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An Empirical Investigation of the Relationship between Quality Initiatives and Financial Performance

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Abstract

Using survey data from 102 industrial enterprises, this study empirically examines the extent to which quality initiatives are implemented and the effects of quality initiatives on financial performance amongst top Turkish 500 industrial enterprises. The findings of the study are: (1) majority of Turkey's top 500 industrial enterprises implement at least one quality initiative; (2) there are significant associations between implementing quality initiatives and top 500 ranking; (3) and quality-initiative implementing companies outperform in financial performance compared to non-quality-initiative implementing companies.

Keywords: *Quality initiatives, financial performance, manufacturing companies, Turkey*

Jel Classification: *L25, L60, M10, M41*

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1. Introduction

One of the most important events of the second half of 20th century in business world is "quality initiatives". In this context, quality initiatives refer to quality management programs, quality certifications, quality award models, and methods & methodologies to improve quality. These initiatives have gained importance, because they provide the tools to improve the quality of the products or services that companies deliver. Even not-for-profit organizations such as hospitals, schools, governmental institutions have implemented these initiatives to improve their service quality. However, the ultimate aim of implementing quality initiatives has been to achieve customer satisfaction.

In this study, the implementation of quality initiatives of top 500 industrial enterprises is investigated. The investigation topics in this study are Quality Award models, ISO (International Organization for Standardization) 9000 Certification, Quality Circles, Six Sigma, and Total Quality Management (TQM).

The remainder of this paper after the introduction section is structured as follows. Section 2 provides information about quality initiatives briefly. Section 3 demonstrates study objectives and questions. Section 4 presents the scope and methodology of the study. Section 5 discusses and analyzes the results. Finally, Section 6 is the conclusion of the paper.

2. Quality Initiatives

2.1. Quality Award Models

In the late 1980s and early late 1990s, several countries established programs to recognize the inventive, yet effective, quality practices taking place-once again, after Japan, which began honoring quality practices in the late 1980s. The criteria of most of these award programs encouraged strategic initiatives in the approach and deployment of quality practices (Vokurka et al., 2000: 41).

Quality award models provide organizations tools for implementing quality strategies, benchmarking, and self assessment of quality in their business environment. However, the ultimate goal is to improve organizational performance in financial terms and other important aspects.

Some studies provide possible linkages between quality initiatives and financial returns. For example, for the 4 years between 1997 and 2000, the stock index made up of publicly traded US companies that received Malcolm Baldrige National Quality Award (MBNQA) outperformed the Standard & Poor's 500 by almost 4.5:1 (Lee et al.: 2003).

Table presents some brief explanations about three quality award models that are investigated in the study.

Table 1. Quality Award Models

Award	Description
Malcolm Baldrige National Quality Award (MBNQA)	To improve quality management practices and the competitiveness of U.S. firms, the Malcolm Baldrige National Quality Improvement Act was signed on August 20, 1987. The MBNQA was created to promote quality awareness, identify the requirements for quality excellence, and share information about successful quality strategies and benefits (Vokurka et al., 2000: 42).
European Quality Award (EFQM)	Recognizing the importance of quality performance, 14 major European companies formed the European Foundation for Quality Management (EFQM) in 1988 with the endorsement of the European Commission. And by 1991, EFQM had developed the European Quality Award program to honor outstanding European businesses. Unlike other awards, the European Quality Award is a regional program (Vokurka et al., 2000: 43).
Turkish National Quality Award (KALDER)	Since 1993, KALDER has been presenting the "National Quality Award" based on the criteria of the EFQM Excellence Model. Since the initial announcement in 1992, National Quality Award has become increasingly popular in Turkey (KALDER, 2007).

2.2. ISO 9000 Certification

The ISO, a global federation of 130 national standard bodies, seeks to promote standardization and the development of related activities worldwide in order to help organizations in the international exchange of goods and services through the introduction of the ISO 9000 series of standards (Magd, 2006: 132).

The ISO 9000 series of standards (see *Table* 2) has captured a lot of attention within the business world due to its widespread adoption by thousands companies worldwide and the "domino effect" of these companies' certifications on their competitors and suppliers (Gotzamani et al., 2006: 44).

The results of a study conducted over a sample of 70 companies listed on the Singapore Stock Exchange over a 6-year period provide evidence that ISO 9000 certification is associated with improvements in financial performance. The study suggests that ISO 9000 certification does bring benefits to the firm and its stakeholders. Specifically, the findings showed that ISO 9000 certification is associated with significant improvements in profit margin, growth in sales, and earnings per share (Sharma, 2005).

Table 2. ISO 9000 Series of Standards

Standard	Focus
Original standard (ISO 9000)	
ISO 9000	Quality management and assurance standards for selection and use
ISO 9001	Quality systems model for quality assurance in organizations whose processes include design, development, production, installation and servicing
ISO 9002	Quality systems model for quality assurance in organizations whose processes include production and installation, but not design and development
ISO 9003	Quality systems model for quality assurance in organizations whose processes use final inspection and testing to meet product and service quality requirements
ISO 9004	Quality management and quality system element guidelines
Revised standards (ISO 9000: 2000)	
ISO 9000: 2000	Quality management system fundamentals and vocabulary-defines terminology and standards
ISO 9001: 2000	Quality management systems requirements-used to assess compliance with requirements (consolidates the former ISO 9001/9002/9003 into a single document)
ISO 9004: 2000	Quality management systems guidelines for performance improvement-offers guidance for continual management system improvement

Source: H.T. Stevenson, and C.F. Barnes, "What Industrial Marketers Need to Know About ISO 9000 Certification: A Review, Update, and Integration with Marketing", Industrial Marketing Management, Vol. 31, 2002: 969.

2.3. Quality Circles

Quality Circles is a people oriented approach to quality improvement in profit and not-for-profit organizations. People working on related activities in organizations are the subject of this philosophy. The implications of this philosophy are empowering employees of a department or a particular work area to improve interaction and increase efficiency.

A quality circle usually involves between six and twelve people who meet voluntarily on a regular basis to identify improvements in their areas and interactions. The benefit of this approach is that it recognizes that the people in the organization are one of the most valuable assets and attempts to tap the knowledge and insights of the employees (Raisinghani et al., 2005: 493-494).

2.4. Six Sigma

The concept of Six Sigma was introduced at and popularized by Motorola in its quest to reduce defects of manufactured electronic products. When used as a metric, Six Sigma technically means having no more than 3.4 defects per million opportunities in any process, product, or service. Six Sigma organizations follow a rigorous process improvement methodology; define, measure, analyze, improve, and control (Hoerl, 1998: 36).

Managers from companies engaged in Six Sigma activities can produce solid data showing improved quality leads to reduced costs, better customer satisfaction and improved bottom-line profitability (Bisgaard and Freiesleben, 2004: 57).

The cost of poor quality (COPQ) is commonly used in industry as a key criterion for the selection and evaluation of Six Sigma projects (Bisgaard and Freiesleben, 2004: 58).

2.5. Total Quality Management

The importance of the "customer" to an organization has grown in recent years. Greater emphasis is now being placed on customer satisfaction and more effort is being expended on broad quality concepts. Increased participation of employees is also being encouraged in a growing number of organizations. These activities form the basis of what is known as TQM (Keogh, 1994: 25).

Total Quality Management (TQM) is the system of activities directed at achieving delighted customers, empowered employees, higher revenues, and lower costs (Juran, and Gryna, 1993: 12).

Total quality management is a universal business strategy which is not culture-bound. It is equally applicable to manufacturing and service industries, private and public organizations, structures of different sizes, and to companies of any socio-cultural background (Krueger, 1999: 262).

TQM is a long-term strategic issue, which is about continuous improvement in all areas of the organization's activities. Therefore the key areas in ensuring the success of a TQM program in an organization are commitment and a systematic approach to the achievement of TQM improvements. Commitment must start with top management and then be gained from each individual employee. Not only is commitment needed, but also a systematic approach to the achievement of TQM improvements requires that the necessary infrastructure of people, systems and training (Keogh, 1994: 25).

The results of a study conducted in Malaysia suggest that the implementations of TQM can lead to the enhancement of customer satisfaction and ultimately improve the financial performance of manufacturing companies in Malaysia (Agus et al., 2000).

3. Study Objectives and Questions

The purpose of this study is to investigate (the study was excerpted from doctoral thesis of Uyar (2007): (1) the extent to which quality initiatives are implemented in Turkish companies; (2) the association between implementing quality initiatives and top 500 ranking according to ICI report; (3) the association between implementing quality initiatives and financial performance.

In relation to these objectives, the following three research questions were prepared:

Research Question 1: Do top Turkish 500 industrial enterprises implement quality initiatives?

Research Question 2: Is there any association between implementing quality initiatives and top 500 ranking of industrial enterprises?

Research Question 3: Is there any association between implementing quality initiatives and financial performance?

4. Scope and Methodology

A questionnaire survey was conducted with the top Turkish 500 industrial enterprises specified by the Istanbul Chamber of Industry (ICI) for the year 2005. These enterprises are selected and ranked by ICI according to their production-based sales (İstanbul Sanayi Odası-I, 2006). The responses were evaluated statistically using SPSS (Statistical Package for Social Sciences) software and the Microsoft Excel spreadsheet program. Out of those top 500 companies, fifteen firms declined to give out their names in ICI report. As a result of, another fifteen firms were added to the list from the "Second Top 500 Companies" (İstanbul Sanayi Odası-II, 2006). Therefore, the total sample size consisted of 500 manufacturing firms.

5. Results and Analysis

5.1. Descriptive Statistics

Of the 500 questionnaires mailed, a total of 102 questionnaires were returned. Hence, response rate of the research is 20.40%. When those 102 responses reviewed, most of the respondents were accounting/finance professionals (26 persons) and quality professionals (48 persons). Other respondents (22 persons) are all respondents out of accountants and quality professionals, including top managers (plant manager, chief executive officers etc.) and managers from various departments (production, engineering etc.). And, 6 respondents were unknown.

The respondents have an average number of employees of 1,388 and an average production-based sales of 333,027,602 YTL (New Turkish Liras). The responding persons have an average work experience of 11.77 years.

The classification of responding firms according to industry types they operate within is as listed below (see Table 3):

Table 3. Classification of the Responding Firms According to Industry Types

Industry type	Frequency	Percentage
Mining and Quarry Industry	4	3.92%
Food, Beverage, Tobacco Industry	17	16.67%
Textile, Apparel, Leather and Footwear Industry	17	16.67%
Wood Products and Furniture Industry	1	0.98%
Paper and Paper prod., and Publication Industry	8	7.84%
Chemical, Oil Prod., Rubber and Plastic Industry	9	8.82%
Cement Industry	12	11.76%
Metal Industry	13	12.75%
Metal ware, Machinery, Equip. and Supplies Ind.	11	10.78%
Automotive Industry	8	7.84%
Electrical Industry	2	1.96%
TOTAL	102	100.00%

5.2. Quality Initiatives of the Responding Firms

When the responding firms are classified according to their quality initiatives, it is observed that (see Table 4): 78 firms (76.47%) implement ISO 9000-ISO 9001 quality management systems, 31 firms implement (30.39%) TQM, 14 firms implement (13.73%) Six Sigma principals, 13 firms implement (12.75%) Quality Circles, 9 firms implement (8.82%) National Quality Award criteria, 6 firms implement (5.88%) EFQM criteria, none of the respondents implement MBNQA criteria, 7 firms implement other quality initiatives, and 7 firms do not implement any quality initiatives. The industry classifications of the firms, which do not implement any quality initiatives, are electrical industry (1 firm), mining and quarry industry (3 firms), and textile, apparel, leather and footwear industry (3 firms).

Table 4. Quality Initiatives of the Responding Firms

Quality Initiatives of the Responding Firms*	Frequency	Percentage
ISO 9000-ISO 9001	78	76.47%
TQM	31	30.39%
Six Sigma principals	14	13.73%
Quality Circles	13	12.75%
KALDER (National Quality Award) criteria	9	8.82%
EFQM criteria	6	5.88%
MBNQA criteria	0	0.00%
Others (QOS [a], HACCP [b], CE [c], IFS [d], BRC [e])	7	6.86%
None	7	6.86%

*The respondents were able to select more than one option.
[a] Quality Operating System; [b] Hazard Analysis and Critical Control Point;
[c] Conformity of Europe; [d] International Food Standard; [e] British Retail Consortium.

5.3. Cross Investigations among Quality Initiatives

In this part, some cross relationships (see Table 5) are examined amongst the quality initiatives (TQM, ISO, EFQM, KALDER, Six Sigma and Quality Circles) and the "top 500" ranking. What catches the attention is that all of EFQM adopters are between 0-200 in the "Top 500" ranking. The significance of the linear association among quality initiatives was investigated by the Spearman's rho correlation (see Table 5).

Table 5. Distribution of Quality Applications the Responding Firms

QUALITY APPLICATIONS							
Quality Initiatives		**"Top 500" Ranking**					**TOTAL**
		0-100	**101-200**	**201-300**	**301-400**	**401-650**	
TQM	count	7	7	4	9	4	31
	% within TQM	22.6%	22.6%	12.9%	29.0%	12.9%	100.0%
ISO	count	18	19	13	14	14	78
	% within ISO	23.1%	24.4%	16.7%	17.9%	17.9%	100.0%
EFQM	count	5	1	0	0	0	6
	% within EFQM	83.3%	16.7%	0.0%	0.0%	0.0%	100.0%
KALDER	count	4	2	1	2	0	9
	% within KALDER	44.4%	22.2%	11.1%	22.2%	0.0%	100.0%
Six Sigma	count	4	7	1	1	1	14
	% within Six Sigma	28.6%	50.0%	7.1%	7.1%	7.1%	100.0%
Quality Circles	count	5	3	2	1	2	13
	% within Quality Circles	38.5%	23.1%	15.4%	7.7%	15.4%	100.0%
Non-implementing any quality initiatives	count	2	0	0	2	3	7
	% within non-implementing any quality initiatives	28.6%	0.0%	0.0%	28.6%	42.8%	100%

The Spearman's rho correlation (see Table) shows the details of linear association amongst quality initiatives TQM, ISO, EFQM, KALDER, Six Sigma, Quality Circles, and the "Top 500" ranking. There are two points here to be investigated:

- Association between the "Top 500" ranking and quality initiatives.
- Association among quality initiatives.

First of all, there is a significant negative linear association between each of variables EFQM, KALDER, Six Sigma and the "Top 500" ranking.

- EFQM & "Top 500" ranking (significant at the 0.01 level)

- KALDER & "Top 500" ranking (significant at the 0.05 level)
- Six Sigma & "Top 500" ranking (significant at the 0.05 level)

Secondly, there are some very significant positive linear associations among quality initiatives as follows:

- EFQM & KALDER (significant at the 0.01 level)
- TQM & KALDER (significant at the 0.01 level)
- EFQM & TQM (significant at the 0.01 level)
- EFQM & Quality Circles (significant at the 0.01 level)
- ISO & Six Sigma (significant at the 0.05 level)
- TQM & Quality Circles (significant at the 0.05 level)

Table 6. Spearman's rho Correlation among Quality Initiatives and the "Top 500" Ranking

	Top 500 ranking	TQM	ISO	EFQM	KALDER	Six Sigma	Quality Circles
Top 500 ranking	1.00						
TQM	-0.05	1.00					
ISO	-0.19	0.07	1.00				
EFQM	-0.33**	0.29**	0.14	1.00			
KALDER	-0.21*	0.48**	0.17	0.66**	1.00		
Six Sigma	-0.23*	0.17	0.22*	0.14	0.18	1.00	
Quality Circles	-0.15	0.20*	0.07	0.28**	0.19	0.10	1.00

** Correlation is significant at the 0.01 level (2-tailed).

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

5.4. Implementing Quality Initiatives and Financial Performance

One of the major aims of the study is to investigate the association between implementing quality initiatives and financial performance. During this investigation the following three performance variables are used: return on assets (ROA) which is a ratio of net income (before tax) to total assets; return on equity (ROE) which is a ratio of net income (before tax) to total equity, and; before-tax profit margin (BTPM) which is a ratio of net income (before tax) to net sales. Since the ICI report about the top 500 industrial enterprises includes net income (before tax) amounts of the companies, these amounts were used in the financial ratios.

In order to investigate whether there is a linear association between each of these three variables and implementing a quality initiative for the year 2005 (see Table),

the Pearson correlation analysis was conducted. The findings indicated following significant associations:

- ROA & implementing a quality initiative (significant at 0.01),
- ROE & implementing a quality initiative (significant at 0.01), and
- BTPM & implementing a quality initiative (significant at 0.01).

Additionally, Table 7 also shows the significant associations among ROA, ROE and BTPM.

Table 7. Results of the Pearson Correlation

	ROA	ROE	BTPM	Implementing a quality initiative
ROA	1.00			
ROE	0.66**	1.00		
BTPM	0.95**	0.70**	1.00	
Implementing a quality initiative	0.26**	0.32**	0.28**	1.00

** Correlation is significant at the 0.01 level (2-tailed).

The analysis in Table 7 shows that implementing a quality initiative correlates significantly (significant at the 0.01 level) positively with profitability as three profitability ratios demonstrate. This means that the companies which implement quality initiatives are more likely to have higher profitability ratios than the companies which do not implement quality initiatives. Furthermore, the significant positive association among three profitability ratios shows that these ratios support each other. This finding is consistent with the assertion that "There is a direct relationship between quality and profits. Higher quality reduces the scrap and rework cost of defective units, and has the potential to increase market share and revenue" (Elshazly, 1999).

6. Conclusion

The empirical findings in this study show that majority of the top Turkish 500 industrial enterprises implement at least one quality initiative. Furthermore, negative associations were found between implementing quality initiatives and top 500 ranking. More specifically, the significant associations were found between implementing each of EFQM, KALDER, and Six Sigma initiatives and the top 500 ranking. This means that a company, which implements at least one of these three initiatives, is likely to have more production-based sales. Lastly, quality-initiative implementing companies outperform in financial performance compared to non-quality-initiative implementing companies.

This study demonstrates a more of a general picture for the top Turkish 500 industrial enterprises on implementing quality initiatives across Turkey. The reason for this is that the respondents come from eleven different industries and seven different geographical areas within Turkey.

The limitation of the study is that the subject of the study includes only top Turkish 500 industrial enterprises therefore the findings may not be applicable to other industries and small companies.

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