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Levels of Management Commitment: A Moderator the Structural Relationships among Critical Success Factors of TQM, World-Class Performance in Operations, and Company Financial Performance

Wakhid Slamet Ciptono*
Ph.D. Candidate, Faculty of Business and Accountancy, University of Malaya, Malaysia

ABSTRACT

This study investigates the moderating impacts of the three levels of management commitment (top, middle, and low levels) on the structural relationships among the constructs— six critical success factors of TQM (quality improvement program, supervisory leadership, supplier involvement, management commitment, training to improve products/services, cross-functional relationships); world-class performance in operations (world-class company practices, operational excellence practices, company non-financial performance); and company financial performance. It uses a sample of 1,332 managers in 140 strategic business units (SBUs) within 49 oil and gas companies in Indonesia.

The empirical results indicate that the goodness-of-fit of the unconstrained model is much better than that of the constrained model, and this is an indicative that the three level of management moderates the structural relationships among the constructs. Those are, three levels of management act as a moderator variable between critical success factors of TQM, world-class company practices, operational excellence practices, company non-financial performance, and company financial performance. Results further reveal that world-class performances in operations (world-class company practices, operational excellence practices, and company non-financial performance) were positively mediated the impact of critical success factors of TQM on company financial performance.

Results also point out that five of six critical success factors of TQM positively associated with world-class company practices and operational excellence practices under the three levels of management (top, middle, low). World-class company practices and operational excellence practices have direct and significant effects on company non-financial performance (productivity, operational reliability). Furthermore, empirical results suggest that there is a positive and significant relationship between company non-financial performance and company financial performance. Implications, limitation and lines of future research are discussed.

Keywords: Company financial performance, critical success factors of TQM, world-class company practices

* Corresponding author. Email: wakhidsciptono@yahoo.com

Introduction

As a means of improving an organization's performance, the principles of Total Quality Management (TQM) have been widely utilized by the public and business organizations since the end of 1980s (ByeoungGone, 1997). The basic purpose for an organization is to reach a desired steady state. The steady state usually means long-term organizational effectiveness and survival (Kast and Rosenzweig, 1972). The organizational goal prescribed by TQM is to establish quality enhancement as a dominant priority (Hackman and Wageman, 1995; Spencer, 1994; Wang, 2004). TQM philosophy says that only through quality enhancement, an organization can obtain long-term effectiveness and survival. Thus, the basic purposes of a TQM organization are to reach organizational effectiveness and to ensure the existence and sustainable development of the organization (Domingo, 1996).

According to Wang (2004), one question arises here is "what do long-term organizational effectiveness and survival mean?" In the TQM paradigm, long-term organizational effectiveness and survival mean satisfying customers. Customers can be defined broadly. It can involve internal customer, external customer and every on him or herself (Evans and Lindsay, 1996). Thus, the phase "satisfying customers" can mean satisfying every human being in our society. In other words, the purposes of TQM organizations should include the employees' personal fulfillment (satisfying internal customers) and the organizational contribution to the society (satisfying external customers) (Miller, 1992). In addition a set of company performance measurements that incorporates satisfying internal as well as external customers is needed to measure organizational performance and improvements (Tatikonda and Tatikonda, 1996; Urdan, 2004; Vokurka and Fliedner, 1995).

To deal with the challenge in achieving long-term organizational effectiveness and survival, an organization must develop continuous process improvement and innovation in order to gain better understanding of a successful TQM implementation (Nonaka *et al*., 2003.; Spencer, 1996; Trott, 2004). The implementation of total quality management (TQM) cannot be successful without utilizing suitable quality management methods or QMMs (Kanji and Asher, 1996; Mann and Kehoe, 1994; Zhang, 2000).

Access to appropriate QMMs has been put forward as vital for successful quality work. The use of QMMs is an essential component of any successful quality process improvement and innovation (Bunney and Dale, 1997; Tidd and Pavitt, 2005). QMMs play a key role in company wide approach to continuous process improvement and innovation (McQuater *et al*., 1995; Mann and Kehoe, 1995). Zhang stated that there is widespread consensus that using QMMs is a way of managing an organization to improve its overall long-term organizational effectiveness and survival. There is less agreement as to how many QMMs actually exist and what the effect of QMMs on company performance are.

To be effective, quality management methods (QMMs) should be categorized into critical success factors (CSFs) of TQM. This suggests that organizations pursuing their long-term effectiveness and survival should be designed consistent with quality management practices implemented by organizations' TQM strategic choice. Accordingly, it may be argued that organizations whose long-term effectiveness and survival are consistent with their quality management practices will outperform those whose long-tem effectiveness and survival performance are not. This issue, however, has not widely explored in the literature (Tamimi and Gershon, 1995; Zhang, 2004). Evidence about the structural relations between quality management practices (critical success factors of TQM) and company

performance (non-financial and financial) is still lacking limited.

This study is designed to fill this gap. It empirically examines the extent to which an appropriate alignment of critical success factors of TQM, world-class performance in operations (world-class company practices, and operational excellence practices) facilitates the achievement of company non-financial performance which leads to improved company financial performance. In addition, attempts are needed to realize that a successful TQM implementation model need not to operate in isolation from other change initiative programs, such as operational excellence practices, world-class company practices, and company performance—they could be integrated (Patterson and Engelkemeyer, 1989). The study wants to determine that with connections, TQM practices could be repositioned as a more impactive company performance improvement program. As a further effort to renew interest in TQM practices, all SBUs along the supply- and demand-chains in the oil and gas industry begin to realize that they depended on each other and the poor quality from one SBU partner mushroomed to affect others (Hakim, 1996).

The Objectives of the Study

Overall, the researcher aims to contribute to the literature in four ways:

(1) To suggest critical success factors of TQM for further improvement and more appropriate implementation;

(2) To investigate the moderating impacts of the three level of management (top, middle, and low) on the structural relationships among the constructs.

(3) To determine whether world-class performance in operations (world-class company practices, operational excellence practices, and company non-financial performance) fully mediated the impact of critical success factors of TQM on company financial performance; and

(4) To broaden the knowledge of TQM by providing the structural relationships among critical success factors of TQM, world-class performance in operations (world-class company practices, operational excellence practices, company non-financial performance), and company performance.

Theoretical Framework

This study concerned with 9 latent constructs and 1 observed variable (company financial performance). The researcher has developed a framework of the study (Figure 1) to illustrate how critical success factors of TQM affect company financial performance. In this framework, the researcher argues that six critical success factors of TQM or CSFTQM (as independent constructs) affect company financial performance or CFP (as a dependent construct) through world-class performance in operations (three mediating constructs: world-class company practices or WCC, operational excellence Practices or OE, and company non-financial performance or CNFP). This research framework also investigates the moderating impacts of the levels of management commitment on the structural relationships among the constructs.

Measurement and Operationalization of the Constructs

All ten constructs are measured with five-point Likert scales. Six items of critical success factor of TQM (CSFTQM1-6), world-class company (WCC), and operational excellence (OE) measure consists of 28 sub items, 4 items, and 3 items. Respondents indicated their agreement/disagreement with each sub item, using a five-point scale ranging from ‘strongly disagree’ to ‘strongly agree’. Higher scores reflect a higher critical success factor of TQM, a higher priority in practicing of world-class

company and operational excellence. The company performance (non-financial and financial) measure consists of 2 items and 3 items. The measures asked respondents indicate how good they were about company performance using a five-point scale ranging from 'very bad' to 'very good'. Higher scores reflect a better company performance. The constructs of this study were operationalized as follows.

Critical Success Factors of TQM

Six critical success factors of TQM were operationalized using a set of 50 quality management methods. These fifty quality management methods (QMMs) can be explained and summarized by a smaller set of meaningful factors quality management practices (i.e. six CSFsTQM) using exploratory factor analysis. The six critical success factors of TQM may be interpreted, respectively, as quality improvement program, supervisory leadership, supplier involvement, management commitment, training to improve products/services, and cross functional team relationships among SBUs. Fifty quality management methods were developed to measure Deming's 14 points based on a thorough literature review that focused on the writings of Ahire *et al*. (1996), Saraph *et al.* (1989), Tamimi (1995 and 1998).

World-Class Performance in Operations. Wright and Geroy (2001) argue that world-class performance in operations is derived from a complex set of interacting practices between world-class company and operational excellence. In developing world-class performance in operations, the researcher considered that most of SBUs in the Indonesia's oil and gas industry are cost centers. They do rely much on company non-financial performance. In addition, if the company non-financial performance is excellence, then world-class company and operational excellence may be sufficient to gain the better company financial performance and to lead to business success.

The characteristic of successful TQM implementation program encourages organizations to address quality on a broad range of issues (i.e., world-class performance in operations—world-class company practices, operational excellence practices, and company non-financial performance). Companies that wish to compete for the world-class standards must produce evidence of leadership and commitment, initiate verifiable cross-functional communications, address the happiness and well-being of the workforce through reward and recognition and, above all work toward achieving long-term objectives.

World-Class Company Practices (WCC) was operationalized using sixty seven Hayes and Wheelwright dimensions. Hayes and Wheelwright (1984) developed their concept of world-class manufacturing based on six principles. Specifically, confirmatory factor analysis is employed to determine whether Hayes and Wheelwright's 67 dimensions have positive and significant effect on the six principles of world-class manufacturing. The measure was developed by Flynn *et.al*., 1999. The term world-class company practices were used because these firms were associated with outstanding performance in the global oil and gas industry.

Operational excellence practices (OE) was operationalized using five dimensions of operational excellence practices—safety, environment, health, reliability, and efficiency. The measure was adapted from Parker (1999) and ChevronTexaco's program (2003).

Company Financial Performance (CFP) and **Company Non-Financial Performance (CNFP)** were operationalized as the ability of the company to increase its operating performance. The measures were adapted from

Cook and Verma 2002. Company financial performance consists of three items (sales, net profit margin, and return on assets) and company non-financial performance consists of two items (productivity and operational reliability).

Levels of Management Commitment as a Moderating Variable. In this study, a multiple informant sampling unit (a stratified systematic sampling)—three levels of management—was used to ensure a balanced view of the structural relationships between the research constructs (as a moderating variable). It is also to collect data from the most informed respondents (1,332 managers' respondents) on different level of management (Ruekert and Walker, 1987). The sampling units were 354 top level managers (Board of Directors and Team Manager), 447 middle level managers (Team Leaders), and 531 low level managers (Team Supervisors) at the SBU level of the Indonesia's integrated oil and gas companies—upstream chain, and downstream chain of oil and gas energy.

The literature of TQM widely accepts that the success of TQM implementation is guaranteed when responsiveness for quality is extended throughout all the levels of management in the organization. For this reason, three levels of management (top, middle, and low levels) commitment are given greater consideration during the implementation of a TQM strategy—as a moderating variable.

The research framework (Figure 1) which identifies sixteen-structural-relationships delineating the factors involved in the association between 10 research constructs for upstream and downstream SBUs. On the basis of a review of the diffusion of distinctive operations strategy literatures, the author posits 7 quantitative-deductive research hypotheses to test the link between six critical success factors of TQM and company financial performance (sales, net profit margin, and return on assets).

1. H1: the three levels of management (top, middle, and low) moderated the structural relationships among the constructs.

2. H2: World-class performance in operations (world-class company practices, operational practices, company non-financial performance) fully mediated the impact of critical success factors of TQM on company financial performance.

3. H3a-f: All six CSFs of TQM have direct and significant effect on world-class company practices.

4. H4a-f: All six CSFs of TQM have direct and significant effect on operational excellence practices.

5. H5: World-class company practice has a direct and significant effect on company non-financial performance (productivity, operational reliability).

6. H6: Operational excellence practice has a direct and significant effect on company non-financial performance (productivity, operational reliability).

7. H7: Company non-financial performance has a direct and significant effect on company financial performance (sales, net profit margin, and return on assets).

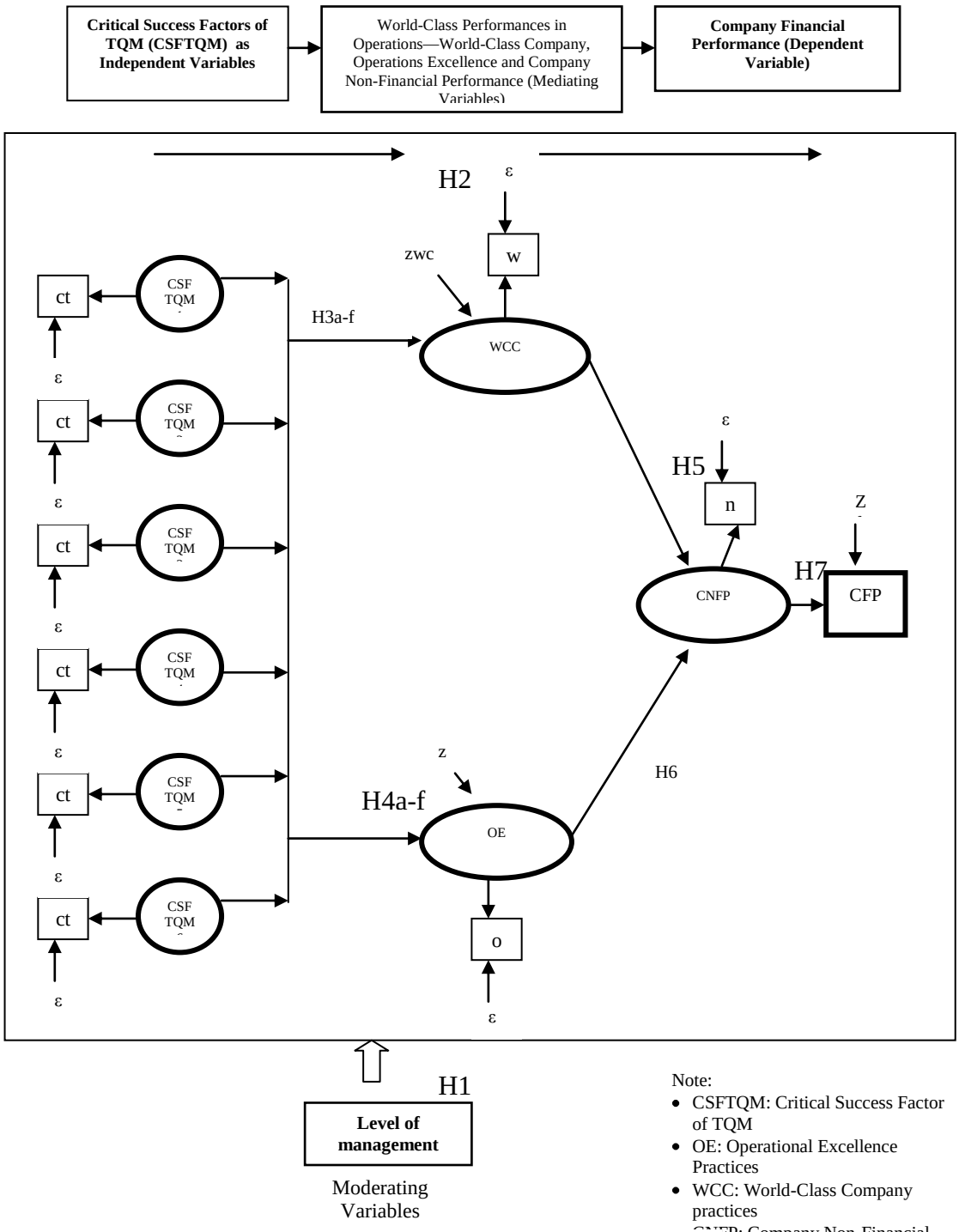

Figure 1 the Research Framework

Research Methodology

Steps of the Research

The methodology to be employed in this empirical study involves two distinctive steps. ***As the first step of the research***, surveys are conducted at several selected oil and gas companies. The types of oil and contractor companies are specifically chosen from the Directorate General of Oil and Gas, Republic of Indonesia. The primary objectives of these surveys are to develop a structural relationship model which includes the interrelationships between the researches constructs; and to analyze the relationships among the research constructs (Critical success factors of TQM, World-class company practices, Operational excellence practices, Company non-financial performance, and Company financial performance) are both substantively meaningful and statistically well-fitting.

For step one, a sample of 140 Strategic Business Units (SBU) within 49 oil and gas contractor companies are participated in this study. These qualified samples fall into 47 upstream (supply-chain) companies with 132 SBUs and 2 downstream (demand-chain) companies with 8 SBUs. The surveys are collected during nine months and couriered by the researcher for analysis through focus groups meeting, traditional postal questionnaire surveys, and internet or questionnaire e-mailed/web surveys to distribute and to complete the questionnaires directly at a single point in time (a cross sectional study). The surveys began in February 2005 and were completed by October 2005.

As the second step of the research, a statistical methodology is utilized to test six hypotheses. All variables are tested statistically to determine a well-fitting structural model for the Indonesia's oil and gas industry. The SPSS version 12.0 and AMOS 5.0 are utilized to analyze the data. For statistical analysis of data, general descriptive and advance statistics including factor analysis, and multigroup structural equation modeling (MSEM), and hierarchical multiple regression are used.

Questionnaire Development

This study used Likert scaling method to measure managers' perception of critical success factors of TQM, world-class company practices, operational excellence, company non-financial performance, and company financial performance. An initial version of questionnaire was developed based on existing questionnaires that had been used in previous studies. Some modifications were made to suit this research context based on in-depth interviews with thirty SBU managers in the Indonesia's oil and gas companies. Reliability and convergent validity assessment after the survey had been accomplished by examining item-to-total correlation and employing confirmatory factor analysis, where several items were dropped for further analysis.

Sample Selection and Data Collection

Two thousand and eight hundred (2800) questionnaires were distributed to the participating oil and gas companies in a qualified sample of 140 SBUs. An initial sample of 200 SBUs operating in Indonesia was drawn at random from the directory of Directorate General of Oil and Gas, Republic of Indonesia. Each SBU was contacted by telephone and e-mailed web system to establish that individuals with primary responsibilities for the three level of management position were identifiable. It was not possible to contact 12 SBUs because of incorrect contact details. A further 48 SBUs were either unable or unwilling to identify individual managers with the required responsibilities. Each qualified sample of 140 SBUs received 20 questionnaires. Only responses and answered completely on of the research constructs were used.

A total of 1,332 individual usable questionnaires were returned thus qualified for analysis, representing an effective response rate of 50.19 percent. Of these, 354 were from high level managers, 447 from middle level managers, and 531 from low level managers. At least 6 questionnaires were returned by qualified sample of 140 SBUs, with 62 SBUs returning more than 10 questionnaires of 20 questionnaires distributed. All 140 SBUs returned questionnaires from their high (top) level manager, middle level manager, and low level manager. According to Black (1994), the typical response rate for a research survey is of the order of 15-20%.

An Assessment of Non Response Bias

An assessment of non response bias was made by using the extrapolation approach recommended by Armstrong (1979). Each individual questionnaire type (high, middle, and low level managers) was categorized by the date the completed questionnaire was received. Tests revealed no significant differences between early responders (the first wave of responses; n = 442) and late responders (the second wave of responses; n = 890) on any of the constructs. As indicated by a CFI (the comparative fit index) of 0.990 for the research model, the multi group models represent excellence rate to the data. As such, non-response bias in unlikely to be present in this data (Morgan and Piercy, 1998).

Multigroup Structural Equation Modeling (MSEM)—Model Fit Assessment

A two-step approach to Multigroup Structural Equation Modeling (MSEM) was employed in this study (Hoyle, 1995). MSEM is uniquely suited to test a structural model to different group simultaneously. MSEM methods do not require cumbersome interaction terms and nested models to estimate hypothesized group differences in path-analytic model coefficients or model fit. A set of goodness-of-fit statistics valuate a set of complex models – one for each group. Differences among group can be evaluated for their appropriateness by freeing some parameters, fixing, and/or constraining any or all parameters for different groups. MSEM analysis often begin by estimating a fully constrained model, then relaxing constraints to allow for group-specific differences in particular parameters based on theory or inductive evidence.

In a two-step process, the measurement model is first estimated and then fixed in the second stage when the structural model is estimated (Howell, 1987; Anderson and Gerbing, 1988). The measurement model in conjunction with the structural model enables a comprehensive, confirmatory assessment of construct validity. A two-step approach allows tests of the significance for all pattern coefficients. Convergent validity can be assessed from the measurement model by determining whether each indicator's estimated pattern coefficient on its posited underlying construct factor is significant, that is greater than twice its standard error. The error term of each composite indicator was fixed at $(1- \alpha)\ \sigma^2$ and the lambda, a loading from a latent construct to its indicator, was calculated as $1 = \alpha^{1/2}\ \sigma$.

Data-model fit assessments were based on multiple indices: (a) the chi-square, chi-square over degree of freedoms (normed Chi-square), and X^2 p-value, (b) the Goodness-of-Fit Index (GFI), (c) the adjusted Goodness-of-Fit Index (AGFI), (d) the Root Mean Square Residual (RMR), Tucker-Lewis Index (TLI), and (e) the Root Mean Square Error of Approximation (RMSEA) (Mueller, 1996).

Hierarchical Multiple Regression Analysis

The author examined the results of the structural relationships analysis further to determine indirect effect of critical success factors of TQM on company financial

performance (Alwin and Hauser, 1975). An indirect effect existed when a critical success factor of TQM (i.e. CSFsTQM1-6) influenced company financial performance with the mediation of a third dimension. However, to fully capture the effect of the six critical success factors of TQM on the company financial performance, one must also consider their indirect effects. Indirect coefficients showed the impact of critical success factors of TQM on company financial performance through its influence on a third dimension (world-class performance in operations—world-class company, operational excellence, company non-financial performance).

In this hierarchical multiple regression analysis, independent and mediating variables were entered separately, and were used to test whether the dependent variable was predictable from the combined independent variables and mediators. To demonstrate mediation, the hierarchical multiple regression analysis requires three regressions to be estimated. *First*, the dependent variable of company financial performance must be predictable from the independent variables (six critical success factors of TQM). *Second*, the dependent variable (company financial performance) must be predictable from the mediators (world-class performance in operations: world-class company, operational excellence, company non-financial performance). *Third*, the dependent variable (company financial performance) must be predictable from the combined independent variable (six CSFsTQM)), and mediators (world-class company, operational excellence, company non-financial performance). If mediation is occurring, the mediators will be significant in the third equation.

Results and Findings

Reliability Measures

Cronbach's alpha coefficients were computed to estimate the reliability of each scale (observed variable or indicator). Item to total correlation was used to refine the measures and eliminate items whose inclusion resulted in lower alpha coefficients. Items with item to total correlation coefficients less than 0.50 were eliminated.

Table 1 Reliability Coefficients (Cronbach's Alpha) of the Constructs

Construct	Number of Items in the Questionnaire	Number of Items Retained	Cronbach's Alpha
CSFTQM	6 Items	6 Items	0.8933
CSFTQM1	9 Sub-Items	7 Sub-Items	0.8768
CSFTQM2	7 Sub-Items	5 Sub-Items	0.8643
CSFTQM3	7 Sub-Items	4 Sub-Items	0.8032
CSFTQM4	7 Sub-Items	6 Sub-Items	0.8886
CSFTQM5	6 Sub-Items	3 Sub-Items	0.7720
CSFTQM6	3 Sub-Items	3 Sub-Items	0.8089
WCC	6 Items	4 Items	0.8475
OE	5 Items	3 Items	0.9106
CNFP	2 Items	2 Items	0.8210
CFP	3 Items	3 Items	NA*)

Note: CSFTQM: Critical Success Factor of TQM; WCC: World-Class Company; OE: Operational Excellence; CNFP: Company Non-Financial Performance; CFP: Company Financial Performance

*) Company financial performance (CFP) is an observed variable; hence Cronbach's alpha is not applicable.

However, items with item to total correlation coefficients less than 0.50 were retained if eliminating those items would result in lower Cronbach's alpha coefficient of the related scale (Hair *et al*., 2006). The Cronbach's alpha of the measures is ranging from 0.7720 to 0.9106, which, according to DeVellis (1991), are respectable to very good. Table 1 shows the reliability of the measures and the number of items retained of the constructs.

Validity Measures

After the scales had met the necessary levels of reliability, the scales were assessed for validity. Confirmatory factor analysis was to assess the validity of each scale, which consisted of the retained items or manifest indicators. All loadings (path coefficients or regression weights) from a latent construct to their corresponding manifest indicators were significant (critical ratio values > 1.96). Thus, it provided evidence of convergent validity.

This study also assessed the discriminant validity of the latent constructs. Discriminant validity is the degree to which two conceptually similar constructs are distinct. According to Anderson and Gerbing (1988), when the confidence interval of ± two standard errors around a correlation estimate between two factors (constructs) does not include the value 1, that is evidence of discriminant validity for the two constructs. None of the confidence intervals in this study includes one.

Fixing the Error Terms and the Lamdas

Single indicators measured latent constructs of this study; however, in each case, the indicator was a multiple-item scale. It is unlikely that a single indicator perfectly measures a construct; therefore, this study estimated the measurement error terms. The measurement error terms were fixed at (1- α) σ^2 and the corresponding lambdas—the loading from a latent construct to its corresponding indicator—were fixed at $\alpha^{1/2}\ \sigma$. For the non-latent (observed) variables, the error terms were fixed at 0 and the corresponding lambdas were fixed at 1.

The measure of this study consists of indicators nine latent constructs measured on a 5 point scale. Therefore, before fixing the error terms and the lambdas for the samples, the study converted those latent constructs into standard scores (Z scores) by subtracting the mean and dividing by the standard deviation for each construct. Using standardized variables eliminates the effects due to scale differences (Hair *et al*., 2006). Table 2 provides the reliability of the constructs, lambdas, and error terms.

Differences in Means

Table 3 displays construct means by levels of management commitment (top, middle, low). Although no hypotheses were proposed as to mean-level differences, this study presents them for comparative purposes. Results are based on two-tailed t tests. In general, differences are found. T-tests for equality of means across samples indicate significant differences in quality improvement program (CSFTQM1), supervisory leadership (CSFTQM2), supplier involvement (CSFTQM3), and training to improve products/services (CSFTQM5). T-tests also show insignificant differences in top management commitment (CSFTQM4), cross-functional relationships (CSFTQM6), world-class company practices, operational excellence practices, company non-financial performance, and company financial performance. The three levels of management have different perspectives in terms of technical aspects but they have the same perspective in terms of managerial aspects related to the TQM implementation program.

Table 2 Construct Reliability

Construct	ε	ɔ	α
CSFTQM1	0.0186	0.3642	0.8770
CSFTQM2	0.0371	0.4857	0.8641
CSFTQM3	0.0520	0.4625	0.8044
CSFTQM4	0.0210	0.4144	0.8918
CSFTQM5	0.0438	0.4010	0.7855
CSFTQM6	0.0410	0.4158	0.8097
WCC	0.0379	0.8186	0.9465
OE	0.1387	0.5999	0.7218
CNFP	0.0248	0.4508	0.8912
CFP	NA	NA	NA*)

Note: CSFTQM: Critical Success Factor of TQM; WCC: World-Class Company; OE: Operational Excellence; CNFP: Company
Non-Financial Performance; CFP: Company Financial Performance*) Company financial performance (CFP) is an observed
variable; hence epsilon, lambda, and alpha are not applicable.

Structural Relationships

To test the possibility that levels of management moderates the structural relationship among constructs, the study tested two structural models – a constrained and unconstrained models. In the constrained model, the study fixed the estimated regression weights (paths) such that estimated paths in the constrained model from top manager sample are equal to those from middle manager and low manager. The goodness-of-fit of the fully constrained model follows (Table 4): Chi-square = 167.672 (df = 15, X^2 **p**-value = 0.000); GFI = 0.976; AGFI = 0.911; RMR = 0.016; TLI = 0.937; and RMSEA = 0.087. In the unconstrained model, the study freed the estimated regression weights (paths) – that were fixed in the constrained model – such that estimated paths might be varied between paths from top manager sample and those from middle and low managers' sample. The goodness-of-fit of the unconstrained model follows Table 5): Chi-square = 19.024 (df = 12, X^2 **p**-value = 0.088); GFI = 0.990; AGFI = 0.952; RMR = 0.005 ; TLI = 0.987; and RMSEA = 0.041.

The goodness-of-fit of the unconstrained model is much better than that of the constrained model (Table 6). This is an indicative that levels of management commitment moderates the structural relationship among the constructs (H1 was accepted).

Results obtained from the multigroup structural equation modeling (unconstrained parameters) analysis suggest that the research model exhibits a quite satisfactory overall fit. The values of goodness of fit index (GFI), adjusted goodness of fit index (AGFI). Comparative fit index (CFI) and Tucker-Lewis Index (TLI) are exceeding recommended level 0.9 or close to 1.

Table 3. Mean Difference

Construct	Level of Management	N	Mean	Sig.
CSFTQM1 (Quality Improvement	Top	354	2.4400	0.003
	Middle	447	2.2210	
	Low	531	2.6505	
CSFTQM2 (Supervisory Leadership)	Top	354	3.5009	0.002
	Middle	447	3.2120	
	Low	531	3.3220	
CSFTQM3 (Supplier Involvement)	Top	354	2.8870	0.034
	Middle	447	2.7660	
	Low	531	3.0625	
CSFTAQM4 (Top Management Commitment)	Top	354	2.9103	0.450
	Middle	447	2.770	
	Low	531	2.6610	
	Middle	447	2.4400	
	Low	531	2.3220	
CSFTQM6 (Cross-Functional Relationship)	Top	354	3.1111	0.110
	Middle	447	3.2121	
	Low	531	3.0917	
WCC (World-Class Company)	Top	354	3.0168	0.105
	Middle	447	2.9720	
	Low	531	2.8620	
OE (Operational Excellence)	Top	354	3.4722	0.120
	Middle	447	3.4515	
	Low	531	3.4412	
CNFP (Company Non-Financial Performance)	Top	354	2.7458	0.225
	Middle	447	2.6887	
	Low	531	2.6422	
CFP (Company Financial Performance)	Top	354	2.7892	0.851
	Middle	447	2.7606	
	Low	531	2.7212	

The root mean square residual or RMR; the root mean square error of approximation or RMSEA; p-value, and X^2/df are also exceeding recommended level (acceptable parameter levels are $1<X^2/df<5$; RMSEA<0.05; RMR close to 0; and p-value≥0.05). Because of the goodness-of-fit statistics resulting from this analysis is a well-fitting model, the unconstrained model is accepted.

Table 4 Results of SEM – Fully Constrained Parameters)*

	Top Level Management Sample		Middle Level Management Sample		Low Level Management Sample			
Structural Relationships	Un standardized Regression Weights (y)	Critical Ratio	Un standardized Regression Weights (y)	Critical Ratio	Un standardized Regression Weights (y)	Critical Ratio	*error* (ε)	Residual (ζ)
CSFTQM1 -------> WCC	**0.344**	**12.180**[s]	**0.344**	**12.180**[s]	**0.344**	**12.180**[s]	ε_1 = 0.019	ξ_1 = 0.372
CSFTQM2 -------> WCC	**0.070**	**2.581**[s]	**0.070**	**2.581**[s]	**0.070**	**2.581**[s]	ε_2 = 0.037	ξ_2 = 0.761
CSFTQM3 -------> WCC	**0.104**	**3.932**[s]	**0.104**	**3.932**[s]	**0.104**	**3.932**[s]	ε_3 = 0.052	ξ_3 = 0.521
CSFTQM4 -------> WCC	**0.089**	**3.400**[s]	**0.089**	**3.400**[s]	**0.089**	**3.400**[s]	ε_4 = 0.021	ξ_4 0.358
CSFTQM5 -------> WCC	**0.163**	**6.352**[s]	**0.163**	**6.352**[s]	**0.163**	**6.352**[s]	ε_5 = 0.044	
CSFTQM6 -------> WCC	**0.190**	**7.843**[s]	**0.190**	**7.843**[s]	**0.190**	**7.843**[s]	ε_6 = 0.041	
CSFTQM1 -------> OE	**0.235**	**5.163**[s]	**0.235**	**5.163**[s]	**0.235**	**5.163**[s]	ή1 = 0.038	
CSFTQM2 -------> OE	**0.091**	**2.058**[s]	**0.091**	**2.058**[s]	**0.091**	**2.058**[s]	ή2 = 0.139	
CSFTQM3 -------> OE	-0.007	-0.155	-0.007	-0.155	-0.007	-0.155	ή3 = 0.057	
CSFTQM4 -------> OE	**0.086**	**2.042**[s]	**0.086**	**2.042**[s]	**0.086**	**2.042**[s]	ή4 0.025	
CSFTQM5 -------> OE	**0.132**	**3.186**[s]	**0.132**	**3.186**[s]	**0.132**	**3.186**[s]		
CSFTQM6 -------> OE	0.042	1.074	0.042	1.074	0.042	1.074		
WCC --------> CNFP	**0.406**	**15.094**[s]	**0.406**	**15.094**[s]	**0.406**	**15.094**[s]		
OE --------> CNFP	**0.407**	**13.228**[s]	**0.407**	**13.228**[s]	**0.407**	**13.228**[s]		
CNFP ----------> CFP	**0.796**	**33.059**[s]	**0.796**	**33.059**[s]	**0.796**	**33.059**[s]		

Goodness-of-Fit Measures		**Acceptable Parameter Level (Hair *et al*., 2006)**	**Desirable Parameter Level (Hair *et al*., 2006)**
Chi-Square Statistic (X^2)	167.672		
Degree of Freedom (df)	15		
Normed Chi-Square (X^2/df)	11.178	1 < x < 5	1 < x < 2
X^2 p-value	0.000	> 0.05	> 0.15
GFI	0.976	Close to 1 is better	
AGFI	0.911	> 0.90	
RMR	0.016	Close to 0 is better	
TLI	0.937	> 0.90	
RMSEA	0.087	< 0.10	< 0.05

*) Parameters are fixed such that estimated parameters of high/top level management sample are equal to parameters of middle and low level management sample.

s) Boldfaced figures indicate significant paths (CR > 1.96).

Table 5 also shows the results of structural relationships among the constructs. Three level of management indicated that critical success factors of TQM 1,5,6 (quality improvement, training to improve products/services, cross-functional relationships) were significantly associated with world-class company practices (H3a,e,f were accepted). Critical success factors of TQM 2,3,4 (supervisory leadership, supplier involvement, top management commitment) was not significantly associated with world-class company practices (H3b,c,d were not accepted). Further, critical success factors of TQM 1,5, (quality improvement, training to improve products/services) were associated with operational excellence (H4a,e were accepted). However, the supervisory leadership, supplier involvement, top management commitment, cross-functional relationship (CSFTQM2,3,4,6) were not significantly associated with operational excellence practices (H4b,c,d,f were not accepted). World-class company practices and operational excellence practices were significantly effect on company non-financial performance (H5 and H6 were accepted). Company non-financial performance (productivity and operational reliability) has a direct and significant effect on company financial performance (sales, net profit margin, and return on assets) (H7 was accepted Table 6 informs that the alternative model (the unconstrained model) is significantly different from the base model (the constrained model). Therefore, level of management significantly moderates the direct and indirect effects of critical success factors of TQM, world-class company, operational excellence, company non-financial performance, and company financial performance.

Mediation Analysis

Table 7 provides the complete results of the hierarchical multiple regressions predicting the link between six critical success factors of TQM and company financial performance. The results indicate that *the first step* explained 45.4% of the variance in company financial performance, $F(1, 1330) = 1104.569$, $p = 0.000$, Durbin Watson =1.640. As expected, a majority of the variance explained in company financial performance could be attributed to critical success factors of TQM. Results from *the second step* of these regressions indicated that entering the mediators increased the amount of variance explained in company financial performance by approximately 8.7 percent, $F(2, 1328) = 125.575$, $p = 0.000$, Durbin Watson=1.736. Mediators positively predicted the company financial performance. The combined variables (independent variable and mediating variables) entered in *the third step* increased the amount of variance explained for company financial performance by 0.7 percent, $F(6, 1332) = 3.540$, $p = 0.001$, Durbin Watson=1.849. Thus, the mediation was occurring. The mediators were significant in the third equation. Therefore, the researcher found that critical success factors of TQM affected company financial performance through world-class performance in operations (world-class company, operational excellence, and company non-financial performance) (H2 was accepted).

Table 5 Results of SEM – Unconstrained Parameters)*

	Top Level Management Sample		Middle Level Management Sample		Low Level Management Sample							
Structural Relationships	Un standardized Regression Weights (y)	Critical Ratio	Un standardized Regression Weights (y)	Critical Ratio (CR)	Un standardized Regression Weights (y)	Critical Ratio (CR)	*error* (ε)			Residual (ζ)		
CSFTQM1 -------> WCC	**0.412**	**7.916** s	**0.394**	**8.834** s	**0.283**	**5.848** s	ε_1	=	0.019	ξ_1	=	0.344
CSFTQM2 -------> WCC	0.064	1.313	0.071	1.734	0.079	1.712	ε_2	=	0.037	ξ_2	=	0.737
CSFTQM3 -------> WCC	-0.024	-0.481	0.252	5.847 s	0.079	1.807	ε_3	=	0.052	ξ_3	=	1.243
CSFTQM4 -------> WCC	0.072	1.460	0.019	0.449	0.146	3.377 s	ε_4	=	0.021	ξ_4		0.284
CSFTQM5 -------> WCC	**0.203**	**4.059** s	**0.111**	**2.696** s	**0.167**	**3.980** s	ε_5	=	0.044			
CSFTQM6 -------> WCC	**0.228**	**5.009** s	**0.159**	**3.993** s	**0.177**	**4.422** s	ε_6	=	0.041			
CSFTQM1 -------> OE	**0.381**	**5.518** s	**0.276**	**4.136** s	**0.109**	**2.133**	ή1	=	0.038			
CSFTQM2 -------> OE	-0.023	-0.320	0.003	0.077	0.304	4.534 s	ή2	=	0.139			
CSFTQM3 -------> OE	-0.311	-4.057 s	0.073	1.539	0.051	0.811	ή3	=	0.057			
CSFTQM4 -------> OE	0.193	2.955 s	0.022	0.755	0.159	2.548 s	ή4		0.025			
CSFTQM5 -------> OE	**0.134**	**2.132** s	**0.090**	**2.428** s	**0.140**	**2.322** s						
CSFTQM6 -------> OE	0.144	2.501 s	0.027	0.587	0.058	1.008						
WCC --------> CNFP	**0.904**	**5.026** s	**0.803**	**4.825**	**0.587**	**5.538** s						
OE --------> CNFP	**0.549**	**2.066** s	**0.181**	**2.480**	**0.156**	**2.351**						
CNFP ----------> CFP	**0.886**	**22.783** s	**0.835**	**20.572** s	**0.690**	**16.212** s						

Acceptable Parameter Level (Hair *et al*., 2006)	**Desirable Parameter Level (Hair *et al*., 2006)**
19.024	
12	
1.585	1 < x < 5
0.088	> 0.05
0.990	Close to 1 is better
0.952	> 0.90
0.005	Close to 0 is better
0.987	> 0.90
0.041	< 0.10

- *) Parameters are freed such that allowing estimated parameters of high/top level management sample to differ from estimated parameters of middle level management sample and to differ from estimated parameters of low level management sample.
- s) Significant paths
- Boldfaced figures indicate significant paths for high/top level management sample that are also significant for middle and low level management sample (CR > 1.96).

Table 6 Comparison of Goodness-of-Fit of the Base Model and the Alternative Model

	Goodness-of-Fit			
	Base Model (Constrained Parameters)	**Alternative Model (Unconstrained Parameters)**	**Criteria**	
			Acceptable Parameter Level (Hair *et al*., 2006)	**Desirable Parameter Level (Hair *et al*., 2006)**
Chi-Square Statistic (X^2)	167.672	19.024		
Degree of Freedom (df)	15	12		
Normed Chi-Square (X^2/df)	11.178	1.585	1 < x < 5	1 < x < 2
X^2 p-value	0.000	0.088	> 0.05	> 0.15
GFI	0.976	0.990	Close to 1 is better	
AGFI	0.911	0.952	> 0.90	
RMR	0.016	0.005	Close to 0 is better	
TLI	0.937	0.987	> 0.90	
RMSEA	0.087	0.041	< 0.10	< 0.05
	Improved Goodness-of-Fit from the Base Model to the Alternative Model			
Chi-Square Statistic (X^2)	167.672-19.024 =148.648		High	
Degree of Freedom (df)	15-12 = 3			
Probability	0.088-0.000 = 0.088		> 0.05	
Conclusion	**The alternative model (the unconstrained model) is significantly different from the base model (the constrained model). Therefore, level of management significantly moderates the direct and indirect effects of critical success factors of TQM, world-class company, operational excellence, company non-financial performance, and company financial performance.**			

Table 7 Summary of Hierarchical Multiple Regression Analysis

Step 1									
R	R Square	Adjusted R Square	Std. Error of The Estimate	R Square Change	F Change	Df1	Df2	Sig. F Change	Durbin-Watson
0.674[a]	0.454	0.453	0.3531	0.454	1104.569	1	1330	0.000	1.640
Step 2									
R	R Square	Adjusted R Square	Std. Error of The Estimate	R Square Change	F Change	Df1	Df2	Sig. F Change	Durbin-Watson
0.735[b]	0.541	0.540	0.3241	0.087	125.575	2	1328	0.000	1.736
Step 3									
R	R Square	Adjusted R Square	Std. Error of The Estimate	R Square Change	F Change	Df1	Df2	Sig. F Change	Durbin-Watson
0.740[c]	0.542	0.548	0.3221	0.007	3.540	6	1322	0.001	1.849

a. Predictors: (Constant), Critical Success Factors of TQM (CSFTQM1-6)
b. Predictors: (Constant), World-Class Performance in Operations (World-Class Company or WCC, Operational Excellence or OE, and Company Non-Financial Performance or CNFP)
c. Predictors: (Constant), Critical Success Factors of TQM (CSFTQM1-6), World-Class Performance in Operations (World-Class Company or WCC, Operational Excellence or OE, and Company Non-Financial Performance or CNFP)
d. Dependent Variable: Company Financial Performance (CFP)

Conclusion

The study explores the moderating effects of the level of management on the relationships of critical success factors of TQM and company financial performance, on that of world-class performance in operations (world-class company, operational excellence, and company non-financial performance) on the fully mediators between critical success factors of TQM and company financial performance.

The researcher obtained evidence that three levels of management act as a moderator variable between critical success factors of TQM, world-class company practices, operational excellence practices, company non-financial performance, and company financial performance. The empirical results indicate that the goodness-of-fit of the unconstrained model is much better than that of the constrained model, and this is an indicative that the three level of management moderates the structural relationships among the constructs.

Results further reveal that world-class performances in operations (world-class company practices, operational excellence practices, and company non-financial performance) were positively mediated the impact of critical success factors of TQM on company financial performance.

Results also point out that five of six critical success factors of TQM positively associated with world-class company practices and operational excellence practices under the three levels of management (top, middle, low). World-class company practices and operational excellence practices have direct and significant effects on company non-financial performance (productivity,

operational reliability). Furthermore, empirical results suggest that there is a positive and significant relationship between company non-financial performance and company financial performance.

The MSEM reveals that the structural relationships have met goodness-of-fit criteria, thus, the interpretation of the impact of critical success factors of TQM on company financial performance were fit with the data. The results of MSEM analysis: (1) support the importance of the level of management commitment (top, middle, and low) as a moderator among the constructs, (2) suggest that the critical success factors of TQM—company financial performance link model is appropriate for examining the relationships between six critical success factors of TQM and company financial performance that oil and gas managers in upstream and downstream sectors can use to establish an effective operations strategy. The results of MSEM show that the model of the study has a great potential for replication to manufacturing as well as service operations.

The hierarchical multiple regression analysis provides additional insights into the indirect contribution of world-class company practices and operational excellence practices (as fully mediators) to company financial performance— sales, net profit margin, return on assets.

Limitations and Lines of Future Research

The findings and conclusions of this study should be interpreted keeping in mind the following limitations. It is important to note that the first potential limitation of this study stems from the use of a cross sectional analysis. Cross sectional analysis only give us portrayed at a particular point of time. The researcher can not examine the dynamic nature of trade-off which is changing over time (Silveira and Slack, 2001). In addition the researcher encourages thinking about whether the models of the study effects vary over time, either because other time the constructs are theoretically important or because the theoretical effect is unstable for some reason.

A second limitation relates to the generalizability of the sample of single industry (the Indonesia's oil and gas industry; five digit of SIC Codes) to the larger population of wide variety industries (two digit of SIC Codes) employing the successful quality management implementation for World-class Performance in Operations.

Third, one must be cautious in interpreting the findings of this study due to the companies restructuring policy into Strategic Business Units (SBUs) was relatively new—the transition era from cost centers to profit centers. The potential problem with respect to the new policy implementation is a probability that SBUs lack of strategic consensus between policy maker (top level manager), middle level manager, and low level manager in the upstream, and downstream of oil and gas chains. As a result, the research findings are intended to represent the types of issues faced by strategic business units (SBUs) inexperienced in the implementations of TQM, world-class company, and operational excellence but nonetheless changed with the necessity of attaining successful TQM practices in order to develop world-class company and operational excellence while also rising company performance.

Several lines of future research suggest themselves:

- It would be of interest to conduct longitudinally to observe the progress of improvement efforts (i.e., by developing Antecedents, Behavioral, Consequences analysis; or by using triangulation method).
- It might be useful to investigate the impact of critical success factors of TQM on company performance to the companies come from a wide ranges of industries.

- A detailed comparison between the upstream and the downstream SBUs of oil and gas companies that shows similarities and differences between the two structural relationships model would be worthwhile.

Implications

The results of the study may have some implications for oil and gas managers considering developing business in world-class orientation. For instance, the findings that the levels of management commitment moderates the relationships among critical success factors of TQM, world-class company practices, operational excellence practices, company non-financial performance, and company financial performance would benefit those managers. In order to enhance the levels of management commitment, efforts should be directed first toward improving levels of both operational excellences (level of efficiency and productivity) and support of the world-class company practices.

The potential implications of the study also can be viewed from the integrated oil and gas chains. Internal development of organization (both upstream and downstream sectors) is deemed as an important precursor to adapting to six critical success factors of TQM (training to improve products/services, quality improvement program, management commitment, supplier involvement, cross-functional relationships, and supervisory leadership). In other words, the mechanism to adapt these CSFs of TQM requires organizational members to realize the commitment of continuous process improvement and innovation beyond the job requirements as well as their formal job descriptions. Critical success factors of TQM—company financial performance links has to be determined as having beneficial organizational impacts in the long-term (to establish streamlined operations in order to reach long-term organizational effectiveness and efficiency) in the oil and gas industry. As Davila et al. (2006) stated, "Organization with internal environments that foster a developed portfolio of continuous process improvement and innovations might be able to adapt to external environment changes more fluidly in order to sustain growth."

In conclusion, this study supports the importance of world-class company practices and operational excellence practices as two determinants of company non-financial performance. Its results show that decision makers of oil and gas companies in Indonesia can gain considerably from articulating and adapting a comprehensive operations strategy for their TQM implementation (in upstream and downstream sectors) to gain the world-class performance in operations. The gains that materialize from such a strategy can enhance a company's growth and value (company financial performance)—economic value-added (EVA) and market value-added (MVA).

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