Impact of Quality Management on Hospital Performance: An Empirical Examination

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Understanding the impact of quality management approaches on organization performance is essential in the healthcare arena. Prior research, however, is inconsistent in regard to the link between various quality management practices and firm performance. That is, some researchers find a strong link between quality management and firm performance, while others do not. The authors believe the use of causal models and an expansive view of quality management may help to bridge these opposing viewpoints or perspectives. To that end, the current research "decomposes" the construct of quality management into two subdimensions of quality practices and quality context, providing a richer conceptualization and understanding of the overall construct. Additionally, they employ structural equation modeling to evaluate the causal sequence showing that both quality practices and quality context are distinct model components concurrently operating through the endogenous construct of quality management to positively impact hospital performance. The implications for hospital managers and executives are clear: in order to improve hospital performance, the scope of the organization's quality activities need to be very broad and encompassing. Last, the authors assess the potential moderating effects of environmental uncertainty and hospital size on the quality management-performance relationship.

Key words: environmental uncertainty, financial performance, hospital industry, healthcare industry, quality context, quality practices

INTRODUCTION

Evaluating and understanding the impact of quality management on firm and organization performance continues to be an ongoing concern for managers, since quality procedures have been shown to reduce product costs (Foster 2007) and positively impact firm performance (Curkovic, Vickery, and Droge 2000; Kumar et al. 2009; Kaynak 2003; Lakhal, Pasin, and Limam 2006; Powell 1995). Raju and Lonial (2001, 141) summarize the typical perspective in this area: "The positive link between product/service quality and organizational performance has been recognized in the literature for several decades."

Research on the link between quality management practices and organization performance, however, often finds contradictory outcomes. That is, quality procedures may not consistently result in a positive or favorable organizational outcome (Foster 2007; Kaynak 2003; Montes, Jover, and Fernandez 2003; Zu 2009). Jabnoun, Khalifah, and Yusuf (2003, 17) conclude that "although quality management practices have been implemented by many organizations all over the world, such implementations have often failed." Taking a more extreme view, Naor et al. (2008, 672) recognize the need for further testing, observing that "recent studies argue that it is important to retest the relationship between quality and performance because past studies have obtained mixed results."

Therefore, additional research is necessary to help researchers and practitioners reconcile these two

seemingly contradictory perspectives related to the impact of quality management on organization performance. The authors believe that accounting for the internal and external quality environment in which the organization operates, along with the use of causal models, may help to bridge these opposing perspectives. To that end, the current study provides three primary contributions relative to prior research. First, and most importantly, the authors' research approach decomposes or separates the construct of overall quality management into the two subdimensions of quality practices and quality context (which are formally defined shortly), providing a richer conceptualization and understanding of the overall construct. These two distinct constructs (that is, quality context and quality practices) are expected to jointly contribute a greater explanatory impact on quality management than either construct by itself. Further, including both subdimensions may prove insightful because the quality context or quality environment confronting the hospital is an important—but often overlooked—component of quality management. Second, this research proposes a causal model by which quality context and quality practices impact hospital performance via the endogenous construct of quality management, and also examines the strength of this relationship. Last, the authors investigate the potential usefulness of environmental uncertainty and hospital size as moderators in the focal relationship between quality management and firm performance. As will be discussed shortly, these moderators were chosen to represent both internal factors (that is, firm characteristics) and external factors (that is, environmental uncertainty) that are thought to impact organization performance.

The authors use a healthcare setting for their research given the sector's overall importance to the economy (Burns et al. 2008) and the growing importance of quality management practices in the healthcare field (Van Matre and Koch 2009). Further, the healthcare sector, and hospitals in particular, face a broad range of competitive and regulatory environments, providing an excellent setting for examining the potential moderating impact of environmental uncertainty and hospital size (Lonial and Raju 2001). The authors employ structural equation modeling (SEM) to evaluate the causal sequence by which quality practices and quality context positively impact hospital performance, via the intervening endogenous construct of quality management. They find that quality management positively impacts hospital performance, and for hospital executives this implies that quality management encompasses a broad range of quality phenomena, including specific quality practices as well as the environment or context under which these practices take place. Focusing on narrow ad-hoc quality practices or policies to improve performance might be ineffective and myopic.

QUALITY MANAGEMENT AND FIRM PERFORMANCE

Components of Quality Management

As previously noted, the extant literature shows that findings with respect to the impact of quality efforts (that is, TQM, Six Sigma, and so on) on firm performance have often been inconsistent (Kaynak 2003; Zu 2009). Researchers have postulated various reasons for this perplexing outcome, with several researchers suggesting the need to develop more comprehensive models to explain the process by which quality management links to organization performance (Montes, Jover, and Fernandez 2003; Naor et al. 2008; Pinho 2008). Additionally, Kaynak (2003) postulates that the mixed results, with respect to the impact of quality management on organization performance, could be partially alleviated by conceptualizing quality management as a multidimensional construct. In summary, the authors concur with the prior research, which indicates that ongoing quality management oriented research needs to evaluate conceptual models that describe the causal process in more detail than many current approaches.

Typically, prior research has focused on the specific quality actions or practices of organizations as

independent variables and their influence on various measures of company performance (Curkovic, Vickery, and Droge 2000; Kumar et al. 2009; Pinho 2009). Researchers, however, have suggested that this link between quality practices and firm performance can be better evaluated by more meaningfully placing these quality-oriented activities in the actual firm environment or context (Sousa and Voss 2002). In particular, Benson, Saraph, and Schroeder (1991, 1122) state that "managers' perceptions of ideal and actual product quality management are influenced by the business unit's quality context, that is, by such factors as the degree of top management support for quality..." Thus, the authors construct for quality management encompasses aspects reflecting both quality practices and the quality context under which these practices take place. That is, quality context and quality practices are anticipated to exert a synergistic effect in terms of overall quality management. As such, both of these constructs are used as distinct or unique indicators of quality management, which is depicted as an endogenous variable in the model. Reflecting its wide scope, the authors define quality management as a combination of the quality practices implemented by an organization as well as the environment or context under which these activities take place.

Within quality management, the authors define the quality context as the environment or corporate culture toward quality efforts within an organization. Thus, the quality context represents the specific conditions under which a hospital operates that affect its quality orientation. Following the approach of Raju and Lonial (2001), these conditions include internal factors reflecting the manager's knowledge and the role of the quality department, as well as external elements such as the marketplace environment in which the firm operates. The quality practices of an organization (which take place within a quality culture or context) are defined as the actions and procedures undertaken by a company or organization to ensure the delivery of a high-quality service or product. These specific actions or procedures include quality training, product and service development, supplier quality management, quality data and reporting, and employee relations. Given the inconsistent findings attempting to link quality management to firm performance in the past (Kaynak 2003), the authors believe that deconstructing quality management into the separate constructs of quality practices and quality context, and examining the causal sequence connecting these constructs, will prove beneficial. This leads to the first two hypotheses.

- H1: Quality context is a positive and significant indicator of quality management.
- H2: Quality practices are a positive and significant indicator of quality management.

Last, it needs to be highlighted that the definitions and terminology in the extant quality management literature exhibit some variation. The authors will therefore make every attempt to clearly define their constructs in the appropriate sections.

Impact of Quality Management on Firm Performance

Many studies in the quality area have used different conceptualizations and measures for firm performance (Dow, Samson, and Ford 1999; Hendricks and Singhal 2001; Lakhal, Pasin, and Limam 2006; Kumar et al. 2009; Powell 1995). Hence, selecting an appropriate definition for this concept is a difficult undertaking. Methods for measuring performance in prior literature include, for example, quality outcomes (Dow, Samson, and Ford 1999) and competitive advantage (Flynn, Schroeder, and Sakakibara 1995). The authors believe that a multidimensional representation of firm performance best captures the meaning of this factor (similar to the need to use a multidimensional construct for quality management). Consistent with Raju and Lonial (2001), the authors use a representation of organization or firm performance that encompasses three subdimensions: financial performance, market/service development, and quality outcomes. Kaynak (2003) echoes the need for a multidimensional approach to measure organization performance and deconstructs performance into three constructs—financial

performance, quality performance, and inventory management—that exhibit general overlap with the conceptualization used in the current study. Using these multidimensional representations for quality management and organizational performance, the authors predict that quality management will positively impact firm performance, leading to their next hypothesis.

- H3: Quality management positively impacts overall firm performance.

Moderating Impact of Environmental Uncertainty

Firms do not exist in a vacuum. That is, the environment in which the firm operates can impact its performance (Jaworski and Kohli 1993; Slater and Narver 1994). While the operating environment facing a firm can be described in various ways, the authors believe environmental uncertainty will impact the relationship between quality management and organization performance. This assertion is consistent with Jabnoun, Khalifah, and Yusuf (2003, 17), who suggest that the failure in prior research to uncover a consistent link between TQM practices and firm performance was because the "match between environmental uncertainty, firm orientation, and total quality management (TQM) was not properly addressed." While these authors developed a contingency model to deal with environmental uncertainty, the model was not empirically tested. Lonial and Raju (2001) also report on the importance of environmental uncertainty in their research, finding that environmental uncertainty positively affected the relationship between market orientation and firm performance.

The authors similarly expect environmental uncertainty to be an important consideration when assessing the relationship between quality management and firm performance. Environmental uncertainty is formally defined as the risks associated with being unsure or uncertain about the firm's operating situation (that is, supplies, labor, competitors, customers, and government regulation) consistent with Lonial and Raju (2001). It is hypothesized that environmental uncertainty will moderate (that is, strengthen or weaken) the link between quality management and organization performance. More specifically, a stronger (weaker) focal relationship is anticipated when the organization faces higher (lower) levels of environmental uncertainty. That is, only firms that are able to consistently demonstrate that quality management positively benefits their performance will be able to successfully navigate an uncertain operating environment. This discussion leads to the fourth hypothesis.

- H4: Environmental uncertainty positively moderates the relationship between quality management and organization performance, such that the relationship between these constructs is stronger (weaker) under conditions of higher (lower) environmental uncertainty.

Moderating Impact of Hospital Size

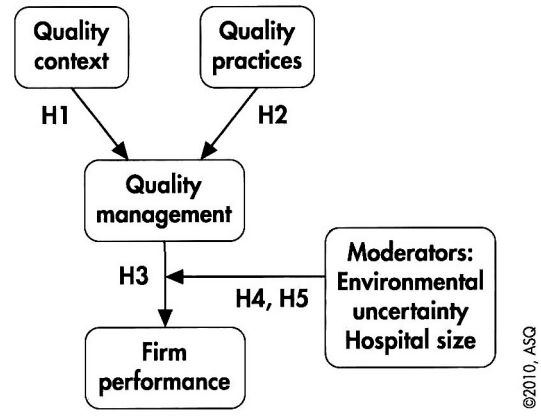
In addition to the environmental context, researchers have also noted that the benefits of quality management accrue more to some types of organizations than others (Hendricks and Singhal 2001). For example, these authors examined the link between TQM and firm performance and found that the primary benefits of TQM practices tended to accrue more in smaller, versus larger, firms. The current study extends this research to postulate that hospital size may strengthen or weaken (that is, moderate) the link between quality management and hospital performance. The importance of this construct is supported by Raju et al. (2000), who reported that hospital size impacted the relationship between market orientation and hospital performance, such that the strength of the association was stronger for smaller hospitals. An analogous outcome is expected in the primary relationship between quality management and firm performance. That is, the relationship between quality management and hospital performance will be stronger (weaker) for smaller (larger) hospitals.

Why should hospital size impact this link? This assertion is based on the logic that smaller hospitals have access to fewer resources (that is, financial, personnel, expertise, and so on). Given these resource constraints, it is imperative for smaller hospitals to ensure that their quality activities favorably impact performance. While larger hospitals may face equally severe external threats, their greater access to resources would allow them to better withstand these threats even with a weaker link between quality management and performance.

- H5: Hospital size moderates the relationship between quality management and organization performance, such that the relationship between these constructs is stronger (weaker) for smaller (larger) hospitals.

In summary, to fully understand and empirically assess the causal process that impacts the overall performance of a firm, one needs to account for moderating scenarios. The authors predict a stronger (weaker) link between quality management and organization performance for hospitals operating under conditions of high (low) uncertainty, since these hospitals are likely to feel a greater urgency to maintain and/or improve firm performance. Likewise, they expect a stronger (weaker) link between quality management and performance for smaller (larger) hospitals. If either construct is shown to be a significant moderator, there are important implications related to the appropriate strategies, and associated operating conditions, necessary for improving hospital performance. Figure 1 presents the authors' conceptual model, and highlights the association between the causal paths in this model and their testable hypotheses.

Figure 1 Conceptual model.



METHOD

Data Collection

Data for this study were collected using a survey that was mailed to the senior executives at 740 hospitals in a five-state region in the United States, which includes Kentucky, Minnesota, Mississippi, Ohio, and Tennessee. These hospitals account for nearly all of the hospitals in this five-state region, and roughly 12 percent of the hospitals in the United States. The authors observed a 24-percent response rate, yielding a usable sample size of 175 hospitals. The characteristics of these responding hospitals, in terms of number of beds, are generally consistent with the population of hospitals in the tested region.

As part of the data collection procedures, four surveys were mailed to the CEO of each hospital. The cover letter to the hospital CEOs included instructions to complete one of the surveys by themselves, and to distribute the remaining three questionnaires to other senior executives at the hospital. This procedure resulted in the collection of 293 completed questionnaires from the 175 responding hospitals. The responses by position within the hospital include 22 percent from the vice president of administration, 21 percent from the CEO, 18 percent from the manager of quality, 16 percent from the manager of support services, 8 percent from the director of nursing, and 5 percent from the director of marketing (and the remaining responses are from the CFO, COO, and the director of community relations). Roughly 63 percent of the hospitals returned a single survey, while the remaining 37 percent mailed back multiple responses. The authors' analysis indicates that there were no substantial differences between the single versus multiple response hospitals.

Table 1

Quality Context Items (Cronbach Reliability = 0.80)	Factor Loadings
Marketplace Environment	
1. Degree of competition faced by our hospital	0.682
2. Barriers to entry into the healthcare industry	0.659
3. Quality demands of our customers and the marketplace in general	0.685
4. Regulatory and legal requirements of the quality of hospital products and services	0.648
Manager's Knowledge	
5. My experience with quality and its role in hospital	0.747
6. My participation in professional quality-related organizations such as ASQ and Health Care Forum	0.680
7. Extent to which I have read books and articles, attended seminars, or sought outside expertise or consultants in the quality area	0.799
8. Overall, my knowledge of the quality area compared to other hospital executives at similar levels	0.827
Role of Top Management and Quality Policy	
9. Extent to which top executives assume responsibility for quality performance	0.752
10. Acceptance of responsibility for quality by major department heads	0.570
11. Degree to which top management (top executive and major department heads) is evaluated for quality performance	0.778
12. Extent to which top management supports a long-term quality improvement process	0.635
13. Extent to which top management has objectives for quality performance	0.633
14. Importance attached to quality by top management in relation to cost/revenue objectives	0.706
15. Degree to which top management considers quality improvement as a way to increase profits	0.714
16. Degree of comprehensiveness of the quality plan	0.451
17. Extent to which top management has developed and communicated a vision for quality as part of a strategic vision of the organization	0.657
Role of the Quality Department	
18. Visibility of the quality department	0.768
19. Quality department's access to top management	0.676
20. Amount of coordination between the quality department and other departments	0.774

Since the analysis is conducted at the hospital level, multiple responses from a single hospital were averaged across responders (when applicable) for all survey questions. Thus, the procedure created an aggregate score for each hospital. This aggregation approach allows one to analyze the data at the hospital level (and ensure that each hospital is counted equally in the analysis). This aggregation approach also provides the most useful assessment of hospital quality strategy. Finally, given that the majority of hospitals (63 percent) returned only a single survey, any potential concerns related to the aggregation process affect only a minority of the hospitals in the sample.

Table 2

Quality Practices Items (Cronbach Reliability = 0.85)	Factor Loadings
Quality Training	
1. Specific work-skills training (technical and vocational) given to hourly employees	0.525
2. Training in statistical techniques (such as histograms, control charts, and so on) in the hospital as a whole	0.850
3. Training in advanced statistical techniques (such as design of experiments, regression analysis, and so on) in the hospital as a whole	0.731
4. Extent to which quality improvement teams are trained in problem-solving approach	0.522
Product/Service Design	
5. Thoroughness of new product/service design reviews before the product/service is produced and marketed	0.751
6. Coordination among affected departments in the product/service development process	0.765
7. Quality of new products/services emphasized in relation to cost objectives	0.737
8. Quality emphasis by customer service, marketing, and PR personnel	0.675
9. Use of "patient focused hospital" or "hospital within a hospital" concept, that is, use of decentralizing of patient support services along patient types	0.525
Supplier Quality Management	
10. Extent to which suppliers are selected based on quality rather than price or delivery schedule	0.714
11. Involvement of the suppliers in the product/service development process	0.715
12. Extent to which longer-term relationships are offered to suppliers	0.713
13. Clarity of specifications provided to suppliers	0.455
Quality Data and Reporting	
14. Availability of cost of quality data in the hospital	0.588
15. Availability of quality data (mortality and morbidity, and so on)	0.686
16. Timeliness of quality data	0.782
17. Extent to which quality data (cost of quality, mortality and morbidity, errors, and so on) are used as tools to manage quality	0.624
18. Extent to which quality data are available to managers and supervisors	0.745
19. Extent to which quality data are used to evaluate supervisors and managerial performance	0.433
20. Extent to which quality data, control charts, and so on are displayed in work areas	0.453
21. Scope of the quality data includes clinical performance and service/process performance	0.601
Employee Relations	
22. Extent to which employee involvement type programs are implemented in the hospital	0.614
23. Effectiveness of quality teams or employee involvement type programs in the hospital	0.603
24. Extent to which the employees are held responsible for error-free output	0.625
25. Amount of feedback provided to the employees on their quality performance	0.740
26. Degree of participation in quality decisions by hourly/nonsupervisory employees	0.722
27. Extent to which quality awareness-building among employees is ongoing	0.632
28. Extent to which employees are recognized for superior quality performance	0.679

Construct Measurement

The authors' survey includes specific questions or items to measure each of the constructs of interest in this analysis: quality context, quality practices, hospital or firm performance, environmental uncertainty, and hospital size. Each of these constructs comprises three to five subdimensions which are, in turn, measured by summing from three to nine individual questions, each on a five-point scale (the exception is hospital size, which is measured using a single item based on the number of beds). The authors employed summed indicators for these constructs due to the large number of individual questions and the overall sample size of 175, consistent with the methodology used in prior research (Carter 2009; Eroglu, Machleit, and Barr 2005; Raju and Lonial 2001). The exact factors and individual items or questions are discussed shortly. Quality management is also an important component in the conceptual model. Quality management, however, is an endogenous construct; thus, there are no survey items used as direct indicators of this construct (see Figure 1).

Table 3

Firm Performance Items (Cronbach Reliability = 0.75)	Factor Loadings
Financial Performance	
1. Net profits	0.890
2. Return on investment	0.813
3. Cash flow from operations	0.856
4. Return on assets	0.856
5. Profit-to-revenue ratio	0.896
Market/Service Development	
6. New product/service development	0.816
7. Investments in R&D aimed at new innovation	0.765
8. Capacity to develop a unique profile	0.724
9. Market development	0.750
Quality Outcomes	
10. Mortality and morbidity rate	0.862
11. Service quality as perceived by customers	0.477
12. Cost per adjusted surcharge	0.310
13. Employee turnover	0.607

Quality context

The specific scale items for quality context are largely derived from Benson, Saraph, and Schroeder (1991), with some modifications, namely that the total number of items or questions was reduced to 20 and the wording was modified so as to be appropriate for the hospital industry (Raju and Lonial 2001). The individual items are measured on a five-point scale from "very low" (1), to "very high" (5). Exploratory factor analysis and researcher judgment were employed to identify four primary dimensions that underlie these 20 items. More specifically, four factors were identified, which are labeled as marketplace environment (factor 1: four items or questions), manager's knowledge (factor 2: four items), role of top management and quality policy (factor 3: nine items), and role of quality department (factor 4: three items). For the measurement model, item scores were summed within each factor. The Cronbach's alpha measure for reliability was 0.80 for the overall quality context construct. This level of reliability is well above the normally accepted value of 0.70. The individual quality context items and loadings, by factor, are provided in Table 1. As shown in the conceptual model (see Figure 1), quality context is not linked directly to firm performance. Rather, this construct operates as an indicator of quality management in conjunction with quality practices.

Quality practices

The conceptualization for quality practices is also based on scale items from Benson, Saraph, and Schroeder (1991). Similar to the approach for quality context, the authors reduced the total number of items to 28, and also modified the wording to be applicable to the healthcare industry. Starting with these 28 items, exploratory factor analysis and

researcher judgment were employed in an analogous manner to extract five dimensions or subconstructs representing quality practices. These five dimensions are quality training (factor 1: four items), product and service design (factor 2: five items), supplier quality management (factor 3: four items), quality data and reporting (factor 4: eight items), and employee relations (factor 5: seven items). Again, item scores were summed within each factor for use in the measurement model. At 0.85, the Cronbach alpha reliability for quality practices is well above the accepted value of 0.70, consistent with quality context. The 28 items and corresponding loadings, grouped by these five subdimensions or factors, are presented in Table 2.

Firm performance

To comprehensively evaluate hospital or firm performance, a multi-item construct was used, consistent with Raju and Lonial (2001) and Lonial and Raju (2001). In particular, overall firm performance is assessed using three dimensions: financial performance (factor 1: five items), market/service development (factor 2: four items), and quality outcomes (factor 3: four items). These 13 measures of overall hospital performance were derived based on a review of the related literature in the healthcare industry and additional interviews with key personnel at local area hospitals. Since hospital executives responding to the survey were expected to be unwilling to share proprietary objective measures of performance, these firm performance items were "judgment based" consistent with the approach of Kumar, Subramanian, and Yauger (1998). The participants evaluated their hospital relative to others using a five-point scale from "much worse than competition" (1) to "much better than competition" (5). Again, item scores were summed within each of the three factors. Cronbach's alpha reliability for overall firm performance was 0.75, which is above the generally accepted level of 0.70. (See Table 3 for the specific items used to measure financial performance, market/service development, and quality outcomes, along with their respective factor loadings.)

Table 4

Environmental Uncertainty Items (Cronbach Reliability = 0.73)
Environmental Uncertainty
1. Suppliers of materials
2. Suppliers of capital equipment
3. Labor supply
4. Labor unions
5. Customers
6. Competitors
7. Government regulations
8. Public opinion
9. Technological advances
10. Industry associations
11. Financial market
12. General economy
Using a five-point scale on the question: "Please rate the extent or degree of impact that the uncertainty associated with each of the following elements of the environment has on your hospital."

Environmental uncertainty

Environmental uncertainty is measured using 12 items, each assessed on a five-point scale from "very low" (1) to "very high" (5), consistent with Lonial and Raju (2001). These measures relate to the risks associated with being unsure about the various elements, or the situation in which the hospital operates. These elements include the uncertainty associated with suppliers of materials and equipment, labor unions, customers, competitors, government regulations, and so on. Conditions for "low" uncertainty (n=90 hospitals) and "high" uncertainty (n=85 hospitals) were defined as either below or above the median split on the summation of the 12 associated items consistent with Lonial and Raju (2001). Supporting the measurement model, Cronbach's alpha reliability for environmental uncertainty was 0.73. The 12 questions corresponding to environmental uncertainty are listed in Table 4.

Hospital size

Of the various possible proxies for hospital size, the authors selected the number of beds in the hospital because they expect this value to be more stable over time and less susceptible to economic and job market cycles, compared to other indicators such as the number of personnel employed. In the current research, the construct for size of the hospital is based on a single question related to the number of beds in the hospital. Hence, there is no corresponding reliability value for this construct. Analogous to Raju et al. (2000), the authors use the median split to binary code the construct for hospital size. More specifically, they define a small hospital as one with 184 or fewer beds (n=88 hospitals) and large hospitals as having 185 or more beds (n=87 hospitals).

Measurement Model Results

Following the two-step approach recommended by Anderson and Gerbing (1988), the authors first tested a measurement model to assess construct unidimensionality, and the items' correspondence to their respective latent construct or variable. They assessed the unidimensionality by conducting a confirmatory factor analysis (CFA) on the constructs for quality context, quality practices, and firm performance. As shown in Appendix 1, all three of the constructs exhibit acceptable levels for Cronbach's alpha reliability (> 0.70, Malhotra 2010). Although the RMSEA measure of 0.086 for quality context is slightly above the guideline of .08 (Malhotra 2010), all of the other fit measures for quality context and quality practices meet generally accepted guidelines, supporting the unidimensionality of these constructs (the accepted guidelines for fit statistics are discussed in more detail in the section on the structural model). There are only three indicators for firm performance and, as such, fit statistics are not defined. For reference, the correlation matrix among the summed components or indicators for quality context, quality practices, and firm performance is presented in Appendix 2.

The second step requires that discriminant validity be demonstrated (Anderson and Gerbing 1988). That is, one must show that quality practices and quality context are distinct constructs, and that the correlation between them is less than unity (Venkatraman 1989). Consistent with Gupta and Lonial (1998) and Venkatraman (1989), discriminant validity between these constructs is demonstrated by estimating two models: 1) the unconstrained model; and 2) the constrained model where the correlation between quality practices and quality context is fixed at 1.0. If the two models (that is, constrained versus unconstrained) are significantly different based on the difference in the chi-square statistic, then the correlation between the two constructs is less than unity, and discriminant validity is supported. In the current study, the constrained model exhibits a chi square value of 114.63 (df=27), while the unconstrained model demonstrates a chi square of 44.61 (df=26). This difference between these two values (69.75) is distributed chi square with one degree of freedom, which is significant at the $p < 0.01$ level. Thus, the correlation between quality practices and quality context is less than unity, and discriminant validity is supported.

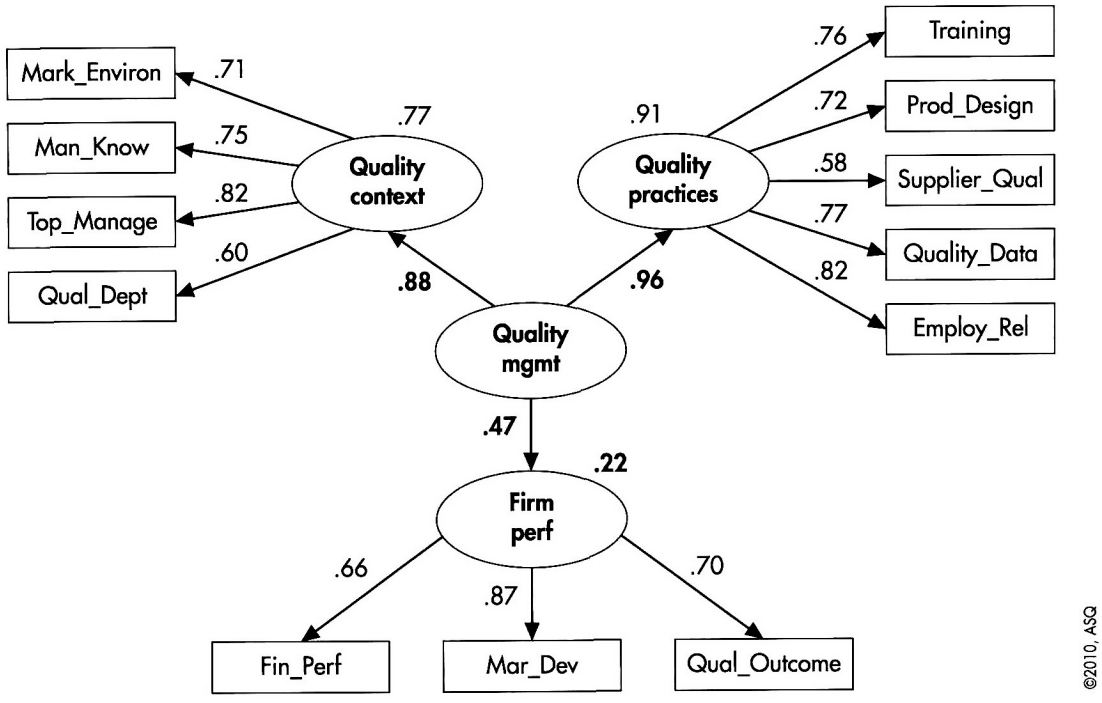
The current study relies on self-reported data for different constructs from subjects, which introduces a potential for common method variance (Podsakoff et al. 2003). The authors conducted Harman's one factor test (Podsakoff and Organ 1986), which is a technique to assess the prevalence of common method bias. As part of this technique or approach, all of the independent variables and performance constructs were entered into an exploratory factor analysis. The results did not reveal a single factor from this analysis, nor was there a general factor that could account for the majority of the variance across these variables, indicating that common method bias in not a major concern in this study.

MODEL ESTIMATION AND RESULTS

Overall Approach

Given the acceptable fit statistics in the measurement model, the authors used SEM to estimate the conceptual model presented in Figure 1. AMOS 4.0

Figure 2 SEM measurement model.



software (from SPSS software) was used for this analysis (Arbuckle and Wothke 1999). Results are based on the entire sample of 175 hospitals, as well as subgroup analysis by high versus low environmental uncertainty, and by high versus low hospital size. The latter two analyses allow one to assess the potential moderating impact of these two constructs.

Total Sample

Based on 175 hospitals in the five-state region, the overall conceptual model depicted in Figure 1 was estimated using SEM. Importantly, all of the path coefficients are significant. To assess the appropriateness of the overall model, the authors evaluated measures in the current study representing overall fit (Cmin/df = 2.43), absolute goodness of fit (GFI = 0.907), incremental fit indices (CFI = 0.925 and TLI = 0.901), and absolute "badness" of fit (RMSEA = 0.091). One of the research challenges of using SEM is that there are no universally accepted "cut-offs" for these various fit measures. For example, multiple guidelines for RMSEA have been reported ranging from 0.06 (Hu and Bentler 1999), to 0.08 (Malhotra 2010), to a range of 0.08 to 0.10 (Hair et al. 2006). Articulating this issue, Hair et al. (2006 p.748) correctly note: "The question of what is a 'good' RMSEA value is debatable..." Nonetheless, on the aforementioned fit measures the authors find general agreement (although not universal agreement) for the following guidelines: Cmin/df < 3.0 (Gefen, Straub, and Boudreau 2000), GFI of 0.90 or more (Gefen, Straub, and Boudreau 2000; Malhotra 2010), CFI of 0.90 or more, TLI of 0.90 or more, and RMSEA of 0.08 or less (Malhotra 2010). Although the RMSEA of 0.091 is slightly above this guideline, it was the authors' judgment that the fit statistics—taken as a whole—supported an assessment of an adequate degree of model fit. The reader is also referred to classic texts on SEM that discuss the individual fit statistics and the overall technique (Bollen 1989; Hair et al. 2006).

The path coefficients from quality context to quality management (coefficient = 0.88) and from quality practices to quality management (coefficient = 0.96) are both positive and significant. These findings indicate that both quality context and quality practices

Table 5 Goodness-of-fit indexes, by high and low environmental uncertainty.

Sample group	Path from quality management to performance (standardized)	CMin/df	Goodness of fit (GFI)	CFI	Tucker-Lewis index (TLI)	Root mean square error of approximation (RMSEA)
Total sample (n=175)	.47*	2.43	0.907	0.925	0.901	0.091
Low environmental uncertainty (n=90)	.54*	1.6	0.879	0.945	0.926	0.082
High environmental uncertainty (n=85)	.41*	1.654	0.873	0.914	0.888	0.088

Overall model fit is judged to be acceptable based on the overall assessment of the fit indexes. For overall firm performance, there is a significant difference in the path coefficients between low and high uncertainty.

*Indicates that the path coefficient is significant at the 95-percent confidence level.

are important components of overall quality management, supporting H1 and H2. This observation is worth emphasizing: viewing quality management as reflecting only quality practices is myopic; rather, it is also essential to understand the quality environment or context as a contributor to the development of an effective quality management orientation.

Further, the authors find a positive and significant relationship between quality management and overall firm performance (coefficient = 0.47), supporting H3. Importantly, quality management explains 22 percent of the variance in overall organization performance, providing additional evidence that hospitals need to adopt quality management practices, in much the same manner as other service industries, to maintain and improve organization performance. The estimated SEM model, including path coefficients, is presented in Figure 2. All of the path coefficients shown in the model are significant at the 95-percent confidence level.

Moderating Effect of Environmental Uncertainty

Previously, it was postulated that the relationship between quality management and firm performance would be stronger under conditions of high environmental uncertainty versus low uncertainty. That is, environmental uncertainty would positively moderate the link between quality management and firm performance. The authors, however, find that the path from quality management to organization performance is significantly greater when environmental uncertainty is low, not high. More specifically, the path from quality management to firm performance is 0.54 under low environmental uncertainty and 0.41 under high uncertainty. Thus, H4 is not supported. The path coefficients and fit statistics, by uncertainty level, are presented in Table 5.

Given this surprising and counter-intuitive finding, the authors investigated further by examining the relationship between quality management and each of the three individual factors comprising overall firm performance (that is, financial performance, market/service development, and quality outcomes), for both high and low levels of environmental uncertainty. Interestingly, there was a difference in the path coefficient, by high and low environmental uncertainty, for both financial performance and quality outcomes (there was no noticeable difference in path coefficients, by uncertainty level, for market/service development). That is, the relationships between quality management and financial performance, and quality management and quality outcomes, are stronger under low environmental uncertainty. Notably, this finding was particularly striking and significant for quality outcomes where the path coefficient was 0.48 (from quality management to quality outcomes) for low uncertainty, and only 0.28 for high uncertainty. While these observations initially appear to be counter intuitive, the authors postulate that when environmental uncertainty is low, quality management

takes on added importance. When environmental uncertainty is high, however, other company orientations—such as, perhaps, a marketing orientation—could be more important than a quality orientation. Additionally, it may be that all companies struggle to perform particularly well when the operating environment is uncertain. When environmental uncertainty is low, however, only those firms with an appropriate quality focus are able to perform well in terms of quality outcomes and financial performance. The path coefficients, by low and high environmental uncertainty, are summarized in Table 6.

Table 6 Path coefficient from quality management to performance.

Dependent variable	Total sample	Low environmental uncertainty	High environmental uncertainty
Overall firm performance	.47*	.54*	.41*
Components of firm performance			
Financial performance	.24*	.24*	.17(ns)
Market development	.41*	.38*	.40*
Quality outcomes	.39*	.48*	.28*

*Indicates that the path is significant at the 95-percent confidence level. For overall firm performance, there is a significant difference in path coefficients between low and high uncertainty.

Moderating Effect of Hospital Size

Recall that the size of the hospital, based on the number of beds, was also postulated to moderate the link between quality management and overall performance, such that the strength of the relationship would be stronger for the smaller organizations. Importantly, the results support the authors' in-going expectation, and H5. More specifically, the standardized path coefficient between quality management and performance for smaller hospitals (0.64) is significantly greater than the path value for large hospitals (0.29). Additionally, the finding that the path coefficient is greater for smaller hospitals compared to larger hospitals is consistent with the results from Raju et al. (2000), even though the current research employs a different conceptual model. This finding is important in that it supports the contention that the viability of small hospitals is naturally "shakier" and less certain compared to larger hospitals, possibly as a result of fewer available resources. As such, it is critical that small hospitals develop quality programs that improve performance, including financial performance. While still important, quality efforts at larger hospitals are anticipated to be less critical because these larger organizations posses greater resources, which allow them to better respond to their corresponding threats and challenges. Table 7 summarizes the findings along with the corresponding fit statistics.

MANAGERIAL IMPLICATIONS AND DISCUSSION

Managers need to understand and identify the factors that impact firm performance, and this issue may be particularly acute for hospital executives given that these organizations face a wide array of competitive and regulatory environments. The hospital manager's job is further complicated since prior research provides potentially conflicting assessments as to the impact of quality management policies on firm performance (Foster 2007; Kaynak 2003; Montes, Jover, and Fernandez 2003; Zu 2009). So how can hospital executives and managers successfully navigate these concerns?

The estimation and analysis of the overall conceptual model (see Figure 1 and Figure 2) provides several important findings and guidance. First, the quality situation or context under which a hospital operates is important. That is, developing a beneficial quality management framework in a healthcare setting requires that managers consider the quality context as well as the specific quality practices. This is shown in the model by the significant path between quality context and quality management, and the significant

Table 7 Goodness-of-fit indexes, by small and large hospitals.

Sample group	Path from quality management to performance (standardized)	CMin/df	Goodness of fit (GFI)	CFI	Tucker-Lewis index (TLI)	Root mean square error of approximation (RMSEA)
Total sample (n=175)	0.47**	2.43	0.907	0.925	0.901	0.091
Small hospitals (184 beds or less, n=88)	0.64**	1.90	0.863	0.913	0.887	0.102
Large hospitals (185 beds or more, n=87)	0.29*	1.48	0.883	0.941	0.924	0.075

Overall model fit is judged to be acceptable based on the overall assessment of the fit indexes. There is a significant difference in the path coefficients between small and large hospitals.

**Indicates that the path coefficient is significant at the 95-percent confidence level.

*Indicates that the path coefficient is on the cusp of significance at the 90-percent confidence level.

link connecting quality practices and quality management. This outcome is worth emphasizing: If quality management only reflects quality practices—and inadvertently neglects the quality context under which the organization operates—hospital performance may well suffer, possibly because the quality context provides an ongoing historical background and philosophy for the quality practices of the firm.

These findings may result in the expansion of the job scope of the hospital quality manager; however, the outcomes suggest that quality management needs to be viewed holistically and broadly encompass multiple dimensions (that is, both quality practices and the quality context or setting) for the hospital to be successful. While other research describes the (indirect) impact of quality context on performance (Raju and Lonial 2001), the current research benefits by demonstrating the importance of integrating quality context with quality practices to form the latent construct of quality management.

Second, and analogous to the broad scope of quality management, the outcomes support the key assertion that the individual constructs represented in the model are multidimensional in nature. More specifically, the constructs for quality context and quality practices are indicated by four and five factors, respectively (see Table 1 and Table 2). In a like manner, organization or firm performance is multifaceted since it is conceptualized using three factors: financial performance, market/service development, and quality outcomes. While other researchers have noted this broad perspective related to firm performance (Morgan and Piercy 1998), the current findings provide additional support for this assertion in a healthcare and hospital setting. When the first two findings are taken together, the implications to management are clear. To improve hospital performance, the scope of the organization's quality activities need to be very broad and incorporate multiple dimensions. If a manager should myopically focus on only quality practices or the quality environment, it is entirely possible that one or more components of firm performance may suffer as a result.

Providing further support for the complicated environment confronting hospital managers, the authors find that the strength of the relationship between quality management and firm performance varies depending on the characteristics or traits of the hospital and its operating environment. As expected, the focal relationship is stronger for smaller hospitals as compared to larger ones. The authors postulate that smaller hospitals are faced with limited resources (compared to larger hospitals) and, as such, it is imperative that managers at these smaller organizations take an expansive perspective of quality management. With fewer available resources, a narrow view of quality management (which may only encompass quality practices) at smaller hospitals could be detrimental to their organization's performance. Hence, it is important that smaller hospitals, despite their limited resources, have a strategic approach to quality as opposed to relying on "ad hoc" quality practices.

In summary, it is important for managers in the healthcare industry to include elements of both quality practices and quality context in their quality management activities to improve overall hospital performance based on financial performance, market development, and quality outcomes.

LIMITATIONS AND IMPLICATIONS FOR FUTURE RESEARCH

As with any single piece of research, there are limitations associated with the current study. First, the research is focused in a single area (that is, hospitals) within the healthcare category. To ensure that outcomes generalize beyond this arena, additional research in a range of both product and service categories is recommended. Second, and as noted in Lonial and Raju (2001), the measurement of environmental uncertainty is unidimensional. That is, the 12 items are summed into a single measure and used to identify the high and low uncertainty conditions. It is possible that measurement of environmental uncertainty may be refined and enhanced by examining subdimensions within this construct. The SEM model could also be estimated using continuous expressions for either or both of the moderating constructs (that is, environmental uncertainty, hospital size). Third, the measure of firm performance may benefit from employing both objective and subjective measures. While subjective measures of performance are easier to obtain, and their use is consistent with a wide variety of prior research, future research may benefit by integrating both subjective and objective performance assessments. Last, given the importance of the quality management construct and its implication that hospital managers need to take an expansive view of their quality orientation, additional efforts to better define, refine, and measure this concept may prove valuable in terms of improving the fit characteristics of the model.

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Appendix 1 Summary of confirmatory factor analysis (CFA) fit statistics.

Dimension (number of items as indicators)	Cronbach's alpha reliability	CMin/df	Goodness of fit (GFI)	CFI	Tucker-Lewis index (TLI)	Root mean square error of approximation (RMSEA)
Quality context (4)	0.80	2.29	0.988	0.968	0.905	0.086
Quality practices (5)	0.85	1.35	0.988	0.997	0.991	0.045
Firm performance (3)	0.75	NA	0.992	0.993	0.980	0.077

NA: Not applicable. Since there are only three indicators for the construct for firm performance, fit statistics cannot be estimated.

Appendix 2 Correlations.

Construct and component	1	2	3	4	5	6	7	8	9	10	11	12
Quality Context												
Mark_Environ	1											
Man_Know	**0.22**	1										
Top_Manage	**0.21**	**0.23**	1									
Qual_Dept	0.08	**0.27**	**0.54**	1								
Quality Practices												
Training	**0.24**	**0.24**	**0.55**	**0.36**	1							
Prod_Design	0.12	**0.25**	**0.51**	**0.31**	**0.56**	1						
Supplier_Qual	**0.18**	0.11	**0.39**	**0.23**	**0.48**	**0.59**	1					
Quality_Data	**0.18**	**0.23**	**0.56**	**0.45**	**0.59**	**0.61**	**0.54**	1				
Employ_Rel	**0.20**	**0.24**	**0.57**	**0.47**	**0.66**	**0.64**	**0.48**	**0.64**	1			
Firm Performance												
Fin_Perf	0.05	**0.15**	0.12	**0.15**	0.09	**0.27**	0.08	**0.26**	**0.18**	1		
Mar_Dev	0.06	0.11	**0.24**	0.12	**0.29**	**0.44**	**0.27**	**0.28**	**0.30**	**0.59**	1	
Qual_Outcome	0.00	**0.19**	**0.17**	**0.21**	**0.27**	**0.38**	**0.21**	**0.28**	**0.26**	**0.46**	**0.61**	1

Significant correlations are shown in **bold.**

Executive Briefs

Impact of Quality Management on Hospital Performance: An Empirical Investigation (pp. 8–24). Robert E. Carter, Subhash C. Lonial, and P. S. Raju, University of Louisville

Understanding the impact of quality management on firm and organizational performance continues to be a concern for managers, since quality procedures have been shown to reduce product costs and positively impact firm performance. Research on the link between quality management practices and organization performance, however, often finds contradictory outcomes—quality procedures may not consistently result in positive outcomes. Thus, additional research is necessary to help researchers and practitioners reconcile these two seemingly contradictory perspectives.

Due to its overall importance to the economy and the fact that quality management practices in the healthcare field are growing in importance, the authors chose a healthcare setting for their research. Data for the study were collected using a survey mailed to senior executives at 740 hospitals in a five-state region. The authors observed a 24-percent response rate, yielding a usable sample size of 175 hospitals. The survey included specific questions or items to measure each of the constructs of interest in this analysis, including quality context, quality practices, environmental uncertainty, and others.

Results of the study indicate that managers need to understand and identify the factors that impact firm performance. Also, the quality situation or context under which a hospital operates is important. Thus, to improve hospital performance, the scope of the organization's quality activities needs to be very broad and encompassing.

Medication Discharge Planning Prior to Hospital Discharge (pp. 25–35). Karen Steffen Mutsch, Northern Kentucky University, and Melisa Herbert, Saint Elizabeth Health Care

Understanding and taking multiple medications can become problematic for patients who have been discharged from the hospital, especially the elderly. It is the responsibility of the nurses to teach patients self-mediation skills that encompass not only obtaining the prescription and monitoring the medication's effectiveness, but also teaching patients why, how, and when to take their medicines. Patients' misunderstanding of prescribed medications can lead to hospital readmission and increased mortality.

This study was conducted to determine whether a written educational resource used by nurses at discharge could improve patient knowledge of cardiovascular mediations. Providing written instructions ensures accurate and consistent information is given to all patients concerning their individualized home medications. The study attempted to answer the following question: "Can a comprehensive verbal and written nursing medication educational intervention in the hospital affect patients' knowledge regarding cardiovascular medication names, dosages, schedules, and purposes prior to hospital discharge?"

At a 650-bed hospital, 50 charts were reviewed pre-intervention and post-intervention for medication reconciliation, and patients were interviewed concerning medication adherence and knowledge. The results of the study suggest that an advanced planning nursing practice model can be used to increase patient knowledge of medications prior to hospital discharge. Nurses who understand the importance of educating patients about their medications early in the hospital admission lead to increased patients' knowledge of medications. Thus, nurses are in the best position to provide medication information prior to discharge and sustain a medication discharge planning program.