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THE IMPACT OF TOTAL QUALITY MANAGEMENT COMPONENTS ON THE FIRMS PERFORMANCE

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The aim of this study is to investigate the effect of Total Quality Management components (TQM) of firms performance in industrial sector in the kingdom of Saudi Arabia. The data of this study was collected from the employees who work in industrial firms, the respondents were given sometimes to answer the questionnaire. In all, a total of 357 useable questionnaires were used in the statistical analysis. Regression and correlation technique were used to investigate the relationship between TQM components and firms performance. The finding of this research indicates that the total quality management components can significantly affect firms performance. In other words, the TQM components have a positive and significant relationship with firms performance, this leads to conclude that the adoption of TQM practices in industrial sector is used in appropriate way. It is recommended that firms should continue implement TQM with all variables to improve performance.

Keywords: Strategic decision, TQM, Firms performance, Industrial firms, Saudi Arabia.

INTRODUCTION

Since the 1980's, when the Total Quality Management (TQM) concept was first defined (Deming, 1986; Crosby, 1979; Juran, 1986), practitioners and researchers tried to give more definitions to defend this business philosophy, the first organic ground based system that emphasizes a systems approach to quality. TQM is a set of techniques, principles, processes, and best practices that over time have been proven effective (Rao *et al.*, 1996).

TQM utilizes techniques that improve as well as get better product quality and processes and thereby help a firm improve competitive performance (Grant *et al.*, 1994). Proponents of TQM argue that the philosophy can be applied to any organization (Powell, 1995).

The effectiveness of TQM as a system for organizational improvement has been widely reviewed in the literature. TQM is an important management tool, which can offer business with stability, growth, and prosperity (Issac *et al.*,

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2004). In order to achieve the requirement of quality, firms have to put the effort on the implementation of TQM. Therefore, firms will introduce quality management practice to integrate internal information communications with TQM philosophy effectively. In addition, the application of TQM mechanisms is also important to develop the relationship between organizations and their suppliers. Moreover, the application of TQM can also increase the satisfaction of the customer by providing preeminent products or services.

There are many studies have investigated the link between TQM and organization performance. However, this study concentrates on the impact of TQM on the performance of directorate of general security in Saudi Arabia. More specifically, this study focuses on the impact of TQM components on the performance of directorate of general security in Reyad - Saudi Arabia.

LITERATURE REVIEW

Christos B Fotopoulos and Evangelos L Psomas (2009) and Kumar, Dixit Garg and Grag (2009) studied the impact of TQM practices on quality management consequences and explained the relationship between TQM components including leadership, strategic quality planning, employee management and involvement, supplier management, customer focus, process management, and other continuous improvements, and their effect on quality management in the form profits, sales, and position.

Some research has found a positive effect of TQM (Easton and Jarrell, 1998; Hendricks and Singhal, 2001a,b); whereas other research reports a negative incidence of TQM on all of the measures (Chapman *et al.*, 1997). Other

research has found a neutral result (Adam, 1994; Powell, 1995; York and Miree, 2004). Hence, that indicates the inconsistent results of those studies, however, that could lead to a methodological problem and conceptual approaches used by researchers which may have led to conflicting results but, in response.

Moreno Luzon (1993) examined the effectiveness of TQM in a survey of 44 small manufacturing companies in Valencia, Spain. Effectiveness was measured on the basis of managers' satisfaction with the achievement of specific objectives and their estimation of the change in several performance variables over a one year period believed to be a consequence of the quality program. Overall, the managers indicated a high level of achievement of their TQM objectives, and some managers perceived that their TQM programs had resulted in highly positive effects. In particular, the most frequently cited effects were the development of a quality culture (with 77% of firms experiencing this effect) and improved training (72.7%). Increased profits and increased sales were less frequently cited, with 63.6% and 50% of firms experiencing these effects, respectively.

Walley (2000) provided insights to the effect of TQM in SMEs in the UK farming sector. Respondents were asked to rate the impact of TQM on a range of criteria. Based on the responses of 25 farmers who had implemented TQM (15.2% of the sample), Walley (2000) concluded that although some farmers had indicated that TQM had resulted in slight decreases in criteria such as 'cost efficiency' and "profitability", on average TQM appeared to have a small positive effect on overall performance.

Criteria where TQM had a major impact were “quality awareness” and “employee morale”.

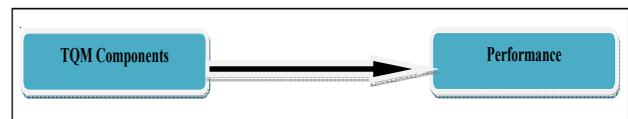
Rahman (2001) studied the relationship between TQM practices and three business outcomes in SMEs in Western Australia. He developed a questionnaire which asked respondents to rate themselves on the degree to which they practiced 36 TQM mechanisms. The questions pertained to the similar six quality criteria that have been examined in Anderson and Sohal’s (1999) study. Business outcomes were defined in terms of revenue, profit, and the number of customers. A self rating scale was used to measure business outcomes. The questionnaire was sent to 250 SMEs, and 49 usable responses were received. Rahman (2001) documented that “leadership”, “processes, products and services”, “people”, and “customer focus” were significantly correlated with revenue, profit, and the number of customers.

Esin Sadikoglu, Cemal Zehir (2010) and Alessandro Brun (2010) investigated the relationship between TQM practices with innovation and employee performance. The theoretical model developed for the study explains how different TQM practices i.e. leadership, training, employee management, information and analysis, supplier management, process management, customer focus, and continuous improvements effects on employee performance which leads to innovation performance and this in later stages effects the firm overall performance.

Some researchers have found a positive effect of TQM (Easton and Jarrell, 1998; Hendricks and Singhal, 2001a,b); whereas other researchers found a negative incidence of TQM on all of the measures (Chapman *et al.*, 1997). Other

researchers also have found a neutral result (Adam, 1994; Powell, 1995; York and Miree, 2004). Hence, that indicates the inconsistent results of those studies, However, that could lead to a methodological problem and conceptual approaches used by researchers which may have led to conflicting results but, in response.

The aim of this study is to investigate the impact of TQM components on the performance



of industrial sector in Saudi Arabia. Based on the previous studies, the theoretical framework of this study is shown as follow

From the above illustrated theoretical framework, the main hypothesis is developed as there is a significant association between TQM components and firms performance.

RESEARCH METHODOLOGY

Sampling

In order to investigate the effect of TQM components on firms performance in industrial sector in Saudi Arabia, qualitative method is employed. This study focuses on industrial sector only, this particular sector is chosen based on several reasons, first the industrial sector is considered as a key producer of beverages in the Middle East and Africa region. Second, the firms listed under industrial sector has more than 2,000 educated employees. This particular paper has chosen several companies that play important role in the industrial sector in general. Therefore, the sample size used in this paper is based on the sampling formula which is as follows

$$n = \frac{\chi^2 * N * K(1 - K)}{\delta * (N - 1) + \chi^2 * K(1 - K)}$$

where:

N Sample size

N Population size

K Interval error

δ Standard deviation

χ^2 Chi- square

According to the sampling formula, a total of 400 questionnaires have been distributed to the employees in several firms in Reyad – Saudi Arabia. The selection of the respondent was based on the simple random sampling method. Respondents were given a week to answer the questionnaire. In all, a total of 357 useable questionnaires were used in the statistical analysis.

Measurement of the Variables

The independent variable of this study is the TQM components that affect firms performance namely are leadership, knowledge management, process management, training, supplier quality management, customer focus and strategic quality. These factors were employed based on a developed instrument by several authors (Sadikoglu and Zehir, 2010; Samson and Terziovski, 1999; Phan Chi Anh and Yoshiki Matsui, 2011; MacKelprang *et al.*, 2012). The factors are contains 31 items. The dependent variable of this study is firms performance. The firms performance is divided into seven factors namely are operational performance, inventory management performance, employee performance, innovation performance, social responsibility, customer results and financial performance. These factors contain 27 items. It was employed based on a developed instrument by several authors (Cf. Sadikoglu and Zehir, 2010;

Sadikoglu and Zehir, 2010; Samson and Terziovski, 1999; Phan *et al.*, 2011; MacKelprang *et al.*, 2012). All items in the questionnaire are based on the 5-point Likert scale ranging from 1 for strongly disagree to 5 for strongly agree.

In order to examine the effect of TQM components on firms performance regression analysis was employed. For purposes of examining the TQM components influencing firms performance, this study has examined the multiple regression analysis' assumption, this study is obliged to examine the outliers, normality, linearity, heteroskedacity and multicollinearity problems in confirming that there is no violation in the assumptions of multiple linear regressions (Hair *et al.*, 1995).

THE MODELS

Regression Model

DeCoster (2004) illustrated regression as a statistical instrument which permits as well as allows researchers to forecast or predict the value of one continuous variable from one or more variables. He added that "when a regression analysis is performed, it means that a regression equation is created which allows the prediction of the value of dependent variable using the values of the independent variable".

Linear regression analysis is employed with the purpose of examining the magnitude and direction of the association between an independent variable and the dependent variable. Julie (2011) claims that linear regression can be used with the intention of predicting the value of a single continuous dependent variable from a single continuous independent variable.

General Linear Regression Equation

$$Y_i = \beta_0 + \beta_1 X_i + \varepsilon_{it}$$

Where γ_i is the value of the dependent variable for case i , X_i is the value of the independent variable for case i , β_0 and β_1 are constant, where β_0 is the intercept and β_1 is the slope that indicates how much it expects γ to change when X is increased by a single unit. ϵ_{it} is the error in the prediction for case i .

The models used in this study are as follows
 Firm Performance = $c + \beta_1$ (TQM Components) + ϵ_{it}

The results and hypotheses testing

Respondent Profile

The personal information of the respondents are shown in Table 1. It is observed in the table below

that the majority of the respondents are male, as a results there are 310 (87%) male respondents and 47 (13%) female respondents. In analyzing the marital status factor for the respondents, it can be seen that there are 88 (25%) single respondents and 269 (75%) married respondents.

Moreover, In analyzing the age factor for the respondents, the results showed that the age of the respondents that ranged between 20–30 are 138 (39%) respondents. However, those who ranged between 31-40 years old are 167 (47%). It can also be seen that the age of the respondents that ranged between 41–50 are 40 (11%) and few respondents are more than 51 years old which are 12 respondents (3%).

Table 1: Summary of Profile Respondents

		n	Percentage
Sex	Male	310	87%
	Female	47	13%
Total	357	100%	
Marital Status	Single	88	25%
	Married	269	75%
Total	357	100%	
Age	20-30	138	39%
	31-40	167	47%
	41-50	40	11%
	above 51	12	3%
Total	357	100%	
Education	Secondary School	16	4%
	Diploma School	112	31%
	Bachelor Degree	212	59%
	Master Degree	14	4%
	PhD Degree	3	1%
Total	357	100%	

Finally, in term of education, it can be seen that most of the respondents are educated. It can be observed that 16 respondents have secondary school certificates and 112 respondents (31%) had diploma degree. The respondents who hold bachelor degree are 212 persons (59%). Furthermore, the respondents who hold master degree are 14 persons (4%). Finally, the respondents who hold PhD degree are 3 persons (1%).

Descriptive Statistics

The main goal of descriptive statistic is to summarize the sample and the measures of the variables used in this study. However, it is important to consider the level of mean satisfaction for each item used before analyzing the descriptive statistics in this study. In other words, the level of satisfaction is considered from score of the answers and was divided into five levels to the Likert scale as follows:

$$\begin{aligned} & \text{(High score – Low score) / Number of levels} \\ & (5 - 1) / 5 \\ & = 0.80 \end{aligned}$$

Therefore, Table 2 shows the criteria for understanding the mean of satisfaction level.

Hence, Table 3 shows the descriptive statistic for all items used to measure the TQM variables.

Table 2: The Criteria for Understanding the Mean of Satisfaction Level		
	Mean Score	Satisfaction Level
1	1.00 – 1.80	Strongly Disagree
2	1.81 – 2.60	Disagree
3	2.61 – 3.40	Neutral
4	3.41 – 4.20	Agree
5	4.21 – 5.00	Strongly Agree

Table 3 illustrates the descriptive statistics for all items used in this study to measure TQM components. It can be seen in the table above that the respondents were almost agreed on the items used, except an 7 items which are labeled as “We inform customers’ current and future needs and expectations to our employees effectively”, “Customer complaints are used as input to improve our processes”, “We have a mission statement which has been communicated throughout the firm and is supported by our employees”, “We develop and implement our strategies and plans based on data concerning customers’ requirements and the firm’s capabilities”. “The management communicates its strategy and objectives to the staff”, “Customers’ needs are taken into account when establishing objectives”, “Our quality strategies affect all organizational areas and managerial activities” which record values of an average greater than 4.21. On other words, This indicated that the 7 items that ranged of the mean score between the values of 4.21 to 5.00 which indicates that the respondents were strongly agree regarding that particular items. The overall mean has recorded a value of 4.1815, this indicates that the respondents were agreed regarding the TQM items for measuring TQM variables.

Furthermore, Table 4 shows the descriptive statistic for all items used to measure firms performance variables.

Table 4 illustrates the descriptive statistics for all items used in this study to measure firms performance. As a result, it can be observed that the respondents were almost strongly agree as well as agree on the items used to measure firms performance. The highest average has recorded a value of 4.2409 for “Purchase material turnover

Table 3: Descriptive Statistic for All Items Used to Measure the TQM Variables

TQM Components	N	Mean	Std.	Meaning
Organizational top management (senior executives and supervisors) views improvement in quality as a way to increase profits	357	4.1457	.67961	Agree
Organizational top management has objectives for quality performance	357	4.1429	.64849	Agree
Organizational top management is evaluated for quality performance	357	4.1457	.62806	Agree
Our firm has an effective performance measurement system to track overall organizational performance	357	4.1176	.64707	Agree
Quality data (error rates, defect rates, scrap, defects, rework rates, cost of quality, etc.) are available	357	4.1597	.59939	Agree
Timely firm performance data are always available	357	4.1541	.65456	Agree
We design processes in our firm to be "mistake-proof" to minimize the changes of errors	357	4.1204	.58976	Agree
We make extensive use of statistical techniques to reduce variation in processes	357	4.1653	.61180	Agree
We give clear, comprehensive, and standardized documentation about work methods and process instructions to employees	357	4.1541	.60551	Agree
A large amount of the equipment on the shop floor is currently under statistical process control	357	4.1765	.55557	Agree
Training in advanced statistical techniques is given to the employees who need training	357	4.1597	.59939	Agree
Our employees possess sufficient knowledge of the basic aspects of our sector	357	4.1625	.61025	Agree
Our employees understand the basic processes used to make our products/services	357	4.1092	.64638	Agree
Managers and supervisors participate in specialist training	357	4.1373	.63218	Agree
Resources are available for employee quality training in our firm	357	4.1625	.59628	Agree
Our suppliers have an effective system to ensure quality of their products and/or services	357	4.1737	.54883	Agree
We emphasize quality and delivery performance rather than price in selecting suppliers	357	4.1429	.64849	Agree
Our suppliers are involved in our quality training	357	4.0812	.70839	Agree
We work closely with suppliers to improve each other's processes	357	4.1905	.60207	Agree
Our suppliers are actively involved in our new product development process	357	4.1569	.53321	Agree
We frequently are in close contact with our customers	357	4.1625	.56731	Agree
We actively and regularly seek customer inputs to identify their needs and expectations	357	4.1541	.59616	Agree

TQM Components	N	Mean	Std.	Meaning
We inform customers' current and future needs and expectations to our employees effectively	357	4.2241	.64927	Strongly Agree
Our customers give us feedback on quality and delivery performance	357	4.1905	.65567	Agree
Customer complaints are used as input to improve our processes	357	4.2689	.55126	Strongly Agree
We measure customer satisfaction systematically and regularly	357	4.1989	.51625	Agree
We have a mission statement which has been communicated throughout the firm and is supported by our employees	357	4.2353	.53062	Strongly Agree
We develop and implement our strategies and plans based on data concerning customers' requirements and the firm's capabilities	357	4.2773	.49590	Strongly Agree
The management communicates its strategy and objectives to the staff	357	4.3866	.49337	Strongly Agree
Customers' needs are taken into account when establishing objectives	357	4.3081	.51414	Strongly Agree
Our quality strategies affect all organizational areas and managerial activities	357	4.2633	.54887	Strongly Agree
Overall		4.1815	0.5956	Agree

Firms Performance	N	Mean	Std.	Meaning
Quality of our products/services is high	357	4.2241	.53019	Strongly Agree
Reliability of our products/services is high	357	4.1737	.48930	Agree
We deliver our products/services on time to customers	357	4.1989	.51625	Agree
Purchase material turnover is high in our firm	357	4.2409	.53863	Strongly Agree
Total inventory turnover is high in our firm	357	4.2213	.52872	Strongly Agree
Our employees' organizational commitment is high	357	4.2007	.54432	Agree
Our employees' job performance is high	357	4.1345	.49590	Agree
Our employees' absenteeism is low	357	4.1232	.45770	Agree
Our employees' morale is high [357	4.2045	.50856	Agree
Our employees' turnover rate is low	357	4.1877	.54160	Agree
The number of successful new product/service introductions of our firm is high	357	4.1204	.61311	Agree
The use of latest technological innovations in our new product is high	357	4.1877	.65434	Agree
The technological competitiveness of our firm is high	357	4.1905	.61591	Agree
The speed of new product development of our firm is high	357	4.2213	.55969	Strongly Agree

Firms Performance	N	Mean	Std.	Meaning
The number of our new products that are first-to-market is high	357	4.1849	.52946	Agree
Protection of environment in our firm has developed	357	4.1793	.54186	Agree
Noise levels caused by our firm have decreased	357	4.2101	.50626	Strongly Agree
Pollution levels caused by our firm have decreased	357	4.1821	.56877	Agree
Our firm has a positive impact on society	357	4.2101	.53853	Strongly Agree
Our firm is actively involved in the community	357	4.2129	.50786	Strongly Agree
Customer satisfaction has improved	357	4.1681	.58998	Agree
Customer retention has improved	357	4.2241	.55098	Strongly Agree
Customer complaints have decreased	357	4.2005	.53546	Agree
Return on assets of our firm has increased	357	4.1765	.59464	Agree
Market share of our firm has improved	357	4.1877	.60990	Agree
Profits of our firm have grown	357	4.2241	.54585	Strongly Agree
Sales of our firm have grown	357	4.2213	.57455	Strongly Agree
Overall		4.1932	0.5477	Agree

is high in our firm” and the lowest average has recorded a value of 4.1204 for “The number of successful new product/service introductions of our firm is high”. The overall mean has recorded a value of 4.1932, this indicates that the respondents were agreed regarding the Firms performance items for measuring the performance variables.

The Effect of TQM Components on the Performance the technique of regression analysis is performed to investigate the effect of total quality management components on firms performance. Table 5 describes the results of the regression analysis.

Table 5 illustrates the effect of total quality management components on firms performance.

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
B	Std. Error	Beta			
(Constant)	3.870	.155	.24.947	.000	
Total Quality Management	.078	.037	.112	2.114	.035
R ²		0.012			
Durbin-Watson	2.033				
Variance Inflation Factor (VIF)	1.000				
Heteroskedacity	No				

Note: Significant at the 0.05 level

Table 6: The Relationship between the Total Quality Management Components and Firms Performance

		Total Quality Management Components	Firms Performance
Total Quality Management Components	Pearson Correlation	1	.112*
	Sig. (2-tailed)		.035
	N	357	357
Firms Performance	Pearson Correlation	.112*	1
	Sig. (2-tailed)	.035	
	N	357	357

Note: * Correlation is significant at the 0.05 level (2-tailed).

It can be seen that the coefficient of determinations (R^2) value of 0.012 implies that on average the variability in the total quality management components for this study, can explain 1.2% of the variability in the firms performance. The Durbin-Watson statistic is used to test for the presence of serial correlation among the residuals. The value of the Durbin-Watson statistic ranges from 0 to 4. The acceptable value of Durbin-Watson shall be ranged between 1.50 - 2.50. As it can be seen in the table above that the Durbin-Watson values is 2.033 which acceptable value.

As results; it can be observed that the total quality management components can significantly affect firms performance. The results showed that the total quality management components has a significant effect on firms performance with a coefficient of 0.112 and probability value of 0.035. This finding is consistant with other researchers' finding who found that the effect of the total quality management components on firms performance is significantly valid (Cf. Sadikoglu and Zehir, 2010; Sadikoglu and Zehir, 2010; Samson and

Terziovski, 1999; EsinSadikoglu, CemalZehir, 2010; Alessandro Brun, 2010; Phan *et al.*, 2011; MacKelprang *et al.*,2012).

The Relationship between Total Quality Management Components and Firms Performance

In order to explore the association between total quality management components and firms performance, correlation analysis was performed. Table 6 demonstrates the relationship between the total quality management components and firms performance.

Table 6 illustrates the relationship between the total quality management components and firms performance. It can be observed in the table above that the total quality management components have a positive and significant relationship with firms performance which records a value of 0.112 at a significant level of 0.05. This finding is consistant with other researchers' finding who found that the effect of the total quality management components on firms performance is significantly valid (Cf. Sadikoglu and Zehir, 2010; Sadikoglu and Zehir, 2010; Sadikoglu and Zehir,

2010; Samson and Terziovski, 1999; Esin Sadikoglu, Cemal Zehir, 2010; Alessandro Brun, 2010; Phan *et al.*, 2011; MacKelprang *et al.*, 2012).

CONCLUSION AND RECOMMENDATION FOR FUTURE RESEARCHES

The aim of this study is to investigate the effect of total quality management components on firms performance. The total quality management components used in this study were leadership, knowledge management, process management, training, supplier quality management, customer focus and strategic quality. The dependent variable of this study is firms performance. The firms performance is divided into seven factors namely are operational performance, inventory management performance, employee performance, innovation performance, social responsibility, customer results and financial performance. Based on the results, it is revealed that the total quality management components can significantly affect firms performance. Moreover, the total quality management components have a positive and significant relationship with firms performance.

Other researchers who are interested on total quality management components can improve other models that consist same variables used in this study but in different sectors such as telecommunication sector and service sector rather than focusing on industrial sector. Moreover, interested parties can also develop models that consist some other factors that could influence the total quality management components.

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