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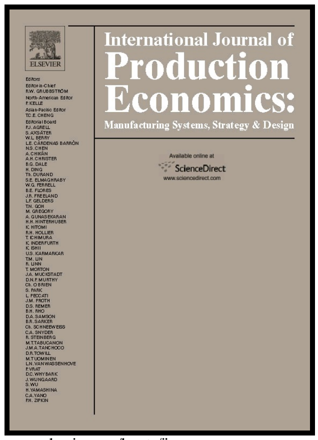

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The QM Evolution: Behavioral Quality Management as a Firm's Strategic Resource

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ABSTRACT

Firms implement various quality management (QM) practices to improve process quality. Scholars recognize that QM practices consist of both technical and behavioral oriented practices. The relationship of technical and behavioral oriented practices on performance has led to paradoxical relationships. Improving quality performance necessitates understanding the relationship between technical and behavioral orientated practices. This study empirically examines the relationship between technical and behavioral quality practices by collecting survey data from both US-based (N = 152) and China-based (N = 222) firms. The analysis usesthe structural equation modeling technique, and shows that behavioral QM practices fully mediate the relationship between technical QM practices and firm performance. This implies that behavioral QM practices act as a strategic resource which helps generate a competitive advantage. The results contribute to understanding how quality management practices can lead to a competitive advantage.

Keywords: *Behavioral quality management; Technical quality management; QM Paradox; QM evolution; Resource-based view; Structural equation modeling.*

1. Introduction

Over the last two decades, several studies have shown that quality management (QM) practices can be classified as either behavioral-oriented or technical-oriented practices (Flynn et al., 1995; Anderson et al., 1995; Powell, 1995;Dow et al., 1999; Rahman and Bullock, 2005; Naor et al., 2008; Gadenneand Sharma, 2009; Dubey and Gunasekaran, 2015). However, the literature has been inconsistent in terms of the characterization and how these practices influence performance. For instance, studies have described these two clusters as: infrastructure versus core quality practices (Flynn et al., 1995), tangible versusintangible quality practices (Powell, 1995), people versus tools quality practices (Dow et al., 1999), and soft versus hard quality practices (Rahman and Bullock, 2005). Further, some studies give conflicting results about the performance benefits of the different practices. For example, some studies assert that the technical-oriented QM practices such as product design, process management, and statistical control have a direct influence on the organization's performance (Flynn et al., 1995; Anderson et al., 1995; Rahman and Bullock, 2005; Zu, 2009), whereas other research argues that behavioral-oriented QM practices such as support from top management, customer focus, and supplier relationship are the source of competitive advantage rather than the technical QM practices (Powell, 1995; Samson andTerziovski, 1999; Dow, Samson, and Ford, 1999; Naor et al., 2008; Jung and Hong, 2008).

This study synthesizes the fragmented literature on the relationships between behavioral and technical quality practices and their effects on firm performance. In addition, we investigate the paradoxical relationships between behavioral QM and technical QM on firm performance by empirically testing the samples from U.S.-based firms and China-based firms. This study examines the precise relationship between behavioral QM and technical QM to understand how firms get a competitive advantage through QM practices. Addressing these questions should help clarify how different quality management practices influences a firm's competitive advantage.

2. Behavioral versus technical quality management practices

Although a number of studies have identified a number of different elements of QM, they show remarkable consistency in how to conceptualize the key elements of QM (Flynn et al., 1995; Powell, 1995; Dow et al., 1999; Rahman and Bullock, 2005; Jun et al., 2006; Naor et al., 2008).For instance, QM practices such as employee involvement, cooperative supplier relations, customer focus, and commitment of top management have generally been conceptualized as the behavioral aspects of QM practices('behavioral QM' hereafter), while QM practices such as process management, information and analysis, strategic planning, and benchmarking techniques have been conceptualized as the technical aspects of QM practices ('technical QM' hereafter), as shown in Table 1. In addition, behavioral QM consists of human-oriented, intangible, and relationship-driven practices, whereas technical QM consists of data-oriented, tangible, and technology-driven practices (Powell, 1995; Dow et al., 1999; Jun et al., 2006; Naor et al., 2008).

Table 1 Key elements of behavioral QM and technical QM on major studies.

	Flynn et al. (1995)	Powell (1995)	Dow et al. (1999)	Rahman and Bullock (2005)	Jun et al. (2006)	Naor et al. (2008)	Dubey and Gunasekaran (2015)
Behavioral QM Practices	*Infrastructure:* ▪ Work attitudes ▪ Top management support ▪ Workforce management ▪ Supplier relationship ▪ Customer relationship	*Intangible:* ▪ Executive commitment ▪ Adopting the philosophy ▪ Closer to customers ▪ Closer to suppliers ▪ Open organization ▪ Employee empowerment	*People:* ▪ Employee commitment ▪ Share vision ▪ Customer focus ▪ Use of teams ▪ Personnel training ▪ Cooperative supplier relations	*Soft:* ▪ Workforce commitment ▪ Shared vision ▪ Customer focus ▪ Use of teams ▪ Personnel training ▪ Cooperative supplier relations	*HR-focused:* ▪ Employee empowerment ▪ Employee training ▪ Teamwork ▪ Appraisal system ▪ Employee compensation	*Infrastructure:* ▪ Top management support ▪ Workforce management ▪ Supplier involvement ▪ Customer involvement	*Soft:* ▪ Human resource focus ▪ Quality culture ▪ Motivational leadership ▪ Relationship with partners

Technical QM Practices	*Core:* ▪ Statistical control and feedback ▪ Process flow management ▪ Product design process	*Tangible:* ▪ Benchmarking ▪ Training ▪ Zero defects mentality ▪ Flexible manufacturing ▪ Process improvement ▪ Measurement	*Tools:* ▪ Use of benchmarking ▪ Use of advanced manufacturing systems ▪ Use of just-in-time principles	*Hard:* ▪ Computer based technologies ▪ Just-in-time principles ▪ Technology utilization ▪ Continuous improvement enables		*Core:* ▪ Quality information on processes ▪ Process management ▪ Product design

There are two major research streams in the literature on the relationship between technical QM, behavioral QM, and organizational performance.One research stream focuses on the relative importance of technical QM versus behavioral QM practices on organizational performance (Powell, 1995; Samson andTerziovski, 1999; Naor et al., 2008; Jung and Hong, 2008; Gadenne and Sharma, 2009). The other major research stream focuses on the sequential relationship between technical and behavioral QM practices and their effect on organizational performance (Flynn et al., 1995; Anderson et al., 1995; Sousa and Voss, 2002; Rahman and Bullock, 2005; Zu, 2009).The Appendix summarizes the major studies on behavioral versus technical quality management practices.

2.1. Relative Benefit of QM Practices

A number of studies examine the relative benefit of behavioral QM versus technical QM (Powell, 1995; Samson and Terziovski, 1999; Naor et al. 2008; Jung and Hong, 2008). For instance, Powell (1995) argued that that tacit behavioral-orientated QM practices such as executive commitment, employee empowerment, and an open cultureleads to a competitive advantage, while tangible and technical-orientated QM tools such as quality training, process improvement, and benchmarking generally do not generate a competitive advantage. Samson and Terziovski (1999) argued that not all QM practices serve as strong predictors of operational performance. For instance, behavioral aspects of QM practices such as people management, top management leadership, and customer focus primarily influenced operational performance. Similarly, Naor et al. (2008) investigated 189 manufacturing plants located across multiple nations including the US, Japan, Sweden, Finland, Germany, and South Korea in order to examine the relative importanceoftechnical QM and behavioral QM practices on firm performance. They found that behavioral-oriented quality practices (so-called 'infrastructure'quality practices) such as support from top management, workforce management, supplier involvement, and customer involvement had a significant positive influence on manufacturing performance both in Eastern and Western countries, whereas technical-oriented quality practices (so-called 'core' practices) such as quality information, product design, and process management do not directly affectfirm performance across different countries (Naor et al., 2008).

2.2 Sequential Benefit of QM Practices

The other major research stream focuseson exploring the relationship between technical and behavioral QM practices on organizationalperformance (Flynn et al., 1995; Anderson et al., 1995; Rahman and Bullock, 2005; Zu, 2009). For example, Flynn et al. (1995) proposed a sequential model for the relationship between QM practices and performance, and argued that behavioral QM practices (e.g.top management support, customer relationship, supplier relationship, work force management, and work attitudes) have a supportive influence on technical QM practices (e.g. product design process, process flow management, and statistical control and feedback). Essentially, Flynn et al.'s (1995) model argues that behavioral QM practices enhances the effectiveness of technical QM on organizational performance. Rahman and Bullock's (2005) empirically tested 261 manufacturing firms in Australia and found results consistent with Flynn et al. (1995). Theirstudyshows a strong association betweenbehavioral QM practices andtechnical QM practices, and that technicalQM practices significantlyinfluence organizational performance. This further supports the view that behavioralQM practices indirectly haveinfluences organizational performance by strengthening the effectiveness of technical QM practices (Rahman and Bullock, 2005). More recently, Zu's (2009) research investigated 226 US manufacturing plants, and found similar results with the extant literature - they showed that behavioral QM indirectly contributes to firm performance by supporting technical QM practices. To sum up, the extant literature has been predominantly concerned with testing or verifying the sequential relationship between behavioral QM, technical QM, and organizational performance.

3. Hypotheses development

We investigate themediating effect of behavioral QM on the relationship between technical QM and performancefor the following reasons. Much of literature over the past two decades has suggested that behavioral QM practices, relative to technical QM, has a significantly greater positive influence on organizational performance (Powell, 1995; Samson andTerziovski, 1999; Naor et al., 2008; Jung and Hong, 2008). This suggests that behavioral QM practices are the ultimate source of a competitive advantage, that is, BQ→P. But the other stream of literature suggests a sequential relationship of 'behavioral QM → technical QM → performance' ('BQ→TQ→P' hereafter) (Flynn et al., 1995; Anderson et al., 1995; Rahman and Bullock, 2005;

Zu, 2009), or alternatively sequential relationship may have the following relationship 'technical QM → behavioral QM → performance' ('TQ→BQ→P' hereafter), as shown in Figure 1. In other words, BQ→Pand BQ→TQ→Pcontradict each other because the case where BQ→TQ→Pindicates that behavioral QM has an indirect effect on organizational performance by supporting the direct effect of technical QM on performance, while BQ→Psuggests that behavioral QM has a more significant direct effect on performance than does technical QM. Nevertheless, to the best of our knowledge, we were unable to find any study that investigated the relationship represented TQ→BQ→P, which challenges the BQ→TQ→P relationship. Thus, these arguments lead us to question the validity of extant knowledge of the relationship between behavioral and technical QM practices. From a practical perspective, understanding this relationship has implications on how managers implement these practices to get a performance advantage.

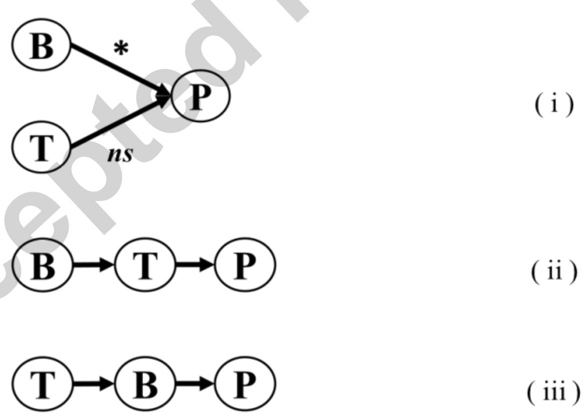


Fig. 1. Paradox of the relationships between behavioral QM, technical QM, and organizational performance. ∗ = significant positive effect; *ns* = not significant; B = behavioral QM; T = technical QM; P = performance.

Understanding this relationship helps understand how firms can get a competitive advantage from quality management practices. The resource-based view (RBV) argues that a firm's sustainable competitive advantages (SCA) come from resources that are valuable, rare, imperfectly imitable, and non-substitutable (Barney, 1991; Lado et al., 1992; Barringerand Harrison, 2000; Barney andHesterly, 2006). Powell (1995) argued that behavioral QM practices such as employee empowerment and executive commitment typically act as sources of SCA because of their imperfectly imitable features; however, technical QM practices can easily mimicked,and therefore are not a strategic resource. Similarly, Reed et al. (2000) argued that tacit behavioral oriented QM aspects such as the commitment of topmanagement, employee education, teams, and culture are closely associated with a firm's SCA because they inherently complex and interact withone another, which makes them difficult to imitate. Hence, behavioral QM practices have a more critical and direct effect on a firm's competitive advantage than do technical QM practices, at least from thisperspective.

To summarize, all the arguments above can be condensed as the following two statements; first, the sequential relationship of TQ→BQ→P could be more in sync with BQ→P than BQ→TQ→Pand second, the relationship of TQ→BQ→Pcan be elucidated by the RBV. Thus, there is a need to investigate the statistical relationship of TQ→BQ→P. Furthermore, even though research has shown BQ→TQ→Phas as statistically significant relationship, in the event that TQ→BQ→P is shown to be a more statistically significant relationship (e.g. behavioral QM acting as a mediator between technical QM and firm performance) than BQ→TQ→P, it might be evident that TQ→BQ→P statistically provides more reliable knowledge than BQ→TQ→P. Therefore, by employing Baron and Kenny's (1986) mediation analysis technique, we propose the following hypothesis to examine whether behavioral QM practices have a mediation effect on the relationship between technical QM practices and firm performance:

H1. *Behavioral QM practices positively mediate the relationship between technical QMpractices and firm performance.*

This research principally focuses on the on examining the relationship ofTQ→BQ→P as stated in Hypothesis 1. However, Baron and Kenny (1986)laid out several prerequisite steps which must be satisfied to establish a mediation relationship. First, the independent variable (i.e., TQ here) should significantly predict the criterion variable (i.e., P here). Next, the independent variable should significantlypredict the mediator variable (i.e., BQ here). Lastly, the mediator variable should be correlated with the criterion variable. Therefore,we propose the following extended hypotheses to confirmall the prerequisites for the mediation test:

H1a. *Technical QM practices have a significantly positive effect on firm performance.*

H1b. *Technical QM practices have a significantly positive effect on behavioral QM practices.*

H1c. *Behavioral QM practices have a significantly positive effect on firm performance.*

The hypothesis for each pathway in the research model can be mathematically expressed by the equations (1) to (4), where *ß* is the regression coefficient, *i*is regression intercept, and *ε*is error in the estimation. Additionally, the following abbreviations were used for simplicity: technical quality management (TQ), behavioral quality management (BQ), and firm performance (FP):

$$\text{H1a: } FP = i_1 + ß_1(TQ) + \varepsilon_1 \quad (1)$$

$$\text{H1b: } BQ = i_2 + ß_2(TQ) + \varepsilon_2 \quad (2)$$

$$\text{H1c: } FP = i_3 + ß_3(BQ) + \varepsilon_3 \quad (3)$$

In particular, the mediation effect of behavioral QM on the relationship between technical QM and firm performance can be describedby the following linear equation:

$$H1: FP = i_4 + ß_4(TQ) + ß_5(BQ) + \varepsilon_4 \quad (4)$$

4. Methodology

4.1. Survey instrument

Primary data was collected via a survey to test the hypotheses in this study. The survey instruments should have good content validity (Singleton and Straits, 2010). Hence, we first conduct a literature review of behavioral QM practices, technical QM practices, and firm performance. We then synthesizethe somewhat fragmented literature, and identified themost common elements for each type of QM practice. The measurementitems relevant to QM practices initially came mostly from Samson andTerziovski's (1999) study. However, some items were slightly revised based on some other studies such as Powell (1995), Choi and Eboch (1998), Dow et al. (1999), Kaynak (2003), Rahman and Bullock (2005), Jun et al. (2006), Naor et al. (2008), and Zu (2009) in order to suit our research purpose.The survey questionnaire used a five point Likert scale to estimate the degree to which the respondents agreed or disagreed with a given item. Next, the questionnaire was refined by a pilot study (N = 15) with MBA students to confirm the operationalization of the survey instrument. Simultaneously, we enlisted the assistance of China-basedoperations professors to translate our English survey questionnaire into Chinese and to direct the survey research in China. During the translation process, two Chinese translators conducted independenttranslations of the survey questionnaire, and then evaluated each other's work (Brislin, 1980; Douglas & Craig,2007). After undergoing several revisions through the process of intensive reviews and additional pilot testconducted in both the U.S. and China, we eventually completed the final version of the survey questionnaire, in both English and Chinese.

4.2. Data collection in the U.S. and China

The target respondent for the survey was a senior-level quality manager who was mainly responsible for the QM practices at their company. Hence, the following criteria helped select the respondent to ensure accuracy of the response.First, the selected respondent should be familiar with the firm's QM practices and performances. Second, the target respondent was selected based on their rank in the company; a higher rank was preferred.

The online survey was designed based on Dillman et al.'s (2008) guidelines for collecting primary data. The U.S. survey began with email invitations that had a web survey link to the questionnaire. We sent emails to 419 quality managers in over 30 states in the U.S. who were in charge of quality assurance. There were two rounds of invitations to participate in the survey which resulted ina total of 152 usable responses for a response rate of 36.3%. Collecting the data from China begin with the cooperation of one of China's leading business schools located in Xian. On our behalf, they sent a Chinese version of the survey questionnaire to 340 firms that primarily operate in the Shaanxi province of China. We collected a total of 222 usableresponses from the China-based firms with a response rate of 65.3%. In the U.S. sample, 43.4% were manufacturing firms and 56.6% were service firms, and of the China sample, 51.8% were manufacturing firms and 48.2% were service firms. Table 2 summarizes the demographic profile of our survey participants.

Table 2 Description of the sample.

Category		**U.S. sample**	**China sample**
Firm's Age	Less than 5 years	6 (4%)	22 (10%)
	5-9 years	15 (10%)	30 (14%)
	10-19 years	16 (11%)	54 (24%)
	20-29 years	27 (18%)	19 (9%)
	More than 29 years	88 (58%)	96 (43%)
Firm's Size[a]	Less than 10	5 (3%)	4 (2%)
	10-99	23 (15%)	27 (12%)
	100-199	15 (10%)	22 (10%)
	200-500	25 (16%)	29 (13%)

		More than 500	84 (55%)	138 (63%)
Industry		Manufacturing	66 (43%)	115 (52%)
		Service	86 (57%)	103 (48%)
Survey Respondent	Age	20-29	11 (7%)	40 (38%)
		30-39	17 (11%)	52 (50%)
		40-49	51 (34%)	12 (11%)
		More than 49	73 (49%)	1 (1%)
	Experience with a current job	Less than 5 years	57 (38%)	43 (41%)
		5-10 years	36 (24%)	30 (29%)
		10-15 years	16 (11%)	15 (14%)
		More than 15 years	41 (27%)	17 (16%)
	Job Title	*Majority*: quality managers such as quality assurancedirector, quality control manager, and director of quality improvement. *Minority*: operations manager, systems manager, maintenance manager, and CEO.		

Note: Not including missing responses.
[a]Number of employees.

5. Scale Assessment

5.1. Validity of measurements

A confirmatory factor analysis (CFA) helped validate the measures used in this study. Tables3, 4, and 5 give a description of each item and the final results from the factor analysis. In the U.S. sample, the factor loading for each item ranges between .652 and .958, satisfying the suggested threshold of .50 or higher (Hair et al., 2010). In the China sample, most of items meet the threshold, ranging between .604 and 1.020. However, the quality outcome factor of the China sample contains one item whose factor loading is .447; nevertheless, the item is significantly loaded in the related factor (p = .009, t = 2.612) and also the internal consistency measured by Cronbach's alpha meets the acceptable level of .60 or higher (Cronbach, 1951; Nunnally, 1978; Hair et al., 2010) so the item was kept in our measures. In addition, Table 6 presents the bivariate correlations among the measured variables, the means, and the standard deviations of both the U.S. and the China samples.

Table 3 CFA test results of measures:behavioral QM practices

Items Description	Beta	S.E.[a]	*t*-value	Supporting Literature
Management Commitment α^{b}= .821 (.633)				Flynn et al. (1995), Powell (1995), Samson andTerziovski (1999), Naor et al. (2008), Kaynakand Hartley (2008), Zu (2009)
- Senior managers actively encourage change and implement a culture of trust,involvement, and commitment in moving towards "Best Practice."	.862*** (.675***)	.081 (.138)	11.937 (7.591)	
- There is a high degree of unity of purpose throughout our c*mpany, and we have eliminated barriers between individuals and/or departments.	.809*** (.686***)	.087 (.126)	11.937 (7.591)	
Employee Involvement α = .737 (.591)				Powell (1995),Ahire et al. (1996), Dow et al. (1999), Samson and Terziovski (1999), Jun et al. (2006),Naor et al. (2008)
- Our company has effective 'top-down' and 'bottom-up' communication processes.	.779*** (.637***)	.114 (.140)	10.078 (7.325)	
- Employee flexibility, multi-skill, and training are actively used to support improved performance.	.753*** (.660***)	.086 (.133)	10.078 (7.325)	
Customer Involvement α = .846 (.742)				Dow et al. (1999), Samson and Terziovski (1999), Das et al. (2000), Rahman and Bullock (2005), Abdullah et al. (2008), Naor et al. (2008), Zu (2008), Akgün et al. (2014)
- We have an effective process for resolving external customers' complaints.	.859*** (.800***)	.083 (.121)	11.986 (9.343)	
- Customer complaints are used as a method to initiate improvements in our current processes.	.854*** (.739***)	.084 (.095)	11.986 (9.343)	
Supplier Involvement α = .892 (.780)				Saraph et al. (1989), Powell (1995), Dow et al. (1999),

-	We work closely with our suppliers to improve each other's processes.	.893*** (.857***)	.072 (.101)	13.667 (10.616)	Kaynak (2003), Rahman and Bullock (2005),Naor et al. (2008),Kaynakand Hartley (2008)
-	Our suppliers work closely with us in product development.	.902*** (.750***)	.075 (.087)	13.667 (10.616)	

Note: U.S. sample N = 152, China sample N = 222 (the figure in the parenthesis represents the estimate of the China sample); [a]Standard error; [b] Cronbach's alpha; *** $p< 0.001$.

Table 4 CFA test results of measures: technical QM practices

Items Description	Beta	S.E.[a]	*t*-value	Supporting Literature
Strategic Planning α^b= .822 (.585)				Black and Porter (1996), Choi andEboch (1998), Samson andTerziovski (1999), Cho and Jung (2014), Akgün et al. (2014)
- We have a mission statement which has been communicated throughout the company and is supported by our employees.	.765*** (.682***)	.079 (.132)	11.336 (8.278)	
- We have a comprehensive and structured quality planning process which regularly sets and reviews short and long-term goals.	.915*** (.604***)	.098 (.110)	11.336 (8.278)	
Process Management α = .672 (.681)				Flynn et al. (1995), Powell (1995), Samson andTerziovski (1999),Naor et al. (2008), Akgün et al. (2014)
- Our suppliers have an effective system for measuring the quality of the materials they send to us.	.652*** (.731***)	.089 (.119)	8.445 (9.438)	
- We have well established methods to measure the quality of our products and services.	.781*** (.707***)	.158 (.095)	8.445 (9.438)	
Use of Benchmarking α = .903 (.757)				Powell (1995), Dow et al. (1999), Samson andTerziovski (1999), Jung and Hong (2008)
- We have undertaken benchmarking in relative cost position.	.905*** (.815***)	.063 (.118)	15.438 (9.391)	
- We have undertaken benchmarking in operating processes.	.909*** (.747***)	.067 (.095)	15.438 (9.438)	
Information and Analysis α = .889 (.779)				Choi andEboch (1998),Samson and Terziovski (1999), Naor et al. (2008), Vanichchinchai andIgel (2011), Akgün et al. (2014)
- We regularly review our product quality and procedures.	.898*** (.806***)	.073 (.108)	13.949 (9.195)	
- We regularly review other firms' processes in bringing new products to market.	.892*** (.792***)	.070 (.110)	13.949 (9.195)	

Note: U.S. sample N = 152, China sample N = 222 (the figure in the parenthesis represents the estimate of the China sample); [a]Standard error; [b] Cronbach's alpha; *** $p < 0.001$.

Table 5 CFA test results of measures: firm performance

Items Description	Beta	S.E.[a]	*t*-value	Supporting Literature
Quality Outcome α^b= .665 (.628)				Samson andTerziovski (1999),Kaynak (2003), Jung and Hong (2008), Kaynakand Hartley (2008)
- Cost of Quality (error, scrap, rework, inspection) as a % of total sales	.665*** (.447**)	.260 (.174)	3.658 (2.612)	
- Defects as a % of production volume	.750*** (1.020**)	.287 (.842)	3.658 (2.612)	
Customer Satisfaction α = .927 (.928)				Juran (1992), Choi andEboch (1998),Rungtusanatham et al. (1998), Samson and Terziovski, (1999), Das et al. (2000), Rahman and Bullock (2005),Zu (2009), Sadikoglu and Zehir (2010)
- Customer satisfaction with regard to our products/services has increased over the past three years.	.902*** (.867***)	.062 (.102)	14.621 (9.008)	
- Your company's customer satisfaction level.	.958*** (1.000***)	.075 (.120)	14.621 (9.008)	
Business Performance α = .849 (.636)				Samson andTerziovski (1999), Jung and Hong (2008),Akgün et al. (2014), Cho and Jung (2014a)
- Growth In Sales	.872*** (.667***)	.108 (.184)	10.330 (5.241)	
- Growth In Market Share	.753*** (.506***)	.083 (.184)	9.721 (5.002)	
- Net Profit Margin	.804*** (.664***)	.087 (.198)	10.330 (5.241)	

Note: U.S. sample N = 152, China sample N = 222 (the figure in the parenthesis represents the estimate of the China sample); [a]Standard error; [b] Cronbach's alpha; ** p< 0.01; *** p< 0.001.

Table 6 Bivariate correlations and descriptive statistics.

Variables	1	2	3	4	5	6	7	8	9	10	11	12	Mean	SD
Behavioral QM														
1 Management Commitment													3.39 (3.15)	1.15 (.83)
2 Employee Involvement	.76** (.46**)												3.20 (3.08)	.98 (.82)

3 Customer Involvement	.63** (.40**)	.60** (.46**)											3.66 (3.47)	.96 (.82)
4 Supplier Involvement	.51** (.39**)	.54** (.36**)	.45** (.36**)										3.27 (3.43)	.92 (.82)
Technical QM														
5 Strategic Planning	.73** (.55**)	.70** (.50**)	.60** (.57**)	.50** (.42**)									3.58 (3.39)	1.05 (.79)
6 Process Management	.59** (.36**)	.62** (.35**)	.53** (.43**)	.71** (.62**)	.57** (.47**)								3.44 (3.45)	.86 (.75)
7 Use of Benchmarking	.52** (.38**)	.52** (.44**)	.63** (.46**)	.53** (.37**)	.56** (.51**)	.62** (.46**)							3.40 (3.40)	.91 (.77)
8 Information & Analysis	.51** (.27**)	.48** (.35**)	.52** (.30**)	.52** (.46**)	.60** (.32**)	.60** (.50**)	.67** (.36**)						3.30 (3.45)	.93 (.80)
Firm Performance														
9 Quality Outcome	.21** (.23**)	.16* (.20**)	.19* (.14*)	.06 (.11)	.17* (.11)	.12 (.12)	.21** (.07)	.07 (.16*)					3.80 (3.53)	.91 (.99)
1. Customer Satisfaction	.46** (.12)	.50** (.19**)	.49** (.23**)	.23** (.09)	.37** (.18**)	.35** (.13)	.25** (.15*)	.26** (.04)	.24** (.17*)				2.99 (2.43)	1.01 (.81)
1. Business Performance	.21** (.09)	.25** (.13)	.28** (.14*)	.06 (.08)	.23** (.19**)	.16* (.11)	.17* (.01)	.16* (.14*)	-.00 (.05)	.39** (.09)			2.64 (2.90)	.96 (.84)
Control Variables														
1. Firm Age[a]	-.06 (.12)	-.09 (.10)	.01 (.11)	-.03 (-.03)	.03 (.12)	-.06 (.15*)	.03 (.12)	.11 (.05)	-.03 (.17**)	-.12 (.11)	-.26** (.30**)		4.15 (3.61)	1.19 (1.40)
1. Firm Size[b]	-.16* (-.04)	-.15 (-.01)	-.05 (.12)	-.02 (-.02)	.00 (.07)	-.11 (.08)	-.05 (.10)	.00 (-.01)	-.19* (.05)	-.20* (.01)	-.11 (.14*)	.52** (.52**)	4.05 (4.22)	1.24 (1.15)

Note: Pearson correlations; U.S. sample N = 152, China sample N = 222 (the figure in the parenthesis represents the estimate of the China sample); [a] Length of time in business (e.g., 3 = 10~19 years, 4 = 20~29 years), [b]Number of employees (e.g., 3 = 100~199, 4 = 200~500); * $p< 0.05$, ** $p< 0.01$ (two-tailed).

5.2. Measurement model fit testing

Before testing our hypotheses, we assessed the goodness of fit of our measurement model by usingvarious fit indices such as the normedchi-square (X^2/d.f.), the comparative fit index (CFI), the root mean square error of approximation(RMSEA), RMSEA 90% confidence interval, and the Tucker-Lewis coefficient index (TLI). Table 7 gives the model fit statistics; all constructs pass the recommended thresholds, and the overall model also fits the data very well.

Table 7 Test results of goodness of fit of measurement model

Fit Index	**Threshold**	**Behavioral QM**	**Technical QM**	**Firm Performance**	**Overall Measure Model**[h]
Chi-square (X^2/d.f.)		16.32 (31.87)	33.37 (28.76)	8.76 (10.59)	305.95 (234.34)
Degree of Freedom (*d.f.*)		16 (16)	16 (16)	11 (11)	175 (175)
X^2/d.f.	<3.00[d]	1.02 (1.99)	2.08 (1.79)	.79 (.96)	1.74 (1.34)
CFI[a]	>0.90[e]	.99 (.97)	.97 (.98)	1.00 (1.00)	.94 (.96)
RMSEA[b]	<0.08[f]	.01 (.06)	.08 (.06)	.00 (.00)	.07 (.04)
RMSEA 90% CI		.00 ~ .07 (.03 ~ .10)	.04 ~ .12 (.02 ~ .09)	.00~.07 (.00 ~ .07)	.05 ~.08 (.02 ~ .05)
TLI[c]	Close to 1.00[g]	.99 (.92)	.96 (.94)	1.00 (1.00)	.91 (.95)

Note: U.S. sample N = 152, China sample N = 222 (the figure in the parenthesis represents the estimate of the China sample), CI = Confidence interval.
[a]Comparative fit index
[b]Root mean square error of approximation
[c]Tucker-Lewis coefficient index
[d]Segars and Grover (1998), Hair *et al.* (2010)
[e] Byrne (1998)
[f]Bollen and Long (1993)
[g]Bentler and Bonett (1980)
[h]All factors are included.

5.3.Multi-group invariance analysis

We performed invariance tests for manufacturing and service sample in order to validate the equivalency across the two groups. First, configural invariance is tested to examine whether the factor loadings estimated for each group show similar pattern (Leuschner et al., 2012; Yan and Nair, 2015). The unconstrained two-group CFA demonstrates good model fit both for the

China sample (Normed Chi-square = 1.233, p = .002, CFI = .955, RMSEA = .033, RMSEA CI = .021 ~ .043, TLI = .928) and the U.S. sample (Normed Chi-square = 1.588, p< .001, CFI = .915, RMSEA = .063, RMSEA CI = .053 ~ .072, TLI = .865). Besides, all factor loadings estimated for the two groups are highly significant (p< .001) and above the recommended threshold of .50 (Hair et al., 2010). Hence, the configural invariance exists across the two groups. Second, we tested for metric invariance to evaluate whether the measures are equivalently reliable between manufacturing and service respondents (Koufteros and Marcoulides, 2006; Yan and Nair, 2015). Table 8 shows the results of the metric invariance tests. There are no significant changes in the model fit statistics such as X^2, RMSEA, and TLI for the fully constrained two-group CFA models. Therefore, it is concluded that our respondents in manufacturing and service industry interpreted and responded to the survey questionnaire in a very similar manner (Koufteros and Marcoulides, 2006; Leuschner et al., 2012).

Table 8 Metric invariance testing

	$X^2/d.f.$	ΔX^2	RMSEA	ΔRMSEA	TLI	ΔTLI	Metric Invariance
U.S.[a]	1.578	32.9^{ns}	.062	-.001	.868	.003	Yes
China[b]	1.248	34.0^{ns}	.034	.001	.924	-.004	Yes

Note: [a] Manufacturing N = 66, service N = 86; [b] Manufacturing N = 115, service N = 103 (not including missing responses); *ns* = not significant (p> .05); RMSEA = Root mean square error of approximation; TLI = Tucker-Lewis coefficient index.

5.4. Common method variance testing

The data for both predictor and criterion variables came from a single respondent which can potentially lead to problems with common method variance. Common method variance is the "variance that is attributable to the measurement method rather than to the constructs the measures represent" (Podsakoff et al, 2003, p. 879). Thus, as ex-ante remedies for controlling

CMV, we allowed respondents answer questions anonymously (Podsakoff et al, 2003) and we also collected the data from upper level informants (Kaynak, 1997; Miller and Roth, 1994). After collecting the data, we evaluated the existence of CMV through the single-method-factor approach, which controls for the effects of a single unmeasured latent method factor (Podsakoff et al., 2003). Hence, we examined the significance of the structural parameters both with and without the common latent factor (CLF) in the model (Podsakoff et al., 2003; Carlson and Kacmar, 2000). For the U.S. sample, the test results show that there is no significant difference in the parameters between the CFA models without the CLF (Chi-square = 305.954; *d.f.* = 175; $p<.001$; Normed Chi-square = 1.748; CFI = .943; RMSEA = .070; TLI = .911) and with the CLF (Chi-square = 301.538; *d.f.* = 174; $p<.001$; Normed Chi-square = 1.733; CFI = .945; RMSEA = .070; TLI = .913), which indicates that the CMV threat is not a major problem in this study (see Fig. B.1. and B.2.inAppendix B for more details). For the China sample, when adding the CLF to the CFA model, some changes in parameters occurred between the CFA model without CLF (Chi-square = 234.348; *d.f.* = 175; $p = .002$; Normed Chi-square = 1.339; CFI = .966; RMSEA = .039; TLI = .947) and with CLF (Chi-square = 216.131; *d.f.* = 174; $p = .016$; Normed Chi-square = 1.242; CFI = .976; RMSEA = .033; TLI = .962), implying that the possibility of CMV cannot be completely eliminated from the China sample. Nevertheless, the changes are minimal and not significant so the CMV is not a critical problem in this study (see Fig. B.3. and B.4.in Appendix B for more details).

6. Results

6.1. Hypothesized SEM analysis

We employ structural equation modeling (SEM) analysis to testthe hypotheses. Table 9 summarises the test results from the SEM analyses using the IBM AMOS software. Table 9 suggests a direct effect of each factor (H1a – H1c) for both the U.S. and China samples. However, in H1, the examination of the mediation effect of behavioural QM on the relationship between technical QM and firm performance is only strongly supported for the U.S. sample. Specifically, for the U.S. sample (N =152), the test result of H1a in Table 9 indicates that technical QM practiceshave a significantly positive influence on firm performance (ß = .43, t = 7.24, $p < .001$); nevertheless, the test result of H1 explicitly demonstrates that the direct positive influence of technical QM on firm performance issignificantly weakened (ß = -.94, t = -1.86, $p = .06$) when inserting the behavioural QM factor between technical QM and firm performance eventhough both the direct effect of behavioral QM on firm performance (ß = 1.48, t = 2.90, $p = .004$) and the direct effect of technical QM on behavioral QM (ß = .94, t = 8.27, $p < .001$) are still significantly positive, as illustrated in Fig. 2.This implies that a firm's behavioral QM practices have a full mediating influence on the relationship between technical QM practices and firm performance. Therefore, using Baron and Kenny's (1986) mediation test methodology, H1 is completely supported for the U.S.-based firms. On the other hand, for the same test in the China sample (N = 222), we could not find any mediation influence of behavioral QM on the relationship between technical QM and performance because both the effect of behavioral QM on performance (ß = -.48, t = -.75, $p = .45$) and the effect of technical QM on performance (ß = .73, t = 1.15, $p = .25$) are simultaneouly weakened when inserting the behavioral QM factor between technical QM and performance, as shown in Fig.3. Further,R^2 for the performance variables in China sample ranges only between .03 and .09, implying that more than 91 % of the variation in firm performance cannot be appropriately explained by the exogenous variables such as technical QM and behavioral QM.Thus, H1 is not supported for the China sample.

Table 9 Test results of SEM analyses on various interplayrelationships between technical QM, behavioral QM, and firm performance.

Test	**Purpose**	**Results of U.S. Sample(N = 152)**	R^2	**Results of China Sample(N = 222)**	R^2
1	To examine the direct effect of T on P: *H1a*	T → P: .43***	.18	T → P: .23**	.05
2	To examine the direct effect of T on B: *H1b*	T → B: .94***	.88	T → B: 1.05***	1.10
3	To examine the direct effect of B on P: *H1c*	B → P: .59***	.35	B → P: .29***	.09
4	To examine the mediating effect of B on the relationship between T and P: *H1*	T → B: .92***; B → P: .56***	B: .85 P: .31	T → B: 1.04***; B → P: .25**	B: 1.09 P: .06
		T → B: .94***; B → P: 1.48**; T → P: -.94†	B: .88 P: .46	T → B: 1.05***; B → P: -.48; T → P: .73	B: 1.10 P: .03

Note: Standardized regression coefficients, † $p< 0.1$, * $p< 0.05$, ** $p< 0.01$, *** $p< 0.001$.
B = behavioral QM; T = technical QM; P = firm performance.

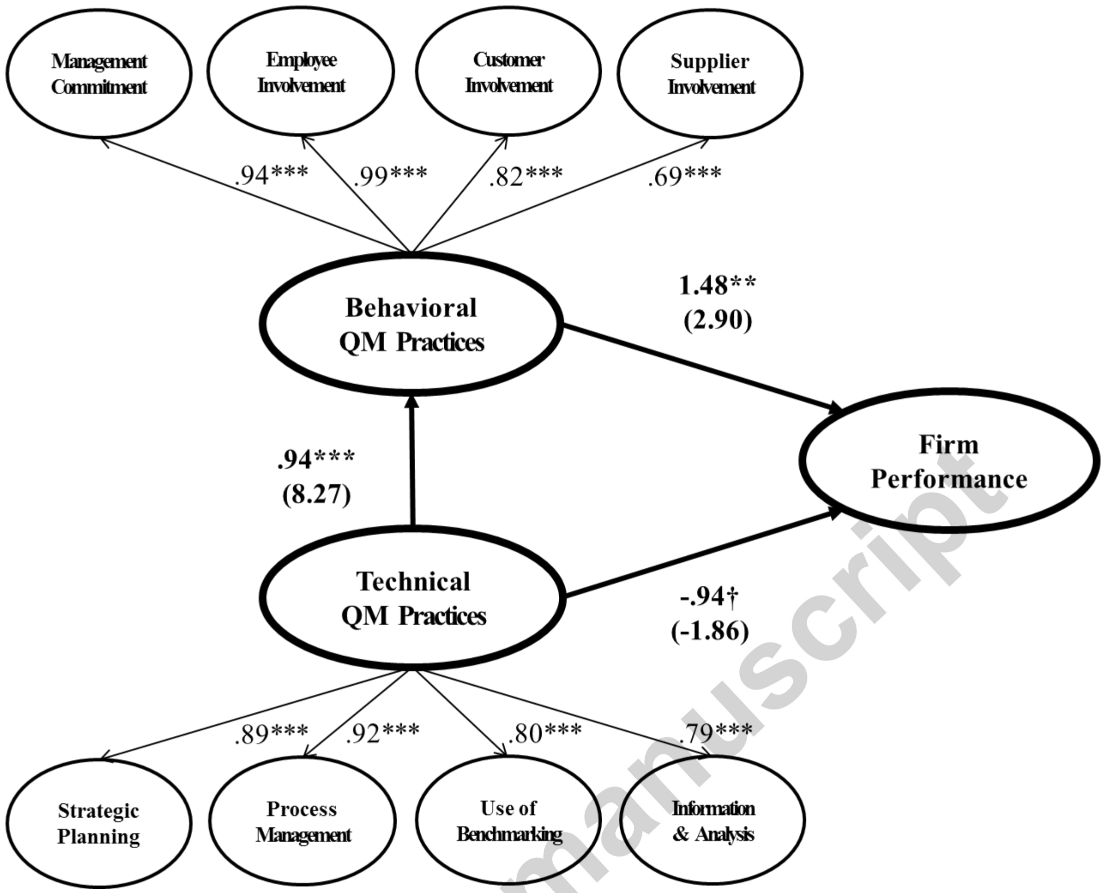


Fig. 2. Mediating effect of behavioral QM on relationship between technical QM and firm performance (U.S. sample, N = 152). † $p< 0.1$; ** $p< 0.01$; *** $p< 0.001$; ( ) *t*-statistics; Chi-square = 608.917; *d.f.* = 219; Normed Chi-square = 2.780; CFI = .832; TLI = .788

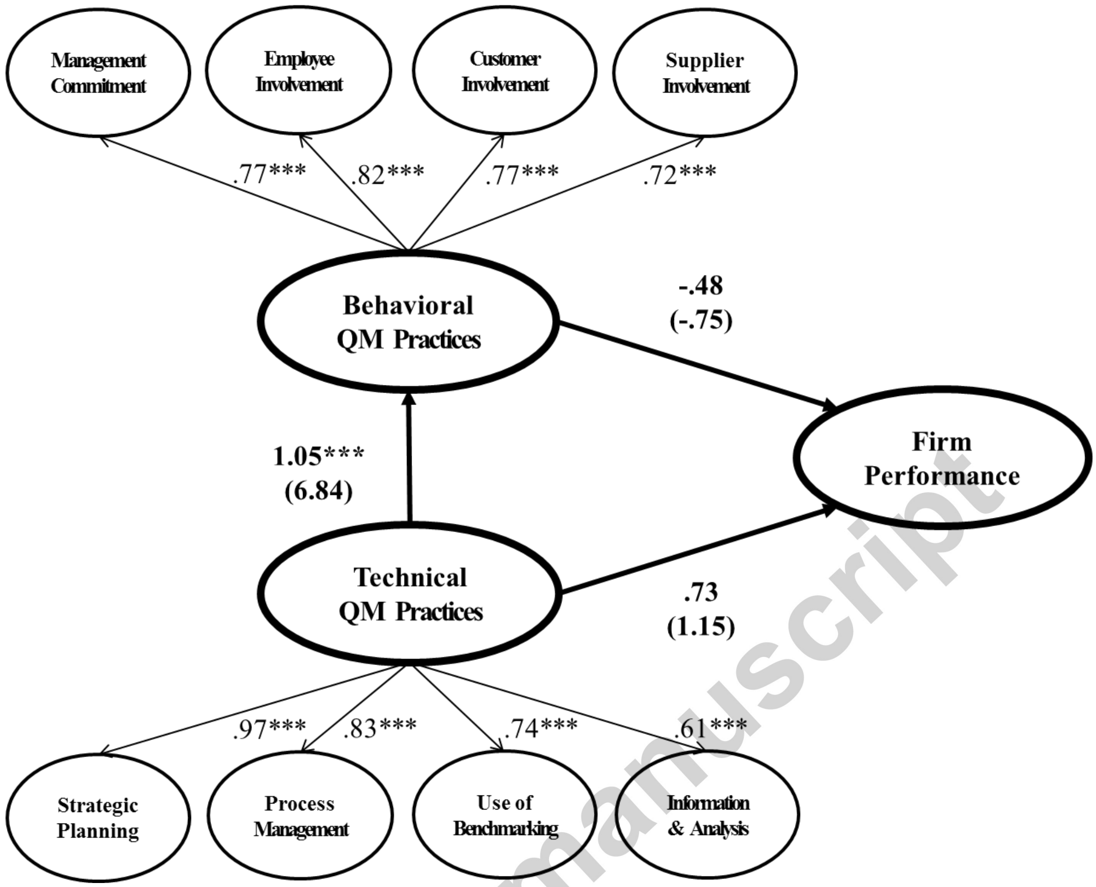


Fig. 3. Mediating effect of behavioral QM on relationship between technical QM and firm performance (China sample, N = 222). *** $p< 0.001$; ( ) t-statistics; Chi-square = 459.654; *d.f.* = 219; Normed Chi-square = 2.099; CFI = .862; TLI = .827

6.2. Post hoc analysis

For the China sample, the SEM test results show no mediation effect of behavioral QM between technical QM and firm performance. However, Table 9 shows significant correlations exist among exogenous and endogenous variables. Hence, we tested whether the indirect effect of behaviroal QM practices on firm performance through techinal QM practices is significant. We performed the Sobel (1982) tests by the folloing equations, where a is the unstandardized regression coefficient between behavioral QM and technical QM; b is the unstandardized coefficient between technial QM and firm performance; SE_a is the standard error of a; SE_b is the standard error of b:

$$z\text{-value} = a*b/SQRT(b^2*SE_a^2 + a^2*SE_b^2)$$

The Sobel test results show the z-value is 4.600 (S.E. = 0.263, $p < 0.001$), implying that the techinal QM practices significantly carries the influence of the behavioral QM practices to the firm performance for the sample of China-based firms.

7. Implication

Our study results reveal several meaningful implications and contributions to both theory and practices. First, the findings of this study contribute to the literature on the resource-based view of the firm (Wernerfelt, 1984; Barney, 1991), while integrating with the literature on quality management. The results for the U.S. sample shows that behavioral QM has a full mediation effect on technical QM and firm performance, implying that behavioral QM is a more critical strategic resource for generating a firm's SCA than is technical QM. Hayes et al. (2005) argue that although it seems that the QM program contributes to improving a firm's operating performance, most of the improvement comes from soft QM components such as commitment of top management, customer involvement, and employee involvement. In the same vein, our study results support the idea that behavioral QM practices have a significantly greater positive influence on firm performance than do technical QM practices (Powell, 1995; Dow et al., 1999; Samson and Terziovski, 1999; Naor et al., 2008; Jung and Hong, 2008; Abdullah et al., 2008). In addition, the behavioral QM aspects of a firm such as skilled leadership, human resource management, and relationships with its customers and suppliers are typically non-substitutable knowledge-based resources that its competitors cannot easily imitate (Barney, 1991; Lado et al., 1992; Powell, 1993; Barringer and Harrison, 2000; Barney and Hesterly, 2006). Therefore, considering the results and the extant literature, we concluded that behavioral QM practices should be viewed as more strategic resource for a firm's SCA than technical QM practices.

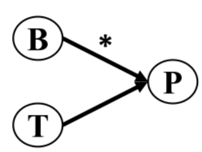
Second, our study results contribute to the QM literature by not only synthesizing the fragmented literature on the QM practices and their effects on firm performance, but also by answering the question which had been remained unsolved for a long time. The synthesized literature review of this study points out two paradoxical research findings: (i) one research stream has maintained that only behavioral-related QM practices only have a significant positive influence on the competitive adavantages of firms (i.e., 'BQ→P' relationship) (Powell, 1995; Samson and Terziovski, 1999; Naor et al., 2008; Jung and Hong, 2008); (ii) the other research stream has uphold that behavioral QM practices are necessary to support and enhance the direct effects of techanical practices on performance (i.e., 'BQ→TQ→P' relationship) (Flynn et al., 1995; Anderson et al., 1995; Sousa and Voss, 2002; Rahman and Bullock, 2005; Zu, 2009). Therefore, our study empirically verified these two contradicting research findings by clarifyinghow behaviroal QM and technical QM frameworks interplay each other to get the performance benefits. Our study gives some mixed results. For the U.S. sample, the study result shows that technial QM practices has the indirect effects on firm performance through behavioral QM practices; whereas, for the China sample, behavioral QM practices has the indirect effects on firm performance through techingal QM practices. In revisiting the RBV, our findings suggest that for the U.S.-based firms, behavioral QM practices act as strategic resources for generating competitive advantages; on the other hand, for the China-based firm, technical QM practices work as strategic resources. From a practical perspective, these study findings have implications on how effectively managers implement their QM practices to get the performance benefits. The study results suggest that the U.S.-based mangers should pay more attention tothe HR practices (e.g., employee training, employee empowerment, sharing vision through organization,and effective communication process) as well as the cooperative relationship with suppliers and customer for achieving sustainable competitive advantages, while the China-based mangers should invest more intheir technial-related quality practices such as information system, benchimarking techquies, and statistical control tools for generating the performance benefits.

Third, the results of our study raise a more fundamental question about the existing conceptualization of QM practices.For instance, in the extant literature, behavioral QM practices are known as ‘infrastructure’ practices, which constitute the fundamental environment that supports the effective implementation of technical QM practices, while technical QM practices are known as ‘core’ practices, which are more directly related to the improvement of organizational performance (Flynn et al., 1995; Samson and Terziovski, 1999; Rahman and Bullock, 2005; Zu, 2009). However, our study results explicitly indicate that behavioral QM practices are critically associated with successful firm performance, while technical QM practices, as the foundation facilities, are mainly related to behavioral QM practices. Based on these arguments, we suggest that it is probably more appropriate to refer to behavioral QM practices as ‘core’ practices and technical QM practices as ‘infrastructure’ practices. Figuratively speaking, a horse-drawn coach (i.e., technical QM practices) would not achieve its main purpose, tranportation (i.e., firm performance), without a coachman (i.e., behavioral QM practices), suggesting that the successful transportation of the coach is more critically dependent upon the driving capabilities of the coachman (i.e.,behaviroal QM practices), rather than on the structural excellence of the coach (i.e.,technical QM practices).

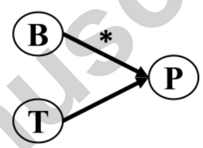
Last but not least,our study results also make contributions to the process improvement research by providing a concrete future research direction. Through the mediation analysis of H1 testing, we could support that the 'TQ→BQ→P' relationship is statistically a more reliable than the 'BQ→TQ→P' relationships, at least in the context of U.S.-based firms’ QM implementation. However, the post hoc study results demonstrate that 'BQ→TQ→P' framework is a more reliable than the 'TQ→BQ→P' for the China-based firms. Thesecontracting results between the U.S. and China can be understood the view that competitive priorities evolve over time with changing business conditions (Krajewisk et al., 2010). For example, it is rationalized that for the U.S.-based firms, behavioral QM practices have evolved as a firm's 'order winner' because the QM programs in the U.S.-based firms reached maturity, while technical QM practicesact as the 'order qualifier' which is the minimum requirement that a firm must satisfy for its survival in the market. On the other hand, it is induced that for the China-based firms, technical QM practices still act as the 'order winner' because technical QM programs such as statistical quality control and information system have not yet universalized in China, continuously producing a competitive edge. However, our study could not suggest any statistical evidences since we did not control for the program maturity of each firm. This is necessary to empirically investigate whether the structural movement of 'BQ→TQ→P' ➔ 'TQ→BQ→P' historically happened as QM practices reach maturity stage. Therefore, it is strongly recommended that future research should involve conducting 'generalizability replication' by using a similar design (e.g. 'BQ→TQ→P' frame) but different data (e.g. more recent data), or 'validity replication' using a different design (e.g. 'TQ→BQ→P' frame) but similar data (e.g. used data) for the previously conducted QM studies (Tsang and Kwan, 1999; Eden, 2002; Frohlichand Robb Dixon, 2006). We also recommend that future research explore how the interplay between behavioral and technical QM practices in determining firm performance changes according to the program maturity of a firm's OM practices; it might be feasible through a longitudinal research design.

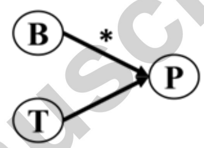
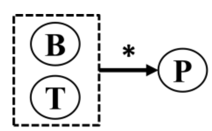
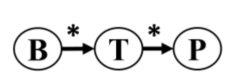
In conclusion, our study results show that behavioral QM practices act as a strategic resource which helps generate a competitive advantage. This finding helps contribute to understanding how quality management practices lead to a performance advantage and why managers should pay more attention to the human-oriented quality management practices for achieving sustainable competitive advantages.

Appendix A.Majorstudies on behavioural versus technical quality managementpractices.

Study	Objective	Type & Sample	Simplified Model & Results	Key Findings
Flynn et al.(1995)	To investigate the relationship between quality management (QM) practices and quality performance.	Empirical / 706 managers of 42 manufacturing plants located in the U.S.		Infrastructure QM practices (e.g., top management support, customer relationship, supplier relationship, work force management, and work attitudes) affect core QM practices (e.g., product design process, process flow management, and statistical control and feedback). The core QM practices have a direct influence on quality performance.
Powell (1995)	To examine QM as a potential source of sustainable competitive advantage.	Empirical / 54 US-based firms, employing 50 or more workers.		Intangible QM practices such as employee empowerment, executive commitment, and open culture significantly contribute to firm's competitive advantage, while tangible QM techniques such as process improvement, benchmarking, quality training do not generally relate to competitive

				advantage.
Dow et al. (1999)	To identify the core dimensions of quality management practices and investigate how these practices contribute to superior quality outcomes.	Empirical / 698 manufacturing plants located in Australia and New Zealand.	B —*→ P	Only three of the nine quality practice constructs such as employee commitment, shared vision, and customer focus have a significant positive association with superior quality performance.
Rahman and Bullock (2005)	To investigate the relationships among soft QM, hard QM, and organizational performance.	Empirical / 261 manufacturing firms located in Australia.	B —*→ T —*→ P	The study results indicate that there are significant positive associations between soft QM and hard QM and between hard QM and organizational performance. The study denotes that soft QM has an indirect influence on performance by strengthening the effect of hard QM.
Jun et al. (2006)	To identify critical elements of QM practices that would contribute to the enhancement of employee satisfaction and loyalty.	Empirical / 407 employees of two Maquiladora-based firms in Mexico.	B —*→ P	HR-focused QM practices such as teamwork, employee compensation, and employee empowerment have a significantly positive effect on employee satisfaction. In turn, the reinforced

				employee satisfaction contributes to a higher level of employee loyalty.
Naor et al. (2008)	To investigate the relationship among organizational culture, infrastructure and core quality practices, and manufacturing performance.	Empirical / 189 manufacturing plants located in six countries including the U.S., Japan, Sweden, Finland, Germany, and South Korea.		Organizational culture more significantly impacts on infrastructure quality management practices than on core quality management practices, regardless of where the manufacturing plant is located in six countries. Besides, infrastructure quality practices have a positive and significant effect on manufacturing performance while core quality practices have no significant effect on it both in the Eastern and the Western countries.
Abdullah et al. (2008)	To examine the impact of soft factors of QM practices on quality improvement and organizational performance.	Empirical / 255 managers of electronics firms located in Malaysia.		Soft QM factors such as management commitment, employee involvement, customer focus, reward, and training are significantly associated with quality improvement. Some soft factors such as management

				commitment, employee involvement, and customer focus are also significantly associated with organizational performance.
Jung and Hong (2008)	To investigate the relationships among the organizational citizenship behavioral (OCB), soft QM, hard QM, and firm performance.	Empirical / 230 Maquiladora firms located at the border between Texas in the U.S. and Mexico.		Soft QM factor which consists of leadership, people management, and customer focus shows a strong positive effect on firm performance, while hard QM factor which contains planning, process management, and information analysis does not represent any significant impact on firm performance.
Gadenneand Sharma (2009)	To explore key soft and hard QM factors in Australian firms and their effect on performance.	Empirical / 119 CEOs and senior managers of Australian small and medium-sized firms.		The study indicates that a higher achievement in firm performance is likely to be influenced by a combination of both soft and hard QM factors.
Zu (2009)	To examine the different influences of infrastructure and core QM practices on quality performance.	Empirical / 226 manufacturing plants located in U.S.		The study shows that infrastructure QM has a significant positive influence on core QM, and that core QM practices significantly affect quality

				performance. Based on the results, the study suggests that infrastructure QM practices indirectly contribute to quality performance by improving the effectiveness of core QM practices.
Dubey andGunasekaran (2015)	To examine the impacts of soft QM practices on firm performance.	Empirical / 132 cement manufacturing firms in India		The study identifies that soft dimensions of QM such as human resource, quality culture, motivational leadership, and relationship with partners, are significant positive determinants of firm performance.

* = significant positive effect; B = behavioral-oriented quality practices; T = technical-oriented quality practices; P = performance-related variables.

Appendix B. Common method variance testing based on a single-method-factor approach

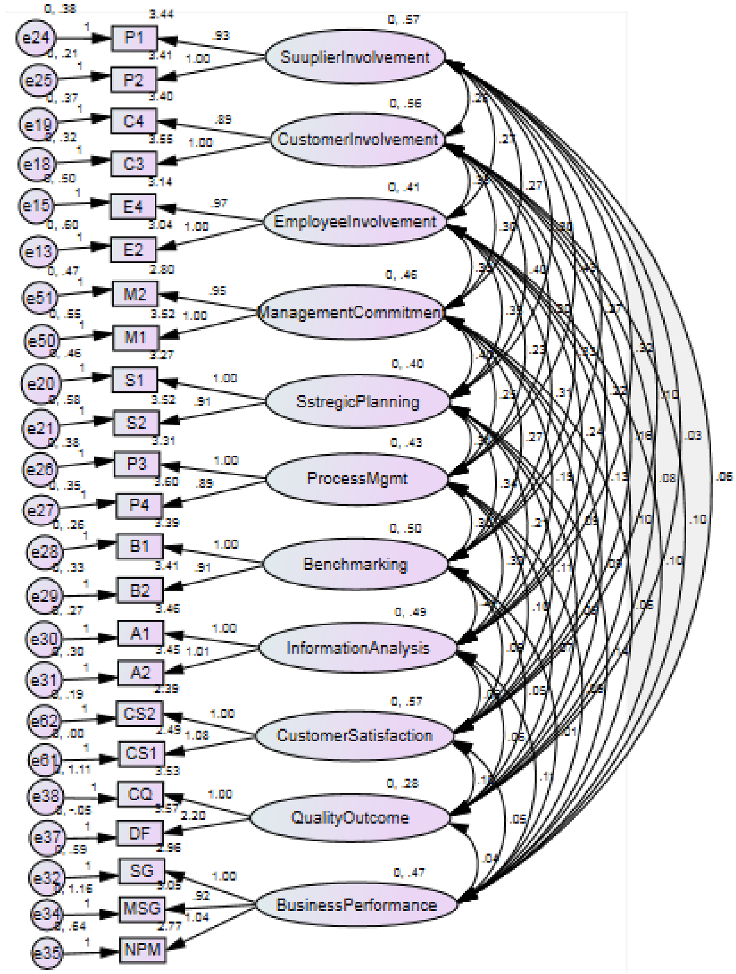


Fig. B.1. CFA without the common latent factor (U.S. sample, N =152) Chi-square = 305.954; *d.f.* = 175; $p<.001$; Normed Chi-square = 1.748; CFI = .943; RMSEA = .070; TLI = .911

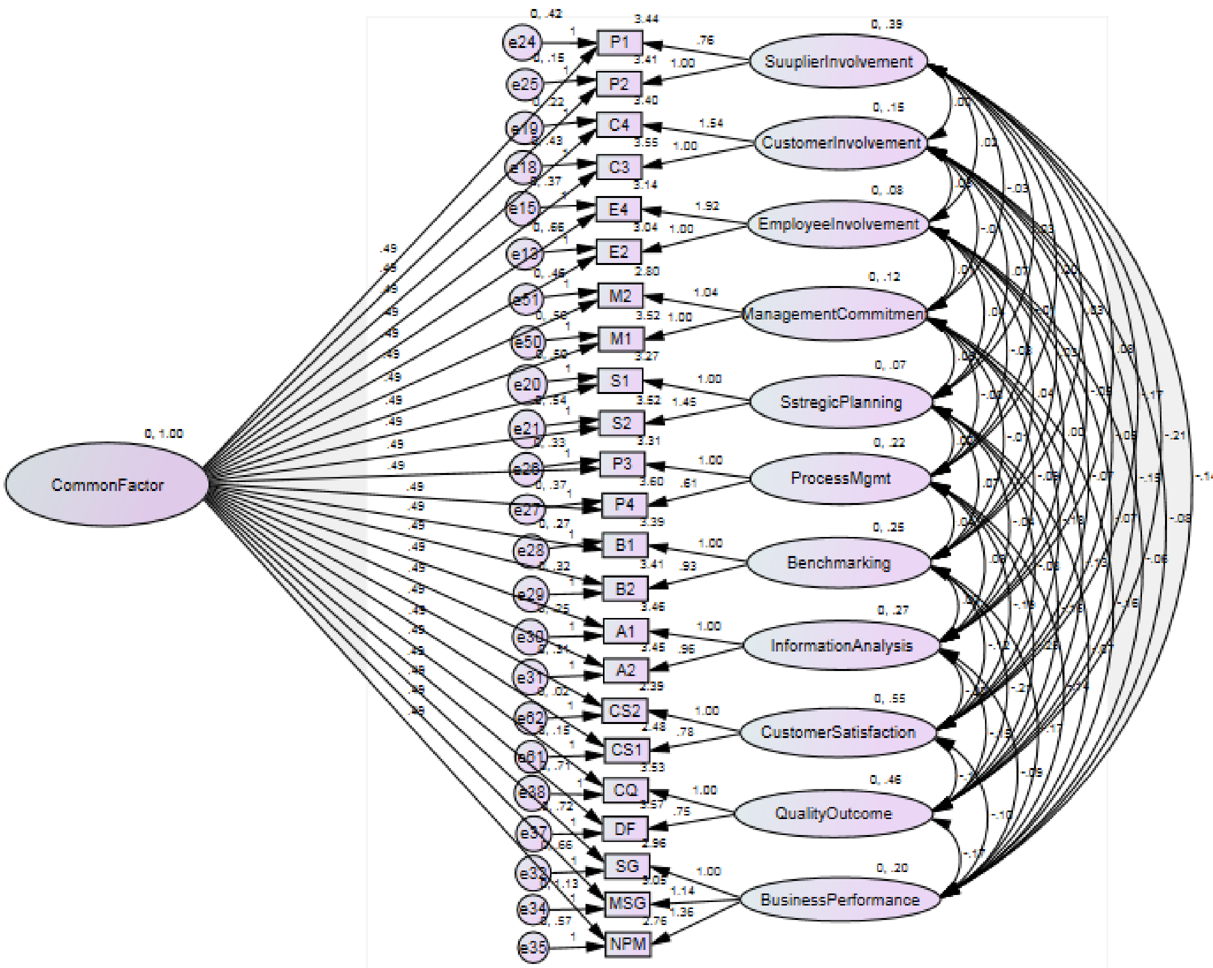


Fig. B.2. CFA with the common latent factor (US sample, N = 152) Chi-square = 301.538; *d.f.* = 174; $p<.001$; Normed Chi-square = 1.733; CFI = .945; RMSEA = .070; TLI = .913

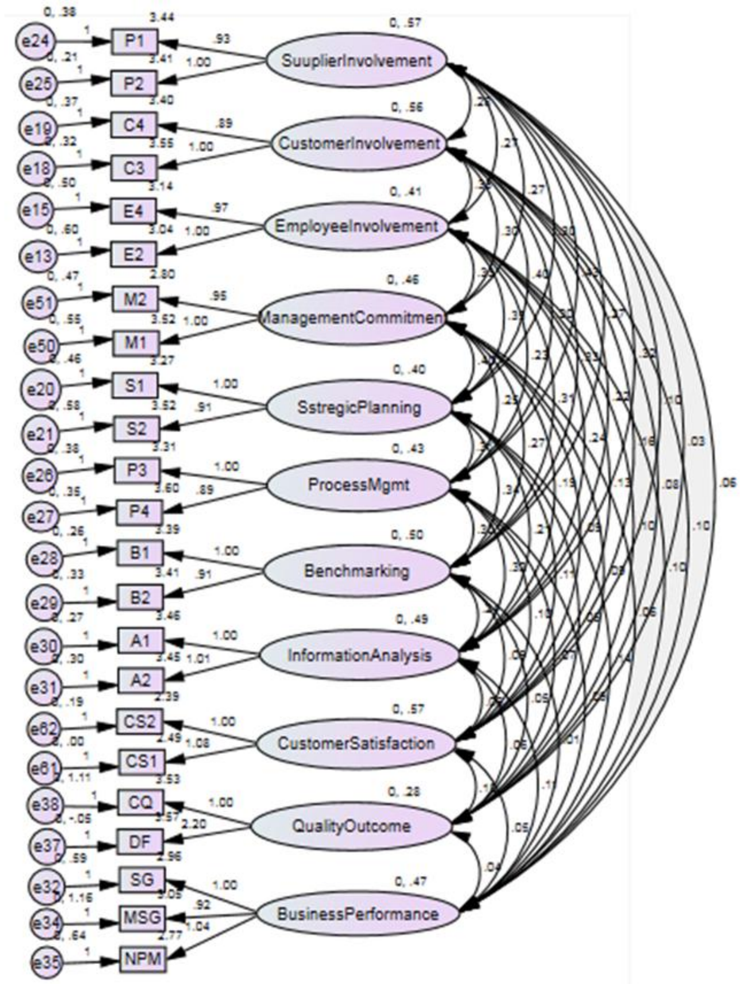


Figure B.3. CFA without the common latent factor (China sample, N = 222) Chi-square = 234.348; *d.f.* = 175; *p* = .002; Normed Chi-square = 1.339; CFI = .966; RMSEA = .039; TLI = .947

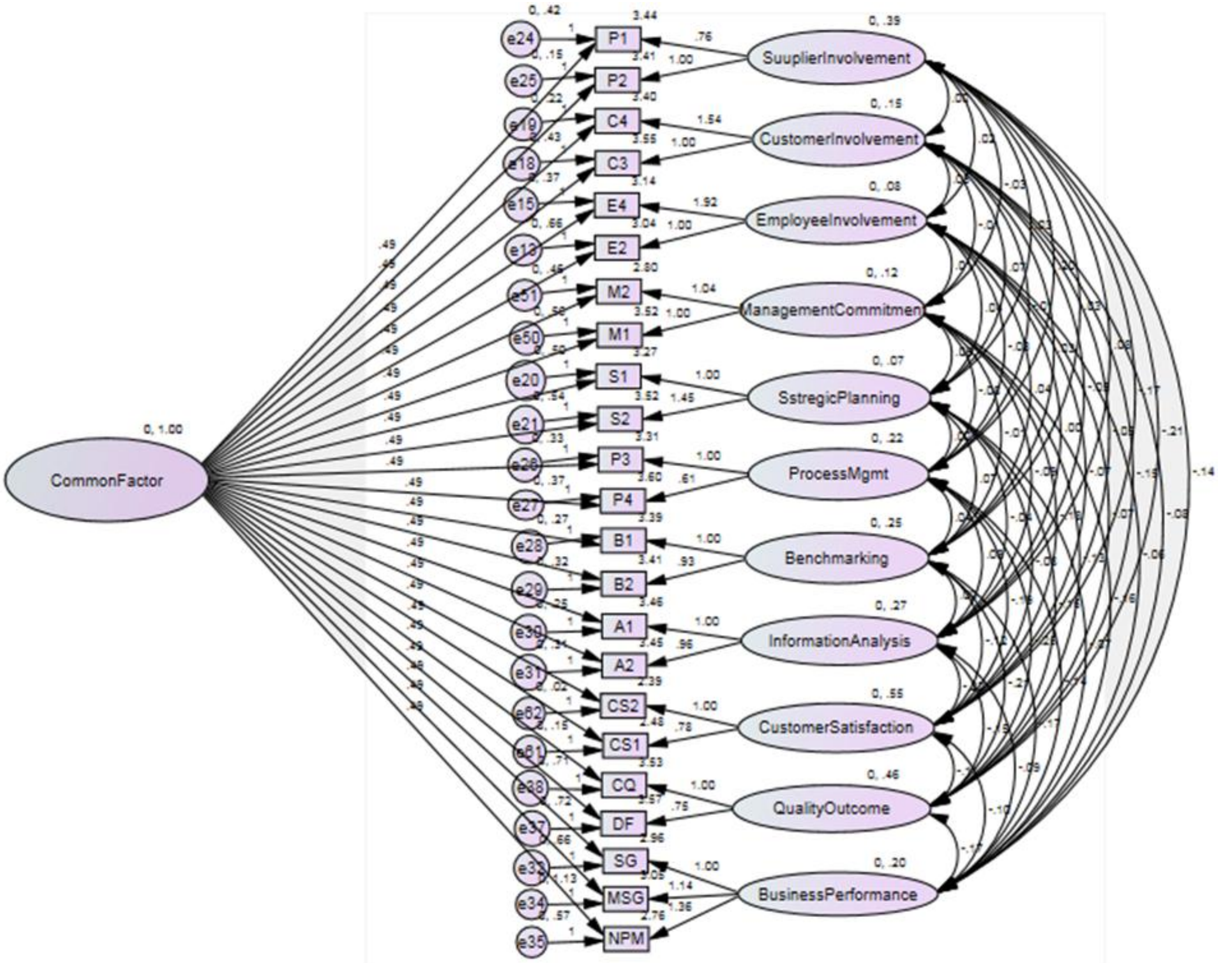


Figure B.4. CFA with the common latent factor (China sample, N = 222) Chi-square = 216.131; *d.f.* = 174; *p* = .016; Normed Chi-square = 1.242; CFI = .976; RMSEA = .033; TLI = .962

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