



# Contingency relationships of firm size, TQM duration, unionization, and industry context on TQM implementation—A focus on total effects

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## ABSTRACT

Past TQM literature has been inconclusive in resolving the validity of the universalistic approach versus the contingency approach of TQM implementation. In this paper we contribute to the resolution of this debate by using a total effects approach within the contingency perspective. We propose a culture-quality system design-outcomes framework for TQM implementation. We then use this framework to study the differences in total effects relationships among TQM constructs across four contingencies, firm size, TQM duration, unionization, and industry type. Data from a sample of 394 plants (SIC codes 20 through 39) are used to test the validity of our contingency model. Our results revealed that firm size, TQM duration, and industry type moderate the influence of total effects of culture (top management commitment, customer focus, and trust) on final outcomes (process quality, product quality, and customer satisfaction). These contingencies also moderate the influence of total effects of quality system design (design management, training, empowerment, quality information usage, supplier quality management, and process quality management) on final outcomes. The strongest contributor to variation in total effects across groups was industry type, followed by size and then TQM duration. To a lesser extent, unionization was a moderator in total effects relationships. These findings uniquely contribute to the emerging contingency theory of TQM implementation.

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## 1. Introduction

Total quality management (TQM) has been widely adopted by firms in the last 50 years and yet firms report less than optimal results (Sousa and Voss, 2008; Sila, 2007; Powell, 1995). In a study of 225 electronics manufacturing firms in Hong Kong, Yeung et al. (2006) reported that advanced TQM firms and non-TQM firms do not differ in their organizational performance. Our study contributes to the contingency perspective research stream which argues that the success of TQM depends on contextual factors (e.g., Sousa and Voss, 2008; Sila, 2007; Shah and Ward, 2003; Powell, 1995; Benson et al., 1991). Specifically, our research objectives are: (1) To study the effects of culture and quality system design on outcomes; and (2) To examine direct and total effect relationships among culture, quality system design and outcomes that are attributable to contextual factors. We propose a culture-quality system design-outcomes model that link key TQM constructs in a network of relationships. As relationships similar to this model

have been established previously (see Section 2), we only provide a brief summary of this model and then move on to our main research intent of examining contingency relationships.

## 2. Baseline model

Our baseline model is based on the premise that firms pursuing TQM address cultural issues first, followed by designing the quality system (Fig. 1). The joint consideration of culture and quality system design issues is expected to lead to positive outcomes. Past TQM literature has pointed out that systemic actions cause outcomes through an establishment of a culture or through deliberate design of the quality system (e.g., Sousa and Voss, 2008; Flynn et al., 1994). Firms invest in structural resources that we call culture, to set an appropriate climate for TQM. We operationalized the Culture-Quality System Design-Outcomes model by proposing thirteen culture, quality system design, and outcome constructs that are frequently discussed in the literature (Sila, 2007; Samson and Terziowski, 1999; Anderson et al., 1995; Flynn et al., 1994). The culture constructs are top management commitment, customer focus, and employee trust. The Quality System Design constructs are design management, employee training, empowerment, supplier quality management, quality information usage, and process quality management. The outcome constructs are design

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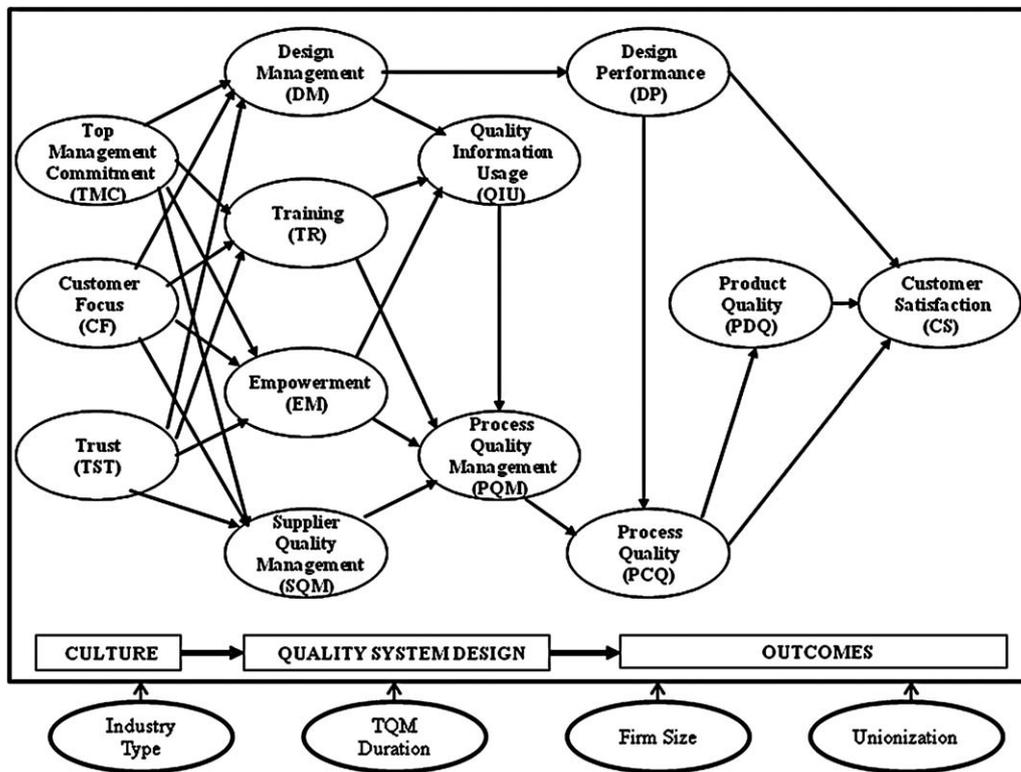


Fig. 1. Contingency model of TQM.

performance, process quality performance, product quality performance, and customer satisfaction. The definitions and support for the constructs appear in Appendix A.

The culture constructs find support from the tenets of the competing values model that suggests that organizations exhibiting flexible processes (instead of rigid controls), have external orientations (instead of internal focus), and value participative management (instead of authoritative) and are better positioned to implement TQM (Sitkin et al., 1994; Hitt et al., 1991). The quality system design constructs collectively encompass a socio-technical mix of tactics ranging from empowerment and training on the one hand (socio-end of the continuum), to design and supplier management at the other end (technical end of the continuum). To complete this spectrum are the measurement mechanisms such as collection and usage of quality information and statistical process control methods. The outcome constructs are design performance, process quality, product quality, and customer satisfaction. In Fig. 1, we summarize our baseline and contingency models in a single framework.

### 3. Contingency perspective of TQM

In the TQM literature, the contingency perspective has argued that success of TQM is dependent on contextual factors (see Table 1 for a summary of key studies). Some studies have reported significant moderating effects of TQM duration on the TQM practice-outcome relationships (Ahire, 1996; Benson et al., 1991). Other studies reported no moderating effects of contextual variables such as firm size, unionization and industry type on the TQM practice-outcome relationships (Sousa and Voss, 2008; Yeung et al., 2006; Shah and Ward, 2003; Pagell and Handfield, 2000; Ahire, 1996). Sila (2007) found that the impact of TQM implementation on outcomes was not contingent upon company size. Table 1 indicates that little attention has been paid to industry type (Shah and Ward, 2003), TQM duration (Ahire, 1996), and

unionization (Pagell and Handfield, 2000) as moderators of TQM practice on outcomes. Ahire (1996) assessed only product quality as an outcome, Shah and Ward (2003) used a narrow five-item scale for TQM, while Pagell and Handfield (2000) offered partial support for contingency impact of unions. Also, prior studies examining the contingency effect of firm size on TQM practice on outcomes report mixed findings – the Sila (2007) study reporting no effects and the Powell (1995) study reporting a negative correlation between size and TQM outcomes. As can be seen from the summary above, while the impact of contextual factors have been investigated by some studies, the majority of these contingency studies have either had a narrow focus, or have not studied the effect of contingencies on the relationships between TQM practices and outcomes. Our study fills this gap by examining sparsely studied contextual variables such as unionization and industry type (discrete versus process). Also, we verify whether the total effects of culture and quality system design factors on each TQM outcome varies across different contextual factors of firm size, TQM duration, unionization and industry type.

#### 3.1. Contingency influence of firm size

Firm size could moderate the relationships of TQM on outcomes as smaller firms have flatter organizational structures, are nimbler and have informal communication channels enabling quality system design elements (such as process quality management and design management) to be more effective compared to large firms (McAdam and McKeown, 1999; Manoochchri, 1988). Also, small firms are more likely to have a cooperative and trusting culture (Sila, 2007; Sironopolis, 1994). However, large firms have more market clout, capital and expertise in TQM (Shah and Ward, 2003; Germain and Spears, 1999; Ahire and Golhar, 1996). This suggests two different drivers affecting the relationships of TQM on outcomes. Shah and Ward (2003) found that plant size adversely influenced the relationship between TQM practices and outcomes,

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