

# Determining the Principles Affecting Perceptions of Strategic Quality Management Implementation: A Study of the Turkish Large Scale Firms

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**Abstract**—The purpose of this study is to reveal the principles, which have the highest impact on determining the Strategic Quality Management (SQM) implementation perceptions of managers. In order to accomplish this goal, first of all, a factor analysis is conducted on the attitudes of managers at 80 large-scale firms in Turkey for SQM principles. Secondly, utilizing t tests and discriminant analysis, the most effective items are determined. The results show that “process improvement” and “assessment of competitiveness” are the management principles, which have the highest impact on determining the SQM implementation perceptions of Turkish managers.

**Keywords**—Assessment of Competitiveness, Process Improvement, Strategic Quality Management.

## I. INTRODUCTION

TOTAL quality is widely considered as an essential business approach in increasing competitiveness of organizations. It is a management process that focuses on processes instead of organization functions and results. By improving the quality of all employees, it aims to make decisions based on reliable information and data collection under the leadership of top management. Besides, Total Quality Management (TQM) aims to reach product and service quality by continuous improvement in all of its applications [1]. However, TQM is not only a management system; it is also a philosophy of strategy implementation [2] and the combination of TQM with Strategic Management to form the main framework of Strategic Quality Management (SQM) philosophy [2]. The objective of SQM is to establish

a linkage between quality professionals and producers in order to develop effective TQM that focuses on systematic, structured and focused quality management strategies [1] by benefiting from strategic management and handle quality planning with a disciplined customer-focused approach that is adapted to all processes. However, as SQM is a combination of TQM and corporate strategy, a small number of companies can implement SQM effectively [2].

After the middle of 20<sup>th</sup> century, quality improvement has increasingly affected operational and product based activities. As many authors define TQM as an organization wide philosophy that increases satisfaction level of customers and decreases the costs through continuous improvement. In order to create a quality culture in the organization, TQM techniques are introduced to reduce variations and achieve improvements [3]. Nevertheless, reduction of process times, optimization experiments and reconstruction of business processes instead of quality improvement plans are getting more popular day by day [4].

Development of product quality is a major component in creating competitive advantage. In addition, quality enhanced through SQM provides customer loyalty and easy adoption to changes in markets. In order to keep pace with rapid changes in competition, firms need to adopt SQM principles. However, it is hard to implement SQM successfully [5] and this is possible only if improvements in some management principles are also adopted. In this study, the impacts of principles on the SQM perceptions of managers are determined by utilizing statistical methods in order to explain which principles of adoption are significant in distinguishing between implementers and not implementers of SQM.

The rest of the paper is organized as follows. Section two focuses on the SQM identification and the basic principles of SQM. Section three includes the implementation of factor analysis, t-tests, and discriminant analysis. In the final section, the results are presented, analyzed, and briefly discussed.

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## II. THEORETICAL FRAMEWORK OF THE RESEARCH

### A. Strategic Quality Management

SQM theory is an extension of TQM developed by Madu and Kuei that sets quality vision, as 'quality is the driving force to compete and stay alive'. In this philosophy; quality is not only a content served with products and services offered to customers, but it is a reflection of the company's holistic performance [6].

SQM is a philosophy that is based on firm's performance how product quality is continuously reviewed and assessed. The intention of companies applying SQM is continuous improvement by aiming to perform their best [4]. According to Madu and Kuei, the product quality of companies should meet the demands of customers; add value and focus on the environment so that the firm can accomplish its social responsibility [6]. SQM is based on continuous assessment of internal and external developments to improve its competitiveness. It is possible to achieve SQM effectively that is based on TQM founded on total system perspective consisting of the following stages; 'determining policies and strategies according to changing conditions', 'quality planning', 'implementation', 'controlling' and 'correction' [7]. First of all, the company's quality mission is developed with the producers in order to set SQM basics. Afterwards, taking into account customer awareness, competitors and quality mission with a declared quality policy composes a quality profile. When long term and annual quality goals are aligned, design of quality implementation begins. Finally, all of the achieved and desired results are compared to provide a final opinion about SQM process refinement [8]. Briefly, SQM can be defined as a comprehensive and strategic structure that combines profitability, business objectives and competition with quality development efforts. Quality improvement efforts of employees, materials, and information resources with recurring services provide customer satisfaction across the entire organization.

Barriers such as standard organizational structures, indifferent information management, and narrow-minded management behaviors are the difficulties of SQM implementation processes. The effective way of decreasing the weakness of information systems is supportive leadership. The critical barrier in SQM application is management participation [1].

### B. The Basic Principles of SQM

SQM can be effectively applied in organizations if supportive changes in organizational culture, technology, management styles, and quality are successfully adopted as well [9]. There are some basic principles that increase the effectiveness of SQM utilization are listed as follows [5]-[10]:

*Customer Focus:* As customer satisfaction is the key factor, firms should understand what their customers really want. They should be supported by strategic analyses not forgetting that innovation is a major tool in sustaining customer focus.

*Leadership:* In order to meet customer needs and provide operational flexibility, it is important to be aware of employee capabilities and empower them accordingly.

*Education (Training):* Continuous development of strategic levels is possible if the organization has the capability to learn. The basic input of SQM is the employees who have the appropriate training for long term continuous quality development strategies.

*Employee Participation (Total Commitment):* All employees and managers' commitment to strategic quality idea is a necessity in SQM. Management shall orient and support total quality attempts, which will provide added value in teamwork.

*Elimination of Rework:* An effective SQM requires the simplification and standardization of jobs and consequently prevent the mistakes before they occur.

*Quality Design, Speed and Prevention of Failures:* Strategic quality planning is an arrangement of all functions. During the strategy developing process, corporate strategy and quality strategy should be harmonized, various decision analysis techniques should be used, and industry comparisons should be made to enhance the effectiveness of quality processes.

*Teamwork:* All leading firms, regarding people as a part of the solution but not the source of the problem, benefit from teamwork to enhance product and service quality. Teams should consist of not only employees but also functions. These teams of functions are established to handle the organization as a system because success cannot be achieved with only the efforts of one function alone.

*Empowering Employees:* One of the core motivation tools of SQM is delegation of people in organization to make decisions. It enhances the understanding that who should make implementation decisions.

*Social Responsibility:* The increasing importance of environmental quality is becoming a core concept and function. Consumers do not prefer buying the products of companies that unfriendly to environment and social demands.

*Continuous Improvement:* As Ishikawa (1990) says, quality management principles aim to meet the needs of customers relating to quality, cost, delivery, and service by the support of continuous improvement applications. In addition, to improve competitive abilities in market, companies should take into account the continuous improvement applications such as performance measurement [11].

*Ongoing Processes:* As SQM is an ongoing process, it should be regarded as a long-term management process of the organization and all long-term plans and applications should be aligned to continuous improvement.

## III. METHODOLOGY

As Harrington suggested, the implementation of all the best practices of world-class organization do not guarantee the success in an organization. In opposition to this, wrong practices can damage the organizations' effectiveness [12]. Thus, it has become urgent to determining practice, which

exerts the most essential impact and provides more advantages to organization. In this pursuit, this research is planned with the goal of accomplishing the following tasks in order to identify essential principles of SQM in Turkey's large scaled firms:

1. Conducting surveys to analyze the implementation principles of SQM in firms.
2. Carrying out factor analysis to determine if the basic principles of SQM are comprised of sub-dimensions, and new definitions of the new variables used in following step.
3. SQM perceptions in terms of managers' attitudes towards basic principles of SQM.
4. Analyze of results of LDA and reveal which principles have discriminative effect.

A field study using the survey instrument was considered appropriate to obtain necessary data. A survey instrument based on the concepts extracted from SQM literature was used in this study. In this context, the firms in the top 500 list of Turkey are selected as target respondents. The survey instrument was sent out by mail to respondents. Data were collected from the respondents that have tasks at top management. In total, 80 usable questionnaires were received and analyzed. In the questionnaire, the respondents were asked to rate the research questions according to a 5 point Likert scale, 5 being most important and 1 least important. The variables related to firm characteristics are questioned in the first part of the questionnaire. A SPSS 16.0 for Windows program is used to process the collected data.

TABLE I  
COMMUNALITIES AND ROTATED FACTOR LOADINGS

	Factor Loadings				Communality
	Factor 1	Factor 2	Factor 3	Factor 4	
Innovative idea development	0.740				0.723
Employee education	0.702				0.664
Rewarding and incentives	0.690				0.612
Continuous improvement	0.686				0.679
Employee participation	0.652				0.603
Clarity of mission and vision	0.650				0.616
Employee motivation	0.625				0.643
Teamwork	0.605				0.657
Willingness in customer satisfaction		0.865			0.816
Customer focused quality improvement		0.855			0.790
Customer oriented innovation		0.793			0.719
Tracking customer satisfaction		0.688			0.591
Customer participation		0.634			0.561
Reliability		0.605			0.430
Benchmarking in SQM			0.900		0.873
Benchmarking for competitive advantage			0.861		0.858
Utilizing analytic comparison methods			0.859		0.795
Process benchmarking			0.661		0.609
Involving quality strategies in mission				0.812	0.716
Involving quality strategies in vision				0.783	0.698
Improving quality strategically				0.737	0.657
Reaching organizational goals with SQM				0.730	0.685
Integration of quality and strategic plans				0.687	0.559

**Note:** Factor loadings less than 0.6 were excluded in order to improve readability

In this research, a factor analysis was conducted in order to reduce the number of items and reveal the underlying patterns of the preliminary data. A principal component analysis, which utilizes equamax rotation of the retained factors, provided reasonable and interpretable results.

#### IV. ANALYSIS OF FINDINGS AND CONCLUSION

Table I illustrates the communalities and rotated factor loadings. The communality values range from 0.430 to 0.873 showing that retaining four factors are explaining a reasonable part of variance in each item. The percentage of variance explained by the four factors is 61.7 %.

TABLE II  
ALPHA COEFFICIENTS FOR THE FACTORS

Factor	Alpha Coefficient
Process improvement	0.918
Customer satisfaction	0.854
Assessment of competitiveness	0.879
Strategy integration	0.878

The accepted factor solution has suggested four factors such as 'process improvement', 'customer satisfaction', 'assessment of competitiveness', and 'strategy integration'. Table II shows the Cronbach alpha scores of the four factors identified. Cronbach alpha is a commonly utilized measure of reliability for construct indicators. Values range between 0 and 1. Higher scores show higher reliability [13]. As it is seen in the Table II, the alpha coefficients of the four factors range from 0.878 to 0.918, suggesting that the factors maintained are sufficiently reliable.

In order to see whether there are significant factor score differences between the SQM implementers and not implementers, t tests are performed. Table III shows that "process improvement" scores of SQM implementers are significantly (p value: 0.01) higher than those of the firms, which do not implement SQM. Furthermore, t tests reveal that, though at a significance level of 10%, "assessment of competitiveness" and "strategic integration" scores of the SQM implementers are higher than those of not implementers. On the other hand, t tests reveal no significant difference between groups in terms of giving importance to "customer satisfaction".

TABLE III  
T- TESTS FOR INDEPENDENT GROUPS

Factor	t-value
Process improvement	2.668**
Customer satisfaction	0.907
Assessment of competitiveness	1.970*
Strategy integration	1.732*

\*\* p<0.05, \* p<0.10

Before the end of this section, a discriminant analysis is conducted in order to determine which of the significant factors have the highest power in discriminating the SQM implementers and not implementers. Box's M test results (p

value: 0.108) showed that the data structure is appropriate for discriminant analysis. Moreover, Wilk's lambda score of the model (a criterion which is useful in determining the statistical discriminating power of discriminant functions) is significant at 1% level. Table IV shows the results of the discriminant analysis.

TABLE IV  
DISCRIMINANT ANALYSIS

Structural Correlation with Discriminant Function	
Variable	Function 1
Process improvement	0.786
Assessment of competitiveness	0.558
Group Centroid	
Group	Function 1
SQM implementers	0.342
SQM not implementers	-0.450

Note: Only factors with loadings greater than 0.3 are listed.

Table IV shows that, emphasizing "process improvement" and "assessment of competitiveness" are the principles that exert highest impact on discriminating the SQM implementation perception.

In the last step, a classification matrix is produced for the discriminant analysis. Table V shows that the two-factor model correctly classifies 69.1% of the firms. However, it should be kept in mind that the model is more successful at predicting the implementers (85%) than not implementers (49%). Finally, in order to evaluate the discriminatory power of the classification matrix, Press's Q test score (11.864) is generated. The score is significant at 1% level. Thus, it can be concluded that the predictions of the discriminant model are significantly better than chance.

TABLE V  
CLASSIFICATION MATRIX

Observed	Predicted		Total
	Implementers	Not Implementers	
Implementers	39 (85%)	7	46
Not Implementers	18	17 (49%)	35

This study reports a research of the current state of SQM implementation in Turkey using the basic SQM principles as the reference. Analyses are conducted to explain the differences between SQM implementing and not implementing firms according to their perceptions of SQM implementation. The results support that firms practicing SQM consider the principles of 'process improvement', 'assessment of competitiveness' and 'strategic integration' more significant. On the other hand, importance put on the principle of 'customer satisfaction' does not provide any difference between implementers and not implementers of SQM. The reason for this is probably that customer satisfaction is considered as a very important principle for all of the firms.

The results of analyses also indicate that 'process improvement' has the highest impact on distinguishing the firms according to SQM implementation perceptions. Process improvement includes employee empowerment, total commitment, teamwork and continuous improvement concepts. As Harrington has stated, it has become a driving force for industries [12]. 'Assessment of competitiveness' is found as a secondary most effective principle to distinguish the SQM using firms. It consists of analytic comparison methods that analyze the firms' competitive strength in the market and help them in making their strategic decisions in case.

In general, the five practices that are 'cycle time analysis', 'process value analysis', 'process simplification', 'strategic planning', and 'formal supplier certification problems' have a chance of 95% percent for improvement of performance in all of the firms [14]. However, firms at different performance levels should concentrate on the implementation of these practices at different levels. For instance, the high performer firms gain highest benefits from practices such as customer based training for new employees, highlighting quality and teamwork studies for top management, extensive participation at meetings from highest level to lowest level of organization, benefiting from world class benchmarking, sharing strategic plans with other partners in the supply chain, increasing permanent customers by maintaining after sales service, and using competitor comparison and customer satisfaction measures during plan development phases. On the other hand, low performer firms mostly focus on the practices fundamentally, such as teamwork in departments and cross functions, training about customer relationships, problem solving approaches, benefiting from customer satisfaction measures when making strategic plans [14].

In this research, it is found that the high performer firms in Turkey tend to behave like low performers and ignore the importance of utilizing improved practices rather than fundamentals. Their perception on SQM implementation is mostly limited to fundamental practices.

It is suggested that future studies are necessary to explain this issue. Studying the reasons of this perceptual error and finding out their root causes may be one way of raising awareness for implementing SQM in the Turkish firms. Another way to provide insight may be researching how implementing the mostly used SQM principles would help companies improve their performance and indicate how successful they are.

#### REFERENCES

- [1] B. Srinidhi, "Strategic quality management," *International Journal of Quality*, vol. 3, pp. 38-70, 1998.
- [2] L. M. R. Calingo, "The evolution of strategic quality management," *International Journal of Quality & Reliability Management*, vol. 13, pp. 19-37, 1996.
- [3] A. Brown, J. Eatock, D. Dixon, B. J. Meenan and J. Anderson, "Quality continuous improvement in medical device manufacturing," *The TQM Magazine*, vol. 20, no. 6, pp. 541-555, 2008.
- [4] M. Hammer and J. Champy, *Reengineering the Corporation*, Harper Business. New York, 1993.
- [5] V. M. R. Tummala and C. L. Tang, "Strategic quality management, Malcolm Baldrige and European Quality Awards and ISO 9000 certification," *International Journal of Quality*, vol. 13, no. 4, pp. 8-38, 1996.
- [6] C.N. Madu and C.H. Kuei, *Strategic total quality management. Westport: Management of New Technologies for Global Competitiveness*, Quorum Books, 1993.
- [7] D. Leonard and R. McAdam, "Total quality management in strategy and operations: dynamic grounded models," *Journal of Manufacturing Technology Management*, vol. 15, pp. 254-266, 2004.
- [8] P. Aravindan, S. R. Devadasan and V. Selladurai, "A focused system model for strategic quality management," *International Journal of Quality & Management*, vol. 13, pp. 79-95, 1996.
- [9] J. Aheto, C. Kuei and C.N. Madu, "Adoption of strategic total quality management philosophies," *International Journal of Quality & Reliability Management*, vol. 13, pp. 57-72, 1996.
- [10] L. S. Pheng and S.H. Hong, "Research and concepts: Strategic quality management for the construction Industry," *The TQM Magazine*, vol. 17, no. 1, pp. 35-53, 2005.
- [11] L.C.R. Carpinetti and R. A. Martins, "Continuous improvement strategies and production competitive criteria: some findings in Brazilian industries," *Total Quality Management*, vol. 12, no. 3, pp. 281-291, 2001.
- [12] H. J. Harrington, "Research and concepts: national traits in TQM principles and practices," *The TQM Magazine*, vol. 8, no. 4, pp. 49-54, 1996.
- [13] J. F. Hair, R. E. Anderson, R. L. Tatham and W. C. Black, *Multivariate Data Analysis with Readings*, Englewood Cliffs, N., Prentice Hall, 1995.
- [14] J. R. Evans and W. M. Lindsay, *The Management and Control of Quality*, seventh edition, Thomson South Western, Mason, USA, 2008.