

A Review on the two Quality Prizes: Deming Prize and Malcolm Baldrige National Quality Award

Seewon Ryu, Hongkyu Jo, and Jaeho Heo

Department of Management Information Systems, KAIST
207-43, Cheongrayngri-Dong, Dongdaemoon-Gu, Seoul 130-012
Tel. 02-958-3663, Fax. 02-958-3604, e-mail: ais@msd.kaist.ac.kr

Abstract

Total Quality Management (TQM) is the aggregated management philosophy for quality including production, operation, human resource, leadership, marketing, and etc. TQM is the advanced concept and philosophy rather than traditional "Quality Control" or "Quality Assurance". Nowadays, downstream costs has been increased, that made cost accountants' attention to costs of quality.

Many countries have developed their own quality awards system in order to improve overall national quality level. The Deming Prize of Japan and Malcolm Baldrige National Quality Award (MBNQA) of United States are two representatives of quality prizes. We compared the two awards by means of their history, objective, coverage, and judging criteria.

Deming Prize has a longer history than MBNQA. Deming Prize selects five winners a year, while MBNQA has two or three areas. The biggest difference is judgement criteria. The Deming Prizes focuses on statistical control which is a traditional quality control method, while MBNQA concentrates on modern business concept such as customer satisfaction.

The suggestions to these awards are: evaluate more on information of quality; evaluate more on inter-functional relationship between quality control function and other link more financial success.

1. Introduction

The study on quality has been a major area of production management for a long time. Nowadays, quality is recognized as a weapon to have competitiveness in the customization environment. Many researchers have concentrated on the maintenance function and statistical method to find the optimal level of quality control. A lot of concepts and techniques related to the quality control such as repair policy, preventive maintenance policy, operating characteristic curve, and average outgoing quality curve have been developed. From the 1980s, Japanese manufacturing system including Just-in-Time (JIT) and Kanban has been watched. The competitiveness of Japanese manufactured products has focused attention on their manufacturing systems since the basis of their success has been high-quality, competitively priced product [Buffa and Sarin, 1987]. American and European researchers have tried to learn the Japanese systems and implement them to their traditional manufacturing and quality control system.

By the way, quality has been regarded as an important area of cost accounting. The reasons why the quality has been paid attention to the cost accountants are an increase of quality cost and need to allocate quality cost properly. Cost of a product consists of three parts including upstream, manufacturing, and downstream costs. Traditional cost accounting system concentrated on calculating and allocating the manufacturing costs, but the ratio of cost is changed from manufacturing oriented to upstream/downstream oriented. Quality costs range from 15% to 20% of sales revenue for many organizations. Quality improvement programs can result in substantial saving and higher revenues. Motorola estimates that it saves \$2.2 billion annually from the quality programs. This amounts to saving of 16.5% on annual revenues of \$13.3 billion in 1992. Motorola's 1992 operating income was \$576 million. Without the savings from its quality programs, Motorola claims its losses would be over \$1.5 billion [Horngren et. al, 1994].

Quality control concepts have been developed since 1970s. The early stage of quality control was the manufacturing and operation level, the department of quality control used the statistical methods and focused on the control within the factory. The modern concept of quality costs includes prevention, appraisal, internal failure and external failure costs. In addition, it emphasizes nonfinancial costs like customer satisfaction. The new concept involving these characteristics is TQM (Total Quality Management). There are lots of guidelines and principles which could achieve the successful TQM, and award systems in various countries and regions. It may be evaluated at various types for the TQM performance. Internal evaluation can be implemented by the manager's diagnosis and auditing for quality. External evaluation can be made by prize system such as Deming Prize, Malcolm Baldrige National Quality Award(MBNQA), NASA award, Shingo Prize, The

European Quality Awards (TEQA), and by authentication like ISO 9000 Series.

The word "TQM" represents total quality management generally, but we can divide TQM into three basic materials - TQM Management, TQM Metrics, and TQM Meetings -. TQM Management is the "book" - philosophy, goals, concepts, and organization - generated by the company on local approaches to comprehensive quality management. TQM Metrics are individual log, pocket notebook used to record both measurement and ideas. TQM Meetings are company-generated set of materials [Mahoney et. al 1994].

There are lots of definitions and names related to TQM. Oakland (1989) said that TQM is an approach to improve the managerial efficiency and flexibility, and to organize and participate the elements of all departments, activities, and levels. Draft International Standards (DIS) uses "Quality Management" which includes quality control, quality assurance, and quality innovation. In Japan, the word of Company-Wide Quality Control (CWQC) is used in order to focus on satisfying the customer's need. Table 1 shows the basic components, steps and tools of TQM.

Basic Components	TQM Steps	TQM tools
Developed and skilled employees Rational management Scientific quality management	Select a theme	Check sheet
	Correct and analyze a data	Graphs
	Analyze the cause	Pareto diagram
	Plan and Implement a solution	Histogram
	Evaluate the effects	Scatter diagram
	Standardize the solution	Cause-and-effect diagram
	Reflect on the process	Control chart

[Table 1] Basic components and steps of TQM [Mahoney et. al, 1994; Shiba et. al, 1993]

Flood (1993) contended that there was a lack of rigor in current TQM thought because it has not been related to the various management and organizational theories that existed. There are two representatives of quality prizes, Deming Prize and Malcolm Baldrige National Quality Award (MBNQA). The quality awards show how they think as the TQM and what they emphasize in the TQM. To understand current TQM thought, we analyzed these two awards; Deming and MBNQA.

In next section, we reviewed the general perspectives of two awards. Then, we compared two awards using their history, overall characteristics, and judging criteria. Next, we analyzed them in the viewpoint of cost management. Finally, we summarized the pros and cons of two awards, and we suggested the solutions to recover their weakness.

2. Comparison between Deming and MBNQA

Deming Prize and MBNQA contributed to spread out and enforce the TQM, and proved the importance of quality through the managerial success of prize winners, but both have the weakness.

The Wallace, which was a distributor of pipe, valves, and fittings for the oil, chemical, and petrochemical industries, received the MBNQA in 1990. It received a considerable amount of press for its quality programs. However, in January 1992, the company filed for protection under Chapter 11. John Wallace, CEO of former Wallace Company, said "In trying to quality for MBNQA, it may have been overkill, ... , MBNQA is good, but if you are in the business of trying to survive, it can become a financial problem and defeat your original purpose of being in business." [Hill et. al, 1992; Hill, 1993].

For MBNQA, there are three criticisms(or Myths) [Garvin, 1991]. First, MBNQA requires large expenditures on the application and preparation for site visits. for example, Xerox and Corning spent large expenditure on the application and preparation for site visits. Secondly, MBNQA is flawed because it fails to predict a company's financial success. Several winners have stumbled after winning the award, for example Motorola, Federal Express, and Cadillac. The Critical evidence is that the award is doing little to enhance American competitiveness or improve corporate performance. Thirdly, MBNQA does not honor superior product or service quality. This also known as the "Cadillac criticism" because of the hue and cry over Cadillac's 1990 Baldrige Award.

For Deming Prize, there are also several critics. Deming Prize would accelerate the conventional TQM. But there are also several criticisms. First, the companies are following the requirements of the prize to be a winner without considering their own contingencies exactly. Secondly, the companies are pouring out large investments and efforts, because Deming Prize is strict and requires many documentations and materials. Thirdly, Deming Prize doesn't regard "customer satisfaction" and "leadership" as the important areas. Recently, Japanese Social Economic Productivity Center (JSEPC) applied the MBNQA criteria to Japanese companies, all of the companies received much lower score than expected (Recite from, Korean Economic Daily, Dec. 10, 1994). The average score of survey companies was 473 (out of a possible 1,000), it was lower than the score 500 which was the average of superior firms. Only 16 percent of companies scored over 600 which is the minimum score to award MBNQA. We can guess the reason that Japanese companies received lower score has been concentrated on their fitting to the criteria of Deming Prize, while Deming Prize doesn't regard "customer satisfaction" and "leadership" as the important areas.

How are these problems and critics on MBNQA and Deming Prize? We interested to find out the basic cause on the problems and to suggest the alternatives to solve the problems.

We compared and analyzed the two awards not by simple perspective, but by critical. In the first phase, we analyzed the overall standpoint, such as historical background, purpose, main emphasis, award recipients, time frame and evaluation period, evaluation process, and award improvement process. Second phase, we analyzed and compared the level and existence of evaluation category on some major issues, such as judging criteria, leadership, customer perception, scores for each category, management of information on quality, change management on quality management, inter-functional communication, and cost quality.

2.1 Overall comparison

Historical Background

Deming Prizes has longer history than MBNQA, and the other difference between two is the establisher of prize. Deming Prize is established by the nongovernmental organization, but MBNQA is established by U.S. government.

Especially MBNQA has been the output of effort to increase productivity and compete for the world markets since early 1980s. At that time, American goods were becoming more costly--and less competitive--in the international market and jobs were being lost. The Malcolm Baldrige National Quality Improvement Act was signed by the President Ronald Regan on August 20, 1987.

These different historical backgrounds have been influenced to the judging criteria.

Purpose

Deming Prize awards to those companies which are recognized as having successfully applied Company-Wide Quality Control(CWQC) based on Statistical Quality Control (SQC) and which are likely to keep up within the future. It has been customary for Japanese corporations wishing to improve their performance in products or services to vie for the Deming Prize to benefit not only from the prestige that goes with the honor but also from the international improvements that result from the required implementation of TQM[Mahoney and Thor, 1994].

MBNQA's goals are to promote quality awareness of quality as an increasingly important element in competitiveness, enhance understanding of the requirements for quality excellence, and encourage sharing of information on successful quality strategies and the benefits derived from their implementation with other U.S. organizations.

Main Emphasis

Deming Prize has a consistent emphasis on the use of statistical methods throughout all aspects of CWQC. Statistical methods are mentioned in the main statement of purpose for the Deming Prize. The MBNQA has very few mentions of specific statistical techniques, but emphasis on the customer satisfaction and leadership.

This difference stems from the origin of the awards. W. Edwards Deming always been a driving force for the use of statistical methods for process understanding, and the Japanese have adopted in every sector of Japanese industry and evolved over time into the concept of total or company-wide quality control and the Deming Prize. U.S. government had legislated MBNQA to achieve competitiveness in the world market, and thus that philosophy permeated to the emphasis.

Award Recipients

The most difference between Deming Prize and MBNQA is the limitation of the number of award recipient. For Deming Prize, any number of companies that meet the standard established by the JUSE will be awarded in the year. There are two broad categories of Deming Prize: the Individual Person and the Application Prize. The Application Prize has four subcategories: Overall Organization, Overseas Company, Division, and Small Enterprise. There is also a Quality Control for Factory Prize.

But MBNQA were to be given in three categories --manufacturing companies(plus their divisions), service companies, and small companies (less than 500 employees)-- with no more than two awards per category per year.

Time Frame and Evaluation Period

The time frame for the Deming Prize is two to five years (preparation with JUSE; application when "ready."), and that for MBNQA is one-year cycles and renew after five years. The evaluation period of Deming Prize is one year, but six months for MBNQA.

Evaluation Process

The companies which are to award should summarized report to the committee in both Awards. The committee of Deming Prize is made up of members chosen by the chairman from among those knowledge and experience and officers of organizations related to quality control. It is chaired by the board of directors of JUSE or a person recommended by the board. The application prize subcommittee is made up of university professors and quality control experts in government and other nonprofit institutions. The committee reviews applications, performs on-site examinations, and awards prizes.

It is generally understood that JUSE consultants work with companies to prepare them though a quality control diagnosis. Prize application is made in the year following the one in which the JUSE consultants finish their work. Upon notification of acceptance, the applicant submits a Description of QC Practices and a company business prospectus, both written in Japanese. If the Description is approved, the applicant's on-site examination occurs and select Prize winners.

All Baldrige Award applications are reviewed and evaluated by the five-member board of examiners. When board members are assigned to review applications, their business and quality expertise is matched to the business of the applicant. Strict rules regarding real and potential conflicts of interest are followed in assigning board members to review applications. Although National Institute of Standards and Technology(NIST) of the Department of Commerce governs the Baldrige Award, the applications review process is not funded by the U.S. government.

After the review, applicants receive feedback reports prepared by members of the board of examiners. These reports critique the application against the model. Generally, companies with scores around 700 (out of a possible 1,000) receive site visits and thus gain more substantial insight.

Award Improvement Process

Deming Prize has been adopted the critics from the academic leaders and quality experts for the 40 years.

Feedback on virtually every aspect of the MBNQA program --criteria, application, examination, and examiner training--was collected after legislation. Since 1988, MBNQA improved guidelines and tightened criteria year by year.

As a result of the improvement process, the award guidelines has clearer instructions, more classifying notes, and more information on the evaluation process for service companies and small companies. Also the weighted scores for each sub-categories has been changed by the importance maintaining 300 scores on customer focus and satisfaction.

The results of overall comparison are summarized in Table 2.

	Deming	MBNQA
Purpose	Award prizes to those companies recognized as having applied Company-Wide Quality Control(CWQC) based on Statistical Quality Control (SQC).	Promote quality awareness, recognize quality achievements of U.S. Companies, and publicize successful quality strategies.
Emphasis	Statistical methods; prevention of quality problems.	Customer satisfaction; prevention of quality problems.
Eligibility	Individuals, factories, and companies- global since 1984.	Companies only-limited to U.S.
Award Recipients	Any number of companies that meet the standard established by the Union of Japanese Scientists and engineers (JUSE).	Maximum of two manufacturing companies (plus their divisions), two small companies (less than 500 employees), and two services companies
Evaluation Criteria	One page of guidelines("Particulars") -very succinct, broad, subjective interpretation.	Twenty-five pages of guidelines("Areas to Address, Scoring System, Business Factors Considered")-1992 issue.
Orientation	Process(60 percent) plus results (40 percent); heavy statistical process control.	Results(60 percent) plus process (40 percent); heavy quality results, customer satisfaction, human resources orientation.
Process	Qualification based on review with JUSE.	Qualification for site visit; competition.
Examiners	Select panel.	Open examiner system; annual application, selection; assignment avoids conflict of interest.
Cost	High dollars and efforts; consulting fees from JUSE are a major component (training has a manor impact in any case)	Low to high dollars; high effort if excellent quality system(s) not in place(training has a major impact in any case).
Time Frame	Two to five years(preparation with JUSE; application when "ready.")	One-year cycles; renew after five years

[Table 2] Comparison between Deming Prize and MBNQA (Characteristics)

2.2 Major Issues

Judging Criteria

The Deming Prize's judging criteria consist of a checklist that is broken down into 10 major categories: Policies, Organization and its management, Education and dissemination, Collection, dissemination, and use of information on quality, Analysis, Standardization, Control, Quality assurance, Effects(results), Future plans. There are 63 subcategories to define major area of emphasis.

MBNQA's judging criteria consist of seven sections: Customer Focus and Satisfaction, Quality and Operational Results, Human Resources Development and Management, Management of Process Quality, Leadership, Information and Analysis, Strategic Quality Planning. The criteria and subcategories have evolved over time. Specifically, Baldrige Award present a model linking the seven examination categories together[Mahoney and Thor, 1994](Exhibit 4). The categories model has four basic elements: Driver, System, Measures of progress, Goal.

Both awards emphasize the concept of company-wide quality control. Therefore, they are looking for quality commitment throughout the organization, including anyone related to the company such as suppliers, distributors, and customers. They both specifically examine such topics as:

- how policy is established, employee awareness of policy, and continuous improvement of policy.
- short- and long-term planning methods.
- management responsibilities.
- programs and results of internal employee education.
- collection methods and dissemination of information.
- techniques for quality analysis and the usage of results obtained.
- control of capital resources and processes.
- quality improvement techniques, quality audits, and methodology.

The Deming Prize's Item 1, "Policies," and Item 10, "Future plans," are similar to the MBNQA's Section 3.0, "Strategic Quality Planning."

The guideline ("Particulars") of Deming Prize is one page, which is very succinct, broad, subjective interpretation. MBNQA has twenty-five pages of guidelines, such as areas to Address, Scoring System, Business Factors Considered.

We analyze and compare the two award by major subject in more detail.

1. Policies.	100
2. Organization and its management.	100
3. Education and dissemination.	100
4. Collection, dissemination, and use of information on quality.	100
5. Analysis.	100
6. Standardization.	100
7. Control.	100
8. Quality assurance.	100
9. Effects(results).	100
10. Future plans.	100

[Table 3] Deming Prize Checklist [Mahoney and Thor, 1994]

1.0 Leadership (95 total)

- 1.1 Senior Executive Leadership (45)
- 1.2 Management for Quality (25)
- 1.3 Public Responsibility and Corporate Citizenship (25)

2.0 Information and Analysis (75 total)

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

3.0 Strategic Quality Planning (60 total)

- 3.1 Strategic Quality and Company Performance Planning Data and Information (35)
- 3.2 Quality and performance Plans (25)

4.0 Human Resources Development and Management (150 total)

- 4.1 Human Resources Planning and Management (20)
- 4.2 Employee Involvement (40)
- 4.3 Employee Education and Training (40)
- 4.4 Employee Performance and Recognition (25)
- 4.5 Employee Well-Being and Satisfaction (25)

5.0 Management of Process Quality (140 total)

- 5.1 Design and Information of Quality Products and Services (40)
- 5.2 Process Management: Product and Service Production and Delivery Processes (35)
- 5.3 Process Management: Business Processes and Support Services (30)
- 5.4 Supplier Quality (20)
- 5.5 Quality Assessment (15)

6.0 Quality and Operational Results (180 total)

- 6.1 Product and Service Quality Results (70)
- 6.2 Company Operational Results (50)
- 6.3 Business Process and Support Service Results (25)
- 6.4 Supplier Quality Results (35)

7.0 Customer Focus and Satisfaction (300 total)

- 7.1 Customer Relationship Management (65)
- 7.2 Commitment to Customers (15)
- 7.3 Customer Satisfaction Determination (30)
- 7.4 Customer Satisfaction Results (85)
- 7.5 Customer Satisfaction Comparison (70)
- 7.6 Customer Expectations, Current and Future (35)

[Table 4] MBNQA's Categories and Scoring Weight [Mahoney and Thor, 1994]

Examination categories	1988	1989	1990	1991	1992
Leadership	150	120	100	100	95
Information and analysis	75	60	60	70	75
Strategic quality planning *	75	80	90	60	60
Human resources development and management **	150	150	150	150	150
Management of process quality ***	150	140	150	140	140
Quality and operational result	100	150	150	180	180
Customer focus and satisfaction	300	300	300	300	300

[Table 5] Change of MBNQA's criteria [DeCarlo et. al, 1990; Hunt, 1992; Mahoney et. al, 1994]

- * Planning for quality in 1989.
- ** Human resource utilization in 1988 ~ 1991.
- *** Quality assurance of products and services in 1988 ~ 1991.

Leadership

Leadership is very important in implementing in TQM as well as other management functions.

MBNQA gave 95 points out of the 1,000 for leadership category in 1992. In MBNQA, the subcategories in leadership are senior leadership(45 points), management for quality(25 points),

and public responsibility and corporate citizenship(25 points).

But Deming Prize does not have any category to evaluate leadership.

Customer Perception

Customer perception of and input to product quality is evaluated for both awards. However, the MBNQA emphasizes it much more in its criteria than does the Deming Prize. It is important to recognize that companies are servicing a customer and thus address quality from the user's standpoint. However, the emphasis that should be placed on customer input is an important and controversial question.

Recently, MBNQA criteria applied to the companies in Japan. The average scores on 214 surveyed companies was 473, and 16% were higher than 600. It was analyzed that the major source of these wrong results are definitely not considering the customer satisfaction in Deming Prize.

Scores for each category

The two awards evaluate the company as total 1000 scores.

Deming Prize scores 100 for each 10 categories. The passing grade is on average 70 percent at all levels; a score of less than 50 percent for any unit will cause the organization to fail.

But Baldrige Award gives score differently for subcategories by the the importance. 300 scores for Customer Focus and Satisfaction, 180 for Quality and Operational Results, 150 for Human Resources Development and Management, 140 for Management of Process Quality, 95 for Leadership, 75 for Information and Analysis, 60 for Strategic Quality Planning. Baldrige Award strengthens more for the customer focus and satisfaction than Deming Prize.

Management of Information on Quality

The information on quality is important for TQM. It is important as a utility to collect, process, disseminate, and use of information on quality for the effective TQM, as possible as using IT. Thus should detailed checklist for the information on quality.

Deming Prize checks collection, dissemination, use of information on quality by 100 scores(10% of total scores)as follows;

- . collection of external information
- . transmission of information between divisions
- . speed of information transmission (use of computers)
- . data processing, statistical analysis of information, and utilization of results

MBNQA defines the category of information and analysis(75 scores: 7.5% of total scores) as follow;

- . analysis and uses of company-level data(40)
- . competitive comparisons and benchmarking(20)
- . scope and management of quality and performance data and information(15)

By comparison of the two Awards, Deming Prize defines the category in more detail from data collection to information use, and specifically the information transmission. Whereas MBNQA stresses the data usage at company level, and competitive information. The scores in Deming Prize(10%) are greater than MBNQA(7.5%).

Deming Prize emphasize on the internal information on quality for TQM, but MBNQA on corporate-level and external information. Both are necessary for the TQM success, we suggest the two awards should complement the other's checklist.

Change management on Quality Management

TQM techniques is "how to do" tool. Yet "what to do" tools, for example reengineering and outsourcing, is increasingly becoming the central challenge facing managements, because of the assumptions on which the organization has been built and is being run no longer fit reality [Drucker, 1994]. There should be continuous change of quality management, as the theory of the business change by the the reality change.

Deming Prize checks partially in "Policies"(policies pursued for management, quality, and quality control, justifiability and consistency of policies) and "Future plans".

MBNQA has no explicit category to check the change management to comply with the theory of the business.

The two Awards should check the systematic change management on quality management for the compliance of the theory of the business more explicitly, although it is 'how to do' tool. This will link quality management with financial results.

Inter-functional Communication

The quality management is not exclusively executable function. There should be suitable

communication with the other functional department or primary department. It also gives tight coupling with the reality like change management.

The two Awards does not have distinct checklist for inter-functional communication. To achieve more complete quality control they should enlist criteria on the inter-functional communication.

Cost of Quality

There are four main "schools" of quality management; Juran, Deming, Crosby, and the "Japanese". They suggested different concepts of cost of quality (COQ). Joseph Juran categorized COQ as prevention costs, appraisal cost, internal failure costs, and external failure costs. He thought that as the prevention and appraisal costs declined, the internal failure and external failure costs were increased. He suggested that there was an optimum point, and tried on finding the optimum quality level to satisfy minimum cost. Edward Deming used different COQ categories; conformance costs and nonconformance cost. He said that the costs of nonconformance (and resulting loss of customer goodwill) were so high that evaluating the costs of quality was unnecessary. Philip Crosby had similar idea to Deming. He found that the ratios of conformance costs and nonconformance costs are 2 ~ 3 percents and 20 ~ 25 percents of sales. So, he said, "Making it right the first time." The "Japanese" approach considered COQ as for directing action, not as a goal in itself. It allocated responsibility for quality management among all employees [Shank et. al, 1994].

Shank (1994) gave two general conclusions. First, COQ is a big opportunity, because COQ is 25 percents of the total costs. Second, Firms spend quality dollars in the wrong place. For example, when COQ is the range of 25 percents of sales, external failure cost is the largest, but when COQ is the range of 5 percents of sales, prevention cost is the largest. As prevention cost has the reverse direction to external failure cost, it is better to try to reduce the prevention cost.

Carr et. al (1994) investigated the relationships of prevention, appraisal, internal failure, and external failure costs. He found that prevention and appraisal costs significantly influence external failure cost, but remarkably neither prevention nor appraisal costs had a statistically significant association with internal failure costs.

Albright et. al (1994) suggested quality management through the quality loss function. He referred the difference between Juran's model and Taguchi's model. He said as follows.

"Many use the classical quality-cost model Joseph Juran developed to monitor and explain the cost of quality. Taguchi's quality loss function attaches a cost to variability when a product's actual measurements for a critical quality characteristic deviate from an optimal target value."

The above three researches implies that the reduction of conformance costs is more useful than the reduction of nonconformance costs. We can apply this implication to our comparison. As shown in table 2 and 3, Deming prize pays attention to reduction of nonconformance cost including prevent and appraisal costs, but MBNQA focuses on conformance cost. There are few criteria related to nonconformance cost in Deming's checklist. Of course, checklist 7 and 9 reflect the internal failure cost, but MBNQA gives 300 points in external failure cost only.

The results of comparison on major issues as scores are summarized in Table 6.

Major Issues	Scores	
	Deming Prize	MBNQA
Leadership	0	95
Customer Perception	0	300
Management of Information on Quality	100	75
Change management on Quality Management	less than 100	0
Inter-functional communication	0	0
Cost of quality	more than 700	less than 500

[Table 6] Scores on major issues of Deming Prize and MBNQA

3. Conclusion

The Deming Prize and MBNQA are a management breakthrough for Japan and U.S. It has been accepted as a sound way to conduct the business of a company. They are still somewhat incomplete and its share of critics.

In chapter 2, we compared the Deming prize and MBNQA. The significant differences are as follows.

(1) *Number of recipients* In Deming prize, any number of companies that meet the standard can be awarded. But the MBNQA is based on competition, maximum two companies for three categories (manufacturing, small, and service companies) are awarded a year.

(2) *Main emphasis* Deming prize emphasizes on SQC (statistical quality control), while MBNQA on customer satisfaction. SQC is related to conformance costs, but customer satisfaction to nonconformance costs.

(3) *Change management* Deming Prize checks partially in "Policies"(policies pursued for management, quality, and quality control, justifiability and consistency of policies) and

"Future plans". MBNQA has no explicit category to check the change management to comply with the theory of the business.

The weakness of the two awards is lack of consideration of inter-functional communication. Management of information on quality should be considered more significantly in order to measure the effectiveness of TQM.

The improvements and reflection should be continued to achieve the total quality, continuous improvement, and customer-oriented philosophy, and after all secure financial success of the awarded company by adoption of the above suggestions in the criteria comparison.

The candidate companies to Award should apply the judging criteria for their contingency, and maintain to comply with the their theory of the business. Further research by detail evaluation item and procedure is expected. In Korea it is expected to research about TQM in the viewpoint of cost of quality.

References

- Albright, T. L. and H. P. Roth, "Managing Quality Through the Quality Loss Function," *Cost Management*, (Winter 1994), 20-28.
- Balachander, S. and K. Srinivasan, "Selection of Product Line Qualities and Prices to Signal Competitive Advantage," *Management Science*, 40, 7 (July 1994), 824-841.
- Berry, L. L., V. A. Zeitbaml, and A. Parasuraman, "Five Imperatives for Improving Service Quality," *Sloan Management Review*, (Summer 1990).
- Buffa, E. S. and R. K. Sarin, *Modern Production/Operation Management*, John Wiley & Sons, (1987).
- Bush, D. and K. Dooley, "The Deming Prize and Baldrige Award: How They Compare," *Quality Progress*, (Jan. 1989), 28-30.
- Carr, L. P., "Applying Cost of Quality to a Service Business," *Sloan Management Review*, (Summer 1992), 72-77.
- and L. A. Ponemon, "Managers' Perceptions About Quality Costs," *Cost Management*, (Spring 1992), 65-71.
- and ---, "The Behavior of Quality Costs: Clarifying the Confusion," *Cost Management*, (Summer 1994), 26-34.
- DeCarlo, N. J. and W. K. Sterett, "History of the Malcolm Baldrige National Quality Award," *Quality Progress*, (Mar. 1990), 21-27.
- Dorio, M. M., "Total Quality Self-Appraisal: Use of the MBNQA Criteria," *Quality Engineering*, 5, 2 (1992), 225-241.
- Drucker, Peter F., "The Theory of the Business," *Harvard Business Review*, (Sept.-Oct. 1994), 95-104.
- Flood, R. L., *Beyond TQM*, John Wiley & Sons, New York, (1993).
- Garvin, D. A., "How the Baldrige Award Really Works," *Harvard Business Review*, (Nov. 1991), pp. 80-93.
- Hill, R. C. and S. M. Freedman, "Managing the Quality Process: Lessons From a Baldrige Award Winner," *Academy of Management Executive*, 6, 1 (1992), 76-88.
- , "When the Going Gets Rough: A Baldrige Award Winner On the Line," *Academy of Management Executive*, 7, 3 (1993), 75-79.
- Hornigren, C. T. et al., *Cost Accounting - A Managerial Emphasis -*, 8th ed., Prentice-Hall, (1994).

- Hunt, V. D., *Quality in America*, Irwin, (1992).
- Mahoney, F. X. and C. G. Thor, *The TQM Trilogy*, AMACOM, (1994).
- Nandakumar, P., S. M. Datar, and R. Akella, "Models for Measuring and Accounting for Cost of Conformance Quality," *Management Science*, 39, 1 (Jan. 1993), 1-16.
- Parasuraman, A., L. L. Berry, and V. A. Zeithaml, "Understanding Customer Expectation of Service," *Sloan Management Review*, (Spring 1991).
- Rutledge, R. W., "Life After the Deming Prize for Florida Power & Light Company," *Cost Management*, (Summer 1994), 18-34.
- Ryu, H. J., *Business Innovation by TQM*, KPC, (1994), in Korean.
- Shank, J. K. and V. Govindarajan, "Measuring the Cost-Of-Quality: A Strategic Cost Management Perspective," *Cost Management*, (Summer 1994), 5-17.
- Shiba, S., A. Graham, and D. Waldwn, *A New American TQM: Four Practical Revolutions in Management*, Productive Press, Portland, Oregon, (1993).
- Srinivasan, K., S. Kekre, and T. Mukhopadhyay, "Impact of Electronic Data Interchange Technology on JIT Shipments," *Management Science*, 40, 10 (Oct. 1994), 1291-1304.
- Tagaras, G., P. Georgiadis, and D. Psinos, "Development of Quality-Assurance System for a Wine Producer in Greece," *Interfaces*, 24, 6 (Nov.-Dec. 1994), 1-13.