

# A replication and extension of quality management into the supply chain

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## Abstract

As competition moves beyond a single firm into the supply chain, researchers are beginning to explore quality management (QM) in a supply chain context. The literature suggests that supply chain management (SCM) consists of internal practices, which are contained within a firm, and external practices, which cross organizational boundaries integrating a firm with its customers and suppliers. Supplier quality management and customer focus are two QM practices that are also clearly in the domain of SCM. In this study we investigate how these two supply chain management-related quality practices lead to improved performance and examine the practices that precede and mediate those relationships. In doing so, we replicate and extend the relationships among the QM practices and their effects on firm performance suggested in Kaynak [Kaynak, H., 2003. The relationship between total quality management practices and their effects on firm performance. *Journal of Operations Management* 21, 405–435] using survey data gathered from firms operating in the U.S. The inclusion of customer focus and supplier quality management in the QM model supports the importance of internal and external integration for quality performance. Implications of the results for researchers and practitioners are discussed, and further research implications are suggested.

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## 1. Introduction

Empirical quality management (QM) research has evolved over the last 20 years. Empirical research has defined and measured QM practices (e.g., Ahire et al., 1996; Flynn et al., 1994; Nair, 2006; Saraph et al., 1989; Sila and Ebrahimpour, 2005). Numerous studies have investigated the relationships among QM

practices and various aspects of a firm's performance (e.g., Adam et al., 1997; Ahire and O'Shaughnessy, 1998; Dow et al., 1999; Kaynak, 2003; Samson and Terziovski, 1999). As competition moves beyond a single firm into the supply chain, focus is shifting from management of internal practices alone. Instead, quality managers must integrate their firms' practices with those of customers and suppliers (e.g., Flynn and Flynn, 2005; Kannan and Tan, 2005; Robinson and Malhotra, 2005; Sila et al., 2006). Integrating QM and supply chain management (SCM) will be important for future competitiveness (Flynn and Flynn, 2005; Matthews, 2006; Robinson and Malhotra, 2005).

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Two QM practices, supplier quality management and customer focus, extend QM into the supply chain. We investigate how these two SCM quality practices lead to improved performance and examine the practices that precede and mediate those relationships. In doing so, we replicate and extend the relationships among the QM practices and their effects on firm performance suggested in Kaynak (2003) in a different sample and in a supply chain context. This study contributes to the literature by extending the examination of QM into the supply chain and by increasing confidence in the relationships among internal QM practices and performance. Replication implies that results can be generalized with confidence, building the foundation for theory (Cook and Campbell, 1979). Though relatively rare in business disciplines (Murgolo-Poore et al., 2002; Singh et al., 2003; Tsang and Kwan, 1999) – and particularly rare in operations management (Frohlich and Dixon, 2001) – replication is essential for the integrity of empirical research (Berthon et al., 2002; Easley et al., 2000; Hubbard et al., 1998; Lindsay and Ehrenberg, 1993; Tsang and Kwan, 1999).

The remainder of this paper is organized as follows. The literature used to identify the QM practices is briefly reviewed. In Section 2, a research model and related hypotheses pertaining to the relationships among QM practices and firm performance are offered. Section 3 describes the research methodology, including the construction of the instrument and measures, the

survey procedure, the sample, and analyses used to confirm construct validity. Section 4 presents the results of testing the structural model. The implications of the results for researchers and practitioners are discussed in Section 5. The paper concludes with limitations and further research opportunities.

## 2. Research model

The eight QM practices investigated in this study – management leadership, training, employee relations, customer focus, quality data and reporting, supplier quality management, product/service design, and process management – have been documented extensively in QM research, as shown in Table 1. SCM consists of internal practices, which are contained within a firm, and external practices, which cross organizational boundaries to integrate a firm with its customers and suppliers (e.g., Dröge et al., 2004; Frohlich and Westbrook, 2001; Kannan and Tan, 2005; Li et al., 2006; Narasimhan and Kim, 2002), and there is overlap between SCM and QM practices (Kannan and Tan, 2005; Robinson and Malhotra, 2005). Supplier quality management and customer focus are two QM practices that are clearly in the domain of SCM.

The original relationships among QM practices confirmed in Kaynak (2003) are shown in Fig. 1. With the inclusion of customer focus, and based on an updated literature review, some of the relationships

Table 1  
QM practices identified in published studies

QM practices	Description	Studies
Management leadership	Acceptance of quality responsibility by top management. Evaluation of top management on quality. Participation by top management in quality improvement efforts. Specificity of quality goals. Importance attached to quality in relation to cost and schedule. Comprehensive quality planning (Saraph et al., 1989, p. 818)	Adam et al. (1997), Ahire et al. (1996), Anderson et al. (1995), Black and Porter (1996), Crosby (1984), Deming (1986), Douglas and Judge (2001), Feigenbaum (1982), Flynn et al. (1994), Garvin (1988), Grandzol and Gershon (1997), Juran (1986), Kaynak (2003), Malcolm Baldrige Award (Criteria for Performance Excellence, 2005), Powell (1995), Rungtusanatham et al. (1998), Samson and Terziovski (1999), Saraph et al. (1989), Wilson and Collier (2000)
Training	Provision of statistical training, trade training, and quality-related training for all employees (Saraph et al., 1989, p. 818)	Adam et al. (1997), Ahire et al. (1996), Anderson et al. (1995), Crosby (1984), Das et al. (2000), Deming (1986, 1993), Douglas and Judge (2001), Dow et al. (1999), Easton and Jarrell (1998), Feigenbaum (1982), Garvin (1988), Grandzol and Gershon (1997), Ho et al. (2001), Juran (1986), Kaynak (2003), Malcolm Baldrige Award (Criteria for Performance Excellence, 2005), Powell (1995), Rungtusanatham et al. (1998), Saraph et al. (1989), Wilson and Collier (2000)

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