awards may be given each year in each of three eligibility categories: manufacturing companies, service companies, and small businesses. The Award examination evaluates applicants according to a set of Criteria and scoring guidelines which are included in the Application Guidelines. These Criteria are designed to be a quality excellence standard for organizations seeking the highest levels of overall quality performance and competitiveness. These Criteria are reviewed and improved on an annual basis to reflect lessons learned during the evaluation process. The award is managed by the National Institute of Standards and Technology (NIST) and administered by the American Society for Quality Control (ASQC). The evaluation of applicants is conducted by a Board of Examiners who are nominated from the quality experts of business, professional and trade organizations, accrediting bodies, universities, and government. Members of the Board of Examiners must meet the highest standards of qualification and peer recognition. The Board of Examiners evaluates each application considering the context of the applicant's business factors, according to the Award Criteria, following a prescribed evaluation process, and using an established scoring guideline. Each of these elements of the Baldrige Award process is described in the following sections.

#### The Effect of Business Factors

While the Baldrige Award Criteria have been designed for their general application for evaluation of any company's quality system, independent of size, type of business, or market environment, it is recognized that the importance of individual business factor for a given company may influence the applicability of the items and areas to address, even for businesses of the comparable size or in the same industry. To give appropriate consideration to these distinctions, the application requests a four-page Overview, which does not count toward the page limit, that addresses key business factors that must be considered during the Award evaluation process. These business factors set the context for the interpretation of the entire application and are exceptionally important. Information that is important to consider as business factors include:

- ◆ Business structure of the applicant and relationship to parent company (if a subsidiary)  
Note: Subsidiaries should also include information that shows key relationships to the parent company: (1) percent of employees; (2) percent of sales; and (3) types of products and services.
- ◆ Size and resources of the applicant
- ◆ Types of major products and services

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- ◆ Key quality requirements for products and services
- ◆ Nature of markets (local, regional, national, or international)
- ◆ Description of principal customers (consumers, other businesses, government)
- ◆ Competitive environment
- ◆ Applicant's position in the industry
- ◆ Major equipment and facilities used
- ◆ General description of the applicant's employment base, including: number, type, and education level
- ◆ Importance of and types of suppliers of goods and services
- ◆ Occupational health and safety, environmental, and other regulatory considerations
- ◆ Other factors important to the applicant

### The Evaluation Process

The Baldrige Award evaluation process contains four stages: first stage review of the written application; consensus review of the written application; site visit review; and Judges final review. Each applicant receives a feedback report which describes assessment of the Board of Examiners as to the Strengths and Areas for Improvement for each Examination Item in the application. The feedback report states observations and evaluations, not prescriptions on how to improve the applicant's quality process. The feedback report is prepared after an application has been eliminated from further consideration at one of the four stages of review.

The first-stage review of the written application is conducted as an independent review by 5 or more members of the Board of Examiners. Each Examination Item is graded in accordance with the Scoring System. The Board of Examiners take the application at face value. They accept the facts as presented and, when questions arise, they record them for verification or clarification at the site visit. The Scorebooks from each evaluation are returned to NIST/ASQC and the Judges select the top-scoring applications for the consensus review. The written comments of the Examiners from the first stage review are used as the basis of the feedback report for applicants not selected for the consensus review.

The consensus review of the higher-scoring applications from the first stage review is conducted by a team of 5 Examiners lead by a Senior Examiner. Consensus is initiated by the team leader with a goal of achieving an agreed upon scoring value for each of the Examination Items after the team has debated the relative merits of the applicant's approach, deployment, and results for that item. This is a particularly important step in the Award process because consensus numerical scores play a major role in determining which applicants will receive a site visit and in determining issues for review during the site visit. In addition, the written comments of the Examiners from the consensus review are used as the basis of the feedback report for applicants that are not selected for site visits. Using these written comments, the Senior Examiner prepares a consensus report to the Judges, and the Judges select the top-scoring applicants for site visits.

Finalists in the Award process receive a site visit from a team of six members of the Board of Examiners, lead by a Senior Examiner. The team visits one or more sites (labs, plants,

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offices) of the applicant to *clarify* uncertain points in the application and to *verify* that the information presented by the applicant is correct. There are five distinct steps in the site visit process:

1. Notification -- The Panel of Judges selects applicants for site visits and transmits the information to the Award Administrator who notifies the applicant and the appropriate members of the Board of Examiners.
2. Initial preparation -- The team leader works with the NIST observer, Award Administrator, team members, and the point of contact from the applicant to establish the agenda and logistics for the site visit. Members of the site visit team perform review evaluation materials and perform tasks as assigned by the team leader.
3. Final preparation -- The team holds a day-long preparatory meeting immediately preceding the site visit. They finalize the agenda and category assignments, review site visit issues, and prepare the site visit worksheet which addresses the issues that the team will evaluate. This meeting is not held at the applicant's site.
4. Conduct of the site visit -- The actual site visit begins with an initial meeting with the applicant. During this meeting the team leader presents the agenda and objectives. After this introductory meeting, the site visit team divides and performs the individual Category assignments. The team caucuses as often as necessary to ensure that all assignments are being implemented, all issues/questions are being adequately addressed, and that the schedule is being followed. When the team leader and members are satisfied that all issues have been clarified or verified, the team leader closes the site visit by holding a meeting with the appropriate applicant representatives.
5. Preparation of the site visit report -- The site visit team completes the site visit worksheet and a report of their findings and conclusions about each Category, including the strengths and areas for improvement. The team leader reviews these worksheets for completeness and prepares a "Recommendation to the Judges" worksheet.

Following the receipt of the site visit reports, the Judges meet for the final review to verify that the Baldrige Award process was followed, review the site visit reports, and make recommendations of the Award recipients. The Award Administrator forwards the Judges' recommendations to the Secretary of Commerce for selection.

### Interpretation of the Criteria

Some consulting companies have hinted that there is a hidden agenda in terms of what the Judges and Examiners are seeking in a "Baldrige-winning" company. But, there are no secrets. One member of the Board of Examiners has even published a book which presents his version of the interpretation of the Examination Items and what the Examiners evaluate.<sup>12</sup> The Board of Examiners is seeking a company which represents a national role model for quality based on that company's approach and deployment of their quality program as well as the results that are attributable to that program. The essential elements of the Award Criteria are described in the Application Guidelines. Together, the following key concepts and core concepts define the infrastructure for the requirements of the Examination Items:

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- ◆ Customer Driven Quality -- Quality is defined by the customer. Business fundamentals, such as design quality and defect or error prevention, which affect the customer should be part of the quality system.
- ◆ Leadership -- The senior leadership of businesses must create clear quality values and build these values into the way the company operates.
- ◆ Continuous Improvement -- Quality excellence derives from well-designed and well-executed systems and processes. Continuous improvement must be part of the management of all systems and processes. Companies need to communicate quality requirements to suppliers and distributors and work as a team to improve the performance of the entire business.
- ◆ Fast Response -- Shortening the response time of all operations and processes of the company needs to be part of the quality improvement effort.
- ◆ Actions Based on Facts, Data, and Analysis -- Companies need to develop goals, as well as strategic and operational plans to achieve quality leadership. Operations and decisions of the company need to be based upon facts and data.
- ◆ Participation by All Employees -- All employees must be suitably trained, developed, and involved in quality activities.

The 1991 Baldrige Award Criteria are summarized in Appendix B. It is important to understand the context in which these criteria are used. The Baldrige Examination is a two-part diagnostic system. The first part is the Criteria which includes the seven Categories which are divided into Areas to Address as well as the detailed description of these areas which are called the Examination Items. Taken together, the Criteria represent the "what" is to be evaluated. The second part of the diagnostic system, the Scoring System, represents the "how" evaluations are made.

The Examination is non-prescriptive. While it is based on the values and key concepts described above, the Examination does not prescribe the specific means (specific techniques, methodologies, or organizational structure) to demonstrate excellence. The Examination also emphasizes the integration of the entire quality system. The Examination Items represent a system of requirements. Thus, quality system integration is the result of a company establishing the linkages among the direct and indirect relationships between the Examination Items. A coherent quality system demonstrates how these linkages are put into practice. In the Findings of this benchmarking study, the relationships among the Examination Items are demonstrated using an Affinity Diagram.<sup>13</sup>

### Scoring Guidelines

The Scoring System is based on three evaluation dimensions: approach, deployment, and results. All Examination Items require applicants to provide information or data relating to one or more of these dimensions. Each of the Examination Items is graded according to a scheme which considers the applicant's approach, deployment of that approach, and results demonstrated from that deployment. The specific interpretation of these dimensions is found in the following operational definitions.

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"Approach" refers to the methods an organization uses to achieve the purpose described in the Examination Item. The Examiners consider such aspects of the approach as:

- ◆ The degree to which the approach is prevention-based
- ◆ The appropriateness of the tools, techniques, and methods chosen to meet the requirements
- ◆ The effectiveness of the use of the tools, techniques, and methods
- ◆ The degree to which the approach is systematic, integrated, and consistently applied
- ◆ The degree to which the approach embodies effective evaluation or improvement cycles
- ◆ The degree to which the approach is based upon quantitative information that is objective, timely and reliable
- ◆ The utilization of unique and innovative approaches, including significant and effective new adaptations of tools and techniques used in other applications or types of business

"Deployment" refers to the extent to which the approaches are applied to all relevant areas and activities which are either addressed or implied in the Examination Items. The Examiners consider such aspects of the deployment as:

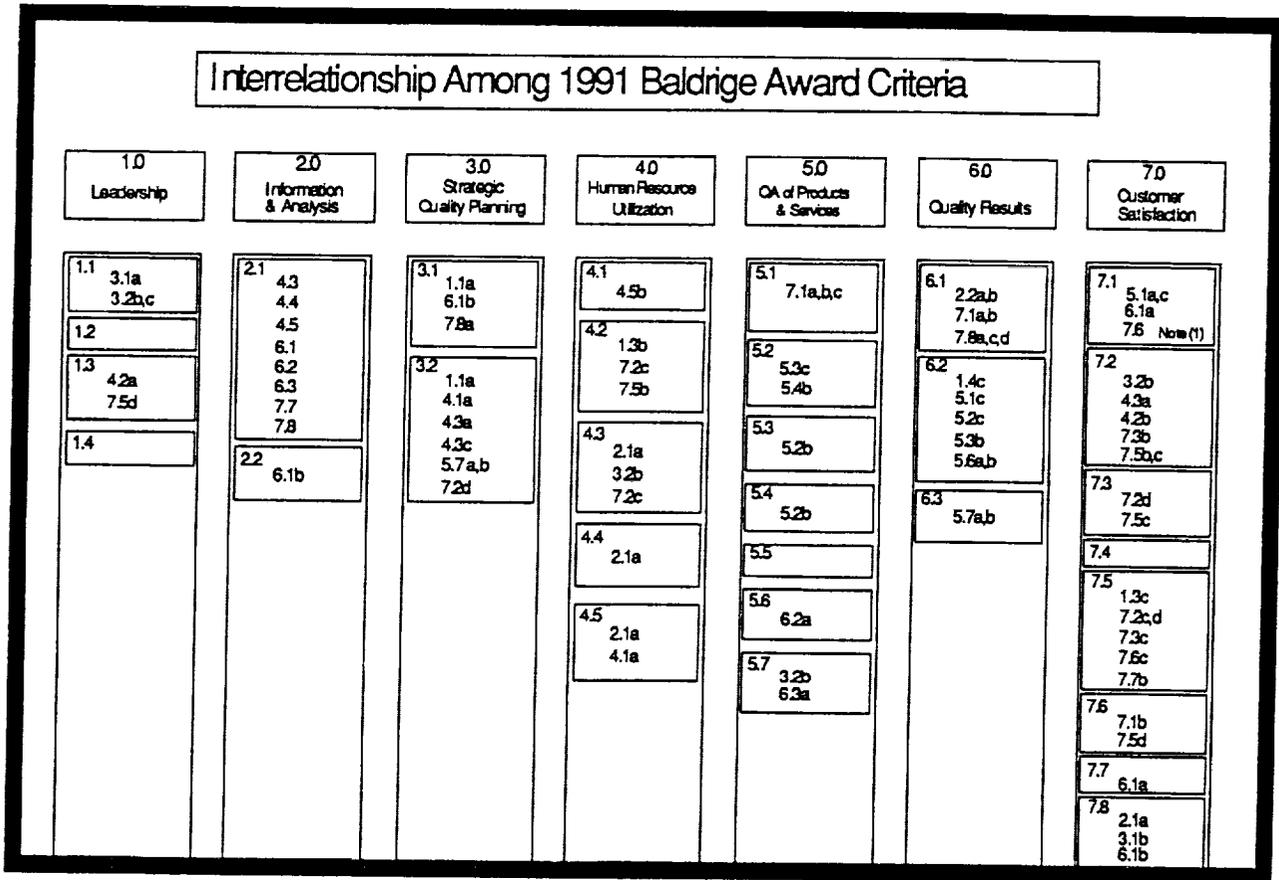
- ◆ The appropriate and effective application to all product and service characteristics
- ◆ The appropriate and effective application to all transactions and relationships with customers, suppliers of goods and services and the public
- ◆ The appropriate and effective application to all internal processes, activities, facilities, and employees

"Results" refers to the outcomes, effects, and achievements that are attributable to the approach and deployment based upon the purposes addressed and implied in the Examination Items. The Examiners consider such aspects of the deployment as:

- ◆ The quality levels are demonstrated and supported by evidence
- ◆ The contributions of the outcomes and effects to quality improvement
- ◆ The rate of quality improvement
- ◆ The breadth of quality improvement
- ◆ The demonstration of sustained improvement
- ◆ The significance of improvements to the company's business
- ◆ The comparison with industry and world leaders
- ◆ The company's ability to show that improvements derive from their quality practices and actions

Examiners are trained to recognize companies that score at the 50% level of performance using these scoring guidelines. Their training calibrates this level and, through the consensus grading process, reinforces the appreciation for excellence which is demonstrated by performance beyond this level. A 50% performance means that a company has a sound, systematic, prevention based approach which includes on-going improvement with evidence of integration; the approach has been deployed to most major areas of the company; and positive result trends that are caused by the approach are demonstrated in major areas.

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### Lessons Learned from the Baldrige Award

Some of the lessons learned observed from the Baldrige Award are listed below using the Baldrige Categories to present them as a state of quality overview:

#### 1.0 Leadership

- ◆ Senior management recognizes that quality is a strategic business issue.
- ◆ Executives are communicating a quality vision and an accompanying value system to their employees and building them into their company culture.
- ◆ The employment market for senior quality management positions indicates that the management structure of organizations are building an infrastructure to strategically deploy quality efforts.
- ◆ Senior executives are speaking out for quality in public forums throughout America.
- ◆ Senior management is not convinced of the relationship of quality performance driving financial performance -- financial measures, rather than quality measures and the need for long-term management, still drive their perception of company performance.
- ◆ Few senior managers use "management by fact" and apply the concept of process thinking to their own activities.
- ◆ Cross-functional involvement in quality planning is beginning to be seen as a necessary activity.

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- ♦ Planning for quality improvement is delegated to lower levels of the organization than the top management team.

### 2.0 Information and Analysis

- ♦ Information technology and data bases exist in most companies.
- ♦ Benchmarking and sharing of information have increased greatly as a result of their emphasis in the Baldrige Criteria, however benchmarking is often confused with industrial tourism and few companies obtain the full value of this tool.
- ♦ Resources are required to implement long-term measurement systems for product quality monitoring and customer and employee satisfaction surveys. The economic environment has precluded some of these investments.
- ♦ Data collected are not distributed and communicated to all parties who require the processed information.

### 3.0 Strategic Quality Planning

- ♦ While benchmarking is becoming a more visible tool, few companies are integrating it with their strategic planning process.
- ♦ The "Six Sigma" stretch goal of Motorola has received great publicity and many companies are considering how to improve their goal-setting capabilities.
- ♦ Companies have poor communication methods to share their strategic goals and plans and, therefore, the organization is not in alignment with these goals.
- ♦ Measurement of the effectiveness of the company planning system is not a common quality management practice.

### 4.0 Human Resource Utilization

- ♦ Team activity has greatly increased and suggestion systems have been implemented to gain more input from employees, although participation tends to be low.
- ♦ While training budgets have increased substantially, the training tends to be basic and the effectiveness of training is not directly measured.
- ♦ Employee surveys are used to assess employee morale, however, first level management resists the empowerment of their employees, perceiving it as a risk to job security.
- ♦ While recognition has increased, recognition by presenting team quality improvement results to senior management is not greatly exercised.
- ♦ Quality of work life and the ergonomic design of working conditions are not integrated into quality programs.

### 5.0 Quality Assurance of Products and Services

- ♦ Manufacturing is a strong area for quality -- particularly for quality teams, statistical process control, just-in-time manufacturing, and supplier quality management.
- ♦ Companies are beginning to seriously use design of experiments, Taguchi methods, and quality function deployment to enhance their product design and development processes.

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- ◆ The spectre of the ISO 9000 registration requirements of the European Economic Community has increased management's interest in basic quality assurance.
- ◆ While quality improvement is strong in manufacturing, corrective action tends to be symptomatic rather than focused on the root cause.
- ◆ New product development is an area for improvement for most companies -- especially the customer listening systems needed to align the product design and delivery system with the voice of the customer.
- ◆ Quality audits are not rigorously conducted in many manufacturing companies and are not conducted in service companies.
- ◆ Quality efforts tend to focus on manufacturing and fail to involve service, support, and business process areas.

### 6.0 Quality Results

- ◆ Quality levels are improving in many industries.
- ◆ Supplier quality programs, ISO 9000 and the Baldrige Award are all tending to improve the quality of the manufacturing supplier base.
- ◆ Many companies do not know which processes are their key business processes and therefore do not focus on their improvement.
- ◆ Product quality measurement is favored greatly over service quality measurement or customer-perceived quality performance.

### 7.0 Customer Satisfaction

- ◆ There is an increased focus on quick response to customers and formal complaint resolution, however management tends to be overdependent upon complaints as a source of customer feedback.
- ◆ People in support functions are just beginning to understand the concept of the "internal" customer.
- ◆ While customer contact people receive motivational training, they are not fully empowered to resolve issues and are reluctant to escalate the issue to the level of the individual with the authority to make the resolution.
- ◆ The process for integrating customer data with new product design and development is informal in most companies.
- ◆ Customer segmentation tends to be incomplete, not addressing all layers of customers (such as distribution channel or final consumer).
- ◆ While the use of customer surveys is increasing, there is little technical understanding of the appropriate application of survey results.
- ◆ Companies change their performance measurements frequently, producing a fragmented historical data base which is not able to make a comparison of trends over time.
- ◆ Companies tend to believe that replacement guarantees should satisfy the customer, rather than providing preventive action.
- ◆ Complaint systems are reactive and responding to formal complaints, rather than aggregating complaints from all sources and dealing with them as an integrated complaint management system.

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### *Comparison of 1991 Quality and Productivity Award Criteria*

There are five major quality awards that have been presented to American companies: the Deming Application Prize, the Malcolm Baldrige National Quality Award, the President's Award for Quality and Productivity Improvement, the NASA Excellence Award (George M. Lowe Trophy), and the Shingo Prize for Excellence in Manufacturing. This section of the study describes the particulars of each award and compares the various award criteria and scoring systems.

#### The Deming Application Prize

The Deming Prize was established in 1951 to honor the contributions of Dr. W. Edwards Deming to the quality control movement within Japan. The Deming Application Prize is awarded in three categories: Deming Application Prize for Division, Deming Application Prize for Small Business, and Quality Control Award for Factory. In addition, individuals who have uniquely contributed to Japan's body of knowledge about quality control and statistical methods may be awarded a Deming Prize. Any company that qualifies for the Deming Application Prize will receive it -- the prize is awarded without external competition and there is no maximum number of companies who may receive the award in a given year.

To qualify for the Deming Application Prize, top management must apply. This is called challenging the Deming Prize. The process to receive the award lasts three to five years and the company's management must convince the Deming Prize Committee that they are prepared for an on-site examination. These experts serve as examiners and audit the state of the quality system, paying particular attention to the use of statistical methods and using a brief set of "particulars" called the Deming Prize Application Checklist (Appendix A). To qualify for the award, a company must score 70 points or more, top management must score at least 70 points, and no unit of the company may score less than 50 points. Companies that have applied for the prize receive a report of the comments and recommendations of the Deming Prize Committee which contain the findings about the desirable and undesirable aspects of their quality operations and constructive suggestions for change.

#### The Malcolm Baldrige National Quality Award

The Malcolm Baldrige National Quality Award was established by President Ronald Reagan in 1987 to honor Malcolm Baldrige, the former Secretary of the Department of Commerce. The Baldrige Award has three categories for application: manufacturing, service, and small business. The Baldrige Award is competitive among the annual applicants and only two awards may be given in each category annually, however, the Board of Examiners may elect not to present an award in a particular category during a given year.

To qualify for the Baldrige Award, top management must apply. While the process to receive the award lasts one year from the time of application to the time of award announcement, it may take a company three to five years, or more, to develop a quality system that is competitive for the award. The application for the Award is limited to 75 single-sided pages for

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the two large business categories and 50 pages for small businesses. To qualify for the Award, the applicant goes through an extensive process (see the above section on the Baldrige process). To be a contender for the award a company should be capable of scoring well above 700 points on the application. The highest score to date on the application has been in the mid-800 point range. However, the Baldrige Award is not granted solely on the competitive score. A more subjective assessment by the Judges is also made to evaluate the potential for the applicant to serve as a national role model for quality improvement. Each company that applies for the Baldrige Award will receive a feedback report that describes the findings of the Board of Examiners relative to the company's strengths and areas for improvement.

### The President's Award for Quality and Productivity Improvement

The President's Award for Quality and Productivity Improvement was established by President George Bush in 1988 to recognize quality and productivity improvements among agencies of the Federal Government. An agency becomes eligible to apply for the President's Award if one or more Quality Improvement Prototypes (QIPs) have been selected from that agency. The Quality Improvement Prototype Award is given to smaller units within an agency that have made significant improvements in quality and productivity. The criteria for these Awards are contained in the Federal TOM Handbook (The President's Award is summarized in Appendix C). The criteria for the QIP Award are a sub-set of the President's Award Criteria. While the President's Award may be given to two agencies annually, QIP Awards may be given up to six governmental units.

To qualify for the Award top management must apply; however, unlike the Baldrige Award, applications are mailed to eligible agencies by the Federal Quality Institute. Like the Baldrige Award, the President's Award cycle is one year, however, this does not indicate the amount of time that it will take a government agency to become competitive for receiving the Award. The application for the Award is limited to 35 single-sided pages for agencies under 20,000 employees and 60 pages for larger agencies. To qualify for the Award, the applicant is evaluated by a Panel of Judges using the scoring guidelines for the Award. Only two President's Awards have been presented to date, so information about the competitive range is not available. The guidelines for the award indicate that scores in the range of 80 - 100% are considered to be World Class. As a measure of comparison 40-60% scores in the Award Criteria Categories indicate an organization with a sound, well-implemented program. Like the Baldrige Award, the score is not the sole determinant of the consideration for the President's Award. A more subjective assessment by the Judges is also made to evaluate the potential for the applicant to serve as a role model to government agencies for TQM implementation and quality improvement.

### The NASA Excellence Award (George M. Lowe Trophy)

The NASA Excellence Award precedes the Baldrige Award by 3 years. It was initially established in 1984 by James Beggs, the Administrator of NASA, to honor those companies who have contributed to the success of the nation's aerospace efforts and to encourage superior quality and productivity in the aerospace industry. The NASA Excellence Award was renamed

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the George M. Lowe Trophy in 1991 in memory of a 27-year NASA veteran and an early pioneer in the development of the NASA Space Programs. The Award is presented in two categories: large and small business. The Award is not competitive and may be given to as many applicants as demonstrate the level of excellence required over the period of time specified.

Top management must decide to apply for the Award and submits a letter of nomination with a brief statement of eligibility compliance. If selected by the Evaluation Committee to compete, the applicant then completes a 35 page application in response to the Award Criteria (summarized in Appendix D). The report guidelines requires that data covering a three year performance window be provided in the report. The Evaluation Committee reviews the applications and selects finalists to receive site visits. The Scoring Guidelines for the NASA Award are considerably different from the Baldrige and President's Awards. While the NASA Scoring Guidelines describe excellence as scores in the 91 - 100% range, the scores of Award recipients range between 800 and 900 points. All award applicants may request a debriefing to identify strengths and areas of improvement. Debriefings are conducted either face-to-face or by teleconference.

### The Shingo Prize for Excellence in Manufacturing

The Shingo Prize for Excellence in Manufacturing was established in 1988 to honor Shigeo Shingo who, with Taiichi Ohno, was the co-creator of the revolutionary manufacturing techniques, methods, and processes which make up the Toyota Production System. This Prize recognizes companies and plants in the United States that have demonstrated outstanding achievements in manufacturing processes, quality, productivity enhancement, and customer satisfaction. The Shingo Prize is awarded in two categories for large and small businesses and only two awards may be given in each category. In addition, individuals who conduct professional research (whether in industry, academia or consulting) in the field of manufacturing excellence may submit a paper for consideration in a competition for a Shingo Research Prize. The Research Prize has three categories: professional, graduate students, and undergraduate students. Up to three awards may be given annually in each category.

To qualify for the Shingo Prize, top management must apply. The Shingo Prize follows the same examination process as the Baldrige Award. The first stage of the award is the evaluation of the written application to the Prize Achievement Criteria (Appendix E). The Board of Examiners makes their award recommendations following their site visits to the finalists to the Shingo Prize Council. The decisions of the Prize Council are final. Companies that have applied for the Prize receive a report citing notable accomplishments and opportunities for possible improvement within their manufacturing systems.

### Comparison of Award Criteria

These five awards have similarities in the way that they recognize improvement in company performance in the areas of quality and productivity. All of these awards recognize

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the need for management attention (Baldrige Criteria 1,0), teamwork and empowerment (Baldrige Criteria 4.0), and quality assurance (Baldrige Criteria 5.0), which produce results. The

NASA Award and the Shingo Prize do not specifically address information and analysis (Baldrige Category 2.0) or strategic quality planning (Baldrige Category 3.0). The Deming Prize Application Checklist does not specifically address customer satisfaction (Baldrige

Comparison of Quality Award Evaluation Criteria					
Categories	Deming Prize	MBNQA	President's Award	NASA Award	Shingo Prize
Leadership	1, 2 ○	1 +	1 +	2.1 ○	IA +
Information & Analysis	4 ○	2 +	6 ○		
Strategic Quality Planning	10 ○	3 +	2 +		
Human Resource Utilization	3 ○	4 +	4,5 +	2.2 +	IB +
Quality Assurance of Products and Services	5,6,7,8 +	5 ○	7 ○	1.2 ○	IC, II +
Quality Results	9 +	6 ○	8 ○	1.3 ○	IIIA,B +
Customer Satisfaction		7 +	3 +	1.1 ○	IIIC +
Numbers identify categories in respective awards. ○ = Area for Improvement. + = Adequately Covered.					

Category 7.0). One interesting observation from this study is that the Shingo Prize, with only slight changes could apply equally well to a service company.<sup>15</sup>

The above table references each of the various award criteria to the seven Baldrige Award Criteria and provides an assessment of the strength of the criteria for that category. Note that the most complete award, relative to the Baldrige, is the President's Award. This is not surprising since the President's Award was developed following the Baldrige Award. The Shingo Prize achievement criteria are strong relative to the Baldrige Award, but they are not as complete. The NASA Excellence Award Criteria are not as complete nor as robust as the Baldrige Criteria, with the exception of the human resources area (section 2.2 in the NASA Criteria). The Deming Prize particulars are stronger than the Baldrige in Categories 5.0 and 6.0, but not as complete in all of the other areas. All of the Baldrige Categories are addressed by the Deming Prize particulars except for Category 7.0 (Customer Satisfaction). Section 5.0 was judged as weak in the Baldrige since it does not have a strong focus on cycle time and waste reduction. (Companies that pursue ISO 9000 certification or integrate ISO 9000 with the Baldrige Criteria will eliminate this perceived area for improvement.) Section six was judged as

## Comparison of Category Weighting

	Deming Prize	MBNQA	President's Award	NASA Award	Shingo Prize	
Scoring Basis	Prescriptive	Non-Prescriptive	Non-Prescriptive	Non-Prescriptive	Non-Prescriptive	
Criteria Definition Stability	Fixed	Continuously Improving	Continuously Improving	Continuously Improving	Continuously Improving	
Point Maximum	100	1000	200	1000	100%	
Categories Weighted	NO	YES	YES	YES	YES	
Weighting Relative Category	1	200	100	100	220	100
	2	100	70	75	0	0
	3	100	60	75	0	0
	4	100	150	150	180	100
	5	400	140	150	250	500
	6	100	180	250	120	200
	7	0	300	250	230	100

weak in the Baldrige since it does not provide a strong assessment of business results. (Note that this area was changed significantly in the 1992 Baldrige Award Criteria.)

### Comparison of Category Weighting

The quality system of a quality award should exhibit the characteristics of both customer satisfaction and continuous improvement. Customer satisfaction means that the applicants for the Award feel that they have been accurately and fairly judged and that the assessment provides them with value in terms of increased self-knowledge of their quality system's strengths and areas for improvement. Continuous improvement means that interpretation of the criteria changes and scores achieved from year to year are difficult to compare. Scoring an application is probably the most emotional aspect of the assessment process. The first aspect of scoring is the weighting of the categories. The Table above shows an assessment of the various Award systems and their approach to weighting their categories after using the categories normalized to the Baldrige Criteria from the previous section.

Note that the Deming Prize is the only award that is prescriptive and has a fixed criteria definition. The Deming categories are not formally weighted, however, many areas of the company are graded and the entire grade sheet is used in each area. The purpose of each award is reflected in the way that the categories are weighted. Most notably, see the Shingo Prize where applicants can score a maximum of 500 points in a single category -- manufacturing improvement, likewise the Deming Prize gives 400 points in process control while the Baldrige

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gives 300 in customer satisfaction. The weighting of the categories is used to reflect the behavior desired in the successful applicants.

### Comparison of Award Scoring Systems

Interestingly, neither the Deming Application Prize nor the Shingo Prize have a formal scoring system. The Baldrige Scoring system was described earlier. A matrix is included in the Application Guidelines to show how the Examiners are to assign scores to particular items depending on the approach/deployment/results for that particular Examination Item. The scoring systems for the President's Award is so specific in its definitions of behaviors, that it borders on a prescriptive approach. The NASA scoring guidelines are skewed to the high side since 71-80% of the points in a category can be obtained by "gradual continual improvement." The NASA Award is unique in that it uses a specified duration for the system being in place, percent of deployment, resource allocation levels for quality program, and the degree of planning integration as indicators of the scoring. The NASA Award is the most complicated of the scoring systems and appears to be an area for improvement.

### *Analysis of Alternative Approaches to Internal Assessment*

The 23 companies studied in this analysis could be grouped into four categories based on their approach to the administration of the assessment criteria. These categories include: self-assessment only, self-assessment plus MBNQA assessment, MBNQA assessment, and custom internal assessment program. These categories and their ratings are shown below:

1. Self - Assessment: 5  
This class of company used a survey or set of forms to conduct their internal Baldrige assessment.
2. Self - Assessment plus MBNQA Assessment: 1  
This company uses the self assessment to screen divisions before they apply for an internal award.
3. MBNQA Criteria Used for Internal Assessment: 9  
These companies followed the Baldrige Examination Process and used the Baldrige Criteria.
4. Companies developed customized approach: 8  
These companies adapted the MBNQA Criteria to their company's culture. These companies included: Control Data Corporation, Hewlett Packard, IBM Europe, Intel, Proctor & Gamble, Westinghouse, Whirlpool, and Xerox.

Although two of the standard MBNQA-clone company awards offered multiple award levels (e.g., bronze, silver, and gold), there was not much originality in the MBNQA look-alike awards. The unique applications for internal assessment are found in the custom category. Each of the unique items in these assessment programs will be described under the "best practice"

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area. First, a brief note on "best practice." In the case of internal assessment, it only goes back about 8 years, Westinghouse having the earliest internal assessment program. Other than a few of the "quality regulars" there has been little in-depth revision of the Baldrige Criteria. Since this is the case, there is too little data to call a practice best. So, they will be considered as interesting processes or, at least different approaches. In addition, the single company that combined self-assessment with MBNQA evaluation approach will be discussed.

### Best Practices and Unusual Observations

- ◆ Company A: This company used a self-assessment survey by all of the divisions as a screening mechanism to determine finalists for their internal award program. Then they asked these finalists to prepare an application and go through an MBNQA process to compete for the company-wide award.
- ◆ Company B: This company does not use the Baldrige Criteria at all, but uses two radar diagrams to display their management and product quality profiles. On the management profile they have eight dimensions: Planning, recognition, participation, trust, cooperation, environmental, people management, and acceptance of new ideas. On the product profile they have six dimensions: price, service, reliability, functionality, user friendliness, and documentation. These reviews are conducted by a cross-functional management team.
- ◆ Company C: This company customized the Baldrige Categories to their own cultural norms to define world-wide excellence: substituting fact-based management for information and analysis; strategic planning for strategic quality planning; COMPANYNAME people for human resource utilization; quality of processes and products for quality assurance of products and services; and measurement & results for quality results. Both leadership and customer satisfaction labels stayed the same. The areas to address under each of these seven areas was then defined in terms of the company's programs and culture. Otherwise, this company followed the MBNQA process.
- ◆ Company D: This company translated the seven Baldrige Categories into five categories which they call the five areas of quality management: planning process, customer focus, improvement cycle, process management, and total participation. Each of these different categories was uniquely defined for the company's quality program and culture. The MBNQA scoring system was used for the evaluation; and results were displayed using a radar diagram with these five categories comprising an operating unit's quality profile.
- ◆ Company E: This company merged the MBNQA Criteria with ISO 9000 and their own long-standing "reliability essentials" program to create a composite set of evaluation criteria.
- ◆ Company F: This company uses a twelve category evaluation criteria, called the conditions for excellence, for their internal assessment process: customer orientation, participation, development, motivation, products and services, processes and procedures, information, suppliers, culture, planning, communications, and accountability. The company has also changed the weighting system for the categories and uses a unique scoring system. Another twist this company puts on the Baldrige process is the use of

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- ◆ external examiners and judges for their assessors. Otherwise, their method follows the Baldrige process.
- ◆ Company G: This company uses the Baldrige process to determine eligibility for their internal company award. After a division has scored 500 points on the written first stage application, then they are eligible for a site visit where they are evaluated on the six dimensions of the company's values: results orientation, risk taking, discipline, customer satisfaction, quality, and a great place to work. The administrative processes follow the Baldrige Award.
- ◆ Company H: This company has not decided to start an award process, but has challenged each operating unit to use the Baldrige Criteria to achieve a "Baldrige certification" which occurs when they score over 750 points as verified by a one day site visit from a team of examiners. This challenge is not too burdensome from the paperwork viewpoint since the site visit is principally oral. This company has basically used a Deming scoring system with the Baldrige Criteria.
- ◆ Company I: This company imposed a twenty page limit on applicants and applies a unique award criteria that is tied to their operational definition of TQM. Eligibility for the award includes business units, divisions, teams, and individuals. Three questions are evaluated in the application: why was the problem chosen; how was the problem approached; and what results were obtained and how significant were there. Each of these three questions is scored according to the contribution of: innovation, leadership; product, and service.

### Biggest Area for Improvement

The biggest problem area outstanding is the scoring habits of the examiners. In one company's training of internal examiners they found point spreads in scoring to be greater than four hundred points, which implies that the examiners needed more training to calibrate their observation skills.

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"I would lay it down as a basic principle of human organization that the individuals who hold the reins of power in any enterprise cannot trust themselves to be adequately self-critical. For those in power the danger of self-deception is very great, the danger of failing to see the problems or refusing to see them is ever-present. And the only protection is to create an atmosphere in which anyone can speak up."

John W. Gardner  
*How to Prevent Organizational Dry Rot*  
Harper's Magazine  
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