



# Investigating the effects of innovation and employee performance on the relationship between total quality management practices and firm performance: An empirical study of Turkish firms

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## ABSTRACT

The results from studies of the relationship between total quality management (TQM) practices and firm performance and from those on the effects of TQM practices on various types of performance measures are mixed. There is no extensive empirical evidence about the effect of TQM practices on employee performance and innovation performance, and few empirical studies have investigated the mediating effect (indirect relationship) of one type of performance measure on the relationship between TQM practices and another type of performance measure. The objective of this study was to investigate the relationships between TQM practices and multiple performance measures and to examine the mediating effects of employee performance and innovation performance on the relationship between TQM practices and firm performance. The study used a cross-sectional survey methodology—we sent questionnaires to 500 randomly selected ISO 9001:2000 certified firms in different industries in the Marmara region in Turkey in 2005 and 2006 and obtained 373 usable questionnaires. After confirming the validity and reliability of the latent variables with confirmatory and exploratory factor analyses, we tested the model and hypotheses using structural equation modeling. Results of the study support the proposed hypotheses that employee performance and innovation performance partially mediate the relationship between TQM practices and firm performance. The study also provides managerial and research implications, research limitations, and suggestions for future studies.

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## 1. Introduction

Total quality management (TQM) is a systematic quality improvement approach for firm-wide management for the purpose of improving performance in terms of quality, productivity, customer satisfaction, and profitability. Since TQM practices have been embraced by many firms around the world for decades, they have earned the attention of many researchers from diverse areas. While there are many success stories related to TQM practices, some TQM programs have failed, and some authors (e.g., Bohan, 1998; Masters, 1996; Whalen and Rahim, 1994; McCabe and Wilkinson, 1998; Taylor and Wright, 2003) have found reasons for these failures.

Results from studying the relationship between TQM practices and firm performance have been mixed (e.g., Kaynak, 2003; Nair, 2006; York and Miree, 2004; Sadikoglu, 2004; Prajogo and Sohal, 2001; Hung, 2007), so a need remains to re-examine this relationship. Replication research contributes empirical general-

izations and knowledge development, and consistent research results among multiple studies using a variety of methodologies give support to the strength and generality of research results (cf. Kaynak, 2003). Replication research also contributes to validating cause-and-effect relationships, uniting the empirical results of a discipline, and increasing knowledge by reducing type I errors, by evaluating the robustness and generalization of empirical results, and by developing theory through satisfying the criterion of reproducibility (cf. Nair, 2006).

In order to be competitive in a changing marketplace, firms must improve both quality and innovativeness (Feng et al., 2006; Hung, 2007; Irani et al., 2004). Continuous (incremental) improvement and breakthrough innovation both have their places in a firm (Irani et al., 2004). Some scholars (e.g., Prajogo and Sohal, 2004, 2001; Kaynak, 2003) have claimed that the effects of TQM practices on various types of performance measures differ. In addition, few empirical studies have investigated the mediating effect (indirect relationship) of one type of performance measure on the relationship between TQM practices and another type of performance measure (e.g., Kaynak, 2003; Prajogo and Sohal, 2006, 2004; Choi and Eboch, 1998; Sila, 2007). Moreover, there is no extensive empirical evidence about the effect of TQM practices

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on employee performance or the effect of employee fulfillment on firm performance (Sila, 2007).

Some scholars have suggested that future studies examine the direct and indirect effects of TQM practices on employee performance (cf. Sila, 2007), on the level of innovation (e.g., Feng et al., 2006), and on various performance measures (e.g., Kaynak, 2003; Stashevsky and Elizur, 2000), and others have suggested investigating the correlation between quality performance and innovation performance (e.g., Prajogo and Sohal, 2001), and between innovation performance and firm performance (e.g., Mazzanti et al., 2006). The objective of this study is to investigate the relationships between TQM practices and performance measures and to examine the mediating effects of employee performance and innovation performance on the relationship between TQM practices and firm performance.

The paper is organized as follows. Section 1 introduces the importance and purpose of the research. Section 2 reviews quality management practices and summarizes the results of previous studies on the relationship between TQM practices and various performance measures. Section 3 presents the proposed research model, the hypotheses related to the relationship between TQM practices and performance measures, and the research methodology, including the survey instrument, data collection processes, and statistical analysis. Section 4 provides results from the data analyses, including sample demographics, and results from the explanatory and confirmatory factor analysis, tests for reliability and validity of the constructs, and the structural path analysis for latent variables. Section 5 presents discussions, results, further research implications, and research limitations. The final section, Section 6, concludes.

## 2. Theoretical background

After we thoroughly reviewed the literature, the TQM factors we developed in the questionnaire were leadership, training, employee management, information and analysis, supplier management, process management, customer focus, and continuous improvement, and the performance measures were employee performance, innovation performance, and firm performance. Although not exhaustive, these factor areas have often been considered the critical factors of TQM (e.g., Sila and Ebrahimpour, 2003; Conca et al., 2004; Claver et al., 2003). We briefly explain these factors in the following section.

### 2.1. Leadership

Leadership, unlike internal management control, is the management task of maintaining and practicing a vision of the organization with respect to customer requirements. Examples of visionary leadership are “clarity of vision, long-range orientation, coaching management style, participative change, employee empowerment, and planning and implementing organizational change” (Anderson et al., 1994, p. 480). Leaders' effectiveness depends less on their position than on the respect and influence they have developed within the organization. According to Deming, management and leadership are different in that anyone with a vision who can lead others toward that vision can be a leader (Gluckman and Roome, 1993; Goetsch and Davis, 2006). TQM theory holds that, with a full commitment to a total quality setting, leaders can organize and synergize people's activities to achieve the common goal of the organization.

### 2.2. Training

Training topics in a total quality setting involve technical skills (statistical process/quality control methods such as control charts and Pareto diagrams, design tools such as design of experiments, and quality function deployment), supervision skills (managerial problem-solving tools), communication, new work procedures (teamwork), and customer relations (Flynn et al., 1994; Goetsch and Davis, 2006).

### 2.3. Employee management

Deming claimed that people in research, design, sales, and production must work interdependently as a team across traditional organizational functions, rather than working independently within their functions, in order to foresee problems in production that may be encountered and to improve the quality of the current and future product or service. Teamwork in design is fundamental in that loss of time and sales may occur if departments do not work as a team from the start (Deming, 1986; Walton, 1986; Hackman and Wageman, 1995). Functions work as a team in order to achieve a common goal and prevent subunit optimization (putting the needs of a unit ahead of the needs of the firm) (Dean and Bowen, 1994; Johnston and Daniel, 1991). Non-managerial employees can make significant contributions when they are empowered, so employee suggestions and participation are encouraged in a total quality setting.

### 2.4. Information and analysis

Managers should make decisions based on analysis of relevant data and information. Organizations measure, analyze, and review data and information to achieve strategic objectives and to anticipate and respond to any organizational or external changes. Managers in a total quality setting provide reliable, high-quality, and timely data and information for all key users, including employees and suppliers, to improve organizational efficiency, effectiveness, and innovation. Business needs and strategy determine the measures that will provide the critical data and information for decision-making (National Institute of Standards and Technology, 2006).

### 2.5. Supplier management

The vendors and purchasing departments in a TQM setting work together to reduce costs and improve quality continuously because teams bring consistency of effort along with knowledge. Deming's Point 4 indicates the advantages of working with a single supplier and building a long-term relationship marked by trust and loyalty (Deming, 1986; Walton, 1986). Buyers should select suppliers on the basis of quality, rather than solely on the basis of cost, and should work with them to improve their quality practices (Hackman and Wageman, 1995).

### 2.6. Process management

Process management emphasizes activities, as opposed to results, through a set of methodological and behavioral practices. Process management includes preventive and proactive approaches to quality management, such as designing fool-proof and stable production schedules and work distribution to reduce variations and improve the quality of the product in the production stage (Kaynak, 2003; Flynn et al., 1995; Saraph et al., 1989).

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