

Quality Management Practices in Automotive Industry in Thailand

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Abstract: - Quality management is used to strengthen the business operation. The quality management assists business for product differentiation, fulfillment of customers requirement, reduction of costs by preventing waste in process, and continuous improvements in organizations. Firms implement the concept of quality management apply many different approaches from those ideas as initiation. The application of quality management can be used in various parts of organizations. This research was to study the characteristics of quality management and their practices in automotive industry in Thailand. The study focus in quality management practices as following: Quality management policy, Quality management methodology, Top management involvement, Quality activity, Quality tool and techniques, Human oriented quality management, Team working, Data collection and analysis, Process management, and Cost control and product management. The data were generated through distribution of questionnaire postal survey among randomly selected factories operating throughout of Thailand. The questioners were answered by two hundreds of automotive industry. The results showed that Thai automotive industry apply quality management mostly in area of Quality process, Data collection and analysis, Top management involvement, respectively. Moreover fair level of practice were found that in Quality management policy, Quality management methodology, Team working, Cost control and product management, Quality activity, Human oriented quality management and Quality tool and techniques. The result showed the different level of utilization from each aspects of quality management practice.

Key-Words: - Quality Management Practice, Automotive Industry, Thai Industry, Quality Tool, Top Management

1 Introduction

Quality management (QM) is the principle of management that customer requirements are met exactly. Quality management is used to strengthen the business operation. Quality management requires participation and integration of all parts in organization. Every person in the organization is involved with the fully commitment of the top management. Quality management is driven by the constant attainment of customer satisfaction through the continuous improvement of all organizational processes. The quality management involves the continuous improvement in quality, productivity and effectiveness obtained by establishing management responsibility for processes as well as output. The quality management assists business for product differentiation, fulfillment of customer requirement, and reduction of costs by preventing waste in process. This concept is a chain reaction since it involves not only the organization staff but the suppliers and customers as well. Deming, Juran, Crosby, Ishikawa and Kume were created concepts

of quality management. Deming [1] offers a theory of quality management based on his famous fourteen points for quality management. Juran [2] presented his trilogy of quality as quality planning, quality control and quality improvement was integrated into quality management. Ishikawa [3] and Kume [4] showed Japanese quality management practices have been characterized as: responding to customer demands; quality from the buyer's standpoint and the vendor's viewpoint; product quality and process quality; company-wide quality control; participation by all members of the organization; education and training in quality; quality control activities; quality audits; and utilization of statistical methods.

Therefore, various studies have been carried out for the identification of those successful and well-known available methods to achieve the objective of quality management. The quality management practices (QMPs) were studied by many researches to identify a successful practices of QM. The comparisons of QMPs have also been studied by

Dahlgaard *et al.*[5], East and West countries, by Zhao *et al.*[6], India, China and Mexico, by Raghunathan *et al.*[7], (USA, China and India). Meanwhile, QMPs has been studied in Australian industry by Sohal *et al.*[8], Australian service and manufacturing industries by Beaumont *et al.*[9], QMPs via a factor analysis in United Arab Emirate firms by Badri *et al.*[10], QMPs in the Dutch construction industry by Bossink [11], QMPs in Thai industry and services firms by Bisalyaputra and Jirapattarasilp [12].

The quality management practice has identified many elements. All elements aim to assist and be part of basic for quality management. The ten elements of quality management practices are a framework for this study that was adapted from Bisalyaputra K. and Jirapattarasilp K. [12] as following

1. Quality management policy: Policy and planning for quality with documentation. Organization must be quality documentation in all process and distribution quality management document to all employees
2. Quality management methodology: Work planning, Standard procedure, reward system are parts of quality management as following: objective setting in all process, standard work instruction in all processes, employee training all of the year, money reward for quality output, recognition as reward for quality, quality competition between units, and yearly bonus related to work quality
3. Top management involvement: this is the major factor to drive quality management. Top leaders should involve in quality planning, objective setting and documenting and operation involvement such as quality system examination meeting
4. Quality activity: The support circle to create the companywide participating in quality issues. This element has been focus on quality control operations, quality control circle (QCC) and job rotation for quality working.
5. Quality tool techniques for management in organization: The scientific techniques used for problem solving and improvement as following: Check sheet, Histogram, Pareto, Cause/effect diagram, Scatter Diagram, and Control Chart
6. Human oriented quality management: The human resource management to support the people ability in quality management such as employee self-development, on job training, company study group (QCC& suggestion). The training is majority of human development that company showed as guest lecturing and in-house training and training the people outside company.
7. Team working: The basic for worker participating in working together to create and maintain quality management. The interest elements are Team working atmosphere, team for companywide quality improvement and team based reward
8. Data collection and analysis: The main data and information is well organized and document, in order to use for managerial decision making. Data collection and analysis in quality management must be concerned on customer detail, product detail, and customer satisfaction
9. Quality process: The process is managed properly with good plan, control, and improvement down to operating level as following: Work procedures in all process, Customer reception process, Management following policy, Daily management, Cooperating work improvement, Work improvement in operating level
10. Cost control and product management: The cost is continuously reduced and controlled. The standard of product design and new technologies and techniques are used to improve the organizations. The issues of this element are searching for new technology and techniques for problem solving, budgeting for cost control improvement project, report periodically checking and project evaluation as planned, standardization for product design and data management for product development

The quality management also extends the application to several industries. The automotive industry is the one of industries that applies quality management. It was selected to studied and presented because it is high-value industry in Thailand. However, the current applications of quality management gain the difference level in practices. The objective of this research is to study the characteristics of QM and their practices in automotive industry. The study was covered to automotive assembly, automotive part and supporting industry in Thailand.

2 The Methodology

The study focus on QM practices as following: QM policy, QM methodology, Top management involvement, Quality activities, Quality tool and techniques, Human oriented QM, Team working, Data collection and analysis, Process management, and Cost control and product management. The questionnaire was divided into ten sections of quality management practices and based on five level of Likert-scale. The questionnaire was highly

reliable according to the Cronbach's α coefficient at 0.932. The data was analyzed by arithmetic mean, standard deviation and test of significantly differences of the QMPs between. The data were interpreted as degree of practices in quality management as follows: 4.51-5.00 = excellent, 3.51-4.50 = good, 2.51-3.50 = fair, 1.51-2.50 = poor, 0.00-1.50 = very poor.

The data were generated through distribution of questionnaire postal survey among randomly selected factories operating throughout of Thailand. Two hundreds valid responses answers from the company were received, which are on the high side for survey of this type. Table 1 shows the percentage of the firms by employees and ages. With respect to number of employees in firms, 23.5 % is 1-100 employees, 26.0 % is 101-200 employees and 50.5 % is over 200 employees. It is also the year of establishment as the most is over 10 years and followed by 7 to 10 years, 4 to 6 years and 1 to 3 years, respectively.

Table 1 Characteristic of Samples

| Number of employees | | |
|-----------------------|-----|-------|
| 1 – 100 | 47 | 23.5% |
| 101 – 200 | 52 | 26.0% |
| > 200 | 101 | 50.5% |
| Year of Establishment | | |
| 1-3 | 6 | 3.0% |
| 4-6 | 11 | 5.5% |
| 7-10 | 39 | 19.5% |
| >10 | 144 | 72.0% |

3 Results

The results showed that the most automotive industries apply quality management practice in area of top management involvement, data collection and analysis, and quality process. Anyway, Quality management policy, Quality management method, Quality Activity, Quality tool techniques, Human oriented quality management, Team working, Cost control and product development are moderate practices. The results of average and deviation data for quality management approaches are shown in the following Table2.

Table 2: The results of Quality management practice in Automotive Industry

| Item | Mean | S.D. | Interpretation |
|--|------|------|----------------|
| Quality management policy | 3.39 | | Fair |
| • Quality documentation in all process | 3.24 | 1.13 | Fair |
| • Quality management document distribution to all employees | 3.54 | 0.94 | Good |
| Quality management method | 3.09 | | Fair |
| • Objective setting in all process | 3.85 | 1.04 | Good |
| • Standard work instruction in all processes | 4.34 | 0.75 | Good |
| • Employee training | 3.30 | 1.14 | Fair |
| • Money reward for quality output | 2.67 | 1.34 | Fair |
| • Recognition as reward for quality | 2.47 | 1.42 | poor |
| • Quality competition between departments | 2.46 | 1.48 | poor |
| • Yearly bonus related to quality of work | 2.58 | 1.25 | Fair |
| Top Management involvement | 3.57 | | Good |
| • Quality policy and objective planning | 3.55 | 1.11 | Good |
| • Quality documentation | 3.47 | 0.97 | Fair |
| • Operation involvement such as quality system meeting or review | 3.70 | 0.87 | Good |
| Quality Activity | 3.05 | | Fair |
| • Quality control operations | 3.69 | 0.99 | Good |
| • Quality control circle (QCC) | 2.98 | 1.10 | Fair |
| • Job rotation for quality working | 2.49 | 1.15 | poor |
| Usage of Quality tool | 2.56 | | Fair |
| • Check sheet | 3.77 | 1.24 | Good |
| • Histogram | 1.84 | 1.76 | poor |
| • Pareto | 2.64 | 1.49 | Fair |
| • Cause/effect diagram | 2.59 | 1.45 | Fair |
| • Scatter Diagram | 2.14 | 1.48 | poor |
| • Control Chart | 2.42 | 1.46 | poor |
| Human oriented quality management | 2.88 | | Fair |
| • Self-development | 3.23 | 1.02 | Fair |
| • On job training | 3.52 | 0.80 | Good |
| • Company study group (QCC& suggestion) | 2.70 | 1.44 | Fair |
| • Invite lecturing and in- | 2.30 | 1.12 | poor |

| | | | |
|---|------|------|------|
| house training • Training outside company | 2.64 | 1.03 | Fair |
| Team working | 3.03 | 1.21 | Fair |
| • Team working atmosphere | 3.41 | 1.05 | Fair |
| • Team for companywide quality improvement | 3.22 | 1.15 | Fair |
| • Team based reward | 2.47 | 1.43 | poor |
| Data collection and analysis | 3.70 | | Good |
| • Customer data | 3.77 | 0.94 | Good |
| • Product data | 3.95 | 0.71 | Good |
| • Customer satisfaction | 3.39 | 1.16 | Fair |
| Quality Process | 3.82 | | Good |
| • Work procedures in all process | 4.27 | 0.84 | Good |
| • Customer reception process | 3.89 | 0.87 | Good |
| • Management following policy | 3.98 | 0.86 | Good |
| • Daily management | 3.71 | 0.74 | Good |
| • Cooperating work improvement | 3.72 | 0.89 | Good |
| • Work improvement in operating level | 3.40 | 0.91 | Fair |
| Cost control and product development t | 2.88 | | Fair |
| • Searching for new technology and techniques for problem solving | 3.53 | 0.93 | Good |
| • Budgeting for cost control and improvement project | 2.95 | 1.19 | Fair |
| • Report periodically checking and project evaluation as planned | 3.18 | 0.99 | Fair |
| • Standardization for product design | 2.35 | 1.86 | poor |
| • Data management for product development | 2.43 | 1.88 | poor |

The following are the highlights of the findings:

The result from table showed fair level of practice in quality management policy. However, the good level was Quality management document distribution to all employees. Quality management method was fair level. Objective setting in all process and Standard work instruction in all processes were good level but Employee training, Money reward for quality output and Yearly bonus related to quality of work are fair level. Recognition as reward for quality and Quality competition between departments indicated poor level.

Top management involvement average was good level by quality policy and objective planning and involvement in quality operation but involvement of quality documentation was fair level. Quality activity was found at fair level. The quality control operation was at good level and quality circle and job rotations are at fair and poor level, respectively.

Usage of quality tool in automotive factory was used at fair level. Check sheet was the quality tool that highest used in industries and shown at good level. Pareto and Cause/effect diagram showed fair level due to the different approached to define problem and solve in medical work. Control Chart, Scatter Diagram and Histogram were the poor level to practices in automotive factories.

Human oriented quality management was fair level. Only on the job training is highly used. Self-development, Company study group and Training outside company were fair level. The result was poor in Guest lecturing and in-house training Team working was shown in fair level. Team working atmosphere and Team for companywide quality improvement were shown at fair level but Team based reward was applied at poor.

Data collection and analysis was good level. Detail information of customer and product were applied at good level but data of customer satisfaction was fair level.

Quality process was considered good practice. The process contains work procedures in all process, customer reception process, management following policy, daily management, cooperating work improvement level were good using. Exclude, work improvement in operating level was fair level.

Cost control and product development was fair level. The Searching for new technology and techniques used to solve problem was good level. The budgeting for cost control improvement project and report periodically checking and project evaluation as planned were at fair level. The standardization for product design and the data management for product development were poor level.

The finding was found that most factories were on preparation section and also went on the process of quality. It was found that quality process, data collection and analysis, and top management involvement made important of quality management in much level where as other variable were rate in Fair level as Deming[1] and Juran [2] commented. According to ISO 9001[13] and Deming prize, leadership of top management, was set to be one of the requirement in the quality assurance. Thus, top management need to have much attention on these activities, to be sincere to develop the quality system and work hand in hand with personnel to promote the system and also personnel.

Therefore, the quality management requires participation and integration of all parts in company. Thus, top management need to realize all operations that quality management will be available to improve processes. In order to plan for implementation of quality management, changing needs consideration towards a quality culture.

4 Conclusion

The good implementation in quality management practices were confirmed by results as following: *Quality management policy* : quality management document distribution to all employees; *Quality management method*: objective setting in all process and standard work instruction in all processes; *Top management involvement* : quality policy and objective planning and operation involvement; *Quality Activity*: Quality control operations; *Quality tool techniques*: Check sheet; *Human oriented quality management*: On job training; *Data collection and analysis*: customer detail and product detail; *Quality Process*: work procedures in all process, customer reception process, management following policy, daily management ,and cooperating work improvement; *Cost control and product development*; Searching for new technology and techniques for problem solving.

On the other hand, the company was poor implementation in Recognition as reward for quality and Quality competition between units on *Quality management method*, Job rotation for quality working in *Quality Activity*, using Histogram, Scatter diagram and Control chart as *QC tool*, Guest lecturing and in-house training in *Human oriented quality management*, Team based reward in *Team working*, and Standardization for product design and Data management for product development in *Cost control and product development*.

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