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Total Quality Management Practices' Effects on Quality Performance and Innovative Performance

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Abstract

TQM and performance relationship is a popular discussion in the literature, quality performance and TQM relationship is supported with various studies but the findings about innovative performance is inconsistent. However, most scholars stress on the importance of TQM activities on performance outcomes. The main goal of the study is to investigate whether TQM activities affect quality and/or innovative performance and also defining the effective components on these performance types. Accordingly, we investigated literature to develop hypotheses and in order to test the research model, data were collected through a survey in Marmara Region, and then statistically significant and positive relationship among TQM activities, quality and innovation performance was found.

Keywords: Total Quality Management; Innovative Performance; Quality Performance

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1. **Introduction**

In organizations, managers/leaders acquire energy through satisfying customer needs and organizational survival which is the main philosophy of TQM. Total quality management is a holistic quality improvement approach to firms for the purpose of improving performance in terms of quality and innovation for the last two decades. Organizations which are used TQM generate many benefits such as higher quality products, more satisfied customers, reduced costs, improved financial, quality and innovation performance and in addition to these improved employee satisfaction. Moreover, if TQM is implemented successfully, it provides a competitive advantage as well [1]. Numerous studies have shown a positive relationship between organizational outcomes and TQM.

This paper discusses the relationship between TQM with innovative and quality performance. This discussion is important for two reasons. First one is; revealing the relationship with innovative performance and TQM because of the inconsistency in the literature. Second, the study aims to clarify the effects of TQM practices whether more influential on innovation performance or quality performance. Both quality and innovation concepts guides today's business world [2]. According to Williams achieving

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both types of performance is not simple, firms have to prioritize one over the other. According to Flynn et.al [3], innovation and quality cannot be achieved at the same because of that generally businesses practice first the concept of quality management within the structure of the firm and then add the innovation concept. [2]. Contrast to this view, Feng [4] reported that firms must improve both quality and innovativeness in a changing market place concurrency. In addition to excellence business management models that consider quality and innovation concepts simultaneously and complementary [2], a recent study by Dervitsiotis [5] pointed that the innovation process should carry out under the TQM for the maximum beneficial impact on performance.

This paper begins with a literature review that examines the current state of TQM, the relationship among TQM, quality performance-and innovation performance. And it continues with the factor analysis and regression analysis to test the proposed model. The last section discuses the findings, limitations of this study and provide recommendations for future studies.

2. Literature Review and Hypotheses Development

2.1. Total Quality Management

Total quality management (TQM) is one of the quality-oriented approaches that many organizations imply. TQM has attracted scholars because of the growing diffusion and acceptance in the business world. Especially over the two decades, TQM is one of the most popular and durable management concepts [6]. Due to the absence of a uniform definition of TQM, defining TQM is quite problematic [1]. Well accepted definitions of TQM in the literature based on "quality gurus" (such as Deming [7], Juran [8], Crosby [9], Feigenbaum [10]) views and prescriptions. For example, according to Rahman [6] TQM is a management approach for improving organizational performance that encompasses a variety of both technical and behavioral topics. Another definition of TQM is that of Kaynak [11], "TQM is a holistic management philosophy that strives for continuous improvement in all functions of an organization, and it can be achieved". TQM is a multidimensional construct. Like having various definitions, TQM consists of several activities. Different researchers have adopted different TQM activities for testing its effect on financial or non-financial performance. These activities are management leadership, role of the quality department, training, employee relations, quality data and reporting, supplier quality management, product service design, process management, strategic planning, customer focus, information technology and analysis, people management [12, 13].

Yet this study focus on the eight among the dimensions of TQM; leadership management, factual approach to decision making, process management, supplier management, continual improvement, employee management, customer focus and system approach to management.

2.2. The Relationship between TQM Activities and Quality Performance

The links between TQM and performance have been investigated by numerous scholars. While examining the relationship between TQM and performance scholars have used different performance types such as financial, innovative, operational and quality performance. Although the effects of TQM on various performance types are inconsistent, quality performance generally indicated strong and positive relations [13]. Supporters of TQM suggest that implement it well generate higher quality products. According to Deming, quality is the principal determinant of success in competitive environments. Quality management is increasingly high-profile activities for all kinds of firms and is associated with gaining a competitive advantage [14].

After seeking the literature, Kaynak [11] revealed the indicators of quality performance which is relevant to TQM. TQM practices help to promote quality performance. The indicators for quality performance are product/service quality, productivity, cost of scrap and rework, delivery lead-time of purchased materials, and delivery lead-time of finished products to customers. The aim of TQM activities such as employee involvement is to promote the human aspects of the quality system in order to adapt changing environment [14]. Customers focus and process management represents the major components of quality [15]. The quality is important for customers. Wilkinson [16] suggest that; "in terms of TQM, the conception of quality should meet customer requirements". One of the main elements of TQM is the process management. Process management improves the quality of the product in the production stage [17]. The empirical studies show that process management directly and positively affects product quality. In addition, management leadership contributes to quality performance through accepting quality culture to employees. Since 1980s, top managers incorporated quality to strategic planning process for gaining

competitive advantage [18]. The other TQM activity which has significantly positive relationship with quality performance is factual approach to decision making. Many scholars [19, 20] have found that information and quality data analysis is significantly, positively related to quality performance [21]. In contrast the relationship between continual improvement and quality performance is not significantly [6]. Besides, in 2004 Prajogo and Brown [22] draw our attention to the strong and positive relationship between TQM activities and quality performance. And Prajoga and Sohal [13] emphasized the importance of TQM on quality performance. Thus, the following hypothesis is proposed:

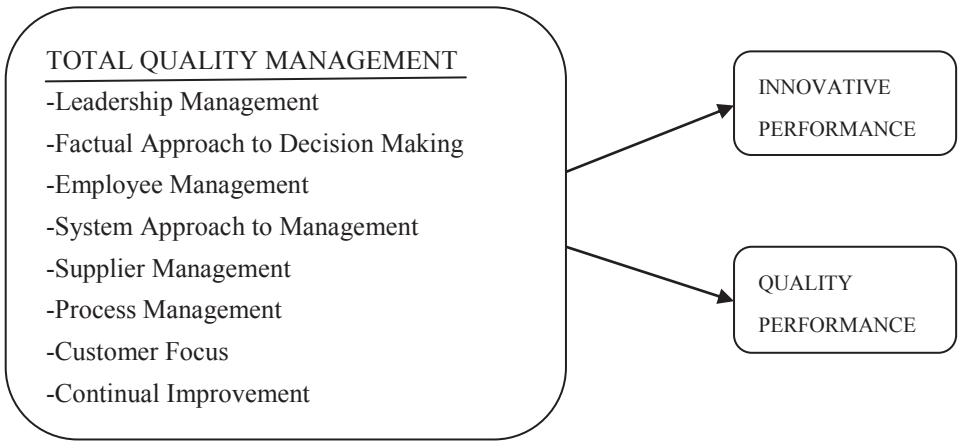
H1: TQM practices have a positive influence on quality performance.

2.3. The Relationship between TQM Activities and Innovative Performance

In today's business environment the basis of competitive advantage has shifted from quality to innovation [22]. Innovation allows companies adaption to changes quickly and helps for finding new products, markets, thanks to this protect themselves from unstable environment [23]. Numerous companies which have benefited from innovation increased their profits and market share. But the important point is that, a firm cannot be successful with innovation if it cannot produce products that meet acceptable quality standards [24] because of that TQM is a good way of improving quality while facilitating the innovation process [23]. When the literature is examined, the findings are inconsistent and complex. Some scholars argue the positive link between TQM and innovation performance while others emphasized the negative link between them. The main reason for this complexity is both innovation and TQM are multidimensional in nature [14]. Scholars who support the negative relationship between TQM and innovation performance claim that TQM can lead organizations to be narrow-minded and hinder creativity due to the enforcement of standardization [23]. Arguments about the positive relationship between TQM and innovation performance focus on the customer orientation, management leadership and continuous improvement which are critical to innovation success. Miengo et al [14] classified TQM elements into two large groups and demonstrated the relationship between organic elements of TQM (such as management leadership) and innovation. As a consequence, leadership (the organic element of TQM) encourages employees to suggest innovative ideas for solving problems or developing new products. Some scholars point out another key element of TQM -customer-focus- which has significantly positive relationship between innovative performances [8]. Being Customer-orientation encourages organizations to search consistently for new customer needs and expectations, so companies can survive in this globally competitive environment. Beside, continuous improvement is also critical to the success of innovation through encourages change and creative thinking in organizing works [23]. Sadıkoglu and Zehir [17] found that all elements of TQM are significantly and positively associated with innovation performance [21]. The empirical study which was done by Hung et. al. [25] confirms the positive relationship between TQM and innovation performance. Based on the literature review, this study proposes the following hypotheses:

H2: TQM practices have a positive influence on innovation performance.

Figure 1. Conceptual Model



3. Research Design

3.1. Data Collection and Demographic Distribution of the Sample

The present study used a survey conducted among mid- and upper-level managers of companies in the Marmara region from various size manufacturing (79.6 %), information technology (6.2 %) and service (14.2) sector companies. While 54,7% of the respondent companies were small and medium-scale; 45,3% were large-scale. In addition to these 15,7% of companies are international, 8% of them are regional and most (76,2 %) of companies are national. Totally 261 valid questionnaire from 104 companies are used for empirical analysis of the study.

3.2. Measures

The demographic properties which are asked to the participants are prepared by the researchers. The other parts of the questionnaires in this study are developed by using scales adopted from prior studies. All constructs are measured using five-point likert scales (from strongly disagree =1 to strongly agree =5). The second part of the questionnaire is about Total Quality Management principles and the related 65 items are adopted from several related studies; these are Cua, McKone ve Schroder [26], Rahman and Bullock [6], Chong and Rundus [27] Fuentes, Saez ve Montes [28], Kaynak [11], Kannan and Tan [28], The third part assesses firm innovativeness and the questionnaire is developed by Hult et al. [29]. The last part consists of performance scales; innovative performance scale (3 items) are adopted from Fuentes, Saez, Montes's [28]and Rahman, Bullock's [6], study and quality performance scale (5 items), is adapted from Kaynak's [11] and Fuentes's et al. [28] studies.

4. Data Analysis and Hypotheses Test Results

4.1. Factor Analysis

We used SPSS software 18.0 for the evaluation of our data. Factor analysis is used for the validity and cronbach alpha scale is used to estimate the reliability of the scales. Correlation and regression analysis are conducted to analyze the hypotheses of the study. According to anti-image table values; all variables are found to be higher than 0.50 (r>0.30), so all items took place in the factor analysis. Factor analysis with principal component by varimax rotation, was performed separately to find out the factor structure of dependent and independent variables For the independent variable since some items were below 0.50 or are having collinearity with more than one factor, and some factors contains one item, it is continued to perform factor analyzing by removing the items one by one till the ideal table. And totally 25 items are removed, rest of the items naturally revealed 8 factors as expected. KMO is 0,925 and significance value p=0.00; Total variance: 65,689 (and in turn variance values for factor 1: 11,210; factor 2: 9,642; factor 3: 9,177; factor 4: 8,991; factor 5: 7,560; factor 6: 7,201; factor 7: 6,267 and lastly for factor 8: 5,641). For dependent variables all items are composed the ideal table. KMO is 0,823 and significance value p=0.00; Total variance: 66,417 (variance value for factor 1: 37,622 and for factor 2: 28,794). Findings show that our sample is suitable for the hypothesis analyzes.

Table 1: Factor Loadings of the TQM and Performance Variables

ITEMS								
TQM Practices	1	2	3	4	5	6	7	8
CI2	,814							
CI4	,763							
CI1	,732							
CI3	,727							
CI8	,611							
CI7	,598							

EM3	,772							
EM4	,770							
EM2	,765							
EM8	,653							
EM1	,646							
EM6	,631							
PM1		,784						
PM3		,784						
PM4		,746						
PM2		,733						
PM5		,608						
PM6		,531						
CF6			,724					
CF3			,705					
CF1			,695					
CF5			,661					
CF7			,641					
L6				,731				
L5				,656				
L3				,645				
L4				,633				
L2				,560				
SM7					,842			
SM6					,800			
SM5					,724			
SM8					,625			
D7						,683		
D6						,650		
D3						,616		
D4						,571		
SA1							,579	
SA4							,566	
SA2							,560	
SA3							,542	
ITEMS								
Performance							1	2
QP5							,821	
QP4							,804	
QP3							,750	
QP2							,716	
QP1							,685	
IP9								,860
IP8								,848
IP7								,679

CI: Continuous Improvement, EM: Employee Management, PM: Process Management, CF: Customer Focus, L: Management Leadership, SM: Supplier Management, D: Factual Approach to Decision Making, SA: System Approach to Management, QP: Quality Performance, IP: Innovative Performance

4.2. Correlation Analysis

We calculated means and standard deviations for each variable and a correlation analysis is conducted to investigate the relationship between dependent and independent variables. According to correlation analysis, all variables are correlated with each other as expected. In order to investigate the reliability scores factors, the cronbach alpha scale is used. Regarding to the results of the above statistical tests for

reliability and validity, it is assumed that the factors of the variables are sufficiently valid and reliable to test hypothesis.

Table 2: Mean, Standard Deviation and Correlation Coefficients

	MEAN	SD	1	2	3	4	5	6	7	8	9	10
1. CI	3,6829	,81199	(,902)									
2. EM	3,5766	,79960	,562**	(,891)								
3. PM	3,6243	,79436	,569**	,436**	(,894)							
4. CF	4,1643	,64582	,455**	,505**	,494**	(,860)						
5. L	3,8980	,67274	,508**	,375**	,470**	,532**	(,797)					
6. SM	3,8184	,76069	,390**	,466**	,475**	,529**	,381**	(,865)				
7. D	3,9603	,70994	,557**	,455**	,570**	,445**	,585**	,402**	(,801)			
8. SA	3,7458	,76618	,638**	,574**	,553**	,566**	,472**	,480**	,605**	(,880)		
9. QP	3,8825	,63076	,439**	,497**	,553**	,558**	,471**	,559**	,478**	,542**	(,770)	
10. IP	3,9880	,68414	,328**	,424**	,314**	,437**	,295**	,362**	,380**	,450**	,473**	(,852)

** Correlation is significant at the 0.01 level SD = Standard Deviation () = Cronbach's alpha

4.3. Regression Analysis:

Analysis results are parallel to related literature and TQM dimensions are positively associated with both innovative and quality performance indicators. In terms of the findings, the main hypotheses of the study is supported empirically. According to regression findings as seen in the table sub-hypotheses are supported partially.

Table 3: Regression Analysis Results

Independent / Dependent	Model Values	CI	EM	PM	CF	L	SM	D	SA
Innovative Performance	F=10,723 Ad. R^2=,261 DW=1,679 P=0.00	-,102	,179*	-,049	,224*	-,045	,056	,120	,247*
Quality Performance	F=28,153 Ad. R^2=,495 DW=1,673 P=0.00	-,070	,109	,234**	,125	,139*	,226**	,029	,156*

Table columns contain standardized beta coefficients (**p<0.01, *p<0.05) VIF values are about 1.70 and 2.30

5. **Conclusion**

TQM is a quality-oriented approach and has effects on quality performance that are supported by leading studies. Dimensions of TQM such as management leadership, process management, employee involvement and customer focus are commonly accepted activities to improve quality performance of firms [14, 16, 17, 18, 22]. In this study analysis results shows that; parallel to these empirical supports

management leadership [18] and process management [17, 13] dimensions are effective on quality management. In addition to these, apart from recent studies supplier management and system approach to management are found to be significantly effective. However some studies [22] found all dimensions acceptable. In this respect this study contributes to the discussion about the most important dimensions. However significant relations which are stressed in this sample should be tested by future studies with different samples and organizational characteristics.

Studies supported the management leadership, continuous improvement and customer focus for positive relations with innovative performance [8]. In this study customer focus is supported as well. Beside these employee management and system approach to management positively affect innovative performance [17, 25]; because of that TQM should be studied with different samples for innovative activities in order to clear the discussed relations. Lastly we should highlight that for two of performance indicators (quality and innovative) system approach to management dimension is found to be an important TQM component so firms should overrate that it is the most important activity for performance improving according to this study's findings.

Like any empirical research effort, this study contains some methodological strengths and limitations. First, the results obtained from a local area; results may differ for firms located in different areas operating in different cultural, environmental and political conditions. One more limitation of this study collects the measure using the same method (self-report), future studies can use the non-self report method.

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