

The Importance of Both People and Technical-Oriented TQM on Performance

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Abstract. This paper examines the importance of incorporating both people and technically-oriented total quality management (TQM) in Malaysian manufacturing industry. The paper specifically investigates relationship between socially and technically-oriented TQM, process performance and business performance and the associations were analyzed through structural equation modeling (SEM). The SEM result reveals that people-oriented TQM measured by dimensions namely 'top management commitment', 'customer focus', 'supplier focus' and 'employee focus' appears to be of primary importance to process performance. In addition, technically-oriented TQM manifested by dimensions namely 'benchmarking', 'quality measurement' and 'process improvement' exhibits significant structural effect on business performance. Findings of the study provide striking demonstrations of the importance of both types of TQM orientations in enhancing performances of Malaysian manufacturing companies. The result indicates that manufacturing companies should emphasize greater attention to customer focus of the socially-oriented TQM and quality measurement aspects of the technically-oriented TQM.

Keywords: Total Quality Management (TQM), socially and technically-oriented TQM, process performance, business performance and structural equation modelling.

1. Introduction

Over the years, the importance of quality grew and soon the concepts of total quality management (TQM) emerge. As the outcomes of several theoretical and empirical studies, quality improvement essentials are all well known, documented, and available as knowledge and techniques; and the importance of quality in all areas of the company's performance became recognized. The quest for a better way depends directly on higher quality. The Japanese concept of seeking continual improvement in all things starts with performance quality and, in the end, results in value for the customer [1] [2] [3].

Despite variable evidence regarding performance improvements related to TQM, relatively little empirical research exists to measure the extent of performance improvements resulted from the TQM especially in the Malaysian context. This paper seeks to address this apparent gap in literature by examining the performance implications of implementing TQM in the context of Malaysian manufacturing industry using structural equation modeling (SEM). This paper specifically investigates relationships between eight important components of TQM namely top management commitment, customer focus, supplier focus and employee focus (which collectively are referred to as socially-oriented TQM) as well as benchmarking, quality measurement, process improvement and zero defect (which are collectively termed as technically-oriented TQM) with process performance and business performance. The main objectives of this paper are: a) To assess the importance of each socially and technically-oriented TQM dimensions on performance; b) To determine whether socially-oriented TQM has significant effect on process performance; c) To discover whether technically-oriented TQM has significant effect on business performance; and d) To test whether there is a significant effect of process performance on business performance.

2. Total Quality Management (Literature Review)

TQM provides a set of practices that emphasizes, among other things, continuous improvement, meeting customers' requirements, reducing rework, long-range thinking, increased employee involvement and teamwork, process redesign, competitive benchmarking, team-based problem-solving, constant measurement of results, and closer relationships with suppliers [4] [5] [2]. Within this context, Deming [3] proposed the

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“theory of profound knowledge” which states that the success of quality management efforts depends on the effective integration of various management subsystems. This idea is shared by Anderson et al. [6] who made the effort of synthesizing a theory of quality management. They assessed the impact of Deming’s management method on a firm’s organizational behaviour and practice of quality management. In addition, Waldman [7] provided some theoretical direction to the study of leadership and TQM while others engaged in theory or model building related to TQM [8] [9] [10].

In this study, in order to determine the domain that encompasses TQM practices, exhaustive theoretical, empirical and practitioner literature were reviewed. Adapting from Powell’s [11] TQM practices and also factors suggested by Saraph et al. [12], Malcolm Baldrige’s [1] framework as well as a thorough review and synthesis of TQM literature [13] [3] [5] [4] [10], the researcher has identified four elements of the socially-oriented TQM practices in this study as follows: 1) Top Management Commitment, 2) Customer Focus, 3) Supplier Relations and 4) Employee Focus. In addition, four technically-oriented TQM practices are demonstrated by 1) Benchmarking, 2) Quality Measurement, 3) Process Improvement and Zero Defects. Several studies have identified performance improvement constructs that are commonly associated with TQM program [14] [15] [10]. The first performance construct in this paper namely process performance is manifested by ‘manufacturing flow management process’, ‘supplier relationship management process’ and ‘order fulfillment process’. On the other hand, the second performance construct namely business performance is considered as a very important bottom-line outcome. In this study, it is operationalised by indicators namely ‘Return on Assets’, ‘Return on Sales’, and ‘Market share’ [16] [17].

3. Hypotheses

A structural equation model is used in this study to analyze the structural effect of these TQM constructs on the performance results. In the test of goodness of fit for the structural equation modeling, the probability that is expected should not be significant (probability value > 0.05) to support the overall null hypothesis which suggests that the overall hypothesized model has a good fit [18]. In this paper, firstly, the study aims to test the fitness of the overall SEM model based on the main null hypothesis:

H_0 : The overall hypothesized model has a good fit.

In addition, this study also attempts to test the following main hypotheses:

H_1 : Technically-oriented TQM is positively related to business performance

H_2 : Socially-oriented TQM is positively related to process performance

H_3 : Process performance is positively related to business performance

4. Research Method

The paper formed part of a larger study on supply chain management (SCM) and TQM. The broader study had focused on individual constructs of SCM and TQM that lead to collective influences, which in turn lead to better performances. Specifically, the paper only focused on socially and technically-oriented TQM. The instrument used in the study was a structured survey questionnaire, which was designed to assess the manufacturing companies in term of the described dimensions. To enable respondents to indicate their answers, seven–point interval scales were used for the questionnaire. Several items of TQM, which had been widely referred, were extracted. Similarly, the dependent constructs namely process performance and business performance also used a seven-point interval scale, representing a range of agreement on statements whether over the past three years these performances were high relative to competitors after implementing socially and technically-oriented TQM. The sample unit of analysis in this study was Malaysian manufacturing companies (the sampling frame was derived from the Federation of Malaysian Manufacturers Directory-FMM) and each company was represented (the respondent) by either senior production or quality manager. One hundred and sixty nine responses were received and analyzed. Face to face interviews with the managers were carried out to ensure the information accuracy, validating the outcome of analysis and developing an understanding of practical aspects of socially and technically-oriented TQM principles and adoption.

5. Structural Equation Modelling (SEM)

A SEM model was employed to investigate simultaneous linkages that allow a researcher to determine the relative strength of relationships between variables. As the first step, the constructs in the study were tested for discriminant validity so that it could verify that the scales developed to measure constructs, were indeed measuring different constructs [19]. Using confirmatory factor analysis (CFA), the chi square differences test was conducted by comparing the freely estimated measurement model with a theoretical model where the correlation parameter was constrained to 1 [20] [21]. Discriminant validity between the four constructs is achieved if the chi-square value for the unconstrained model is significantly lower than that of the constraint model. The result of the CFA suggested that the 4-factor model should be adopted since it had a significantly lowest chi-square value. The goodness of fit index (GFI) and comparative fit index (CFI) of the constructs were more than the value of 0.90 criterion suggested by Hair et al. [22], hence, establishing the construct validity. CFA showed all the items were loaded highly on their corresponding constructs, which supported the independence of the constructs and provided strong empirical evidence of their validity. The reliability analysis was also conducted by computing the Cronbach's alpha for the main constructs. The result indicated that the Cronbach's alpha measures for the main constructs exceeded the threshold point of 0.70 suggested by Nunnally [25]. Alpha coefficients for socially and technically-oriented TQM and performance scales ranged between 0.901 and 0.935 after the alpha maximization processes were carried out.

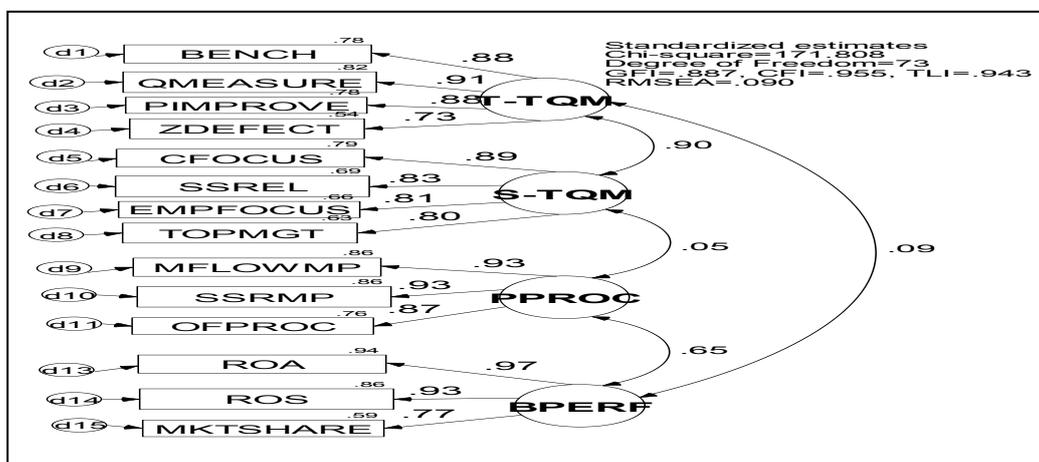


Fig. 1: The Confirmatory Factor Analysis (CFA) Model for Testing Validity

In the second step, the study investigated the linkages between socially-oriented TQM, technically-oriented TQM, process performance and business performance as depicted in the model shown in Figure 2. To support the assumption regarding the fitness of the SEM model with the empirical data, the acceptance of the null hypothesis of the overall model was expected. Hence, in this test of goodness of fit for the structural equation modeling, the resulting probability should be higher than 0.05 to support the overall null hypothesis of the model.

The SEM result indicated that the Chi-square value was 84.751 with p-value of 0.164 (Figure 2). This suggested that the model had a good fit. The p-value was considerably sufficient (p-value > 0.05) in supporting the proposition that the overall model fitted the data. In addition, other statistical structural indices such as Goodness of fit index (GFI = 0.934), Bentler comparative fit index (CFI = 0.995), and Normed fit index (NFI = 0.963) further suggested that the model had a satisfactory fit (Figure 2). Since the probability value and structural modeling indices were well above the recommended level, the model was considered to be a reasonable representation of the data [24] [17] [18].

The direct structural effect of technically-oriented TQM on business performance (structural effect = 0.32) was considered moderately high given the complex causal linkages, suggesting the importance of 'Quality measurement' followed by 'Process Improvement', 'Benchmarking' and 'Zero Defects' in supporting technically-oriented TQM in Malaysian manufacturing industry. Therefore, we had enough evidence to accept the proposition that technically-oriented TQM had a positive and significant structural effect on business performance (H_1 was supported). Establishing the causal linkages between input and

bottom-line outcomes is difficult in most complex system. Surprisingly, the direct structural effect of socially-oriented TQM on process performance was high and significant (structural effect = 0.65) (H_2 was supported). Subsequently, the direct structural effect of process performance on business performance (structural effect = 0.49) was also high and significant and able to support the third hypothesis (H_3 direct effect was supported).

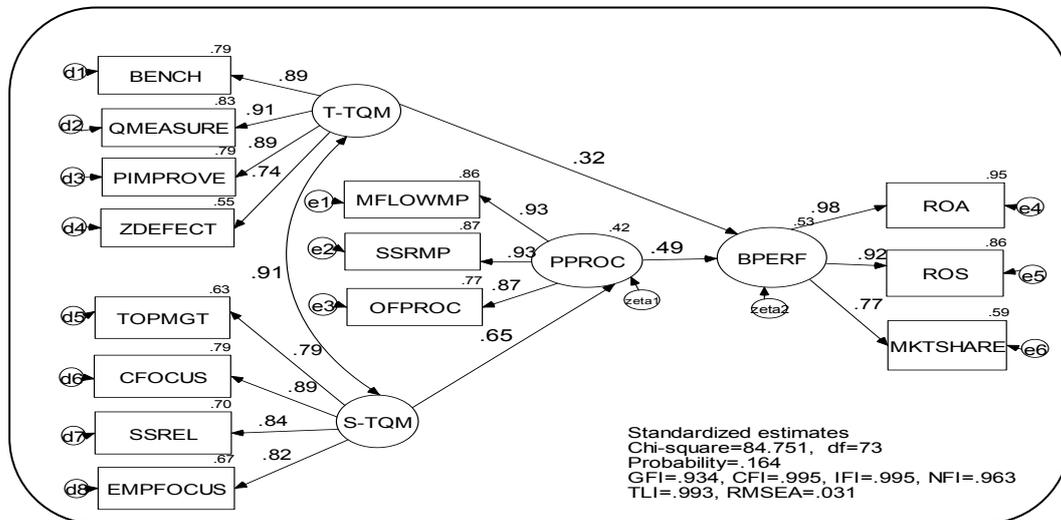


Fig. 2: The Structural Equation Model Showing the Linkages between Technically-Oriented TQM, Socially-Oriented TQM, Process performance and Business Performance.

Reviewing the structural loadings of each technically-oriented TQM dimensions on performance, it was obvious that quality measurement (structural loading = 0.91) had the highest contribution towards technically-oriented TQM implementation. This was followed by benchmarking (structural loading = 0.89), process improvement (structural loading = 0.89) and zero defects (structural loading = 0.74). Observing the structural loadings of each socially-oriented TQM determinants on process performance, it was suggested that customer focus (structural loading = 0.89) had the highest contribution towards socially-oriented TQM implementation. It was followed by supplier relations (structural loading = 0.84), employee focus (structural loading = 0.82) and lastly top management commitment (structural loading = 0.79).

6. Conclusion and Implications

Socially and technically-oriented TQM provides a vision that focuses everyone in an organization on product, production and quality improvements. The pursuit of these improvements is not only requested by the market but also driven by the need of manufacturing companies to survive. The associations and effects of TQM variables are evaluated using structural equation modeling. The results of the study assist in the understandings of how TQM influences process performance and business performance. The findings and evidences derived from the statistical analysis lead to several main conclusions suggested as follows:

- Socially-oriented TQM (manifested by dimensions namely ‘customer focus’, ‘supplier focus’ ‘employee focus’ and ‘top management commitment’) has positive effect on process performance.
- Technically-oriented TQM (operationalized by dimensions specifically ‘Benchmarking’, ‘Quality measurement’, ‘Process Improvement’ and ‘Zero Defects’) has positive effect on business performance.
- Process performance has positive structural effect on business performance.

The findings suggest that both socially and technically-oriented TQM dimensions are important in enhancing performances. Technically-oriented TQM demonstrates a direct and significant structural effect on business performance which is translated by ROA, ROS and market share. However, socially or people-oriented TQM only indicates indirect structural effect on business performance. The result highlights that the link between socially-oriented TQM and business performance is mediated by process performance. This can suggest that people may be difficult to accept changes and new quality implementations but good people-

oriented programs can result in better process performance and ultimately enhance bottom-line performance. The degree of socially-orientation and technically-oriented TQM reflects the relative emphasis the manufacturing company places between the people and technical programs in implementing TQM. In other words, a manufacturing company pursuing TQM can strive to be either people focus or operation focus or emphasize both. Since TQM in this study emphasizes not only business performance but also process performance, therefore people or social factor also become a key input to TQM. A manufacturing company that focus on both socially and technically-oriented TQM exhibits high people orientation practices and places technical and quality objectives in their overall orientation practices. In addition, it also monitors quality through programs like benchmarking, quality measure, process improvement and zero defects. The conclusion emerging from this study is that socially and technically-oriented TQM have a positive impact on performance. It can be concluded that a higher level of performance can be expected when both TQM orientation are jointly implemented.

7. References

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