

# Relationship Between Hard Total Quality Management Practices and Organizational Performance in Municipalities

<sup>1</sup>Abdullah ALNasser, <sup>1</sup>Rushami Zien Yusoff and <sup>2</sup>Rabiul Islam

<sup>1</sup>School of Business Management, College of Business,

<sup>2</sup>School of Economics, Finance and Banking, College of Business,  
University Utara Malaysia, 06010 UUM, Sintok, Kedah, Malaysia

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## ABSTRACT

Hard total quality management has now become the major business strategy in current management and has currently been taken up by companies around the globe. The aim of the study is to determine the relationship between hard total quality management practices and performance in municipalities. A quantitative research design was adopted to collect data. Multiple regression analysis method was used to conduct this study. The findings of the study will contribute to both theory and practice. The results of this study have important contributions and implications for practitioners and policy-makers in these five developing countries. Empirical evidence revealed that hard total quality management has relationship with performance. The findings also implied that hard total quality management has positively relation with performance and there is difference in organizational performance mean between all these countries.

**Keywords:** Quality Management, Practice, Municipality, Performance

## 1. INTRODUCTION

The core characteristic of hard TQM is its stress on production control. Hard TQM was introduced at the onset of the industrial revolution in the earlier years of the past century. During those years, TQM was not as popular as today, although some elements of Hard TQM were being applied. In addition varying schools of TQM were also in existence such as Henry Ford, Frederick Taylor's Scientific Management which all had a significant impact to the achievement of the TQM movement (Ross, 1995). At that time, quality management involved the inspection of products to guarantee that they each achieve the specifications. The concept of hard TQM stemmed from the identification and elimination of the causes of quality issues in TQM, continuous improvement and quality awards including ISO, EFQM, Malcolm Baldrige National Quality Award

and the Toyota Way. At the onset of the millennium, the focus shifted from human management to the interconnection between soft aspects of TQM and firm performance (Wilkinson *et al.*, 1998).

The pioneering researcher who made a distinction between soft and hard TQM was (Wilkinson, 1992). On the other hand, (Rahman, 2004) stated that hard TQM are more involved in practical, numeric and systematic quality control techniques while (Al-Tarawneh, 2010) claimed that hard TQM presents the production orientation of the quality stressing on data collection, measurement, TQM tools application including Statistical Process Control (SPC), flow charts, tally charts, Pareto analysis, scatter diagrams, histograms, control charts and cause and effect analysis. Hard TQM is said to have the following three critical factors.

Total Quality Management (TQM) practices are being widely adopted by contractor companies to solve

**Corresponding Author:** Abdullah ALNasser, School of Business Management, College of Business, University Utara Malaysia, 06010 UUM, Sintok, Kedah, Malaysia

problems regarding quality in the construction industry particularly to satisfy the needs of the customers. 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. The construction industry is being considered as comparatively having one of the poorest quality emphases among different manufacturing and service sectors (Alotaibi *et al.*, 2013).

### 1.1. Process Management

Process management involves all processes, process flow management, process improvement, production process, process control, process control and improvement, process design, flexible processing, advanced systems and the utilization of Just in Time (JIT) principles, use of technology and process quality (Karuppusami and Gandhinathan, 2006). On the other hand, (Mehmet *et al.*, 2010) considers process management as the process control implementation with the help of statistical process control methods. Various statistical process control techniques are present such as control charts, cause-effect diagrams, scatter diagrams and Pareto charts.

### 1.2. Quality Information and Analysis

The suitable and timely provision of relevant data and information is of significant importance to any firm. The effective flow of communication and information among individuals and teams in an organization is not possible without a system of data and information. According to TQM gurus such as Crosby, Deming and Juran, along with the experts in the field of TQM such as (Saraph *et al.*, 1989; Badri and Davis, 1995; Quazi and Padibjo, 1998), quality information and analysis is a significant TQM factor. Based on the study by (Chin and Sofian, 2011), easy access to relevant information facilitates the availability of knowledge in a timely manner and enables human capital's utilization of data in their work processes for the purpose of production and continuous improvement and it also enables information sharing regarding operational measures among the organization's employees which would lead to production improvement. The access to quality data and information of all stakeholders through quality tools, dependable user-friendly software and hardware systems are all important in driving and maintaining quality excellence and performance improvement (Sila, 2005).

### 1.3. Strategic Planning

Strategic planning is considered to be among the TQM critical success factors (Karuppusami and Gandhinathan, 2006). It includes mission/vision statement, quality policy, quality aims, business plan, communication methods and control and improvement of plans. It is the driver in an organization, whether profit or non-profit, in order to survive in a competitive market. For the achievement of effective strategic planning, it is imperative to take into consideration the following aspects of the organization; quality goals, effective measurement, clear unambiguous plans and accurate goals and objectives and resources. Strategic planning lays down the direction, assists in evaluating and creating synergies, facilitates prioritization and offers the basis for effective planning, motivation and control (David, 1997). Several researchers consider strategic planning as one of TQM's critical success factors (Drew and Healy, 2006; Prajogo and McDermott, 2005; Sila, 2005).

## 2. MATERIALS AND METHODS

### 2.1. Theoretical Framework of the Study

Following the thorough literature review and the identification of subsequent theoretical gaps, the research framework of the study is designed. The study model is depicted in **Fig. 1** where four latent variables are presented namely Soft Total Quality Management, Hard Total Quality Management, National Culture and Organizational Performance. Soft TQM is explained by a total of five variables which are management commitment, supplier relationship, employee relations, strategic planning, education and training customer focus. On the other hand, Hard TQM is explained by process management, quality information and analysis and strategy planning. Organizational performance is explained by four variables namely financial element, customer, internal process and employee.

As stated earlier, prior studies dedicated to shedding a light on the relationship between TQM strategy and performance has been inconclusive. As a result, there is a call for current researchers to examine the variables that may improve the TQM implementation success. The framework below is used to test the postulated hypotheses.

The present chapter sheds a light on the study's research design. The chapter includes the detailed measures used by the study. Following the introduction to the chapter, the research design, questionnaire design and summaries of data analysis are explained.

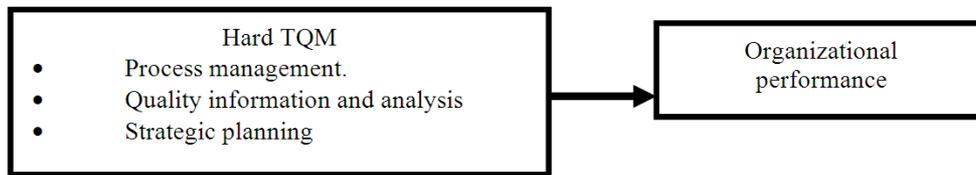


Fig. 1. Theoretical framework

## 2.2. Hard Total Quality Management as Independent Variables

Inconsistencies of the methods of measuring the construct of TQM strategy have been revealed in prior literature. In the present study, the constructs are measured by a six point Likert scale (1) “strongly disagree” to (6) “strongly agree”. An average score is calculated for every construct on the basis of the items. The Hard TQM comprises of three items with 24 questions. Respondents are requested to indicate their degree of agreement with each statement through a 6 point Likert scale 1 indicate strongly disagree 6 strongly agree, (Hair *et al.*, 2011). Three critical factors of Hard TQM were derived from literature namely, process management, quality information and analysis and strategic planning.

## 2.3. Pilot of the Study

The first draft of the questionnaire has gone through many phases of revisions to rectify the problems and clear the ambiguity arose. Following that, it was a crucial step to conduct the pilot test using the data collected from a sub-set of the participants to test for the validity and reliability of the measure (Sproull, 2002). While pretest evaluation of the questionnaire involved two academicians and professionals, the pilot test involved respondent from the same pool of respondents of the study from which the real data were collected (Bradburn, 2002). However, the pilot test was conducted to refine the measure before being distributed to collect the real data of the study, to rephrase the ambiguous questions, to decide the time required responding to the questionnaire and finally to measure the reliability and validity of the measure used. Following are the steps performed to conduct the pilot test and the source of the data collected.

## 2.4. Independent and Dependent Variables Relationships

Section 2.4 hypothesis testing is done using regression model. The first part of the hypothesis test

will be concern with the direct relationships between all the independent variables and the dependent variable which is the organizational performance. The first model will test the relationship between all the independent variable along the moderators as independent variable to test initially whether these variables are moderator. Baron and Kenny (1986) suggested that to test whether a variable should be included as a moderator it must be included in the equation as an independent variable and test its direct effect on the dependent variable. If the variable is found to be significant as an independent variable then transformation is need to test it indirect effect. Therefore the first model will test the direct relationship between hard TQM practices and the organizational performance Equation 1:

$$OP = a_1 + b_1TM + b_2ER + b_3E + T + b_4SR + b_5PM + b_6QI + b_7SP + \epsilon \quad (1)$$

Where:

TM = Top Management  
 ER = Employee Relations, E  
 T = Education and Training  
 SR = Supplier Relationships  
 PM = Process Management  
 QI = Quality Information and Analysis  
 SP = Strategic Planning

## 3. RESULTS

### 3.1. Descriptive Analysis

Descriptive analysis describes conditions, populations and phenomena as they are the purpose of descriptive statistics are to summarize or describe a set of quantitative data. Researchers use these statistics to describe or characterize the population or sample being studied. Basically, descriptive statistics refers to means, ranges and numbers of valid cases of one variable. **Table 1** shows the descriptive statistics of all principal constructs for all items.

**Table 1.** Descriptive statistics of all principal constructs

Variable	Construct	Mean	Std deviation	Skewness	Kurtosis
Hard TQM practices	Process management	4.06	1.030	-0.381	-0.148
	Quality information and analysis	4.06	1.060	-0.484	-0.201
	Strategic planning	4.05	1.090	-0.820	0.536
Organizational Performance	Organizational Performance	4.11	0.959	-0.657	0.224

In this study, the mean for Hard TQM practices was in the range of 4.05 to 4.06 and standard deviation was in the range of 1.03 to 1.06 and the mean of the performance measure is 4.11 while its standard deviation was 0.96. The mean scores for all variables were moderately high. There were no low level mean scores. The moderate high mean scores imply that respondents agree that all variables influence the organizational effectiveness of an organization. Among the independent variables, employee relations have the highest mean compared to other variables while the lowest was for the education and training. However, the mean score for the moderator variable culture shows that the highest mean is for uncertainty avoidance while the lowest was for Masculinity. Even though the rest of the TQM practices were not as high as employee relation their mean scores of around 4.00 imply that these activities cannot be taken lightly.

The standard deviations for all variables seem to fall between 0.88 and 1.11, which simply reflects the existence of considerable acceptable variability within the data set. The variation value indicates that all answers on the study variables were substantially different from one respondent to another, thus, signifying the existence of tolerable variances in responses. Finally, the Skewness and kurtosis of the 13 constructs are well behaved in term of normality. The values of Skewness and kurtosis are between the ranges of -1 and +1 which indicate that there are no outlier or extreme values that might jeopardise the validity of the analysis. Consequently, all the thirteen constructs representing the four variables are ready for subsequent analysis.

### 3.2. Reliability

The reliability test was conducted to observe the internal consistency of the constructs. The alpha value is important to determine the consistency of items in each of the constructs. If the alpha value falls below the minimum value that can be considered as an adequate reliability, that factor will be dropped for the confirmatory factor analysis using structural equation modelling.

Cronbach's coefficient alpha values vary between 0 and 1. However, there is no general agreement as to

what constitutes good or very good levels of Cronbach's alpha. Gable and Wolf (1993) suggests that alpha coefficients in the high 0.80 or above should be considered good and (Cortina, 1993) suggests that alpha coefficients 0.85 or above are quite good. But, it is also important to know that (Nunnally and Bernstein, 1994) suggest that alpha values above 0.7 can be considered as adequate.

The summary of results of the internal consistency reliability test for all the constructs used in this study is presented in **Table 2**. Basically, constructs with Cronbach's coefficient alphas of above 0.7 will be retained.

According to (Talib *et al.*, 2013), the top management commitment has good internal consistency with a Cronbach's alpha coefficient reported of 0.932. In this study the Cronbach's alpha coefficient is 0.938. The Cronbach's alpha of Supplier relationship for this study is 0.919, which is in line with the findings of (Talib *et al.*, 2013) of 0.910. For employee relations the Cronbach's alpha reported above is 0.952 is higher than what was found by Yunus *et al.* (2013) which was 0.842. Similarly, the construct education and training reliability (0.925) is higher than what was found by (Talib *et al.*, 2013) which was 0.902. Other constructs followed the same trend where this study reliability for all constructs seems to be either equal or exceeds some of the studies in TQM practices. On the other hand, National culture construct seems to show acceptable level of reliability whereby all the construct display Cronbach's alpha exceeding 0.7 as recommended by Nunnally and Bernstein (1994).

### 3.3. Factor Analysis

Factor analysis is an interdependence technique and it is essential in several stages of development and assessment of measures. The underlying principle of factor analysis is the data parsimony and data interpretations in which items are condensed into common interrelated and meaningful dimensions (Churchill and Iacobucci, 2002). The primary purpose of factor analysis is to define the underlying structure among the variables in the analysis (Hair *et al.*, 2006).

**Table 2.** Cronbach's Coefficient Alpha for the Study Constructs

Variable	Construct	Items	Cronbach's Alpha
Organizational performance	Organizational performance	12	0.933
Hard TQM practices	Process management	4	0.856
	Quality information and analysis	11	0.960
	Strategic planning	9	0.945

The total number of items to measure all the variables for the current study is 96. For the soft TQM practice the constructs are top management (8 items), Supplier relationship (8 items), employee relations (15 items), education and training (7 items) and Customer focus (6 items). Hard TQM practice consists of three constructs which are process management (4 items), quality information and analysis (11 items) and strategic planning (9 items). The moderator which is the national culture consists of 4 constructs power distance (4 items), uncertainty avoidance (4 items), Individualism (4 items) and Masculinity (4 items). The dependent variable which is organizational performance consists of total of 12 items.

In addition, only items with loadings higher than 0.50 on one factor and low cross-loadings were retained for further analysis (Nunnally, 1978). Factor loading is useful to ascertain the convergent and discriminant validity of the scales (Hurley and Hult, 1998). It also specifies the strength of the relationship between items and latent construct. According to (Hair *et al.*, 2006), factor loadings of  $\pm 0.5$  or greater are considered practically significant. Generally, in this study, the items were not retained if they: (i) did not load into any factor with a value of 0.5 or greater, (ii) freestanding items (i.e., in one factor there is only one item with high factor loading) and (iii) had cross loading on two factors. The results will be presented as follows. First the KMO results, second the scree plot, third the variance explained and lastly the rotated matrix with the factor loadings. In terms of deciding how many factors to include two criteria will be used namely, scree plot and Eigen value more than 1. Using only one of these two might lead to inclusion of unnecessary factors.

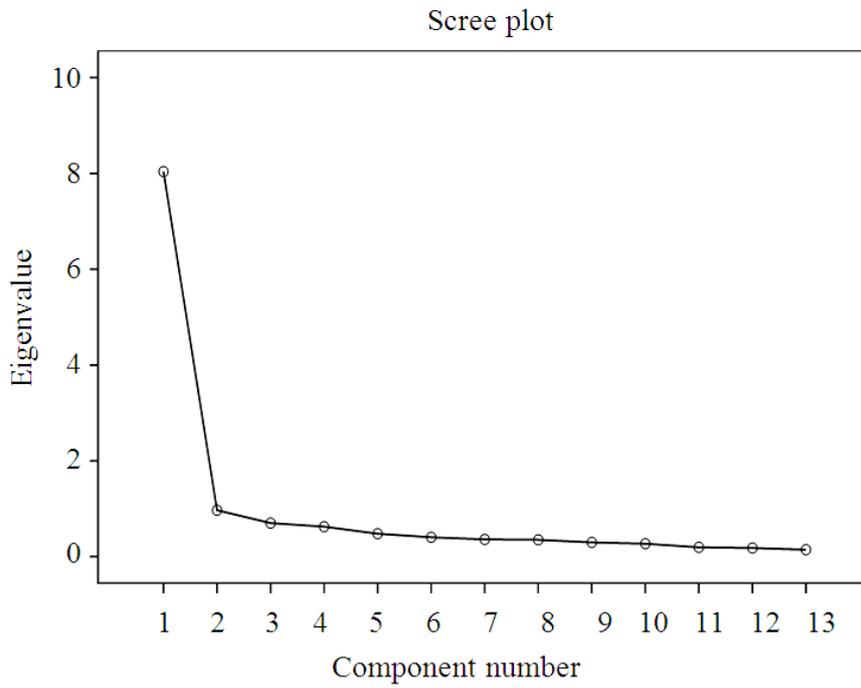
The factor analysis was run on three main variables. First, the independent variables which consist of Soft and Hard TQM practices which are formed using 5 and 3 constructs respectively. Second, the moderating variable, the national culture which

consists of 4 constructs. Lastly the dependent variable which consists of one construct only. The analysis was done separately for these three variables. **Table 3** shows the number of factors extracted, the KMO, the Bartlett's test of Sphericity and the variance extracted.

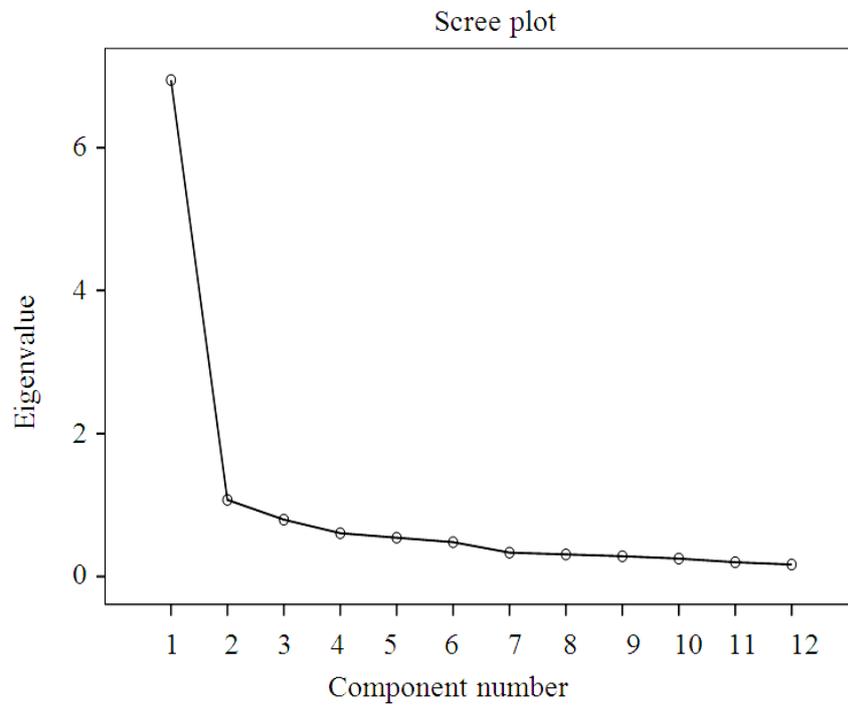
Since the original variable consist of 5 construct that cannot be ignored when looking at the scree plot. Therefore based on the Eigenvalues and the theoretical knowledge of the 5 constructs 4 factors were used after filtering. Similarly, **Fig. 2 and 3** shows the scree plot for hard TQM practices and municipalities performance respectively. The graph also indicates that only one factor should be used because the line breaks at factor 2 and somehow flattens out. Again based on the theoretical model the hard TQM practices has three main constructs and the Eigenvalue show that 3 factor are appropriate.

**Table 4** reports the factor analysis results for hard TQM practice and the factors reliability. All hard TQM practices construct are included and will be used. However, few items were deleted as shown earlier in **Table 4** Out of the 11 items of quality information and analysis 6 items remains to be used for hypothesis testing. Process management maintained all its 4 items while strategic planning has only 3 items out of 9 to be used in further analysis. The reliability of these factors was tested and the results indicate that quality information and analysis has the highest mean of 0.93 followed by process management with Cronbach's alpha of 0.86 and finally strategic planning with lowest reliability of 0.84 as shown in **Table 4**.

**Table 5** reports the factor analysis results for the dependent variable the municipalities performance and its reliability. It is clear that the municipalities' performance reliability which is at 0.933 is still the same as before since no item was dropped after the factor analysis. Therefore these variables are ready for the next stage of analysis which is the regression analysis to test the study hypothesis.



**Fig. 2.** Scree Plot of hard TQM practices



**Fig. 3.** Scree Plot of organizational performance

**Table 3.** Exploratory factor analysis process for study variables

Number of extracted factors	KMO	Bartlett's Test of sphericity	Variance extracted (%)	Remarks
<b>Independent Variables</b>				
<b>hard TQM practices</b>				
3	0.953	2991	72.5	Quality information and analysis item 9,10 and 11 and strategic planning 2,7 and 8 dropped-cross loading
3	0.942	1922	72	Strategic planning item 1 and 4 dropped-cross loading
3	0.937	1625	73	Strategic planning item 5 and quality information and analysis dropped-wrong factor loading and cross loading
3	0.927	1250	75	Final set. 15 items
<b>Dependent Variable (the adoption of Programming and performance budgeting</b>				
1	0.919	1009*	58	Total number of items with loading more than 0.5 is 12 items

\*; Theoretically it was expected that the measurement items would group into eight variables that were identified in the literature. Due to cross-loadings, the number for the independent variables (factors) decreased to 6 during the stages of the EFA process. The number drops to 6 in the final stage of the EFA process

**Table 4.** Factor loading and reliability test for Hard TQM practices

Factors Item	Quality information and analysis	Process management	Strategic planning	Reliability Cronbach's Alpha	
QUAL_3	0.653			0.93	
QUAL_4	0.678				
QUAL_5	0.755				
QUAL_6	0.860				
QUAL_7	0.763				
QUAL_8	0.701				
PROC_1		0.723			0.86
PROC_2		0.704			
PROC_3		0.790			
PROC_4		0.676			
PLAN_3			0.701	0.843	
PLAN_6			0.816		
PLAN_9			0.639		

**Table 5.** Factor loading and reliability test for organizational performance

Component Item	Organizational performance	Reliability Cronbach's Alpha
OP_1	0.637	0.933
OP_2	0.759	
OP_3	0.762	
OP_4	0.793	
OP_5	0.710	
OP_6	0.772	
OP_7	0.821	
OP_8	0.769	
OP_9	0.763	
OP_10	0.763	
OP_11	0.769	
OP_12	0.795	

## 4. DISCUSSION

### 4.1. Regression Analysis

Section 3.4 will concentrate on the regression analysis of the proposed framework and to test the hypothesis derived from it. However before delving into the regression analysis there is some critical issue that needs to be addressed.

**Table 6** report the regression results of the first model. The result shows that all hard TQM practices are significant and positively related with the organizational performance. The standardized beta shows the direction as well as the strength of the partial correlation between each independent variable and organizational performance.

**Table 6.** Regression result for model 1

Variable	Unstandardized Coefficients	Standardized Coefficients	t-value	Tolerance	VIF
Constant	3.285		17.753	0.549	1.820
TM	0.850*	0.457*	4.620	0.541	1.847
ER	0.949*	0.433*	4.348	0.930	1.075
E&T	0.247**	0.162**	2.134	0.699	1.430
SR	0.472*	0.287*	3.279	0.630	1.587
PM	0.442*	0.278*	3.016	0.638	1.568
QI	0.543*	0.333*	3.632	0.881	1.135
SP	0.220*	0.378*	4.836	0.549	1.820
R <sup>2</sup> = 36%					
Adj. R <sup>2</sup> = 32%					
F-value = 9.56*					

\*, \*\*, significant at 1% and 5% respectively

**Table 7.** Organizational performance mean difference

Variable	F-value	Mean difference					
		Saudi Arabia	Egypt	Turkey	Jordan	Qatar	
Organizational performance	22.4*	Saudi Arabia	-----				
		Egypt	1.07*	-----			
		Turkey	-0.03	1.11*	-----		
		Jordan	1.36*	0.29	1.39*	-----	
		Qatar	0.01	-1.1*	0.05	-1.34	-----

\* Significant at 1%

From **Table 7** standardized beta for the hard TQM practices indicate that top management has the strongest influence on the organizational performance followed by employee relations, supplier relationship and lastly education and training. The tolerance and VIF which test Multicollinearity indicate values higher than 0.2 and less than 10 respectively indicating that the model does not suffer from severe Multicollinearity. In term of the goodness of the model the R<sup>2</sup> and the adjusted R<sup>2</sup> indicate that 36% and 32% respectively of the variation in the organizational performance is explained by all the independent variables. In addition, the F-value which indicates the goodness of fit is significant at 1% pointing out that the model is good. Furthermore to check the two important classical assumption of the model namely, normality and homoscedasticity the three graphs below confirm that the model does not violate any of the classical assumptions.

**4.2. Difference in Organizational Performance**

Section 3.5 will test the hypothesis whether the mean performance across countries are similar or not. The technique that is used to test the mean difference between

these countries is one way analysis of variance or one way ANOVA. The result is reported in **Table 7** below. The result of testing the hypothesis indicates that there is a significance difference between all these countries in terms of mean of organizational performance. However this does not show which countries is different and by how much. It is clear that Saudi Arabia has higher and significant mean than Egypt and Jordan but not turkey and Qatar. On the other hand Egypt has significantly higher mean than turkey but significantly lower than Qatar. Lastly, turkey organizational performance is significantly higher than Jordan.

**5. CONCLUSION**

This study was set up to relate Hard TQM and organizational performance relationship as reflected in the municipalities in five developing countries (Egypt, Jordan, Qatar, Saudi Arabia and Turkey). However, Hard TQM, related to the system, tools and techniques, soft quality factors are those elements of TQM deals with long-term natures and is characterized as humanistic intangible factors that are difficult to directly been measured such as top management commitment, customer focus, teamwork,

training and empowerment and effective communication, (Thiagarajan and Zairi, 1997).

Essentially, this study was greatly motivated by the inconclusive findings, in the recent relevant literature concerning the relationship between Hard Soft Total Quality Management and the Organizational Performance. However, the inconclusive conclusions about these relationships (Nair, 2006) have been an important unresolved issue that needs further examination. In addition to that, there are a number of organizational variables should be taken into account in the study of this relationship, (Ehigie and McAndrew, 2005; Douglas and Judge, 2001) that did not receive attention or neglect in most previous studies. Therefore the research has been studying the impact of national culture in this relationship.

The results of this study have important contributions and implications for practitioners and policy-makers in these five developing countries. Empirical evidence revealed that Hard TQM have relationship with Performance. The findings also implied that Hard TQM have positively relation with Performance, The findings also implied that there is difference in organizational performance mean between all these countries. In other words, this study provided advantageous insights on how Hard TQM can enhance the overall organizational performance. This is an expected result in municipalities are related to the services provided to citizens and non-application of these TQM principles will have negatively effect on the organizational performance.

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