CRITICAL SUCCESS FACTORS IN THE IMPLEMENTATION
OF TOTAL QUALITY MANAGEMENT IN SELECTED
FERTILIZER COMPANIES IN CIKAMPEK INDONESIA

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Abstract.
Total quality management (TQM) is an integrative management philosophy aimed at continuously improving the performance of products, processes and services to achieve and exceed customer expectations (Jiju Antony, Kevin Leung and Draeme Knowles). This paper provides an empirical study on the identification of the critical success factors (CSFs) of TQM implementation in Indonesia industries which is selected fertilizer companies. A total of 7 dimensions with 72 variables were considered in the questionnaire. The difference test among 6 division consist of maintenance, production, head division, klh, wasses and material found there are 28 variables significantly differentiate among the respondents. These factors were shown to be reliable and valid and offer new insights into the understanding of TQM success factors in Indonesia industries.

Keyword : Total Quality Management (TQM), continuous improvement, fertilizer,

Introduction.
In contemporary management, total quality management (Total Quality Management) has become the major business strategy in the 1990s (Witcher, 1994; Lee and Leung, 1999). The evolution of Total Quality Management into an all pervasive philosophy of management took shape through the works of Crosby (1979), Deming (1982, 1986), Feigenbaum (1983), Ishikawa (1972), Juran (1988) and Taguchi (1982). The primary focus of Total Quality Management philosophy is on the hands and minds that employ the tools and techniques rather than the tools and techniques themselves. Recent research has shown that many Total Quality Management-based organisations failed to indicate a significant competitive improvement in business performance (Witcher, 1994).

In Indonesian fertilizer industry, implementation of Total Quality Management is rather new. Lee and Leung (1999) observed that the implementation of Total Quality Management in Indonesia is quite common, even with the critical problems of lack of long term planning, inadequate commitment and misunderstanding of quality at the management level. Many managers do not fully understood what Total Quality Management is all about and the most important factors that drive the successful implementation of Total Quality Management in Indonesian fertilizer industry. Therefore, an investigation of
Critical Success Factors in Total Quality Management implementation in the Indonesian fertilizer industry was worthwhile to carry out. This research presents the results of the study of Critical Success Factors for Total Quality Management in the Indonesian fertilizer industry.

**Background of the Study**

As long as Total Quality Management is adopted fully and practiced effectively in an organization, many advantages will be delivered. It will strengthen the organizational business performance and competitive advantage. The successful implementation of Total Quality Management will result in:

- Improved employee involvement. Total Quality Management ensures everyone within the organization should have a clear understanding of what is required and how their processes relate to the business as a whole. Through the practice of Total Quality Management teamwork is employed and the employees are motivated and encouraged to control, manage and improve the processes, which are within their responsibility (Dale, 1994).

- Improved communication. A better communication can be accomplished through the effective implementation of Total Quality Management principles in any organization. More open and frequent communication among people will be found, and they will view and treat one another as customers and suppliers (Anjard, 1998).

- Increased productivity. Total Quality Management changes the organizational culture and creates a happy working environment. Due to the effective delegation, empowerment and total staff involvement, problems are identified and solved at lower levels. The working process will become more efficient. Consequently, productivity can be increased by reducing the cycle time.

- Improved quality and less rework. In Total Quality Management implementation, work processes and improvements are focused. Employees will place more emphasis on the elimination of the root causes rather than correction of problems. Also, more up-front effort is applied to clarify requirements and prevent proactively the occurrence of defects and errors. Problems will be identified and tackled at lower levels, by the people closest to the work who are empowered to deal with the problems. As a result, the quality of the products/services will be improved and product rework will be reduced.

- Improved customer satisfaction. Through open communication among employees, customers and suppliers, the true voice of the customers can be more readily understood. Since the quality operations also focus more on the work process and improvement, the company will provide a better quality product/service to the market. Therefore enhanced customer satisfaction is achieved.

- Reduced costs of poor quality. Effective implementation of Total Quality Management will lead to significant reduction in costs of poor quality such as scrap, rework, late deliveries, warranty, replacement, etc.
- Improved competitive advantage. To sum up, the final benefit is to strengthen the competitive advantage of an organisation to survive in the market. If Total Quality Management is successfully implemented, this will result in better customer satisfaction and quality products/services provided with lower prices. This can lead to increased sales to achieve the profit objectives and business growth.

**Research Paradigm**

The relationship among the variables in the formulation of Total Quality Management implementation in fertilizer companies in Indonesia

The researcher extracted common Critical Success Factors of TQM from previous researchers (Antony, Leung and Knowles, 2002) to come up with seven factors as follow:

- corporate culture
- leadership and commitment
- participation, motivation and education
- information sharing
- quality control
• stakeholder relationship
• innovation

Statement of the Problem

The problem to be studied is how to implement Total Quality Management and control quality in Indonesian fertilizer industry. The research questions in this research are:

1. To what extent did the respondents answer the Total Quality Management variables of the selected Indonesian fertilizer companies with respect to:
   - corporate culture
   - leadership and commitment
   - participation, motivation and education
   - information sharing
   - quality control
   - stakeholder relationship
   - innovation

2. What are the dominant critical success factors that significantly contribute to successful TQM implementation?

3. Are there significant differences in how the division of respondents, namely the maintenance, production, head division, klh, wasses and material perceive the Total Quality variables of the selected Indonesian fertilizer companies?

Significant of the Research Study.

The importance of the research is to provide and understand the process of implementation of Total Quality Management applied in selected organizations. In addition, the present research is to enhance the ability of Total Quality Management, being applied in daily operations to improve the quality and productivity of business corporations and also to recommend to Indonesian manufacturing firms especially fertilizer companies a better strategy for implementing Total Quality Management as the key to success.

Scope and Limitations

The scope of the study for implementing Total Quality Management are that it is focused only on research at PT. Pupuk Kujang and its subsidiaries in Cikampek Indonesia as manufacturing firms with total 2,550 employees consist of:

1. PT. Pupuk Kujang
2. PT. Sintas Kurana Perdana
3. PT. Kujang Sud Chemicalitas
4. PT. Megayaku Kemasan Perdana
5. PT. Kawasan Industri Kujang Cikampek (KIKC)

All of the companies have been certified for ISO 9000 or ISO 14000 and being part of the leading companies that have been stated as a successful company.
in implementing quality control and management.

**Literature Review**  
The basic research on Quality Management in industries is a multi-economy study on Total Quality Management used as a reference by most Asian companies, and focusing on implementation aspect of Total Quality Management. The research being conducted is to follow up the survey on quality management applied to manufacturing firms sectors. It sets to identify the strengths and weaknesses of Total Quality Management, enhance the capabilities of business in carrying Total Quality Management, and facilitate Total Quality Management application in a broader spectrum of organizations.

The selected organizations being studied are meant to represent fertilizer manufacturing firms. The companies selected for the research are manufacture companies PT. Pupuk Kujang group as manufacturing companies.

**Research Methodology**  
The objectives of the research is to asses Total Quality Management implementation initiatives in a number of manufacturing companies to explain and identify similarity and differences in the implementation approach, benefits achieved, difficulties experienced and critical success factors. The filed study is based on the guidelines suggested by *Yin (1989)* and focused on manufacturing firms which sought richness in data and data gathering procedures.

**Research Design.**  
This research is a case study in *Quantitative Research* design e.g. Exploratory Research design (*Yin, 1994*).
The method of research will be using Inter-temporal Research Methods and Cross Sectional Research Methods (Tsetsekos, 1993).

**Population and Sampling Plan**

The populations are the manufacturing firms especially in fertilizer industry. The company which the author has selected is the industrial company called PT. Pupuk Kujang that located in Cikampek, West Java. Compared to other companies from the same industry, this BUMN company is already mature and secure. Their maturity is showed by their management’s commitment in developing and applying a very good total quality management concept that makes the company to remain in existent and different from others.

PT. Pupuk Kujang has 5 subsidiaries included in this research with total employees 2,550 people consist of:

<table>
<thead>
<tr>
<th>No</th>
<th>Company Name</th>
<th>Number Employee</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>PT. Pupuk Kujang</td>
<td>1,100</td>
<td>43%</td>
</tr>
<tr>
<td>2.</td>
<td>PT. Sintas Kurana Perdana</td>
<td>450</td>
<td>18%</td>
</tr>
</tbody>
</table>
The research will use stratified sampling based on the 5 companies above.

<table>
<thead>
<tr>
<th>No</th>
<th>Company Name</th>
<th>Number Employee</th>
<th>Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PT. Pupuk Kujang</td>
<td>1,100</td>
<td>42</td>
</tr>
<tr>
<td>2</td>
<td>PT. Sintas Kurana Perdana</td>
<td>450</td>
<td>17</td>
</tr>
<tr>
<td>3</td>
<td>PT. Kujang Sud Chemicalitas</td>
<td>420</td>
<td>15</td>
</tr>
<tr>
<td>4</td>
<td>PT. Megayaku Kemasan Perdana</td>
<td>300</td>
<td>12</td>
</tr>
<tr>
<td>5</td>
<td>PT. Kawasan Industri Kujang Cikampek (KIKC)</td>
<td>280</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>2,550</td>
<td>97</td>
</tr>
</tbody>
</table>

Sampling method is judgment sampling. Judgment sampling is a type of non-random sampling (also called purposive sampling or deliberate sampling). (S.P. Gupta, 1995, E.4). The sample will compare the manufacture fertilizer companies. The manufacturing companies are PT. Pupuk Kujang and its subsidiaries companies, which for sixteen years the company has been successfully implementing Total Quality Management.

**Dominant Critical Success Factors That Significantly Contribute To Successful TQM Implementation**

The dominant critical success factor that significantly contribute to successful of TQM implementation were obtained using Factor Analysis. Factor analysis (FA) is a data reduction technique that uses correlations between data variables. The underlying assumption of FA is that a number of factors exist to explain the correlations or inter-relationships among observed variables (Chatfield and Collins, 1992). For the present study, a FA was first performed on all 72 variables using principal components extraction (Tabachnick and Fidell, 1989). The goal of this method is to extract maximum variance from the data set within each factor. It is basically used to reduce a large number of variables down to a smaller number of components. For the simplicity of analytical purpose, each statement on the questionnaire was coded as:

1. Corpcul 1 – 7 = corporate culture
2. Leadcom 1 – 8 = leadership and commitment
3. Pmp 1 – 8 = participation, motivation and education
4. Sharing 1 – 6 = information sharing
5. Qualcon 1 – 15 = quality control
6. Stake 1 – 12 = stakeholder relationship
7. Inov 1 – 7 = innovation performance

The variables in each dimension in Total Quality Management then reduced using Factor Analysis. The Loading column indicates the relative weight of the elements in each of the three factors with those loading above 0.5 having been included as significant (Hair, 1998). The number of variables was reduced from 72 to 3 factors as a result of the varimax rotation method.

The three factors resulted from components extracted from Factor Analysis consist of:
Factor 1: Quality Control
Factor 2: Innovation and Stakeholder Relationship
Factor 3: Corporate Culture

The three factors are presented in descending weights in term of order of importance to the respondents. Likewise, the three factors selected have Eigenvalues greater than 1, as shown under the Eigenvalue column, representing the squared loadings of each factor, also referred to as the latent root.

**Significant differences Among Division in response to TQM**

An additional effort to obtain the different responses among respondents is by using One Way Anova method to test the significant difference among variables. The F value obtained from the analysis should be at the significant level of less than 0.10 for validity. The result shows that only twenty eight variables in the variables are significantly different among respondents.

- In Corporate Culture, the lowest value are wasses and production, while the highest value are maintenance, head division and material.
- In participation, the lowest value are klh and wasses, while the highest value are maintenance and material.
- In quality control, the lowest value are klh and wasses, while the highest value are production and material.
- In stakeholder, the lowest value are klh and wasses, while the highest value are maintenance and production.
- In innovation, the lowest value are wasses and production, while the highest value are maintenance and head division.

**Reliability and Validity Test**

According to Black (1999) "reliability is an indication of consistency between two measures of the same thing". To understand the relationship between the two groups of data, it is necessary to quantify the reliability of the data. The reliability of the factors needs to be determined in order to support any measures of validity.
that may be employed (Nunnally, 1978). A commonly used technique, internal consistency analysis, was employed in this research to measure the reliability of each derived factor from the factor analysis. The estimation used a reliability coefficient called Cronbach's alpha. With regard to the validity test; content, construct and criterion-related validity were conducted to ensure the data collected was valid. From the results of the Factor Analysis, 72 variables were clustered into three factors. Using the SPSS reliability analysis program, an internal consistency analysis was performed separately for the items of each critical factor. The values of alpha (i.e. reliability coefficient) computed for each factor resulted value of 0.972 which is considered reliable. Generally, an alpha of 0.6 or higher will be considered adequate in exploratory research (Black and Porter, 1996).

Discussion
With regard to the key findings of this research, the following section discusses the strengths and weaknesses of the implementation of TQM in Indonesia fertilizer companies, and hence, recommendations and areas for improvements will be highlighted.

Strengths
In accordance with the results of the analysis, three strengths have been identified
(1) Stakeholder relationship and Corporate culture. Corporate culture is important to improve the communication among top-to-bottom, bottom-to-top and across the departments, in which the information will be shared by each staff. In this study, Factor 1 Stakeholder relationship and Corporate culture appears as the most critical success factor, which reflects those organizations have a relatively open culture to improve the availability of the information and quality data to each level (i.e. manager, supervisor and employees). This results in a better understanding of the improvement areas for the employees.

(2) Leadership commitment. The results show that Factor 2 (Leadership commitment) is the most important factor for the successful implementation of TQM in Indonesia fertilizer companies. It indicates that those companies which have spent a huge effort of leader’s commitment is an important asset of a firm. Those executives also believed that leadership commitment would contribute to the success of the business.

(3) Participation, motivation and education by management. In TQM, management involvement and their total participation is necessary to lead and facilitate the implementation. For this study, the analytical results show that the management such as head division, have understood the importance of quality and quality improvement within the long-term business plan. They accept their quality responsibilities to participate in the quality functions, and are able to support the quality policies of the organization.

Weaknesses
From the results of the analysis of survey, two main weaknesses have been observed, which include:

1. Lack of innovation at the management level. The results of the analysis show that the amount of training is mainly focused on the personal development of the employees, not improving innovation skills. Management in many cases does not know how to support the quality management practices. Therefore the personal development of managers is equally important as the employees. The managers in Indonesian companies indeed need to be trained and educated to be more innovative in the TQM journey. For the successful introduction and development of TQM initiatives, the lack of awareness of innovation at the management level needs to be tackled.

2. Lack of sharing and employee involvement. Recognition, teamwork and delegation are required to encourage the participation in the quality practices such as problem solving, decision making and quality improvement. In this study, it was found that employee sharing involvement is not critical in Indonesia companies. In Indonesian culture, senior management does not push decision making to the lowest practical level. Managers sometimes feel threatened by the idea of delegating authority and empowering employees as the Indonesian managers are relatively slow in organisational trust. Another possible reason that leads to the failure of employee sharing involvement is the negative and passive attitude of employees towards management in the Indonesian culture.

**Action Plan**

The proposed action plan tackle twenty eight variables which are significantly different in value. The objective is to minimize gaps among divisions.

- In Corporate Culture, improve wasses and production, while keep up the good work of maintenance, head division and material.
- In participation, improve klh and wasses, while keep up the good work of maintenance and material.
- In quality control, improve klh and wasses, while keep up the good work of production and material.
- In stakeholder, improve klh and wasses, while the keep up the good work of maintenance and production
- In innovation, improve wasses and production, while keep up the good work of maintenance and head division.

**Conclusions**

This research presents the results of a study on CSFs for TQM implementation in Indonesia industries. A total of 7 dimensions with 72 variables were considered in the questionnaire. A factor analysis was carried out on the collected data, which identified three Critical Success Factors of TQM namely:

- Factor 1: Quality Control
- Factor 2: Innovation and Stakeholder Relationship
- Factor 3: Corporate Culture

The difference test among 6 division consist of maintenance, production, head division, klh, wasses and material found there are 28 variables significantly differentiate among the respondents. The reliability and validity analysis on the results were also conducted. It was concluded that they were reliable factors and the study was valid. Systematic literature review and the comprehensive pre-testing was done by Saraph et al. (1989) to ensure the content validity. The unifactorial factor analysis was also carried out to support the construct validity (Black and Porter, 1996). The strengths and weaknesses of the study are also reported in the research.

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