

Assessing the Impact of Total Quality Management Practices and Quality Culture with Competitiveness of Saudi Contractors

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Received 2013-05-06, Revised 2013-06-10; Accepted 2013-06-30

ABSTRACT

Total quality management practices in construction industries can be described as the processes or that aligns the business performance strategy to the business processes in the hopes of achieving customer satisfaction and product and services quality. Quality culture conditions are strongly linked with project outcomes and hence, initiatives undertaken should be incorporated to the organizational cultural changes. The aim of the study is to determine the impact of total quality management practices, quality culture and their relationship with the competitiveness of Saudi Arabia contractors. A quantitative research design was adopted to collect data and test hypotheses. A cross-sectional survey method was used to conduct this study. The findings of the study will contribute to both theory and practice. Through the present study, the researcher expects the findings to indicate that total quality management practices meaningfully contributed and related to competitiveness and developing cooperative relationship with customers; practices that are related to the achievement of continuous improvement and in turn, continuous improvement affects quality outcomes.

Keywords: Total Quality Management Practices, Quality Culture, Relationship, Competitiveness, Contractors

1. INTRODUCTION

Total Quality Management (TQM) practices are being widely adopted by contractor companies to solve problems regarding quality in the construction industry particularly to satisfy the needs of the customers (Fung and Wong, 1995; Kanji and Wong, 1998). It is no surprise that TQM has now become the major business strategy in current management and has currently been taken up by companies around the globe (Rad, 2006). The construction industry is being considered as comparatively having one of the poorest quality emphases among different manufacturing and service sectors (Wong and Fung, 1999). In fact, numerous criticisms have been heaped on the construction industry

for the general under quality of workmanship. This relates to the final product and processes that the products undergo, the peoples and the materials (Mahmood *et al.*, 2006). Thus, the present study is confined to TQM implementation in the contractor companies in general and the Saudi classified contractor companies in particular.

The relation between the total quality management practices and competitiveness is such that several organizations are failing to achieve competitive advantage through TQM practices' implementation while some others have succeeded. The failure is attributed to the incomplete implementation of the crucial TQM practices and the absence of the assisting assets that must be simultaneously used with TQM for the achievement of competitive advantage (Douglas and Judge, 2001).

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The competitiveness concept has been defined in multitude of ways; in the individual firm's context, industries context and nation's context (Alotaibi *et al.*, 2013). TQM practices implementation comes the monumental changes that affect elements such as: Organizational structure, quality culture, leadership, or design process. Hence, it goes without saying that the implementation of TQM should have its basis on the culture, beliefs, traditions and tailor-designed TQM strategies. TQM's core principle is based on the fact that all other business objectives like profit, productivity, market share growth, happy employees, must stem from the single objective of customer satisfaction (Bagchi, 1997).

Quality culture may be considered to encompass all the institutionalized ways and the implicit beliefs, norms and values and premises which underline and govern behaviour (Ahmed *et al.*, 1999). Various countries, nations, regions and enterprises generally project different feelings, requirements, creations and understanding from each other. The researchers have still not reached a unanimous definition of quality culture. Douglas and Judge (2001), on the other hand, advocate the fact that quality culture can be investigated in both broad and narrow points of view. In the former, it is considered to be phases of consciousness, standards, value orientation, codes of conduct modes of thoughts and manners and customers regarding quality issues developed through a long term production and operating activities of firms and society and the totality of products, identifications and actions, (Douglas and Judge, 2001).

Competition is often considered as the contest between two or more than two entities for a certain attractive target or goal. Generally speaking, the dictionary meaning of competitiveness is often an aggressive willingness to compete. Aggressiveness is considered as the quality of boldness and enterprising. A competition commonly has three elements to make it so: main interests of the independent competition, competitors and the result of competition (Shi-Rong and Guang-Kun, 2008). Porter (2003), defines competitiveness as the country's share of world markets for its products. From this definition, it can be assumed that competitiveness is a zero-sum game due to the competitiveness of one country at the expense of other countries. Holt *et al.* (1994), provided a classification of competitiveness indicators into five categories; contractor's organization, financial considerations, management resource, past experience and past performance. Every group comprises of particular indicators.

2. MATERIALS AND METHODS

The conceptual framework is adopted from three comprehensive variables which include TQM, quality culture and competitiveness. TQM is the single component considered as the independent variable while the dependent variables consist of competitiveness. In addition, quality culture will be considered as the mediating variable in the relationship between TQM practices and competitiveness in **Fig. 1**.

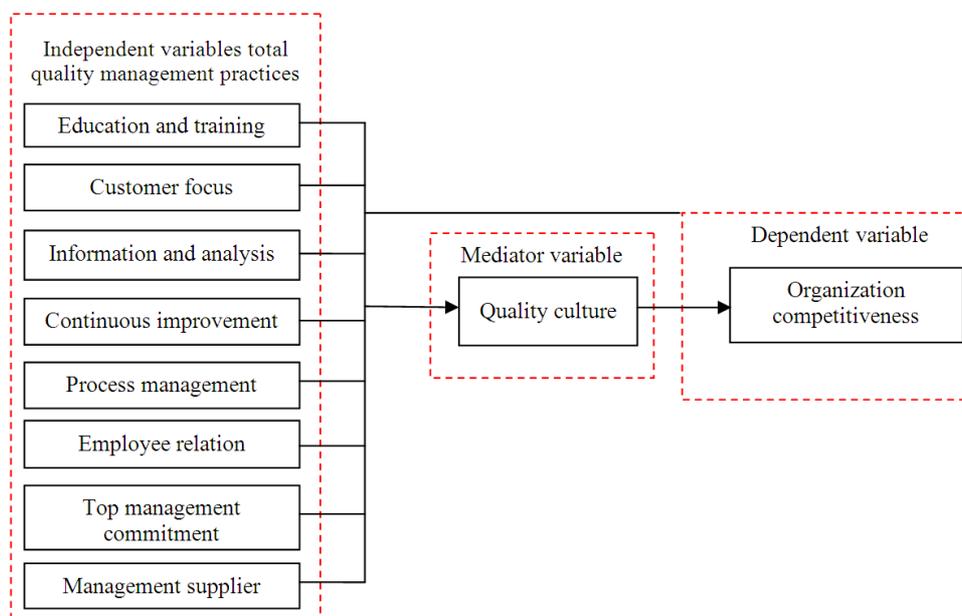


Fig. 1. Conceptual framework

It is notable that when quality culture is intended to be studied as the mediating factor, the theoretical model becomes one of a kind. As evidenced by (Abdullah *et al.*, 2009), quality culture is a fundamental element in such research model and based on a thorough review of literature, there is lack of studies investigating the role of quality culture as a mediating variable between TQM and Companies' competitiveness in Saudi construction companies. Therefore, the justification of the present study attempting to utilize the same as a mediating variable for the purpose of the investigation between TQM and competitiveness is valid. **Figure 1** presents the conceptual framework of the present study.

There are the following hypotheses:

- H1: Total quality management practices are associated with competitiveness
- H2: Total quality management practices are associated with quality culture
- H3: Quality culture is associated with competitiveness
- H4: Quality culture mediates the relationship between total quality management practices and competitiveness

3. RESULTS

3.1. Reliability Test

Pallant (2001), research concluded that new measures of scales should have reliability to the extent of minimum 0.60. Reliability implies the reference to making assessments of the extent to which there is uniformity amongst the varied measurements of the variables (Hair *et al.*, 2006). Thus, it can be said that this process serves as a means to measure levels of consistency of the given performance levels and behaviours. According to (Sekaran, 2003). Cronbach's alpha has been very frequently used as an indicator for representing the appropriate indication levels relative to reliance and internal consistency. It is mostly agreed that the most widely accepted value for Cronbach's alpha turns out to be 0.70 and above (Hair *et al.*, 2006).

Table 1 below summarizes the reliance tests of the different items. As evident, the Cronbach's alpha in terms of measurements related to the lower limits of acceptance is found to be such that $\alpha > 0.70$. In view of such circumstances, all measures were found to be having considerable reliability.

3.2. Descriptive Analysis

For the purpose of descriptive analysis, the mean and standard deviation are computed.

Table 1. Reliability results

Variables	Variables	No. of items	α
Total quality management practices	Education and training	4	0.899
	Customers focus	4	0.930
	Information and analysis	4	0.817
	Continuous and improvement	3	0.766
	Process management	4	0.887
	Employee relations	7	0.929
	Top management commitment	4	0.884
	Management of supplier	4	0.803
Quality culture	Improvement orientation	6	0.929
	Team work orientation	4	0.893
	Mission and goal orientation	5	0.918
	Management style	4	0.853
Competitiveness	Personal influence performance	6	0.947
	Task environment	5	0.840
	Corporate image	6	0.933
	Technology and innovation	3	0.862
	Marketing capability	4	0.889
	Financial capability	4	0.876
	Project management skill	4	0.720

Table 2. Means and standard deviations for all variables

Variables	M	SD
Total quality management Practices (TQMP)	3.69	0.39
Quality Culture (QC)	3.68	0.45
Competitiveness (C)	3.77	0.36

Table 3. Cohen's guideline of correlation strength

<i>r</i>	Strength of relationship
0.10 to 0.29/ - 0.10 to -0.29	Low
0.30 to 0.49/ - 0.30 to -0.49	Moderate
0.50 to 1.0 or/ - 0.50 to -0.1.0	High

Table 4. Summary of correlations of variables

Study variables	Correlation coefficient	Strength of relationship
TQMP and competitiveness	0.412**	Moderate
TQMP and quality culture	0.762**	High
Quality culture and competitiveness	0.353**	Moderate

** $p < 0.01$

As portrayed in **Table 2**, it can be observed that the mean scores of TQMP indicated a high level of TQMP with 3.69 (SD = 0.39). For the Quality Culture the mean was 3.68 (SD = 0.45), which indicated a high level of agreement. Furthermore, Competitiveness indicated a high level of Competitiveness with 3.77 (SD = 0.36).

Table 5. Statistic values of Skewness and Kurtosis (Descriptive statistics)

Variables	Skewness		Kurtosis	
	Statistic	Std. error	Statistic	Std. error
Total quality management practices	0.286	0.124	0.167	0.247
Quality culture	-0.250	0.124	0.840	0.247
Competitiveness	-0.052	0.124	-0.246	0.247

Table 6. Durbin-Watson statistical value

Model	IV	DV	R square	Adjusted R square	Std. error of the estimate	Durbin-Watson
1	TQMP	Competitiveness	0.170	0.168	0.33484	1.507
2	TQMP	Quality culture	0.580	0.579	0.29397	1.782
3	Quality culture	Competitiveness	0.125	0.122	0.34384	1.576

3.3. Correlation Analysis

Correlation analysis is a statistical method used to describe the strength and direction of the linear relationship between two variables (Pallant, 2001). The degree of correlation concerned is to measure the strength and importance of a relationship between the variables. Pearson’s correlation coefficient (r) with significance levels was utilised in order to assess the correlations between the variables. Cohen (1988), has provided a guideline to explain the strength and the degree of the correlation between two variables as presented in **Table 3**. In **Table 4**, a summary of the variables' correlations is presented.

3.4. Regression Analysis

All the variables were tested using skewness and kurtosis levels to determine normality. According to (Hair *et al.*, 1998), the acceptable level of skewness and kurtosis is between -2.00 and +2.00 at the significance level of 0.05. It is clear from **Table 5** that none of the variables showed skewness or kurtosis over 2.0, implying that data was suitably distributed. It indicates that analysis of skewness and kurtosis at univariate levels results to prior confirmation of multivariate normality only.

3.5. Independence of Error Term

For the purpose of making an assessment and validation of the independence of error assumptions, the Durbin-Watson statistics were utilized. Based on (Coakes, 2003), the independence of error term is considered invalid if the Durbin-Watson values are between 1.50 and 2.50. For the present study, the Durbin-Watson value is summarized in **Table 6**. The result shows that the value declined among the acceptable values, indicating that auto-correlation problems are not found.

Table 7. Correlation coefficients of research factors (N = 388)

Factors	Quality culture
Competitiveness	1.000
Education and training	0.274(**)
Customers focus	0.508(**)
Information and analysis	0.335 (**)
Continuous improvement	0.286(**)
Process management	0.169(**)
Employee relations	0.555(**)
Top management commitment	0.478(**)
Management of supplier	0.245(**)

**p<0.01

4. DISCUSSION

4.1. Total Quality Management Practices and Quality Culture

In order to investigate the relationship between TQMP factors and the Quality Culture, Pearson correlation coefficient was used. **Table 7** shows the results of the correlation test between TQMP factors and the Quality Culture.

In order to answer this research question and test the research hypotheses linear regression analysis is conducted. The analysis helps determine the contribution of every factor and pinpoints the factor that is the best predictor of any outcome. The TQMP factors explained a significant percentage of variance in Quality Culture $R^2 = 0.681$, $F = 101.278$, $p < 0.001$.

In general, the higher the mean value, the higher level of agreement with the statements and the smaller the standard deviation the more concentrated the data around the mean (Jennings and Loan, 2001). For ease interpretation, the range of five point likert-scale was categorized into equal sized; categorized as low, moderate and high. Hence, scores of less than 2.33 (4/3 +lowest value 1) are considered as low; scores of higher than 3.67 (highest value (5)-4/3) are considered as high and those in between are considered moderate.

Table 8. Multiple linear regression analysis between Total Quality Management Practices (TQMP) Factors as IVs and Quality Culture as DV

Model	R	R ²	Adjusted R ²	Std. error of the estimate		
Model summary						
1	0.605(a)	0.366	0.353	0.2953		
Model	Sum of Squares	df	Mean Square	F	P.	
ANOVA(b)						
1	54.145	8	6.768	101.278	0.000(a)	
	25.327	379	0.067			
	79.472	387				
		Unstandardized				
		-----			S.zed	
Model		B	Std. Error	Beta	t	P.
Coefficients (a)						
1	(Constant)	0.385	0.143		2.689	0.000***
	Education and training	0.131	0.012	0.323	10.796	0.000***
	Customers focus	0.164	0.021	0.276	7.977	0.000***
	Information and analysis	-0.031	0.024	0.045	-1.281	0.201
	Continuous improvement	0.017	0.021	0.027	0.816	0.415
	Process management	0.004	0.014	0.010	0.328	0.743
	Employee relations	0.245	0.017	0.475	14.740	0.000***
	Top management commitment	0.207	0.023	0.304	8.885	0.000***
	Management of supplier	0.092	0.026	0.144	3.517	0.000***

*** p<0.001

Table 9. Correlation coefficients of research factors (N = 388)

Factors	Competitiveness
Competitiveness	1.000
Quality culture	0.762(**)

** p <0.01

Table 8 shows the results of multiple linear regression analysis between TQMP factors (education and training, customers focus, information and analysis, continuous improvement, process management, employee relations, top management commitment and management of supplier) and Quality Culture.

As portrayed in **Table 8**, the results indicated that five TQMP (Education and Training, Customers Focus, Employee relations, Top Management Commitment, Management of supplier) factors significantly affect Quality Culture while three TQMP factors (Information and Analysis, Continuous Improvement, Process Management) have no significant effect on Quality Culture.

4.2. Quality Culture and Competitiveness

In order to investigate the relationship between Quality Culture and Competitiveness, Pearson correlation coefficient was used. **Table 9** shows the results of the correlation test between Quality Culture and Competitiveness. It is found in the table that the quality culture variable explain a significant percentage of variance

in competitiveness ($R^2 = 0.125$, $F = 54.985$, $p < 0.001$). Therefore, quality culture variable explain 12.5% of the total variance in competitiveness. In short, above hypothesis is supported. In detail, **Table 10** explains that the regression model supports hypothesis the above.

Therefore, TQMP factors (education and training, customers focus, information and analysis, continuous improvement, process management, employee relations, top management commitment and management of supplier) explained 68.1% of the total variance in Quality Culture.

4.3. Quality Culture Mediates the Relationship between Total Quality Management Practices and Competitiveness

In order to investigate the relationship between total quality management practices and the contractors' competitiveness, Pearson correlation coefficient was used. **Table 11** shows the results of the correlation test between TQMP factors and the contractors' competitiveness.

Table 12 shows the results of multiple regression analysis between TQMP factors (education and training, customers focus, information and analysis, continuous improvement, process management, employee relations, top management commitment and management of supplier) and contractors' competitiveness.

Table 10. Simple linear regression analysis between quality culture as IV and competitiveness as DV

Model	R	R ²	Adjusted R ²	Std. Error of the Estimate		
Model summary						
3	0.353(a)	0.125	0.122	0.34384		
Model		Sum of Squares	df	Mean Square	F	P.
ANOVA (b)						
3		6.501	1	6.501	54.985	0.000(a)
		45.635	386	0.118		
		52.136	387			
		Unstandardized				
Model		-----		S.zed		
3		B	Std. Error	Beta	t	P.
Coefficients(a)						
	(Constant)	2.728	0.143		19.110	0.000***
	Quality culture	0.286	0.039	0.353	7.415	0.000***

***, p<0.001

Table 11. Correlation coefficients of research factors (N = 388)

Factors	Competitiveness
Competitiveness	1
Education and training	0.129(*)
Customers focus	0.127(*)
Information and analysis	0.168(**)
Continuous improvement	0.154(**)
Process management	0.176(**)
Employee relations	0.567(**)
Top management	0.133(**)
Commitment	0.168(**)
Management of supplier	

** p<0.01

Table 12. Multiple linear regression analysis between Total quality management practices (TQMP) Factors as IVs and Competitiveness as DV

Model	R	R ²	Adjusted R ²	Std. Error of the Estimate		
Model summary						
1	0.605(a)	0.366	0.353	0.2953		
Model		Sum of Squares	df	Mean Square	F	P.
ANOVA (b)						
1		19.081	8	2.385	27.346	0.000(a)
		33.055	379	0.087		
		52,136	387			
		Unstandardized				
Model		-----		S.zed		
		B	Std. Error	Beta	t	P.
Coefficients (a)						
1	(Constant)	2.438	0.164		14.907	0.000***
	Education and training	-0.008	0.014	-0.024	-0.560	0.576
	Customers focus	-0.051	0.024	-0.105	-2.146	0.033*
	Information and analysis	0.009	0.028	0.015	0.315	0.753
	Continuous improvement	0.040	0.024	0.076	1.653	0.099
	Process management	0.039	0.015	0.106	2.503	0.013*
	Employee relations	0.235	0.019	0.562	12.369	0.000***
	Top management commitment	0.003	0.027	0.006	0.124	0.901
	Management of supplier	0.092	0.026	0.144	3.517	0.000***

*, p<0.05, ***, p<0.001

As shown in **Table 12**, the results indicated that four TQMP (Customers Focus, Process management, Employee relations, Management of supplier) factors significantly affect contractors' competitiveness while four TQMP factors (Education and training, Information and Analysis, Continuous Improvement, Top Management Commitment) have no significant effect on contractors Competitiveness.

5. CONCLUSION

It discussed theories related to TQM, quality culture and competitiveness. Studies have revealed positive links between quality culture and competitiveness and between TQM and competitiveness. TQM is not a philosophy with flaws rather it's the TQM implementation that is carried out in manner full of flaws (Steele, 1993). This is the basis of the inability of the researchers and authors to reach a consensus of the critical elements of TQM success. Most authors advocate the top management involvement and consistent culture improvement while other authors differ on other elements related to TQM success in light of competitiveness. This study provided a description of the theoretical framework utilized and adopted in the present research. The framework is developed by adopting elements of prior researchers on the subject such as the analysis of the interrelationship between TQM practices, quality culture and firm's competitiveness. In view of the outcomes that emerged from the research, it can be said that the hypothesis was supported the mediating effect of quality culture on the relationship between total quality management practices and competitiveness. The independent variable also revealed a pattern whereby they sufficiently contributed to the competitiveness.

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