Quality Management in Korea: Past and Present Situations and Future Desirable Directions

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Abstract

First of all, this paper deals with the past and present situations of quality management(QM) in Korea to show where the Korean industry stands in terms of QM movements. Next, this paper describes what the future desirable directions are for good and sound QM movements.

1. Introduction

Korean industries, if there were any, were completely destroyed during the Korean War between 1950 and 1953, and the effects of the war lasted for a long time. The birth of Korean QC or QM movements can be said to have begun in 1961 when the Industrial Standardization Act was announced. Over the last 40 years, the firm determination of the Korean people to develop their industry has been successful and, quite remarkably, we have achieved an average about 8% annual growth in the gross national product. Such development is often called "Han River Miracle" in the 20th century.

At the present time, however, due to bad effects of economic crisis controlled by IMF, due to large increases in the price of raw materials(especially in oil price), due to strict protectionism by advanced countries and due to ever-challenging competitiveness by other developing countries, the Korean economy is facing a tough challenge from both the inside and outside. To survive in the international market we have to overcome many difficulties, and need a quality and productivity revolution through the process of total quality management(TQM).

With most of its energies in the past having been largely on the quantitative development of industry, Korea is now at the point of turning its emphasis towards quality in production. Korean people feel that it has become indispensable for enterprises to introduce a higher level of scientific methods of management in order to strengthen their international competitiveness. Recently, this

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has propelled many Korean companies to adopt TQM, Six Sigma, ISO 9000/14000 series, etc. in their company management.

Scientific management tools should be essentially used for development of industry.

However, the basis of all scientific management tools is statistical thinking, statistical methods and/or statistical data base management. In fact, the statistical thinking is the beginning of all scientific management tools. Figure 1 shows the rough relationship among these.

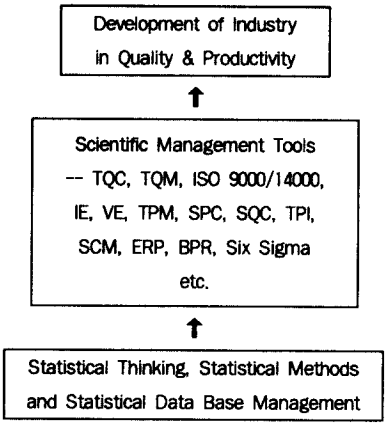

Fig. 1 Relationship between scientific management tools, statistical methods and management science tools

** TQC = Total Quality Control
ISO = International Organization for Standardization
IE = Industrial Engineering
VE = Value Engineering
TPM = Total productive Maintenance
SPC = Statistical Process Control
SQC = Statistical Quality Control
TPI = Total Productivity Innovation
SCM = Supply Chain Management
ERP = Enterprise Resource Planning
BPR = Business Process Reengineering

The contribution of statistics for development of Korean industry has been more than remarkable. I believe that, without the help of statistical methods to industry, Korean industry cannot be developed to the current level of development.

This paper first presents the history and the development of QM movements in Korea. Next, some problems encountered in QM movements in Korea are disclosed and some counter-measures and future desirable directions to overcome these problems are suggested.

2. History and development of QC/QM activities

The last 40 years can be divided into 3 periods, i.e. introductory, development and expansion periods.

2.1 Introductory period(1961-1972)

This period is called introductory since QC-related systems, laws and organizations were established, and standardization and training QC were initiated. The major events are as follows.

1961. 09: Industrial Standardization Act enacted.

1962. 03: Korean Standards Association (KSA) established.

1963. 07: Korean Industrial Standards(KS) marking system implemented.

1966. 07: Korean Society for Quality Control(KSQC) established. The name of KSQC has been changed to KSQM(Korean Society for Quality Management).

1970. 03: Quality Control Law for industrial products enacted.

1971. 03: First national qualification examination for certified QC engineers executed.

2.2 Development period(1973-1986)

QC/QM activities began to spread rapidly when the TQC concept was introduced in industries in the early part of 1970s. At the same time, the Korean economy began to make a drastic conversion from light industry to heavy and chemical industry with emphasis on QC/QM. The foundation of the Industrial Advancement Administration (IAA) in 1973 and the first national contest of QC circles marked a turning point in QC movements in Korea.

1973. 01: The Industrial Advancement Administration(IAA) established under the Ministry of Commerce and Industry.

1975. 10: First national contest for QC circles.

1976. 04: First international convention on QC circles(ICQCC '76 - Seoul) held.

1981. 06: Factory grading system for QC introduced.

1983. 11: QC training center in KSA established.

2.3 Expansion period(1987-present)

In this period the TQC/TQM concept spread to small-and medium-sized indusries.

TQC/TQM started to be adopted as a management tool and began to be operated as a total systems approach. Also ISO 9000/14000 series were introduced to Korean industry.

In late 1990s, the concept of Six Sigma was introduced and, recently, many Korean companies are interested in this quality revolution management of Six Sigma.

1987. 11: ISO 9000 series introduced.

1992. 12: Amendment of Industrial Standardization Act to include new industrial fields such as services and information processing.

1993. 12: Quality Management Promotion Act promulgated. The KS A/ISO 9000 series adopted as the national standards. Here, KS means Korean Industrial Standards, and A means a serial number in KS.

1996. 12: KS A/ISO 14000 series adopted as Korean standards.

1997. 01: Six Sigma introduced.

1999. 03: Korea Research Academy of Six Sigma organized. This Academy is an organization in which experts in Six Sigma from university-industry-institute study together for development of Korean industry.

3. Current problems and future desirable directions

3.1 Old concept of quality and new paradigm of quality

The old concept of quality such as "meeting the required quality characteristics" has been changed, and the new concept of quality has been emerged. Since the change is really drastic, we may call new concept of quality as new paradigm of quality. Some of the important aspects of new paradigm of quality are as follows.

(1) Quality has become a management concept and management responsibility, and it has become an international business language.

(2) The human behavior and pattern of human consumption is changing. Now the power is shifting from the producer to the customer. Quality becomes the number one criterion in evaluating the product in which the customer is interested.

(3) Quality can be measured, and it is judged by knowledge-based informations.

(4) Quality, productivity and cost can be harmonized.

(5) Service quality becomes more important than product quality.

(6) Quality is mostly made in R&D stages.

Still many manufacturing companies in Korea understand the quality in the context of old quality. This current situation causes many problems in QM. Since the concept of quality has been changed, the QM activities should be accordingly changed. For instance, since the quality becomes a management concept, the top management should be involved in QM, and he should be the leader of QM. Also, since the customer seeks the quality first, "quality first" policy should be adopted as the number one philosophy for company policy. Also, since quality is mostly made in R&D stages, bigger company resources should be allocated in R&D divisions.

3.2 QM based on statistical methodology

It is said that the 21st century is the information-based knowledge society. This means that for a company to survive, it should take care of the knowledge as the most important asset, and the knowledge management should be based on information technology. This fact will be not only true for a company, but also it will be true for any organizations such as university, government,

research institute, and so on.

Figure 2 shows the knowledge triangle. The fact exists by itself in our society.

If we want to obtain some raw data from the fact to understand it, we need some statistical designs such as DOE(design of experiments) or sampling design. Without these statistical designs, we cannot get raw data efficiently. From the raw data, in order to obtain useful informations, we need to use statistical methods such as data mining tools, regression analysis, multivariate analysis and so on. To obtain valuable knowledge from information, we need some kind of statistical data base to manage and collect informations in an efficient way. At this stage, the information technology such as high-speed computers, internet systems, intranet systems, etc. plays an important role.

Note that in Figure 2 that some forms of statistics are involved in each stage fromFact, Data Gathering, Information and Knowledge. This means that statistics is the crucial decision-making science in the so called information-based knowledge society.

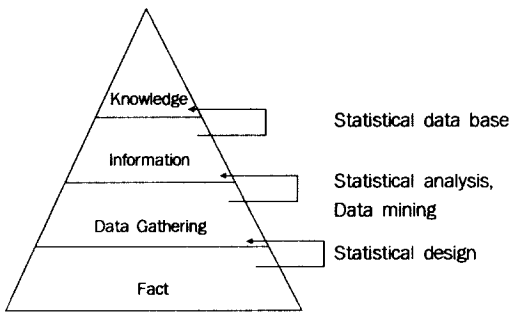

Fig. 2 Knowledge triangle

This also means that statistics will be more studied, used and loved by many people in quality management. However, unfortunately the current situation for the use of statistical methodology is not satisfactory. We should be more concerned about this current problem.

A sample survey was implemented in late 1997 in Korea to find out the quality competitiveness of Korean companies. In the survey total 197 manufacturing companies aanswered the questions which are related to statistical methods. The number of hours for statistical education in a year related to SQC/SPC was asked in the survey. Table 1 shows the average number of education hours per each person per year, which indicates that most companies use less than 20 hours for statistical education. There is no doubt that such education time is not satisfactory.

I believe that, since the statistical thinking and statistical methodology is important for quality management, at least 30 hours training in average should be provided for researchers, engineers and workers in manufacturing companies.

Table 1 Average hours for statistical education per year

Average hours	Number of companies
less than 10 hours	108
10 - less than 20 hours	59
20 - less than 30 hours	15
30 - less than 40 hours	6
equal to and more than 40 hours	3
no answer	6
Total	197

3.3 Use of scientific QM methods

Many managers and engineers in industry are not well aware of the power and usefulness of scientific QM methods such as SPC(Statistical Process Control), DOE (Design of Experiments), reliability analysis, TPM(Total Productive Maintenance), IE (Industrial Engineering) and so on. Even though there are many certified QC engineers in Korean industries, it seems that they are not very active in using some of the scientific QM tools. Since they do not use scientific tools much, consequently they do not use industrial statistics much.

In order to advance the current status of QM to a further level, more scientific QM tools should be actively used, and some related statistical softwares should provided with proper education. Perhaps the best way to activate the use of scientific QM methods is to organize project teams, and let them use the tools for their problem solving.

Fortunately, as Six Sigma is introduced in Korea, many companies which adopt Six Sigma, start to form many project teams and use scientific QM methods. We are in fact quite encouraged by Six Sigma management in Korean industry.

3.4 Reliable data gathering, and use of information technology

Since the industrial situation becomes more complex and a lot of variables are involved, we need to obtain large data sets for the complex industrial systems.

Therefore, in order to visualize the complex industrial systems, reliable data gathering are necessary. However, the modern technology is not still quite capable in handling large data sets with good reliability. Moreover, most top managers of old generation do not understand the current changing society with fast information technology.

We need to prepare and quickly go ahead to cope with complex industrial systems by using modern information technology and good scientific tools such as data mining and large-scale data analysis tools.

6. Concluding remarks

Now is the right time in governmental, industrial and academic circles in Korea to reflect upon whether the QM movements have been playing the right role for development of Korean industry. For this point of view, we reviewed the historical development of QC/QM activities, and a survey result with regard to statistical education in industry.

Several problems we have in QM movements in industry have been disclosed and possible counter-measures and future desirable directions were suggested. We hope that eventually quality-related activities can be more strengthened in

Korea, and keep contributing themselves for development of Korea economy.

Acknowledgements

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