CHAPTER 6

RELATIONSHIP BETWEEN CRITICAL SUCCESS FACTORS AND QUALITY, FIRM PERFORMANCES

Although businesses in the West started TQM process in the years approaching the 80's and despite the abundant literature on TQM, empirical studies of the relationship between TQM practices and operational performance did not start until 1994. Moreover, few of them used large samples of manufacturing businesses from different sectors. The purpose of this study, which is based on extensive fieldwork, is to provide new evidence to consolidate previous findings and as well as to provide a guidance for managers currently working in this field. The study seeks to discover whether the implementation of TQM practices has an impact on the improvement in operational performance and to find out in which areas the influence is greatest. In order to do so, we have firstly carried out a revision of the literature related to this issue. Next, the conceptual framework was established in order to define the indicators which measure the implementation of TQM practices. Then the variables were set in the empirical model in which they were to be contrasted. Finally, the results obtained were analyzed and the conclusions of the study were reached.

6.1 THE RELATIONSHIP BETWEEN QUALITY AND PERFORMANCE: A REVISION OF THE LITERATURE

The relationship between the adoption by companies of certain practices and performance is the subject of constant interest among researchers in the field of business management. The implementation of any kind of practice represents a cost for the company, both in terms of human and material resources. If the efforts made with regard to the implementation and maintenance of these practices are to show a return, then an improvement in the results must be achieved. In the field of TQM we need to distinguish between TQM practices (input) and quality results (output). Over the last few years, there have been a number of studies which have tried to relate TQM practices with different operational results, including quality.
results, among others. In the majority of the empirical studies on TQM, this issue appears in one form or another (Flynn et al., 1994; Adam, 1994; Hendricks and Singhal, 1997, Curkovic et al., 2000; Kaynak, 2003; Rahman & Bulllock, 2005).

There are several studies of an empirical nature, undertaken by different institutions or firms of consultants for informative purposes, the conclusions of which indicate that the companies which adopt total quality models obtain better results (U.S. GAO, 1991; American Quality Foundation, 1991). However, precaution must be shown in regard to these conclusions as these studies can be partial and not scientifically accurate (Powell, 1995).

Flynn et al. (1994) in their attempt to create an instrument to measure TQM and in order to establish its validity as a criterion, they analyzed the correlation of its dimensions with two measurements of quality performance and found a strong relationship between them. From that moment on, different empirical studies have appeared over the years. These studies have been published after 1994, except for one particular case. On the whole, they are based on data from American companies and almost all the cases centre exclusively on one sector of manufacturing. The methodology used for the analysis is varied, although the multiple regression analyses are most common. In general, the relationship between the TQM practices and the results is positive, that is to say, the greater the level of implementation, the better the results obtained. Nevertheless, the significance of some dimensions are not the same as for others, nor is the repercussion the same on the operational performance or the economic-financial results. All the studies present transversal type data and have the methodological limitations peculiar to this type of study (Sila et al., 2003).

Next to the Baldrige award, Deming's 14 points (1981) are the most often cited tenets on quality management. To develop a theory of quality management based on the 14 points, Anderson et al. (1994) enlisted the aid of a number of academicians and practitioners and used the Delphi Method to identify 37 concepts suggested by 14 points. They used a heuristic clustering algorithm to reduce the concepts from 37 to 7. The final seven concepts
included: visionary leadership, internal and external cooperation, learning, process management, continuous improvement, employee fulfillment, and customer satisfaction. In a subsequent article, Anderson et al. (1995) proceeded to specify the casual relationships among the set of seven concepts (model not shown).

Adam (1994) used exploratory factor analysis to define quality and productivity approach constructs. Using the quality and productivity factors as independent variables, Adam ran stepwise multiple regressions, with the dependent variables being actual quality, operating, and financial performance. Results of this study showed a statistically significant relationship between the quality constructs and operating or financial. Flynn et al. (1994) proposed another causal model for quality management (not shown) embedded in a strategic view of the manufacturing functions of the organizations they defined as “World Class Manufacturing.” Quality management was only one construct associated with this integrated approach to manufacturing. The other constructs were: Strategic management, Human resources management, Just-In-Time, Technology Management, and Top Management support.

Dow et al. (1999) developed the following nine constructs using factor analysis: workforce commitment, shared vision, customer focus, use of teams, personnel training, cooperative supplier relations, use of benchmarking, use of advanced manufacturing systems, and use of just-in-time principles. They developed and compared three structural models (baseline, best practice, and a two-factor model). Briefly, they concluded that (1) quality practices such as the use of teams and personnel training are usually implemented in combination and are not independent, and (2) the baseline model provides the best overall model fit. Their nine quality practice constructs were not closely tied to the seven MBNQA categories, although these nine constructs did approximate some Baldrige subcategories.

Samson and Terziovski (1999) used the first six constructs and their respective factor scores as independent variables in multiple regression
analysis, and the seventh construct and its factor score, "operating performance", as the dependent variable. The results of the regression analysis showed that leadership, people management, and customer focus were statistically significant and positively related to operating performance. The other three independent factors—strategic planning, information and analysis, and process management—were either not statistically significant or negatively (inversely) related to operating performance.

Wilson & Collier (2000) conducted an empirical investigation of the MBNQA award causal model. The survey population was 800 manufacturing firms in USA. The evidence from their research supported the general theory behind MBNQA award criteria and causal model. The theory states that leadership drives system performance, and these variables (leadership & system) cause business and customer satisfaction results. The results of the research supported the theory.

Curkovic et al., (2000), studied the impact of Quality-related Action Programs (QAPs) on quality performance and firm performance in USA. They concluded that not all QAPs have pervasive direct effects, but many have indirect effects. Fynes & Voss (2001) developed a path analytical model of quality practices, quality performance and business performance. The first indication from the study is the need to recognize the central role ‘design quality’ plays in the overall spectrum of quality performance. Not only it is necessary to focus on quality practices that have a direct impact on design quality; but also firms must recognize the influential role of design quality on other measures of quality performance such as conformance quality and external quality-in-use. The additional implication of their study is the need to consider other measures of manufacturing performance if overall performance is to improve. Kaynak (2003) conducted a study in USA to investigate the relationship among TQM practices and to identify the direct and indirect effects of TQM practices on the various dimensions of performance using structural model testing. They found that a positive relationship exists between the extent to which companies implement TQM and firm performance. Rahman & Bullock (2005) investigated the relationship between
soft TQM and hard TQM on organizational performance. They found that the elements of soft TQM are significantly related to organizational performance.

6.2 THE RESEARCH PROBLEM AND ITS RELEVANCE

From the above discussion, it appears that dedicated studies that explore the relationship between TQM critical success factors and quality, firm performances have not been conducted so far in India. The finding indicates a gap in the literature on TQM in manufacturing industries. Hence, there is a need for exploring the relationship between Critical Success Factors (CSFs) and performances.

6.3 TQM CRITICAL SUCCESS FACTORS

After a comprehensive review of quality gurus, quality award models, and other existing literature, the following ten TQM critical success factors were identified as the most primary TQM critical success factors.

1. The Role of Top management and Quality Policy (RTQP)
2. Role of the Quality Department (RQD)
3. Training (TR)
4. Product Design (PD)
5. Supplier Quality management (SQ)
6. Process Management (PM)
7. Quality Data and Reporting (QDR)
8. Employee Relations (ER)
9. Customer Focus (CF)
10. Lean Manufacturing (LM)
11. Quality Performance Measures (QPM)
12. Firm Performance Measures (FPM)

Critical success factors (CSFs) of TQM are latent variables, which means they cannot be measured directly Ahire et al. (1996). Hence Quality-related Action Programs (QAPs) are generated that represent manifestations of these CSFs. For a field study, each manifestation is measured with an item in a scale.
In the current research, 10 CSFs were manifested into 75 QAPs. Sixteen output performance measures related quality, firm performances were included in the survey to study the relationship. The ten CSFs were treated as independent variables (Numbered 1 to 10). The output measures were treated as dependent measures (Numbered 11 and 12).

6.4 WEB-BASED TQM MEASUREMENT PROCESS

For the present study, survey based on Visual Basic (VB) software has been developed for collecting responses through e-mail and internet. After a pre-test with experts, a survey questionnaire with 10 CSFs and 75 QAPs were prepared for the present empirical survey. Quality-related action programs were arranged in a random order and presented to the respondents. Three hundred e-mails with survey questionnaire file attached were sent to selected ISO 9001 certified companies in India. The respondents entered their responses by clicking the right button of the computer mouse next to the question in 5 point Likert scale. A total of 82 responses were received through internet and 22 additional responses were received through posts. The responses, 104 in total were analyzed using the SPSS Version 9.05 statistical package.

6.5 BIVARIATE CORRELATIONS AMONG CRITICAL SUCCESS FACTORS OF TQM AND ANALYSIS.

TQM critical success factors were treated as independent variables and the quality, firm performances as dependent variables. The bivariate correlation between independent variables and dependent variables was tested using the responses collected through survey. The software SPSS Version 9.05 was used for the analysis. The results are presented in the Table 6.1. From the results, it is evident that each dependent variable is positively related to with most of the critical success factors of TQM.
Table 6.1 Bivariate correlations among critical success factors of TQM and performance measures

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<tr>
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<th>RTQP</th>
<th>RQD</th>
<th>TR</th>
<th>PD</th>
<th>SQ</th>
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** Correlation is significant at the 0.01 level (2-tailed).
Quality performance measures are positively (>0.6) related to all the critical success factors except 'training (TR) and lean manufacturing (LM)'. Firm performances are related (>0.6) to all the critical success factors except 'quality data and reporting and lean manufacturing'. Among critical success factors, 'the role of top management and quality policy' is positively related to supplier quality management, process management, quality data & reporting and lean manufacturing. Similarly, the CSFs, supplier quality management, process management and quality data & reporting are positively related with other CSFs. The results of this study conformed the findings of similar studies reviewed in this paper that the TQM implementation indeed has a positive effect on quality and firm performances.

6.6 RESULTS AND DISCUSSION:

This study was carried out to analyze the relationship between TQM critical success factors and the quality, firm performance factors in TQM organizations. ISO 9000 certified companies were treated as TQM organizations and the survey was conducted through internet. Ten critical success factors were manifested into 75 Quality-related action programs and the quality, firm output performances were manifested into 16 measures for the empirical study. The results of the study validated relations among TQM practices and the effects of these practices on firm, quality performances.

Evaluating customer relations as a technique of TQM is becoming more viable because TQM organizations are customer focused. Measurement studies on TQM discussed in this paper provide measurement items for the scale of customer focus. A lack of top management commitment to the implementation of TQM has emerged as a positive reason for the failure of TQM systems in some organizations.

A paper based on the contents of this chapter is under review for a possible publication in the Journal of 'ICFAI operations management.'