

Testing Hospital Quality Strategic Determinants

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ABSTRACT

Hospital administrators are motivated to improve hospital quality in the eyes of their patients, healthcare quality regulators, and accrediting organizations. This study empirically tests the importance of some strategic determinants of hospital quality by collecting data using an emailed questionnaire filled by 258 chief quality officers. The results supported the importance of competitive intelligence, strategic leadership, management of technology, specific characteristics of the change process, and organization culture as major determinants of hospital quality. Based on the results, the report makes recommendations on where to direct their efforts, including understanding how to measure these important factors. The important model tested here has not been proposed before and provides several research opportunities for perhaps expanding the model and account for unexplained variance in hospital quality, including other constructs potentially being moderators and mediators for the hypothesized relationships.

KEYWORDS

Competitive Intelligence, Hospital Quality, Management of Technology, Organization Culture, Project Management, Strategic Leadership

INTRODUCTION

The importance of ensuring health care quality has been recognized by all developed nations. Some examples are The European Observatory on Health Systems and Policies (EOHSP) in the European Union and The Joint Commission in the United States. In most cases these efforts compare health care provider organization within the specific country or other political unit (Wagner et al., 2014). This study deals with some potentially important factors affecting health care quality in the USA. From a hospital patient perspective, the importance of health care quality is universally recognized, particularly by those who are presently requiring or have required medical care at one time or another.

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From the organization perspective, hospital quality seems less well recognized. Many authors have addressed the potential factors leading to hospital quality (Missios & Bekelis, 2018; Montgomery et al., 2013; Stimpfel et al., 2016). However, based on their meetings agendas, hospital Governing Board, and top managers have shown a relatively weak interest in hospital quality issues. Some hospitals' agenda did not include quality on their agenda (Jha & Epstein 2010; Joshi & Hines, 2006), or quality issues were inconsistently or sporadically addressed (Mastal et al., 2007; Prybil et al., 2010). More in depth studies regarding the Board's time spent on patient safety or care quality, found that such issues took less than expected (Baker et al., 2010 ; Jha & Epstein 2010; Jiang et al., 2008 ; Jiang et al., 2009 ; Levey et al., 2007; Prybil et al., 2010). Most Boards reported that hospital quality issues accounted for 25% or less of their time (Baker et al., 2010; Jha & Epstein, 2010; Jiang et al., 2009; Poniatowski et al., 2005 ; Prybil et al., 2010; Vaughn et al., 2006).

Many studies have addressed the lower level management involvement and its effect on hospital quality. These studies propose that lower-level managerial action has been beneficial to hospital quality and performance (Baker et al., 2010; Bradley et al., 2006; Jiang et al., 2009; Joshi & Hines, 2006; Vaughn et al., 2006; Weingart & Page, 2004). On the other hand, the literature also has many conflicting studies concerning senior management support and engagement in hospital quality improvement initiatives. In some studies, support and engagement at the top levels of management was found to be one of the primary factors associated with good hospital quality outcomes, including success implementing quality improvement programs (Bradley et al., 2006; Jiang et al., 2009; Joshi & Hines, 2006; Vaughn et al., 2006). However, several studies indicate that management involvement (at several levels) has little, no or even a negative influence on hospital quality (Caine & Kenrick, 1997; Jiang et al., 2009; Joshi & Hines, 2006; Saint et al., 2010; Vaughn et al., 2006).

Given the widely recognized importance of hospital quality among patients, researchers, and practitioners, the topic is of great importance and demands a clearer understanding of the factors which potentially might be important to improve hospital care quality. A major reason for this study was the gap between published research and the need for new knowledge in practice. Thus, this study's primary objective is to identify and empirically test the relationships between some of the main strategic level factors that the literature has proposed as likely determinants of hospital quality. The research model, the major variables and the independent variables corresponding hypotheses are justified are discussed next in greater detail.

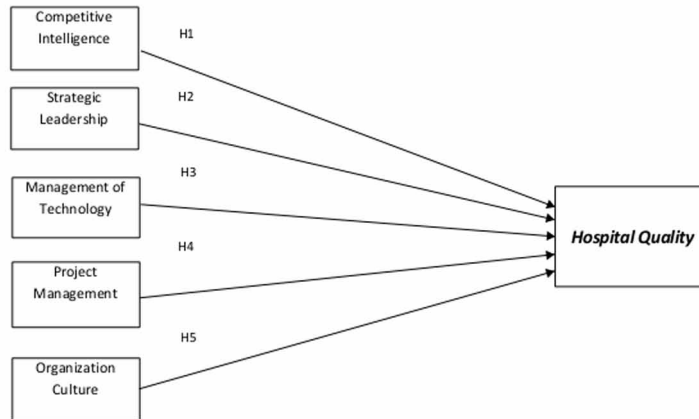
THEORETICAL BACKGROUND

This section is structured as follows: Figure 1 shows the theoretical model for this study; each construct is discussed in more detail, including its measures, as well as the questions sent to perspective respondents.

Hospital Quality (Dependent Variable)

Chassin & Loeb (2013) discussed hospital quality importance based on the creation of The Joint Commission, for accrediting and certifying nearly 21,000 US organizations and programs providing health care. The stated mission for this regulator "is to continuously improve health care for the public, in collaboration with other stakeholders, by evaluating health care organizations and inspiring them to excel in providing safe and effective care of the highest quality and value." The Joint Commission's Chief Operating Officer of Accreditation and Certification Operations stated that "in 2017 they surveyed 750 U.S. hospitals from Jan. 1 through June 30, found deficiencies at every hospital during each of the surveys, and worked with these hospitals to address the issues. Immediate Threats to Health and Safety (ITHS) were found to be dependent on a combination of factors and findings." When surveyors identify a deficiency at this level, they are "to immediately contact their central office staff to confirm the ITHS status, review the finding with hospital leadership, support hospital leadership and staff in mitigating the threat while they remain on site." The surveyors then expect that

Figure 1. The proposed theoretical model



the hospital “will identify the source(s) of the ITHS, will notify the Centers for Medicare & Medicaid Services (CMS) which determines any appropriate regulatory action, and if necessary share findings with the state department of health which in turn, determines if the ITHS requires public action.”

According to several authors (ANCC, 2017; Chen et al., 2014; Stimpfel et al., 2016), The American Nurses Credentialing Center (ANCC) created another major vehicle for improving hospital quality by implementing the Magnet Recognition Program. Some authors found Magnet Programs implementations somewhat controversial (Lasater et al., 2016; Missios & Bekelis, 2018) for a variety of reasons such as “the program is too short lived or not fully implemented,” or “the results are measured in different ways,” etc. Nevertheless, the primary reason for implementing these programs is the unquestionable “importance of improving hospital care quality through increased nursing participation in management activities” (Missios & Bekelis, 2018; Park et al., 2016; Stimpfel et al., 2014; The Truth about Nursing, 2016).

For the same reason, at the global level, The European Observatory on Health Systems and Policies (EOHSP) was created for “promoting and supporting the establishment of quality improvement policies. It aims to improve care quality by bringing together a wide range of policy makers, academics, and practitioners for analyzing trends and drawing on European experiences regarding health quality policy and implementation issues.” The EOHSP “includes the World Health Organization Regional Office for Europe, the Governments of Belgium, Finland, Greece, Norway, Slovenia, Spain and Sweden, the Veneto Region of Italy, the European Investment Bank, the Open Society Institute, the World Bank, the London School of Economics and Political Science, and the London School of Hygiene & Tropical Medicine.”

The importance of public reporting of hospital quality data and pay for performance as determinants of hospital quality was proposed by Lindenauer et al. (2007). Quality was measured by addressing “acute myocardial infarction” (AMI), “congestive heart failure” (CHF), and “pneumonia” (PNA). Using a large sample of hospitals in the United States over a 2-year period, Jha et al. (2007) reported a clear inverse relationship between hospital quality and mortality rates among Medicare enrollees admitted for AMI, CHF, and PNA. Several authors proposed the need to view hospital quality with a wider point of view, including several critical variables as “patient satisfaction, friendly administrative requirements, hospital layouts conducive to operating efficiency,” etc. (Lasater et al., 2016; Stimpfel et al., 2016). Such studies empirically validated the link between hospitals nursing excellence and “value-based measures, and in terms of patients’ experiences.” Parand et al. (2014) undertook an extensive literature survey of the designed to study hospital managers’ role in “improving

quality and patient safety.” Results show that top managers show limited interest regarding hospital quality issues, as shown by Boards’ agendas; for some hospitals quality issues was not on their agendas, (Jha & Epstein 2010; Joshi & Hines, 2006). Inconsistent results regarding hospital quality were reported by Mastal et al., (2007) and Prybil et al., (2010). In conclusion, the evidence to date is, despite its importance, hospital care quality in practice calls for a better understanding of how to achieve its determinants.

Depending on the study objective several measures for hospital quality have been used. Hospital quality was measured by Jha et al. (2007) and Lindenauer et al. (2007) in terms of the particular clinical treatments provided to patients admitted for specific medical conditions such as AMI, CHF, and PNA. Because of their particular objectives, other studies had to expand the measure of hospital quality to include other essential factors such as more efficient hospital layouts, and higher patient satisfaction. A substantial literature review regarding measures of hospital quality was conducted by Gupta & Rokade (2016) to assess its importance. Sharma & Narang (2011) used “patients’ perceptions of service quality and willingness to return to the hospital”. Based on the nature of adverse events to hospital patients (assessed by post facto retrieval of medical records) Verelst et al., (2012) used a reversed measure for hospital quality. Seema Mehta (2011) used “patient satisfaction with hospital services including promptness of service, medical aid, clinical services, and available facilities”. Bhardwaj & Chawla (2013) targeted “patient perceptions and expectations and measured quality in terms of service accessibility, timeliness, accuracy, security, ambience, competence, impressiveness, and customization”. Appendix A shows that the measure of hospital quality for this study follows the broad parameters proposed by Gupta & Rokade (2016) after their extensive survey of quality measures. The validity and reliability of this study measures are discussed in the Study Methodology section.

Competitive Intelligence (Independent Variable)

The importance of competitive intelligence has been increasingly recognized to maintain organization awareness of their markets, (du Toit, 2015; Elbashir et al., 2011; Moilanen et al., 2014; Tarraf & Molz, 2006; Witell, Gustafsson, & Johnson, 2014). The requirements and results from competitive intelligence were discussed by Maltz & Kohli (1996). Various approaches for intelligence collection from competitors were proposed by Heil & Robertson (1991).

Among the many potential benefits derived from CI are “improved competitive edge” (duToit, 2003; Editors, 2004; Moilanen et al., 2014; Westervelt, 1996), “overall company performance improvements” (Davison, 2001), “increased awareness of problems and opportunities enabling proactive strategies” (Elbashir et al., 2011; Moilanen et al., 2014); “enabling continuous improvement” (Babbar & Rai, 1993); “awareness of competitor strategies” (Harkleroad, 1993; Westervelt, 1996); “higher speed to markets and globalization (Batz, 1994; Ettorre, 1995); “increasing likelihood of organization survival” (Westervelt, 1996); “providing better customer assessment” (Darling, 1996); and “aiding in the understanding of external influences” (Moilanen et al., 2014; Sawka, 1996). Such benefits provide the basis for firms better understanding of the potential impact proposed innovations leading to hospital quality.

Effective CI increases the likelihood of organization survival and success which then to a greater extent becomes determined by the organization rate of learning about the market place (Anonymous, 2005; Elbashir et al., 2011; Moilanen et al., 2014; Tarraf & Molz, 2006). “If learning is faster than external changes, the organization will experience long term success” (Darling, 1996). While “as much as 68% of U.S. companies have an organized approach to providing such information to decision makers” (Westervelt, 1996), Ettorre (1995), proposed that probably less than 10 percent of American corporations manage the CI process well, effectively integrating the information collected into their strategic plans.” Thus, we state hypothesis ***H1: Hospital CI effectiveness has a positive effect on Hospital Quality.***

As shown in Appendix A, CI effectiveness was measured, according to Guimaraes & Armstrong (1998a) and Guimaraes & Paranjape (2013). The overall measure of CI effectiveness is represented by its component items average rating.

Strategic Leadership (Independent Variable)

Effective leadership has long been recognized as essential for organization long term success managing change (Flatten et al., 2015; Lee et al., 2014; Sun & Anderson, 2011; Zenger & Folkman, 2016). For this study organization strategic leadership is the most important (Garcia-Morales et al., 2012).

Changing organizations require “transformational or charismatic strategic leadership” (Garcia-Morales et al., 2012). Highly uncertain environments “requiring major innovations tend to be perceived as risky, where wrong decisions could be costly”. Such environments probably generate a high degree of stress. “Charismatic leadership would tend to reduce stress and generate confidence, and perhaps show how uncertainty can be turned into a vision of opportunity and success” (Flatten et al., 2015; Lee et al., 2014; Sun & Anderson, 2011). Waldman et al., (2001) proposed the leader articulates “a vision and sense of mission, showing determination, and communicating high performance expectations” (p.135). The followers supposedly “reply with confidence in the leader and strong admiration or respect”. Further, “they identify with the leader’s vision and with the organization itself, creating a high level of collective cohesion”. The charismatic leader “also show persistence and enthusiasm in pursuing goals while demanding of followers through their communication high-performance expectations” (Trice & Beyer, 1993). Historically there is evidence that top charismatic leadership is related to organization performance and innovativeness (Day & Lord, 1988; Yukl, 1998).

Transactional leadership is another important type of strategic leadership (Garcia-Morales et al., 2012). It is important for the operation of an existing, more stable organization, instead of one trying to make major changes. This type of strategic leadership “attempts to satisfy the current needs of followers by focusing on exchanges and contingent reward behavior, paying closer attention to exceptions or irregularities, and taking necessary corrective action” (Bass, 1985). Transactional leadership is conceptually similar to “the cultural maintenance form of leadership” described by Trice & Beyer (1993), “acting to strengthen existing organization processes, structures, strategies, and culture”.

Katz & Kahn (1978) argued that “both transactional and transformational (charismatic) leadership are potentially important at the strategic level, as a means of mobilizing an organization to meet new demands from its environment”. Further, Trice & Beyer (1993) acknowledged that “a given leader could show both types of strategic leadership over time”, and both types of strategic leadership are “somewhat complementary because they can be displayed separately or concurrently by the same individual leader” Bass (1985). Based on the above discussion, given that the effort to improve hospital quality is likely to require substantial changes to the organization, we state hypothesis **H2: Strategic leadership has a positive effect on Hospital Quality.**

Effectiveness in strategic leadership is represented by “the ability of the top management team to provide leadership when the organizational environment requires innovation”. Because “both forms of strategic leadership are potentially important and are thought to be complementary” (Bass, 1985), Appendix A shows the items proposed by Waldman et al., (2001) to measure both types of strategic leadership.

Management of Technology (Independent Variable)

The literature abounds with studies proposing a plethora of technologies potentially useful for organization innovation (Beattie & Fleck, 2005; Block, 2014; Lee et al., 2014; Li-Hua & Khalil, 2006; Wang et al., 2014). New technologies become important when organizations try to improve by providing new services and products. The impact from computer and related technologies on have long been addressed by many researchers (Guimaraes & Paranjape, 2013; Hostler et al., 2011; Hostler et al., 2012; Yoon et al., 2013). For example, Expert Systems used for “effectively capturing and

distributing knowledge and knowledge processing capability across an organization” have been studied by Friedenberga & Rice (1994) and Yoon et al., (1995). In the hospital setting the implementation of Healthcare Management Systems (HMS) has been widespread (Caccia-Bava et al., 2016), and the emerging tsunami represented by Bigdata Analytics (BDA) applications is truly impressive but also essential for improving operational as well as strategic decision support (Sakr & Elgammal, 2016; Ward et al., 2014). The importance of effective MOT for supporting innovation projects based on technology could not be overestimated. Many significant changes required for improving hospital quality are likely to over time require new technology. For these reasons, we propose hypothesis **H3: Hospital MOT effectiveness positively affects Hospital Quality.**

MOT Effectiveness enabling hospital quality initiatives “is the extent to which the needs for technology services while implementing hospital innovations have been met”. This measure was used by Guimaraes & Armstrong (1998a), as well as by Guimaraes et al., (2019). As shown in Appendix A, we ask respondents to rate their hospital along the specified dimensions. Their average represents the hospital MOT effectiveness.

Project Management (Independent Variable)

A survey of the literature on the desirable characteristics for successfully managing the process of changes required in significant innovation projects indicates several pre-requisites: such as “conformity to organization objectives, employee and department participation in the innovation process, monitoring progress, customer input, reasonably balancing risk taking with cost benefit analysis, and good communication within and outside the project team regarding how change is to be planned and executed process” (Alexander, 2015; Carvalho & Rabechini 2015; Rajablu et al., 2015;). In other words, “how innovation is implemented is considered to be an important determinant of success”. That was proposed, (Guimaraes & Armstrong, 1998b) and subsequently assessed in practice (Caccia-Bava et al., 2005; Guimaraes & Paranjape, 2013). The characteristics of the innovation process discussed in the literature are likely to influence projects’ success while hospitals try to improve their quality. Thus, we propose hypotheses **H4: Effective project management has a positive effect on Hospital Quality.**

For this study, project management effectiveness is represented by the degree to which the organization generally promotes “desirable innovation process activities”. As proposed by Caccia-Bava et al., (2005) and Guimaraes & Paranjape (2013), we asked respondents “to please rate the importance that the hospital places on” ten items “considered important for increasing the likelihood of innovation success”.

Organization Culture (Independent Variable)

Since the early 1980s many authors have considered company culture to be important for long term organization success (Peters & Waterman, 1982; Davis, 1984). Büschgens et al., (2013) proposed that this literature is based on two major propositions: “that all cultures reflect the values and actions of the senior leaders;” and “that cultures are important determinants of firm performance”. While “organization culture has a strong intuitive appeal as a determinant of company innovativeness and performance, from the beginning researchers have had difficulties producing conclusive results. Such difficulties detract from attempts to influence practitioners on how to change their company culture to improve innovativeness”. These difficulties linking organization culture, innovativeness, and performance have been addressed by Ogbonna & Wilkinson (2003) stating that, just as in the organizational behavior literature, researchers in the human resources area question the wisdom of planned culture change and even the importance of the culture concept.

Additionally, “while addressing the organization culture-performance relationship, researchers have had conceptual difficulties defining culture” (Schneider et al., 2013), and “experienced various methodological issues due to small sample sizes, construct measurement issues, and variance created while trying to compare multi-industry assessments” (Detert et al., 2000). Despite academic research on culture over time becoming methodologically more sophisticated, and individual researchers having

used diverse measures of company culture and performance, “making cross studies comparisons remained very difficult” (Hartnell et al., 2011; Sackmann, 2011).

The critical question then becomes, if in general company innovativeness is intuitively linked to company culture, why have researchers not been able to conclusively demonstrate this link? Büschgens et al. (2013) provided some possible reasons. First, some firms known for their innovativeness become superficially known for some unique aspect of their corporate culture. For instance, 3M’s innovativeness is explained as due to being essentially a science-based organization. For Apple’s innovativeness the credit goes to the idea of employees focusing on larger product visions and the creation of new major ground-breaking technologies. Google’s innovativeness is explained by its employees’ individuality and broad freedom. Such superficial analysis of existing cultural traits, as having led to successful innovativeness, is misleading because company innovativeness will require more than just one cultural trait. Such mythology adds to the confusion representing the other side of the spectrum where a very large number of culture traits discussed in the literature as being mostly empirically irrelevant as determinants for company innovativeness.

Thus according to Büschgens, et al. (2013), in practice the heterogeneity of culture is mirrored by a multitude of cultural values that has been investigated scientifically. Their literature review, identified more than 40 different cultural traits supposedly related to company innovativeness, comprising a wide range of broad variables such as “innovation culture” (Gumusluoglu, & Ilsev, 2009) or “supportive culture” (Berson et al., 2008; Wei & Morgan, 2004) to very specific cultural traits like tolerance for failure (Danneels, 2008) or participative decision-making (Hurley & Hult, 1998).

Some confusion is likely to emanate from such wide diversity of traits being investigated. A few studies proposing a positive link between culture and innovation produced counter intuitive results, with negative correlations for “supportive culture” (Berson et al., 2008) and for culture stability (Jaskyte, 2004). Given the confusing results the various interpretations, measurements, etc., we must accept the statement by Büschgens et al. (2013) that “a compelling theoretical explanation for the relation of organizational culture and innovation is still missing.” The major problem seems to be related to critical issue of construct measurement and validity. Only after this issue is resolved will researchers be able to empirically test the relationships between organization culture and its possible determinants and outcomes. To hopefully cut through the conceptual and measurement difficulties, this study used a new measure for company culture which seems to be more useful in practice (Guimaraes et al., 2018; Guimaraes et al., 2019). Thus, we propose hypothesis ***H5: Desirable organization cultural traits have a positive effect on Hospital Quality.***

The company culture measure used here was developed through organizations found by prior studies to be successful innovators and having the managers of such organizations report their organization’s cultural traits they believed to have been most instrumental for their success (Guimaraes et al., 2018). Appendix A shows the exact items comprising this measure.

STUDY METHODOLOGY

This section provides an overview of the sampling and data collection procedures, a brief description of the sample, the validity and reliability of the study’s constructs, and the data analysis procedures for testing the hypotheses.

Sampling, Data Collection, and Sample Description

An emailed questionnaire was used for collecting data from hospital Chief Quality Officer (CQO) of 1000 randomly selected hospitals from a list of approximately 6,200 in a privately owned US hospital directory. The cover letter to the CQO stated the study’s purpose, promised strictest anonymity for all information, and that only summary information would be published. It also asked for email response to the questionnaire and offered to share this study’s results. A published report from a prior study regarding success factors for hospital processes reengineering projects was attached as a courtesy.

From all respondents asked, for a wide variety of reasons 42 CQOs declined to participate, and 386 CQO's expressed willingness to participate in the study through email. The study targeted the CQO role because that is their area of expertise and aware of their hospital activities regarding the issues relevant to this study from a corporate perspective including the independent variables.

The CQO returned 296 questionnaires however 38 were unusable because of incomplete information producing a usable sample size of 258 responses. The study's response rate is deemed acceptable for exploratory studies of this type (Teo & King, 1996). This is consistent with mailed surveys past experience (Igbaria et al., 1991; George & Barksdale, 1974). Nevertheless, care was taken to assess the representativeness of the sample. Chi-square tests were used comparing the sample against non-respondents, to check for the possibility of non-response bias.

The hospital demographics in this field test are presented in Tables 1 and 2. Using t-tests for comparing the percentages of hospitals in each category for the sample versus the percentages in the population, based on hospital geographical area and size (number of beds) the sample shows no significant difference, thus indicating good sample representation.

Construct Validity and Reliability

Following many of Carmines & Zeller (1979) recommendations, in an effort to address "content validity: a thorough survey of the relevant literature was undertaken to understand the important aspects of each major construct and its individual components, and include all their important dimensions". The constructs addressed in this study and their measures have been used by prior studies, nevertheless several precautions were taken to ensure the validity of the measures in the context of this research project.

A group of three hospital managers from different organizations reviewed the questionnaire to further reduce the possibility of non-random error, considered to be the main source of invalidity (Carmines & Zeller, 1979, p. 15). This is important for its validity measuring the factors proposed as important for hospital quality, as well as the latter, in terms of their completeness "including all

Table 1. Hospital geographical area (n=258)

| US Geographical Area | Frequency | % |
|----------------------|-----------|--------|
| Southwest | 58 | 22.48 |
| Southeast | 51 | 19.77 |
| Central | 40 | 15.50 |
| Northwest | 44 | 17.05 |
| Northeast | 65 | 25.19 |
| Total | 258 | 100.00 |

Table 2. Hospital size in number of beds (n=258)

| Number of beds | Frequency | % |
|----------------|-----------|--------|
| 50 or below | 22 | 8.53 |
| 51 to 100 | 42 | 16.28 |
| 101 to 300 | 58 | 22.48 |
| 301 to 500 | 71 | 27.52 |
| 501 or above | 65 | 25.19 |
| Total | 258 | 100.00 |

relevant items”, and readability reducing likelihood that questionnaire respondents will misinterpret a particular question”. To improve readability some questions were reworded; otherwise, the items composing major variables were as taken from the literature.

Construct validation addresses the extent to which a measure performs in accordance with theoretical expectations. To ensure construct validity, “the theoretical relationships between the constructs should have been previously established, and these relationships hopefully have been empirically supported by different studies over time” Carmines & Zeller (1979). As discussed earlier in the Theoretical Background section, the theoretical underpinnings of this study are relatively well established, with the constructs and most of the items in each construct having been addressed before by several authors. Nevertheless, the constructs’ reliability was re-tested using “Cronbach’s alpha coefficient” proposed by Carmines & Zeller (1979). Various authors have proposed different acceptable levels for the reliability coefficient. Nunnally (1978) suggested a coefficient of 0.50 or higher would suffice, Srinivasan (1985) and Magal et al., (1988) proposed that when using a non-validated data gathering instrument in exploratory research, a coefficient of 0.5 or higher is acceptable; Van de Ven & Ferry (1980) proposed that for exploratory research even a value of 0.4 or higher would be sufficient. In this study, the reliability coefficients for the major variables were higher than 0.70, proposed by Peterson (1994) as useful for more rigorous studies. Table 3 shows the internal consistency coefficients for the scales used in this study.

Data Analysis Procedures and Results

All data analysis for data validation and testing the hypotheses proposed in this study were conducted using IBM SPSS software commercially available. Table 3 shows the average and standard deviation for each variable. For each major variable in Table 3, the values for its component’s items shown in Appendix A, were averaged to represent the value for the corresponding main construct. Confirmatory factor analyses for the items in each main variable were conducted as the basis for their validation and as a prerequisite for assessing their internal reliability coefficients presented within parentheses in Table 3. Each major variable component items were subjected to a principal component analysis followed by a varimax (orthogonal) rotation to identify their underlying factors. To be included in a given factor the item is expected to load unambiguously (i.e., with one loading of 0.5 and no other loadings greater than 0.4), as suggested by Magal et al. (1988). Several researchers (i.e. Nunnally, 1978), suggested “the minimum eigenvalue for a factor to be retained was specified as 1.0”. In this study this procedure produced single factor solutions for all major factors except for hospital culture whose components loaded unambiguously into four factors (Organization Awareness, Seeking Improvement, Goal Achievement, and Trust and Cooperation), as expected from prior research (Guimaraes et al., 2018). Because theoretically these sub-factors are not useful for this study’s objective, these four factors were subject to a second order factor analysis and produced a single factor used to represent hospital organization culture in this study. As the preliminary test for each proposed hypotheses, Pearson’s correlation coefficients between the major study variables were computed and presented in Table 3. To detect any possible difference between the two strategic leadership types as determinants of business innovation success, they were processed separately in this analysis. \

Because of the likelihood of collinearity among the independent variables, a stepwise multivariate regression analysis was conducted to assess the extent to which each independent variable incrementally contributes to explaining the variance in the dependent variable. Because this study is focused on assessing the impact of strategic leadership as a whole, the two leadership types were combined, since this combination was deemed valid by a second order factor analysis. The multivariate regression analysis results are presented in Table 4.

Based on Table 3, in comparison with their main competitors, on average the hospitals in the sample are thought to be performing slightly above average in their management of technology effectiveness. On the other hand, on average the hospitals in the sample are thought to be performing below average in the areas of charismatic leadership, competitive intelligence, having the specific

Table 3. Correlations between major variables (n=258)

| | Mean | Std Dev | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|-----------------------------|------|---------|-------|-------|-------|-------|-------|-------|-------|
| 1. Hospital Quality | 3.87 | 1.39 | (.78) | | | | | | |
| 2. Competitive Intelligence | 3.35 | 1.81 | .33** | (.76) | | | | | |
| 3. Transactional Leadership | 4.01 | 1.23 | .35** | NS | (.85) | | | | |
| 4. Charismatic Leadership | 3.20 | 1.79 | .40** | .25** | .26** | (.89) | | | |
| 5. Management of Technology | 4.13 | 1.17 | .39** | .29** | .31** | .38** | (.78) | | |
| 6. Project Management | 3.83 | 1.32 | .55** | .19* | .15* | .44** | .52** | (.82) | |
| 7. Organization Culture | 3.17 | 1.12 | .58** | .53** | .37** | .51** | .39** | .54** | (.83) |

Numbers in parentheses diagonally are Cronbach's alpha reliability coefficients.
NS means not significant, * means $p < .05$, ** means $p < .01$

Table 4. Results of multiple regression using stepwise method

| Dependent Variable: Hospital Quality | Incremental R Squared | Significance Level |
|--------------------------------------|-----------------------|--------------------|
| Independent Variables*: | | |
| 1. Organization Culture | .34 | .00 |
| 2. Project Management | .13 | .00 |
| 3. Management of Technology | .09 | .01 |
| 4. Strategic Leadership | .05 | .01 |
| 5. Competitive Intelligence | .02 | NS |
| Total Variance Explained | .63 | |

* In sequence they entered the regression equation.

characteristics in the change process and the cultural traits needed for improving hospital quality. Furthermore, the sample shows significant differences from hospital to hospital along all the major variables studied, as indicated by the relatively large standard deviations.

The “Pearson’s correlation coefficients” used as the first test hypotheses H1-H5 are shown in Table 3. All five major independent variables show a direct relationship to hospital quality, as defined earlier in this study. Thus, all five hypotheses are found significant at the 0.01 level or better. To complement this analysis, addressing the possibility of collinearity among the determinants of hospital quality, a stepwise multivariate regression analysis assessed the extent to which each of the variables incrementally contributed to explaining the variance in hospital quality. Based on the specific sequence in which the determinants of hospital quality entered the regression equation, the results are shown in Table 4. The hospital culture alone explains 34 percent of the variance in hospital quality, followed by the characteristics of the hospital’s innovation process (13 percent), performance in effectiveness managing technology (an additional 9 percent), and last strategic leadership explain an extra 5 percent. In total these four success factors can account for a total of 63 percent of the variance in hospital quality, even though in this case the contribution from competitive intelligence is not statically significant.

CONCLUSION

As we briefly mentioned earlier, hospital administrators are very interested and motivated to improve hospital quality for a variety of important reasons to themselves and because it is obviously important

in the eyes of many stakeholders. To hospital patients better hospital quality means potentially greater benefits from the medical services they receive, but most importantly, it means greater peace of mind while under care. To care givers hospital quality is directly connected to professional fulfillment and pride which directly affects their job motivation and mental health. Last, to health care quality regulators, and accrediting organizations, hospital quality is the primary reason for their jobs. With the increase in competition as well as the increase in quality accreditation activities, improving hospital quality is increasingly important. This study shows strong evidence about all five determinants proposed in the literature for improving hospital quality as measured here. The results suggest that hospital managers, especially CQO's, should strive to improve their hospital's culture, as well as performance of competitive intelligence, strategic leadership, management of technology, and the project management process used to implement the necessary improvements toward hospital quality.

Some insights can be gleaned, from this study's results regarding CI. To improve it, hospital managers should assume their market intelligence collection from perspectives matching the six areas considered important: traditional and emerging hospital competitors, traditional and non-traditional customer needs and wants, hospital relationships with partners, and the development of new products or services. The importance of any one of these areas may be relatively higher or lower depending on the hospital circumstances, including the possibilities that in some cases one or two of these sources may be irrelevant. Further, before embarking in major programs for quality improvement which are supposedly market driven, cost/benefit analysis for changes should be validated with CI information, not just guesstimates by top managers or external consultants. At the very least, the possible market reactions to projects involving significant innovations must be carefully considered. Based on this study, on average many hospitals' performance in this area important for quality improvement success is below average and needs attention.

Regarding strategic leadership there are also several implications from this study. Charismatic leadership "showing determination while accomplishing goals, inspiring confidence, making people feel good around you, communicating expectations for high performance, generating respect, transmitting a sense of mission, and providing a vision of what lies ahead" is on average relatively scarce in many hospitals today, and judging by its nature it should be difficult to develop. Nevertheless, managers must try, particularly in hospitals with intense competition (Guimaraes et al., 2019) requiring continuous innovation. Also apparently important is transactional leadership "taking action if mistakes are made, pointing out what people will receive if they do what needs to be done, reinforcing the link between achieving goals and obtaining rewards, focusing attention on deviations from what is expected, and rewarding good work" which by its nature should be easier to develop. Pawar & Eastman (1997) have proposed that "transactional leadership is more relevant within a stable organization environment instead of one attempting to implement changes. Furthermore, Katz & Kahn (1978) proposed that "while charismatic leadership seems to be more relevant in organizations engaged in significant changes, both types of strategic leadership are potentially important". Indeed, for higher hospital quality this study confirms that both types of leadership are important.

Effectiveness managing technology is also important for higher hospital quality. Managers should look at hospital performance regarding its technology leadership position among competitors, its knowledge and ability in getting the best technology available, effectiveness in using specific technologies, and benchmarking the use of specific technologies against the hospital's main competitors or best-in-class target organizations. An important requirement to accomplish these objectives is the clear definition of the more important technologies necessary to support the hospital's main services. Managers also must account for the fact that successfully implementing each of the various technologies depends on their specific success factors, often different from technology to technology. Despite their great importance, success factors for the various technologies are considered beyond the scope of this study and have been discussed more thoroughly elsewhere (Guimaraes et al., 1992; Guimaraes et al., 2014; Guimaraes & Igbaria, 1997; Udo & Guimaraes, 1994; Yoon et al., 1995; Yoon et al., 1995; Yoon et al., 1998).

Toward increasing the chance for success of projects aimed to improve hospital quality, top managers must ensure that their project management process follow prescribed guidelines based

on the desirable characteristics studied here: “all significant changes must conform to organization objectives, all affected departments participate in the change process, individual employee input is considered important, clients’ input is considered important, business partners input is considered important, managers ability to balance risk taking with cost/benefit, ensuring that clearly defined measures to monitor progress toward changes implementation exist, that innovation objectives and progress are clearly communicated, and that the innovation management teams respond quickly and effectively to required change”. These guidelines must be widely shared and enforced by project managers for significant innovations toward hospital quality.

The specific items comprising our measure of organization culture provide interesting insights from a Human Resources Management perspective. These items seem quite dependent on specific employee skills, abilities, and motivation to acquire, process, and manage knowledge as an organization; specifically, their ability to use external resources to obtain information such as “personal networks, consultants, seminars, internet, databases professional journals, academic publications, market research, laws and regulations”. Their ability to search for relevant information concerning their industry, including the company, competitors, etc., might affect every day and long term company operations. Managers should motivate employees to use and deal with information sources within as well as beyond their industry. This would provide an organization environment enabling employees to freely communicate ideas across departments. That way when a business unit obtains important information, it can promptly communicate it to other organization units. Such environment can be useful in absorbing new knowledge and to expand it before making it available for further purposes. Further such environment is likely to lead to developing improved tools and processes.

Study Limitations and Research Opportunities

An extensive survey of the relevant literature, provided the basis for proposing and empirically testing a model integrating organization culture, strategic leadership, competitive intelligence, management of technology, and specific characteristics of the hospital’s project management process as strategic determinants of hospital quality. While testing such a model is an important contribution to knowledge, it is also likely that other strategic determinants of hospital quality may be helpful in further explaining variance in hospital quality. Also helpful for that purpose would be the identification and empirical testing of factors mediating or moderating the relationships between hospital quality and its strategic determinants.

Given the importance of increased competition among hospitals, a very interesting research target would be the relationship between increased competition and hospital quality. Some constructs and their relationships to hospital quality are poorly understood. Specifically, two studies have shown that “Board Quality committees are a positive factor for improving hospital quality performance, but fewer than 60 percent of hospitals had them” (Jha & Epstein, 2010; Jiang et al., 2009). Further, other authors indicated that “compensation and performance evaluation based on executive quality performance was related to better hospital quality performance indicators” (Jiang et al., 2009; Vaughn et al., 2006), but that “quality measures were not significant in CEOs’ performance evaluations in most cases” (Jiang et al., 2008; Joshi & Hines, 2006). Last, an important study may address “interactions between the Board and the medical staff during the process of establishing a hospital’s quality strategy” (Vaughn et al., 2006).

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APPENDIX A

Appendix table

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|---|----------------------|
| Measuring Hospital Quality: Compared with its main competitors, please rate your hospital along the items below using the scale (1) much worse, (2) significantly worse, (3) slightly worse, (4) about even, (5) slightly better, (6) significantly better, and (7) much better. | |
| 1. Overall patient care. | 1 2 3 4 5 6 7 |
| 2. Infection control effectiveness. | 1 2 3 4 5 6 7 |
| 3. Overall hospital environment (cleanliness, attractiveness, safety, security, etc.). | 1 2 3 4 5 6 7 |
| 4. Quality of medical services (Physicians and staff performance). | 1 2 3 4 5 6 7 |
| 5. Standard operating procedures. | 1 2 3 4 5 6 7 |
| 6. Responsiveness of service. | 1 2 3 4 5 6 7 |
| 7. Patient complaints rate. | 1 2 3 4 5 6 7 |
| 8. Resolution of patient complaints. | 1 2 3 4 5 6 7 |
| 9. Overall hospital image. | 1 2 3 4 5 6 7 |

Appendix table

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| Measuring Organization Culture Traits: Using the same scale as above, please rate the extent to which your hospital shows the specific culture trait listed below. | |
| 1. People in this organization have a sense of direction, a vision for its future, with clearly defined goals, objectives, and responsibilities. | 1 2 3 4 5 6 7 |
| 2. People are tuned in to what is going on in the market place regarding customers, competitors and their products/services, suppliers, etc. | 1 2 3 4 5 6 7 |
| 3. New ideas are encouraged and seriously evaluated. | 1 2 3 4 5 6 7 |
| 4. Goals and tasks assignments are discussed and agreed to by the people involved. | 1 2 3 4 5 6 7 |
| 5. The goals set are challenging but attainable. | 1 2 3 4 5 6 7 |
| 6. People are accountable for what they agreed to do. | 1 2 3 4 5 6 7 |
| 7. People are willing to personally sacrifice a little to accomplish their tasks and goals. | 1 2 3 4 5 6 7 |
| 8. People are rewarded for good performance toward their goals. | 1 2 3 4 5 6 7 |
| 9. We use metrics on our creative and development processes to track how much time and money is spent on creating and implementing innovation. | 1 2 3 4 5 6 7 |
| 10. In this organization, employees trust each other, communicate and cooperate freely. | 1 2 3 4 5 6 7 |
| 11. There is a good balance between specialization and ability to step in to do someone else's work. | 1 2 3 4 5 6 7 |
| 12. In this organization employees trust their superiors. | 1 2 3 4 5 6 7 |

Appendix Table

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| Measuring Effectiveness in Competitive Intelligence: Compared with its main competitors, and using the scale (1) much worse, (2) significantly worse, (3) slightly worse, (4) about even, (5) slightly better, (6) significantly better, and (7) much better, please rate your hospital effectiveness identifying strategic business opportunities and problems while dealing with: | |
| 1. traditional competitors, | 1 2 3 4 5 6 7 |
| 2. emerging competitors, | 1 2 3 4 5 6 7 |
| 3. traditional customer needs and wants, | 1 2 3 4 5 6 7 |
| 4. non-traditional customer needs and wants, | 1 2 3 4 5 6 7 |
| 5. relationships with business partners, suppliers, etc. | 1 2 3 4 5 6 7 |
| 6. product or service development. | 1 2 3 4 5 6 7 |
| Measuring Effectiveness in Strategic Leadership. Using the same scale above please rate the extent to which your hospital 's top managers in general exhibit the particular behavior listed below when compared to managers of main competitors. | |
| Transactional leadership: | |
| 1. Takes actions if mistakes are made. | 1 2 3 4 5 6 7 |
| 2. Points out what people will receive if they do what needs to be done. | 1 2 3 4 5 6 7 |
| 3. Reinforces the link between achieving goals and obtaining rewards. | 1 2 3 4 5 6 7 |
| 4. Focuses attention on irregularities, exceptions, or deviations from what is expected. | 1 2 3 4 5 6 7 |
| 5. Rewards good work. | 1 2 3 4 5 6 7 |
| Charismatic leadership: | |
| 1. Shows determination when accomplishing goals. | 1 2 3 4 5 6 7 |
| 2. I have complete confidence in them. | 1 2 3 4 5 6 7 |
| 3. Makes people feel good to be around them. | 1 2 3 4 5 6 7 |
| 4. Communicates high performance expectations. | 1 2 3 4 5 6 7 |
| 5. Generates respect. | 1 2 3 4 5 6 7 |
| 6. Transmits a sense of mission. | 1 2 3 4 5 6 7 |
| 7. Provides a vision of what lies ahead. | 1 2 3 4 5 6 7 |
| Measuring Desirable Project Management Characteristics. Using the same scale above, please rate the extent to which your hospital innovation projects generally show the following characteristics: | |
| 1. All significant innovations must conform to company objectives, | 1 2 3 4 5 6 7 |
| 2 All affected departments participate in the innovation process, | 1 2 3 4 5 6 7 |
| 3. Individual employee input is considered important, | 1 2 3 4 5 6 7 |
| 4. Customers input is considered important, | 1 2 3 4 5 6 7 |
| 5. Business partners input is considered important, | 1 2 3 4 5 6 7 |
| 6. We have the ability to balance risk taking with cost/benefit, | 1 2 3 4 5 6 7 |
| 7. We have clearly defined measures to monitor progress, | 1 2 3 4 5 6 7 |
| 8. Innovation objectives and progress are clearly communicated, | 1 2 3 4 5 6 7 |
| 9. We respond quickly to required change, | 1 2 3 4 5 6 7 |
| 10. We respond effectively to required change. | 1 2 3 4 5 6 7 |
| Measuring MOT Effectiveness in Supporting Hospital Innovation. Using the same scale as above, please rate the extent to which compared to its main competitors your hospital is considered to have: | |
| 1. Technology leadership in the industry, | 1 2 3 4 5 6 7 |
| 2. Knowledge of how to get the best technology, | 1 2 3 4 5 6 7 |
| 3. Effectiveness with which technology has been used over the years, | 1 2 3 4 5 6 7 |
| 4. Effectiveness using technology in comparison with main competitors. | 1 2 3 4 5 6 7 |

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Tor Guimaraes has been rated by several independent sources as one of the top researchers in the world based on publications in the top IS journals. He holds the Jesse E. Owen Chair of Excellence at Tennessee Technological University. He has been the keynote speaker at numerous national and international meetings sponsored by organizations such as the Information Processing Society of Japan, Institute of Industrial Engineers, Sales and Marketing Executives, IEEE, Association for Systems Management, and the American Society for Quality Control. Tor has consulted with many leading organizations including TRW, American Greetings, AT&T, IBM, and the Department of Defense.