

## Investigation the effects of total quality management implementations on organizational performance in production corporations: The sample of Ankara-Ostim

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### Abstract

The aim of this study is to investigate the effect of Total Quality Management (TQM) applications that may have an effect on the organizational performance in the context of factors such as business process improvement, quality improvement, productivity enhancement and market share increase depending upon an improvement in customer relations on organizational performance depends on Production Performance (PP) within context of this aim that is made through Anova, correlation and regression analyses by the results of survey data in production corporations that implement TQM and Quality Management Systems (QMS). As a result of these analyses although positive relationship is found between TQM and corporation performance, it is not found explanatory relationship between TQM implementation degree and PP degree.

Keywords: total quality management, organizational performance, production performance.

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## 1. Introduction

In the modern management, managerial decisions always have to decide through reflection, modern and root design and continuous transformation according to the customer's wishes and possibilities and potential competitor abilities. TQM, is a process which aims to create a standard for continuous improvement of quality, methods and optimal use of limited resources (Karamzadeh, Alirezai & Hashemzadeh, 2015). In the late 1970s and early 1980s, previously unchallenged American industries lost substantial market share in both US and world markets. To regain the competitive edge, companies began to adopt productivity improvement programs which had proven themselves particularly successful in Japan. One of these "improvement programs" was the TQM (Kaynak, 2003). TQM is a sense of management which has started with seminars given to Japanese corporations by Deming in the 1950s and which has been tried to be applied by corporations at the present time by expanding its context with innovative approaches developed by Juran (1954), Feigenbaum (1956), Ishikawa (1962) and Crosby (1961) (Ulukanoglu, 2000). The pioneers in TQM, and also as it is stated by Suarez (1992), Deming, Juran, Crosby and Feigenbaum highlighted the importance of the quality philosophy as an essential competitive weapon for the transformation of an organization. Researchers define TQM is both a set of guiding principles and management style and that have been adopted by managers in organizations to improve competitiveness and organizational performance (Jaafreh, 2013). In the context of production corporations, TQM applications have caused to seek new competitive means in operations and processes. Drawbacks like variations during production process, labor force costs due to defective product production process and losses of time may be eliminated via these means. Furthermore, an increased customer loyalty is provided by a high quality of product and service delivery, as well as significant increases in sales by new customer gains in the corporations in which customer satisfaction, employee engagement and process improvement which are the building blocks of TQM applications are provided.

These corporations should be managed depending on performance and this performance should be consistently measured. To improve the performance the corporations should have a corporate strategy and measurable goals; business processes should be redesigned and improved by a consistently measurement and employees' performance should be measured and evaluated such that the process and strategies are improved (Barutcugil, 2002). It is possible to measure TQM efficiency by organizational performance evaluations which are carried out in the context of financial and nonfinancial factors and which represent general performances of the departments. In this context when studies in the literature are examined, in the study in which a relationship between TQM and organizational performance is examined by production performance measurements; Chenhall (1997) has concluded that TQM programs developed depending on production performance measurements will increase the organizational performance. Chong and Rundus (2004) and Karamzadeh et al. (2015) have found that there is positive correlation between customer-oriented applications of TQM and the organizational performance. TQM applications may have an effect on the organizational performance in the context of factors such as business process improvement, quality improvement, productivity enhancement and market share increase depending upon an improvement in customer relations. In this study the mediation effect of the PP on correlation between TQM and the organizational performance was examined. It is expected that companies which have a high TQM and PP will also have a high organizational performance. Therefore, it was tested whether there is a correlation towards hypotheses indicated below in order to examine the effects of TQM dimensions on the organizational performance.

H1: There is a linear correlation between the PP and TQM, and the department performance.

H2: There is correlation between high TQM and PP, and the organizational performance.

H3: There is a correlation between high TQM and low PP, and the organizational performance.

H4: There is a correlation between low TQM and PP, and the organizational performance.

H5: There is a correlation between low TQM and high PP, and the organizational performance.

## **2. Correlation between total quality management applications and organizational performance**

Performance of a system is an output at the end of a certain period or a study result. This result is the extent of execution of the corporations' goals or tasks. In this context, enterprise performance may be defined as the evaluation of all efforts made to realize the goals of the enterprise (Zerenler, 2005).

It is advantageous to address the performance evaluation according to different dimensions in the context of TQM. By different dimensions, a teamwork, flexibility, innovations and application of statistical control techniques are meant. There are some rules which should be followed for performance measurement and evaluation of TQM. These are as follows (Ertugrul & Karakasoglu, 2005);

- Dimensions that will be taken into consideration in performance measurements should be quality, productivity and innovation.
- Vision, value judgements, purpose of existence and job definition of the enterprise should be re-determined and long-term goals should be explicitly detected. These should be turned into strategic plans and programs and medium and long term goals suitable for these should be determined.
- It is very important for a feedback system to be operated in the correct way in performance measurement and controls. It should be allowed the evaluation results to be transferred to the correct places in a correct time in order to transform the information provided by the system into decisions and actions; and corrective and developmental steps should be taken in the goals and purposes as well as in the plans and programs.
- Performance measurements are an important promoter in performance improvement. Rewards which will meet the success needs of the employees are useful only when they are given depending upon healthy measurements, thereby encouraging the employees to reach better.
- Measurement should encompass entire organization level and should be reduced to the lowest units, if possible.

In the production corporations, a primary performance criterion is for work output. This topic is measured by sub-criteria such as output duration (work number defined as being completed in a given period), the required time period (time required to finish a constant work number) and output ratio (output amount obtained from total inputs) (Beamon, 1998). Performance of the production system is associated with an activity performance. Thus, the activity performance is a concept related to how a production unit transforms its sources into a product and service output efficiently. The purpose of a production unit is to increase productivity in pecuniary and human resource usage as well as to provide a value from the resulting outputs. It is not enough to define the effectivity of a process in order to measure the performance. Furthermore, this effectivity should be measured (Parkan & Wu, 1997).

Intense competition in the marketplace has caused production corporations to search for a competitive edge in their production operations and processes. It has been argued that the use of TQM practices has a synergistic impact on organizational performance (Chong & Rundus, 2004). Preliminary evidence seems to indicate that TQM-adopting firms obtain a competitive advantage over firms that do not adopt TQM. Firms that focus on continuous improvement, involve and motivate employees to achieve quality output and focus on satisfying customers' needs are more likely to outperform firms that do not have this focus (Joiner, 2007). Due to the importance of the material and

human endeavours that the organizations must carry out for the implementation of TQM, researchers have been concerned with its relationship with the improvement of organizational performance. Thus, an increasing number of studies exist trying to determine the degree of influence of the different principles and elements of quality on organizational performance (Montes, Jover & Fernandez, 2003).

### 3. Implementation

#### 3.1. Purpose of the research and methodology

In this study hypotheses suggested by a survey in 107 corporations which are in business in Ankara-Ostim Industrial Zone were tested in order to examine the effects of TQM on the organizational performance via the performance measurement. In the study, corporations which applied TQM or had a quality certificate were preferred. A survey form which consisted of 21 questions and 2 sections contained in Chenhall's study (1997) to allow the hypothesis to be measurable was used in one-to-one interviews made with quality control employees of these corporations. The first section included general information about the company, whereas the second section included information about Quality Management Systems (QMS), TQM and performance criteria. A value expressed as a reliability test of the obtained data was found to be 0,858. As  $\alpha \geq 0,60$  this result indicates that this scale is very reliable.

Ostim which is Turkey's biggest but one of the important small and medium scaled industrial production areas in the world houses approximately 5000 corporations in 17 main sectors. During the interviews made with data processing unit of the industrial zone it was determined that 231 corporations had any quality certificate according to data in 2013. During the determination of the required sample size, 96 samples should be taken from the main mass of 5000 individuals when  $p=0.5$  (the probability of occurrence) and  $q=0.5$  (the probability of nonoccurrence) in 90% confidence interval. According to the calculation made depending on the number of the corporations contained in the main mass which had a quality certificate, taking 92 samples in 97% confidence interval may provide reliability.

#### 3.2. Findings

In accordance with the results of the survey study, the basic information pertaining to 107 different companies are shown in table 1.

Table 1. Basic information about the corporations participating in the survey

Sectoral Distribution	The Number of Employees		QMS Operating Time					
	N	%	N	%				
Textile	3	3	1-9	11, 10,3	Less than 4 years	5	4,7	
Food	1	1	10-49	75	70,1	4-7	48	44,8
Plastics	8	8	50-99	21	19,6	8-11	52	48,6
Machinery	24	24	100-159	0	0	12-15	2	1,9
Construction	9	8	160-199	0	0	16 years and over	0	0
Metal	7	6	200-249	0	0			
Heavy Equipment	6	5	250 and above	0	0			
Other	49	45						
<b>Toplam</b>	<b>107</b>	<b>100</b>		<b>107</b>	<b>100</b>		<b>107</b>	<b>100</b>

According to table 1.it is seen that when the corporations participating to the survey, most (24%) of which are active in machinery sector are classified by their employee number, they are small and medium scale corporations. It can be said that a research was performed about the corporations which had utilization times of 8-11 years in a ratio of approximately 50% according to QMS utilization time. The effects of TQM on the organizational performance with the mediation effect of the PP have been revealed via the following hypotheses;

- H1: There is a linear correlation between the PP and TQM, and the department performance.
- H2: There is correlation between high TQM and PP, and the organizational performance.
- H3: There is a correlation between high TQM and low PP, and the organizational performance.
- H4: There is a correlation between low TQM and PP, and the organizational performance.
- H5: There is a correlation between low TQM and high PP, and the organizational performance.

Table 2. Correlation matrix

	Performance criteria	TQM	PP
Performance criteria	1	,456**	,117
TQM		1	,482**
PP			1

\*\*Significant at 0.01

According to table 2.there is a positive and significant correlation ( $p < 0,01$ ) between TQM and the performance criteria ( $r = 0,456$ ) and between TQM and the PP ( $r = 0,482$ ).

Summary of the regression model in which the correlation between the PP and TQM, and the department performance expressed in the first hypothesis was tested, and the analysis results are as in table 3.and table 4., respectively. According to this the regression equation is as  $Y = b_0 + b_1X_1 + b_2X_2$ , with the dependent variable being (Y) and the independent variables being  $X_1 = \text{TQM}$  and  $X_2 = \text{PP}$ .

Table 3. Regression model summary

Model	R	R <sup>2</sup>	Adjusted R <sup>2</sup>	Std error of estimate	Sig. F. Variance
Y	,419(a)	,175	,156	,506	,000

a: (Constant): PP, TQM

Table 4.Regression analysis results

Model	Nonstandard coefficients		Standard coefficients		
	B	Std Error	B	T	P
(Constant)	2,256	,394		5,726	,000
X <sub>1</sub>	,422	,102	,459	4,152	,000
X <sub>2</sub>	-,119	,125	-,105	,947	,346

$r = 0,419$  ; Adjusted R<sup>2</sup> = 0 ,156

b: Dependent variable (Department performance)

According to table 3.,there is a positive correlation between the variables ( $r=0,419$ ). Moreover, according to the corrected value of  $R^2 = 0,156$ , 15.6% of the department performance which is a dependent variable are described by TQM and PP. This result supports the positive correlation

between the department performance, and TQM and the PP. The value of  $b = ,422$  belonging to the variable  $X_1$  which is an independent variable seen in table 4. indicates that there is a positive correlation between TQM and the department performance. This suggests that improvements in TQM applications will lead to positive improvements in the department performance. The value of  $b = -,119$  belonging to the variable  $X_2$  which is an independent variable indicates that there is a negative correlation between PP and the department performance. However this result is insignificant as significance value is greater than 0,005 ( $P = ,346$ ).

In order to analyze the variability between the variables belonging to TQM and PP, the results of the test which measures the homogeneity of the variances are as shown in table 5.

Table 5. TQM-PP Homogeneity of variance test results

Levene Statistic	df1	df2	Sig.
,887	14	74	,575

According to table 5., variances are homogeneous ( $\text{Sig.} = ,575 > 0.05$ ). In this case as there is no difference between the variables, variance analysis can be performed, because a homogeneity hypothesis is provided.

Descriptive statistics obtained depending on the degree of the PP and TQM are shown in table 6. The table includes information on the averages ( $\bar{X}$ ) of the graded answers given to the questions related to TQM and PP; standard deviations there of (Std) and how many (N) and at which level the corporations gave answers.

Table 6. Two-way interactions performance rate averages

TQM		
PP	High	Low
High	A	B
	$\bar{X} = 2,14$ Std = ,13 N = 6	$\bar{X} = 1,40$ Std = ,75 N = 2
	C	D
Low	$\bar{X} = 1,80$ Std = 1,18 N = 20	$\bar{X} = 2,42$ Std = 1,00 N = 63

The following hypotheses were created using the information obtained from table 6.

- H2: There is correlation between high TQM and PP, and the organizational performance.
- H3: There is a correlation between high TQM and low PP, and the organizational performance.
- H4: There is a correlation between low TQM and PP, and the organizational performance.
- H5: There is a correlation between low TQM and high PP, and the organizational performance.

The results of the homogeneity test of the variances belonging to the variables of the hypothesis above are as shown in table 7.

Table 7. One-way analysis of variance results

	Levene Statistic	df1	df2	Sig.
PP Low TQM Low	1,067	6	97	,388
PP High TQM High	4,061	4	20	,014
PP Low TQM High	1,251	6	97	,287
PP High TQM Low	1,240	6	97	,293

According to table 7.,it is seen that the variance of each variable is homogenous (Sig. > 0.05). In this case as there is no difference between the variables, a variance analysis can be performed, because a homogeneity hypothesis is provided. In table 8., sources of variance change are shown as “between-groups” and “within-groups”, and total change sources in the dependent variable are shown as “total”.

Table 8.Anova Test Results

	Total of Squares	df	Mean square	F	Sig.
PP low TQM low	Between Groups	6,4	9	,711	,681
	Within Groups	101,315	97	1,044	
	Total	107,715	106		
PP high TQM high	Between Groups	,074	5	,015	,879
	Within Groups	,335	20	,017	
	Total	,409	25		
PP low TQM high	Between Groups	19,331	9	2,148	1,62
	Within Groups	128,626	97	1,326	
	Total	147,957	106		
PP high TQM low	Between Groups	6,238	9	,693	1,266
	Within Groups	53,11	97	,548	
	Total	59,347	106		

According to this;

A significant correlation was not found between low PP and low TQM as Sig= ,724 (P>0,005 ). Therefore the hypothesis was rejected.

A significant correlation was not found between low PP and high TQM as Sig= ,12 (P>0,005). Therefore the hypothesis was rejected.

A significant correlation was not found between high PP and high TQM as Sig= ,513 (P>0,005). Therefore the hypothesis was rejected.

A significant correlation was not found between high PP and low TQM as Sig= ,265 (P>0,005). Therefore the hypothesis was rejected.

#### 4. Conclusion and Recommendations

Corporations has started to focus on TQM applications by the effect of factors such as increasing customer expectation, development rate of technologies, increased costs for cheapness, accelerating international competition and increased importance of human being. Improvement and change which are the driving force of TQM have become an essential principle of the performance evaluation forming an important part of TQM applications. The purpose which is intended to be reached with

TQM is understood more easily with the performance evaluation and thereby, success for reaching the purposes is further increased. Measurements and controls which are done in accordance with the purpose support improvements based on the performance.

In this study 5 hypotheses were created in accordance with the study purposes. According to the study results it is seen that although the corporations to which a survey is applied have a quality certificate for about 10 years, there is no relevant unit or an authorized person within them and in general persons who occupies a position called company executive deal with this issue. While evaluating the employees' performances of these corporations, 82,2% "yes" and 15,9% "no" answers were obtained according to the distribution of answers given to the survey question related to whether quantitative information about departments (store, material handling, throughput time, etc.) involved in the production process is taken into consideration or not. Accordingly, it is seen that quantitative information obtained from the departments involved in the production process is highly used while evaluating the employees' performances. This provides important information on performance measurement systems used in the production corporations. As a result of the analyses it is seen that improvements in quality systems also affect the measurement systems according to the linear correlation between TQM and the PP. In recent analysis, although there is a linear correlation between TQM, PP and performance measurement, no illustrative correlation was seen between the degree of TQM application and the degree of the PP, and the enterprise's performance. In this study it is seen that the corporations were not successful enough in TQM applications and they failed to reflect quality management systems that they applied to their PP as a result of acceptance of hypothesis H1 and rejection of hypotheses H2, H3, H4 and H5. As a consequence of this study the following recommendations have been developed for the corporations;

- Corporations should meet expectations of both internal and external customers at a sufficient level in order to compete with external world.
- Employees should be informed of their performances and performance standards should be determined. This will provide a high quality of goods and services production during production process and will contribute to allow the employees to follow their works and to be informed of their behaviors.
- Companies should provide and control training for their employees periodically about innovations and improvements. Companies should prefer individuals who have adequate information and ability suitable for their corporations, high specialization skills and good human communication skills while choosing employees. This factor should not be ruled out in the sense that a certain system is created in the company and a compromise is reached between the employees.

## References

- Barutcugil, I. (2002). *Performans yönetimi*. Istanbul: Kariyer Yayınları.
- Beamon, B. M. (1998). Performance, reliability and performability of material handling systems. *International Journal of Production Research*, 2(36), 377-393.
- Chenhall, R. H. (1997). Reliance on production performance measures, total quality management and organizational performance. *Management Accounting Research*, 8, 187-206.
- Chong, V. K. & Rundus, M. J. (2004). Total quality management, market competition and organizational performance. *The British Accounting Review*, 36(2004), 155-172.
- Ertugrul, I., & Karakasoglu, N. (2005). Toplam Kalite Yönetimi Açısından Performans Değerlendirme ve Denizli İmalat Sanayisinde Uygulanabilirliğine İlişkin bir Çalışma. VII. *Ulusal Ekonometri Ve İstatistik Sempozyumu*, 26-27.
- Jaafreh, A. B. (2013). The effect of quality management practices on organizational performance in Jordan: An empirical study. *International Journal of Financial Research*, 4(1), 93-109.



Filiz, A.C., Duran, C. & Ozden, S. (2017). Investigation the effects of total quality management implementations on organizational performance in production corporations: The sample of Ankara-Ostim. *Global Journal of Business, Economics and Management: Current Issues*, 7(1), 25-33.

Joiner, T. A. (2007). Total quality management and performance (The role of organization support and co-worker support). *International Journal of Quality & Reliability Management*, 24(6), 617-627.

Karamzadeh, A., Alirezaei, A., & Hashemzadeh, G. (2015). The impact of total quality management (tqm) on organizational performance. *IJER @ Serials Publications*, 12(4), 1527-1534.

Kaynak, H. (2003). The relationship between total quality management practices and their effects on firm performance. *Journal of Operations Management*, 21(2003), 405-435.

Montes, J. L., Jover, A. V., & Fernandez, L. M. M. (2003). Factors affecting the relationship between total quality management and organizational performance. *International Journal of Quality & Reliability Management*, 20(2), 189-209.

Parkan, C., & Wu, M. L. (1997). On the equivalence of operational performance measurement and multiple attribute decision making. *International Journal of Production Research*, 11(35).

Suarez, J. G. (1992). *Three Experts on Quality Management: Philip B. Crosby, W. Edwards Deming, Joseph M. Juran* (No. TQLO-PUB-92-02). Total Quality Leadership Office Arlington Va.

Ulukanoglu, C. (2000). Toplam kalite yonetiimi ve kaizen felsefesi. *Dokuz Eylul Universitesi Sosyal Bilimler Enstitusu Dergisi*, 2(3), 53-64.

Zerenler, M. (2005). Performans olcum sistemleri tasarimi ve uretim sistemlerinin performansinin olcumune yonelik bir arastirma. *Ekonomik ve Sosyal Arastirmalar Dergisi*, 1, 1-36.