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Leadership and quality management – a correlational study between leadership models and quality management principles

Liderança e gestão da qualidade – um estudo correlacional entre estilos de liderança e princípios da gestão da qualidade

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Abstract: Quality management has been established as one of the most important discussion topics in modern management. Among the critical factors for the success of quality management programs, leadership is one of the most cited factor. However, although the relationship between quality management and leadership is clear, it is possible to perceive several gaps of research that can be explored. Thus, the objective of the present study is to explore the relationship between quality management and leadership, using the transformational-transitional leadership model, and Competing Values Framework leadership model. Relationship between leadership models and quality management principles were explored using correlation analysis of Pearson. Although it could not be found significate differences between correlation coefficients for transformational and transitional leadership, some Competing Values Framework leadership styles stand out, showing higher and statistically significate correlation coefficients. Thus, the most important contribution of this study is realizing an initial exploration about the relationship between leadership and quality management principles, pointing tendencies and making way so new studies can extend this knowledge. Here discussed the importance of, in future studies, establishing the same correlations for different participant samples and use, further principles, quality management practices and tools.

Keywords: Quality management; Leadership; Transformational-transational; Competing values framework.

Resumo: *A gestão da qualidade tem se constituído em um dos tópicos de discussão mais importantes em gestão moderna. Dentre o levantamento de fatores críticos para o sucesso de programas de gestão de qualidade, a liderança apresenta-se como um dos fatores mais citados. No entanto, embora a relação entre gestão de qualidade e liderança seja clara, é possível perceber que há ainda diversas lacunas de pesquisa a serem exploradas. Desse modo, o objetivo do presente estudo foi explorar a relação entre gestão da qualidade e liderança, utilizando-se, para tanto, do modelo de liderança transformacional-transacional e do modelo Competing Values Framework. A relação entre os estilos de liderança e princípios de gestão da qualidade foi explorada com análise de correlação de Pearson. Foram obtidos coeficientes de correlação positivos tanto para os perfis de liderança tanto transformacional quanto transacional e perfis de liderança do Competing Values Framework, de modo que alguns desses perfis destacaram-se, apresentando coeficientes de correlação maiores. A principal contribuição do trabalho foi realizar uma exploração inicial sobre a relação entre estilos de liderança e princípios da qualidade, apontando tendências e abrindo caminho para que novos estudos possam estender esse conhecimento. Discute-se a importância de, em estudos futuros, estabelecer as mesmas correlações para diferentes amostras de respondentes e empregar, além de princípios, práticas e ferramentas de gestão da qualidade.*

Palavras-chave: *Gestão da qualidade; Liderança; Transformacional-transacional; Competing Values Framework.*

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1 Introduction

According to Chen (1997), recognizing quality as an effective strategy in an increasingly competitive market has forced companies to implement programs to improve their products and services. For Fotopoulos & Psomas (2009), in recent years, quality management and improvement systems have evolved fast, and, in the last decades, inspections of activities has been more and more replaced and supplemented with quality control and quality assurance standards.

The quality management program was introduced by Deming (1986), Juran (1989) and Feigenbaum (1986), and it is focused on customers, continuous improvement, teamwork and constant update. Sila & Ebrahimpour (1992) define quality management as an approach to improve competitiveness, effectiveness and flexibility of an organization as a whole. Then, quality management would be essentially a way to plan, organize and understand that every activity depends on every individual at every level of hierarchy (Sila & Ebrahimpour, 1992).

Most quality management programs consider technical elements, including statistical process control, confidence analysis and product design (Chen, 1997). However, the creators of quality management were less focused on tools, techniques and technical training and more on the human aspects of production, once they recognized these tools were not responsible for quality management. Hart & Schlesinger (1991) also indicate a successful implementation of a quality program requires cultural changes in the company, in terms of values, organizational structure, the way people work and even how people feel in relation to their participation and involvement in the company's issues.

Several studies about determinants of successful quality program implementation and maintenance show leadership as a very significant factor (Fotopoulos & Psomas, 2009; Sila & Ebrahimpour, 2005; Pannirselvam & Ferguson, 2001), which also modulates the effect of other factors. Idris & Ali (2008) indicate leadership is one of the key categories of the Malcolm Baldrige National Quality Award (MBNQA), which reinforces its importance in achieving quality.

However, several authors suggest that, although the literature about quality management shows leadership development as something essential, it has not presented studies that systematically seek to describe the nature of leadership or mechanisms used by leadership to make quality culture implementation easier. For example, Waldman et al. (1998) suggest that, despite great consideration given to leadership in the *Malcolm Baldrige National Quality Award* (MBNQA), its role in the continuous quality improvement process is not really clear. Hirtz et al. (2007) suggest that, although the field of quality believes management is key for a successful quality program, the effect of specific leadership models on quality performance has not been determined. Ovretveit (2005) says that, among the studies conducted so far about the influence of managers on quality management, evidence is not strong of what management actions are effective for quality management. Lakshman (2006) says that the potential association of the literature about leadership with the literature about quality management is huge and it may be beneficial to both theory and practice.

Then, we believe exploring the relation between leadership models for quality facilitators and quality management principles is justified, once exploring such relation through explanatory and experimental studies, especially those seeking to establish correlations between the characteristics of leadership models and the implementation of principles, shows a gap in the literature. In addition, given leadership is an aspect of great relevance for quality management, such understanding seems to be essential if we consider it could be the base for the creation of policies and practices for the development of leadership aspects that are relevant to successful quality program implementation and maintenance, such as individual development plans and improvements in recruitment and selection processes.

Therefore, the purpose of this study is to explore the relationship between quality management and leadership in Brazilian companies, seeking to create correlations between leadership models and quality management principles.

2 Quality management

For Flynn et al. (1994), quality management can be defined as an integrated approach to achieve and maintain quality results, focusing on continuous improvement and defect prevention at all levels and in all functions of an organization, aiming to reach or exceed consumer expectations. For Dean & Bowen (1994), quality management is "a management philosophy or approach", comprised of a "set of mutually supporting principles, each based on a group of practices and techniques". Sousa & Voss (2002) exemplify this relation, saying the "continuous improvement" principle can be supported by the "process management" practice, which, in turn, uses several techniques, such as "statistical process control" and "Pareto".

Based on Sousa & Voss (2002) and Dean & Bowen (1994), Gambi (2014) defines "quality principles" as "essential rules considered as the base of quality management"; "quality practices" as "conventional standard execution of quality management technique(s)", and "techniques" as "tools and/or methods (intellectual or not) that help in the management process". These are the definitions we will use in this study.

Sousa & Voss (2002), gathering data from five main studies that summarized the vast literature on

quality management and identified its constructs, observed a substantial agreement regarding dimensions classified as corresponding to quality management, showing that quality management, as a field of knowledge, has matured, with solid knowledge base (Sousa & Voss, 2002).

For Wilkinson et al. (1998), quality management elements can be divided in two dimensions: hard and soft. Hard elements refer to production and process control techniques, which ensure the correct operation of processes (including design process, 'just-in-time' philosophy, ISO 9000 and the seven basic tools of quality control), while soft elements include topics such as leadership, human resource management, supplier relationship and customer focus (Wilkinson et al., 1998). According to Rahaman & Bullock (2004), soft elements have many roles, such as creating a climate to ensure the dissemination and implementation of hard elements can happen, and impacting the organization's performance just like traditional practices of human resource management.

A study conducted by Fotopoulos & Psomas (2009) indicated the following as the main factors of quality management: top management quality practices, employee involvement, customer focus, data quality management, and process and utilization of quality tools and techniques. For the authors, such results confirm the impact of hard elements on the organization's performance is less significant than the impact of soft elements (Fotopoulos & Psomas, 2009). Abdullah et al. (2009), analyzing dates from 255 Malaysia companies, found that some soft factors of quality management had significant influence on companies performance, as management commitment, customer focus and employee involvement. Also Prajogo (2005) demonstrated that the adoption of quality management principles for service and manufacturing companies significantly promoted a product quality improvement in terms of reliability, performance, duration and requirements conformity. Dubey & Gunasekaran (2015), using multiple regression analysis, identify four soft dimensions importants for the success of quality management implementation: human resources, quality culture, motivational leadership and relationship management. Thus, the meta-analysis realized by Jitpaiboon & Rao (2007) revealed that soft elements are significantly associated with busssiness results.

Fotopoulos & Psomas (2009) pointed that obtaining a competitive advantage that ensure the company sustainability and market dominance, concerning to satisfying customers and substantially improve quality, depends on quality management soft elements and quality management tools and techniques. However, tools are just the quality improvement vehicle, and alone are not capable of conducing the company to a continuous improvement process, customer satisfaction and market position consolidation, without top management and employees proper conduction, besides suppliers support. The authors stated that "quality management is induced much more by adoption of a quality culture than for technic methods" (Fotopoulos & Psomas, 2009).

However, besides the quantity of studies that reinforce the soft aspects importance for a quality program implementation, this topic still has been explored and debated, especially in Brazilian context. For example, Roesch & Antunes (1995) pointed that cultural change represented by soft aspects requires a consultative management style, just like treating people well, giving them training and developing opportunities and giving them empowerment, sharing power, knowledge and information. However, this approach conflicts with the strong hole atributed to leadership, besides the authoritary style (top-down) of implementation of the model. In the case study presented, authors point the employees ambiguous perception about quality management program implementation, once it raised leaders power, extending management work, besides also had created employee involvement with companie objectives, cooperation and collaboration beyond employees (Roesch & Antunes, 1995).

3 Leadership

3.1 Definition of leadership

For Puffer & McCarthy (1996), the literature on leadership has produced many definitions, each of them emphasizing different aspects. Traditionally, leadership has been defined considering characteristics of personality, behaviors, influence on other people, standards of interactions with people, roles performed and authority of an administrative and formal position (Yukl, 1999).

According to Clemmer & McNeil (1989), leadership means managing people and accomplishing organizational goals through the direction of human labor. This way, an effective leader able to encourage and use the human resources available in the organization to reach goals, which should be consistently aligned with the customers' needs (Clemmer & Mcneil, 1989).

In their classical study on leadership, Bennis & Nanus (1985) say leadership is about having the view of what should be done, paying attention to events, establishing a new direction and, especially, concentrating everyone's attention on the organization. Thus, Bennis & Nanus (1985) suggest a leader has to be good at planning, organizing, commanding and controlling, to help employees achieve what most people think it is impossible.

In this study, we've decided to address two leadership models: the transformational-transactional model and the Competing Values Framework model.

The first was chosen because it is one of the most frequently used in general literature and specifically in the literature on quality management, which allows a better comparison of results. The second model was chosen because it presents four perspectives to leadership models, ensuring greater variability of results. In addition, the literature has several studies relating quality management to organizational culture by using the Competing Values Framework model, allowing to study the relation between leadership and organizational culture in the quality management context.

3.2 Transformational-transactional leadership

Based on concepts of Burns (1978) and Bass (1985), Bass & Riggio (2006) developed the transformational-transactional leadership concepts. This theory was developed in the context of new perspectives in leadership that appeared after the 20th century, and that were contrary to traditional theories, emphasizing emotions and values and recognizing the importance of symbolic behaviors and the role of the leader in making events meaning for followers (Yukl, 1999).

The transformational-transactional leadership model consider the existence of two poles regarding the behavior of a leader, and a third type, a counter variable, called passive leadership, or *laissez-faire* (Bass, 1985; Bass & Avolio, 1990). For Bass & Avolio (1997), all leaders have behaviors from both poles, what varies is the frequency of such behaviors.

The transformational pole refers to a leader who identifies major needs and motivations of followers and encourages them to reach high performance standards (Burns, 1978). Besides, this leader is concerned about raising the followers' awareness of the importance of reaching certain results, encouraging them to look beyond self-interests to the common good (Laohavichien et al., 2001) and develop their own skills, defining goals and objectives based on their intrinsic motivation (Bass, 1985; Bass & Avolio, 1990).

According to Bass (1985), transformational leadership involves four dimensions: charisma, inspiration, intellectual stimulation and individualized consideration. A charismatic leader wins the trust of followers, establishes a view of the future and is respected. Inspiration refers to communicating views, especially by example. The leader becomes an example to be followed and earns admiration, respect and trust of followers (Bass & Riggio, 2006). An intellectually inspiring leader promotes new ideas and encourages others when critically evaluating both his and someone else's work. Lastly, individualized consideration refers to providing mentoring and being a coach to followers, with feedback about their performance (Avolio & Bass, 2002).

On the other hand, the transactional pole is based on leadership as a relationship in which efforts are exchanged for rewards. This type of leadership is characterized by setting goals and monitoring results (Bass & Avolio, 1990). This style includes behaviors of contingent reward, active management-by-exception and passive management-by-exception. Contingent reward involves task assignment and definition of what has to be done, as well as rewards for satisfactory performance. Active management-by-exception means the leader actively monitors any deviation from standards and mistakes of followers and takes corrective actions, that is, the leader punishes poor performance, whereas passive management-by-exception means the leader waits for problems to come up and takes an action only after a mistake of followers has occurred (Bass & Riggio, 2006).

Lastly, the *laissez-faire* style, or hands-off leadership, would be related to dissatisfaction, conflict and ineffectiveness. In this model, leaders are passive and avoid making decisions and getting involved in providing instructions. Passive leaders also avoid setting goals and expectations and defining objectives and work methods to their followers (Bass, 1985).

3.3 Competing values framework

In the last two decades of the 20th century, Quinn developed and adapted the Competing Values Framework (CVF) model to explain the various roles required for personal effectiveness in complex organizational environments (Quinn, 1988; Quinn & Mcgrath, 1982; Quinn & Rohrbaugh, 1983).

The Competing Values Framework model essentially involves two dimensions for an effective management:

(1) A dimension of flexibility versus stability;

(2) A dimension of external versus internal focus.

The vertical and horizontal dimensions produce four quadrants, each representing one of the four main organization theory models: human relations model, open systems model, rational goal model and internal process model (Quinn, 1988). The human relations model in the upper left quadrant is based on values like cohesion and morale, as well as development of human resources. The open systems model in the upper right quadrant values growth, resource acquisition and external support. The rational model in the lower right quadrant emphasizes values like planning and goal setting results and efficiency. Lastly, the internal process model in the lower left quadrant highlights information management and communication, as well as stability and control (Quinn, 1988).

Besides the basic framework with these four quadrants representing the organization theory models, Quinn (1988) also developed adaptations. Quinn

(1988) produced an adaptation of the framework in which the four quadrants represent four styles of organizational culture, the most famous and frequently used adaptation. He also produced another adaptation for the managerial level, in which the framework was adapted to represent four leadership styles. Figure 1 explains this adaptation of the framework.

In this framework representation, each quadrant originates two leadership styles, totaling eight different leadership styles (Quinn, 1988). Chart 1 summarizes the main characteristics of each leadership styles.

Most experimental studies conducted about this framework confirmed leaders have characteristics from one or more quadrants along time (Cameron & Quinn, 2006). It means leaders tend to develop specific skills, mental models and behaviors from one or two quadrants.

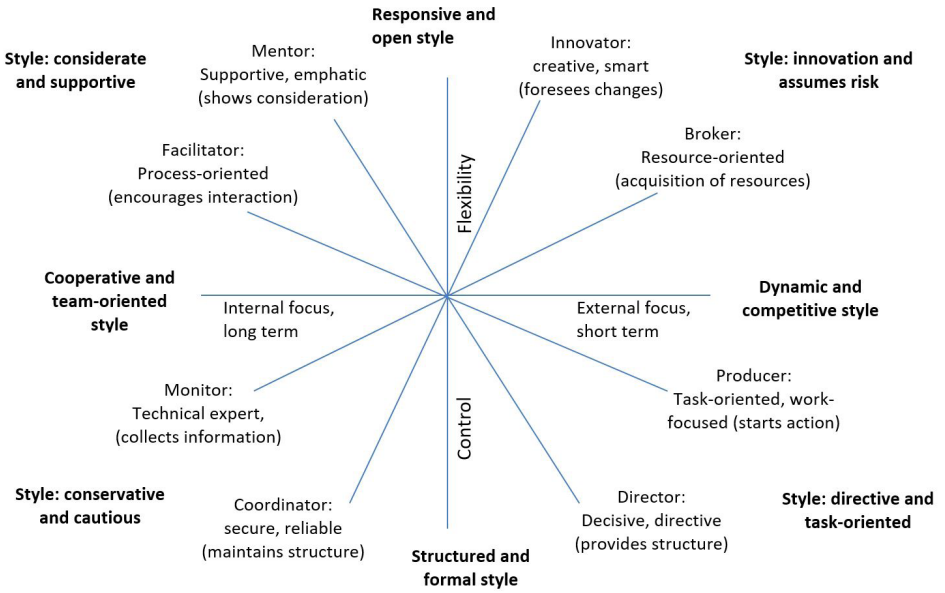

Figure 1. Competing Values Framework of Leadership Roles. Source: Quinn (1988, p. 49).

Chart 1. Competing Values Framework Leadership Styles.

Producer	This leader is task-oriented and work-focused; presents a high level of interest, motivation and energy; encourages followers to accept responsibility, achieve goals and keep high levels of productivity.
Director	This leader has clear expectations regarding processes like planning and goal setting and focus on decisions to resolve problems; selects alternatives; sets objectives; defines roles and tasks; generates rules and policies; evaluates performances and gives instructions
Broker	This leader maintains the organization's external legitimacy and acquires resources; is politically astute, persuasive, has influence and power.
Innovator	This leader can easily adapt to changes; conceives and designs changes the organization needs.
Facilitator	This leader promotes collective efforts; builds cohesion and teamwork and manages interpersonal conflicts, mediating disputes through conflict resolution techniques; seeks to resolve problem with the team.
Mentor	This leader promotes people development through an empathic guidance process; listens actively; supports legitimate claims; shows appreciation; praises people and gives credit to people for their achievements.
Monitor	This leader is concerned about knowing the organization's plans and if people are following the rules and the organization is achieving its goals; is detail-oriented and good at rational analysis and dealing with routine information; solves problems logically.
Coordinator	This leader maintains structure and the system flowing; protects business continuity, minimizing interruptions; performs bureaucratic tasks; reviews and evaluates reports; describes budget; develops and coordinates plans and proposals.

Source: Quinn (1988).

4 Quality management and leadership

4.1 Quality management and transformational-transactional leadership

Many theoretical studies have suggested transformational leadership would be the 'visionary leadership', according to Deming and other quality management experts, required for an effective quality management program implementation (Dean & Bowen, 1994; Waldman, 1994; Laohavichien et al., 2001).

Transformational leadership has been described in the literature as a mechanism to develop an organizational culture and, consequently, associated with the creation of quality management policies and related procedures. This is because this leadership model promotes changes and its probable results help team members deal with the discomfort that inevitably comes with the change process (Bass, 1985; Tichy & Devanna, 1986) and encourages them to continuously improve their own skills and quality capability (Brown, 1991; Deming, 1986). Lastly, the transformational leader would also encourage people to accept the change (Bass, 1985; Conger & Kanungo, 1987).

Berson & Linton (2005) conducted a study that analyzed the relation between this leadership style and the development of a quality climate. The results indicated that, both transactional and transformational leadership styles would lead to a quality climate in the R&D department of a telecommunications firm, although less significant results were obtained with the first style. Laohavichien et al. (2009) tested the influence of transactional and transformational leadership on quality improvement of a company. The results suggested the transformational leadership style had effects on the infrastructure and core aspects of quality management, while the transactional leadership style did not have any impact on them (Laohavichien et al., 2009).

Alharbi & Yusoff (2012) also conducted a study that analyzed the transactional, transformational and passive leadership styles and their relations with the quality management practices of public hospitals in Saudi Arabia. The results showed the transformational leadership style impacted the quality management practices more positively, as well as the organizational performance, while passive leadership would be negatively related to the quality management practices. Parzinger et al. (2009), in a study that analyzed the influences of transformational and transactional leadership characteristics in the context of organizational changes in software development, indicated a significant increase in successful quality management programs with the transformational leadership style. Lastly, Hirtz et al. (2007), when correlating the transformational, transactional and *laissez-faire* leadership styles with organizational performance according to the criteria of the *Baldrige Quality Award*, found out the level of perception of quality management implementation in the administrative and service departments was positively related to transformational and transactional leadership, and negatively related to the *laissez-faire* style. McFadden et al. (2015) founded evidences that a security climate, that is connected to a transformational leadership style, relates to the implementation of quality continuos improvement process, and quality improvement process in hospitals.

4.2 Quality management and competing values framework

This literature review did not find any study establishing a relation between the quality management concept and a leadership model; it only identified studies with a relation to culture, according to the Competing Values Framework model, and quality management.

For example, Cameron et al. (2006) presented correlations among the different cultures of the Competing Values Framework and groups of quality management factors, showing that, when all factors are integrated in a quality management project, the success rate is significantly higher. Prajogo & McDermott (2005) proposed a study to analyze the relation between quality management practices and organizational culture, identifying particular cultures that determine a successful implementation of each of these practices. The results support a pluralist view of organizational culture, with different subgroups of quality management practices determined by different types of culture (Prajogo & Mcdermott, 2005).

In Brazil, a study conducted by Gambi (2014) analyzed the influence of organizational culture on quality techniques and the impact on organizational performance. The results showed that certain cultural profiles are more related to the use of certain quality techniques than others, also supporting a pluralist view of organizational culture (Gambi, 2014).

5 Method

5.1 Study design

This study has a descriptive and correlational design, as its purpose was to describe the correlation between two groups of variables: leadership styles of quality managers and quality management principles. The study had a non-probability and convenience sample of respondents. The participants were contacted by email and a message on LinkedIn (a virtual platform) through a presentation letter that explained the study objectives. The answers were collected through a survey, applied between December 2014 and March 2015.

5.2 Sample characterization

This study had 47 participants (quality managers), from total 194 questionnaires answered. This number of participants was obtained after excluding incomplete questionnaires and respondents not specifically working in the quality area or with a management position.

Of 47 participants, 36 (76%) were male and 11 (24%) were female. Most participants were from the Southeast region in Brazil (74%), mainly from São Paulo (53%); followed by the Central West region (9%), Norte and Northeast (6% each) and South (4%). Regarding the company size of respondents, most were large (57%), followed by midsize (30%) and small (13%). Participants of 18 to 25 years old corresponded to 6% of total respondents; 17% were 26 to 30; 32% were 31 to 35; 6% were 36 to 40; 30% were 41 to 45; 2% were 46 to 50 and 6% were 56 to 60 years old.

5.3 Procedure and instruments

In order to evaluate transformational and transactional leadership characteristics of leaders interviewed in our study, it was used the test developed by Fonseca & Porto (2013), as it has been translated to Portuguese and validated in the Brazilian context. To reduce the time required to answer the questionnaire, a reduced version of this instrument was used, developed by the same authors, but not published, with 22 items from total 45 items of the original instrument. The answers were obtained using a 6-point Likert scale, as follows: always, almost always, very often, not often, rarely and never.

To evaluate Competing Values Framework leadership profiles, it was used a transcultural adaptation of the test to evaluate leadership styles developed by Quinn (1988). This transcultural adaptation was based on the procedures suggested by Reichenheim & Moraes (2007). In order to verify internal reliability of the items, Cronbach's alpha was used, and the following coefficients were obtained to leadership profiles: 0.814 to innovator; 0.674 to coordinator; 0.804 to broker; 0.425 to monitor; 0.766 to producer; 0.890 to facilitator; 0.725 to director and 0.703 to mentor.

Then, only the coefficients founded for coordinator and monitor was below the level considered appropriate for Nunnally (1978). Trying to eliminate this deficit, it was conducted an additional analysis to identify if the items elimination should raise Cronbach's alpha, not been obtained satisfactory results. We chose to keep items corresponding to these two leadership profiles, though we need to make a reservation about the reability of the results of these two leadership profiles.

Regarding the quality management principles, we used a test developed in the Brazilian context by Alexandre (1999), based on the study proposed by Saraph et al. (1989). The original questionnaire has 52 items, distributed in the following categories: top administration commitment, quality measurement, training, customer focus, empowerment, continuous improvement, supplier partnerships, benchmarking, employee involvement and organization's results. To reduce the time required to answer the questionnaire, 19 items were excluded. To avoid response bias of respondents, the items, previously distributed in categories, were randomly rearranged.

To ensure internal reability, Cronbach's alpha analysis was used in this questionnaire. In this process, eight items of the questionnaire were excluded to have the Cronbach's coefficient of every construct was at an acceptable level, above 0.7. Then, the final questionnaire had only 19 items.

Besides these three instruments, it was required from the participants answering a questionnaire for sample characterization, like size and sector of the companie in which they worked.

5.4 Data analysis

Pearson's correlation coefficient was used to generate the results. The level of significance considered in this study was $p \leq 0.05$. Data were analyzed with SPSS 17.0. The classification proposed by Cohen (1988) was used to interpret the results: 0.10 to 0.29 indicate small scores; 0.30 to 0.49 are medium scores and 0.50 to 1 are high scores.

6 Results

Table 1 shows the Pearson's correlation coefficients obtained for the leadership profiles studied and the quality management principles.

When considering the transformational and transactional leadership profiles, we see that for most quality management principles analyzed, top management commitment, training, custumer focus, continuous improvement and employee involvement, besides the quality management questionnaire average, the correlation coefficient obtained for the transformational profile was higher than the coefficient obtained for the transactional profile, with three statistically significant coefficients: top management commitment, training and employee involvement. The only exception was "quality measurement",with transational profile correlation level higher than transformational profile. It was found no negative correlation level.

Regarding the leadership profiles proposed by the Competing Values Framework, and considering the division proposed by Cohen (1988), broker was the

Table 1. Correlation coefficients between leadership profiles and quality management practices.

	Transformational	Transactional	Innovator	Coordinator	Broker	Monitor	Producer	Facilitator	Director	Mentor
Mean	0.272	0.197	0.282	0.339*	0.385**	0.283	0.349*	0.109	0.233	0.198
Top Management Commitment	0.294*	0.230	0.212	0.192	0.297*	0.175	0.364*	0.164	0.178	0.093
Quality measurement	0.154	0.232	0.245	0.272	0.406**	0.283	0.335*	0.017	0.251	0.097
Training	0.290*	0.217	0.282	0.280	0.321*	0.276	0.323*	0.170	0.166	0.322*
Customer Focus	0.071	0	0.211	0.176	0.328*	0.184	0.239	0.001	0.076	0.071
Continuous Improvement	0.269	0.086	0.224	0.270	0.353*	0.235	0.346*	0.084	0.211	0.065
Employee Involvement	0.298*	0.198	0.285	0.444**	0.343*	0.279	0.247	0.135	0.259	0.296*

*p<0.05; **p<0.01. Source: elaborated by authors.

profile that most presented correlation levels considered medium, or, above 0,3. Then, we have producer profile, with four medium correlation coefficients; coordinator, with two medium coefficients; and innovative, with one medium coefficient. Others leadership profiles showed no coefficient above 0,3.

7 Discussion

Summarizing, results shows a relation between the leadership styles and quality management principles analyzed in this study, with a small advantage of the transformational profile in relation to the transactional profile, since this profile showed higher correlation coefficients.

Results also indicate higher correlation coefficients of the Competing Values Framework leadership profiles of external focus and short-term with the quality management principles, while lower coefficients were obtained with the leadership profiles of internal focus, group-oriented and cooperation.

About transational and transformational leadership, results agree with data found in the literature. In almost all studies showed (Berson & Linton, 2005; Alharbi & Yusoff, 2012; Parzinger et al., 2009; Hirtz et al., 2007), with exception of Laohavichien et al. (2009), both transactional and transformational leadership models presented a positive correlation with quality management, although transformational leadership almost always had some advantage.

For example, in Berson & Linton (2005), it was found that both the transformational and transactional leadership style showed statistically significant correlation with a quality environment when it was used regression analysis, but only transformational leadership was statistically significant when using a structural equation model. Also Hirtz et al. (2007) found that the level of awareness of quality management implementation was positively related to both transformational as transactional leadership. However, when it was created the correlation analysis between each leadership style and quality management, all the characteristics of transformational style (idealized attributes, idealized behavior, inspirational motivation, intellectual stimulation and individualized consideration) had positive correlation, although one characteristic of transactional leadership (contingent reward) was positively related and other (management by exception / liabilities) was negatively related.

Regarding the Competing Values Framework, when we analyze studies about the relation between cultures of the Competing Values Framework and quality elements, we realize that each culture has a relation to certain elements, what did not happen in our study. The quality management principles analyzed in this study tended to have a uniform relation to leadership styles, i.e., higher or lower correlations to all principles, not only some.

We suppose a possible explanation for the divergence is due to the fact that, in this study, we analyzed leadership in the perspective of the Competing Values Framework model, unlike prior studies that focused on the organizational culture. So, we can suppose that the relation between different organizational cultures and quality management elements develops in a different way when compared to the relation between leadership styles and quality management elements.

Moreover, we can also suppose that the found results are not consistent with the results presented due to the consulted sample. Regarding the leaders sample used in these studies that related leadership styles to quality management, we can realize that

most of them focused on, or at least used, senior management or line managers, as opposed to quality managers, which is an support area. For example, in the study conducted by Alharbi & Yusoff (2012) there were used as respondents quality department managers and other department managers, although they have not specified what departments. In the study of Idris & Ali (2008), CEOs of companies were questioned. Finally, Berson & Linton (2005) used in his study managers who worked with Research and Development Tools (R&D) and administrative positions managers.

Thus, given the differentiation of the sample, we assume that it can also be considered different the autonomy degree of the study participants. Managers consulted in this study probably have less autonomy to implement the principles and practices of quality in companies where they work, so the implementation and maintenance of them are still on hands of the top management and, therefore, related indirectly to the leadership style of the managers.

Different studies have shown that senior management have an essential role in the implementation of strategic changes in organizations, such as the changes required for quality culture implantation (Boone & Hendricks, 2009; Bourgeois & Eisenhardt, 1988; Carmeli & Halevi, 2009). In fact, Salaheldin (2009) found results that prove the importance of top management commitment for the implementation of quality programs. In his exploratory study, Salaheldin (2009) found that the lack of top management commitment was the greatest impediment to the implementation of total quality management. In the same way, Salaheldin (2009) noted that when top management commitment were noted, implementation of quality programs led to an atmosphere of cooperation and produced many positive outcomes such as improved quality, increased productivity and improving management style.

This hypothesis is strengthened when we consider that the Competing Values Framework leadership profile that that achieved the higher correlation coefficients was the broker profile, whose main characteristic is the power to influence. Thus, assuming that quality manager does not have autonomy to implement the principles of quality management within the organization, its ability to convince senior management becomes your most important ability to ensure the implementation of these principles.

Moreover, we can also assume that the results obtained are not consistent with the results presented from literature because these studies tried to relate organizational culture with principles of quality management, not leadership styles. We can thus suppose that the correlation between culture and quality management principles develops differently from correlation between these same principles and leadership styles.

Finally, the incompatibility can also be explained by limitations of the study, such as the fact that we use a convenience sample, that was relatively small.

8 Conclusions

The results of this study indicate that both transformational and transactional leadership are positively correlated to the principles of quality management, although data indicate a tendency to get higher correlation levels with transformational leadership style. Data also indicate that there is a difference in the correlation of different Competing Values Framework leadership styles and principles of quality management, with some profiles presenting a tendency to show higher correlations than others. However, the relationship between organizational culture and quality management, this correlation seems to be uniform, so when the profile has a tendency to get higher correlations, presents it to all the principles of quality management.

Among the difficulties encountered during the study, we can point the difficulty of reaching a specific target audience, since we had little control over the public who accessed the questionnaire, and responses of more than half of the sample had to be discarded because the profile of the respondents did not match the profiled target audience. In addition, many respondents did not finalize the questionnaire, possibly because of the fact that, as mentioned, the sum of the items of the three questionnaires resulted in a list of extensive questions.

For future studies, we suggest employing respondents of different hierarchical levels, especially senior management, and try to establish a relationship between the degree of autonomy of the managers and the correlation of their leadership styles with quality management elements. Thus, it would be possible to confirm or refute the analysis developed about the findings. We also suggest, besides getting the perception of managers on the implementation of quality practices within the organization, also analyze the perception of other employees. We believe this would be important to confront the opinions, avoiding a possible bias of managers to analyzing the results of their own work.

Finally, we believe that it would be useful in future studies, analyze the Competing Values Framework leadership profiles relationship also with practices and quality tools in order to observe if the relationship between culture and quality management is similar to the relationship between leadership and quality management.

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References

Abdullah, M. M. B., Uli, J., & Tari, J. J. (2009). The relationship of performance with soft factors and quality improvement. *Total Quality Management & Business Excellence*, 20(7), 735-748. http://dx.doi.org/10.1080/14783360903037051.

Alexandre, J. W. C. (1999). *Uma investigação das práticas da gestão da qualidade no setor manufatureiro do estado do Ceará* (Tese de doutorado). Escola Politécnica da Universidade de São Paulo, Universidade de São Paulo, São Paulo.

Alharbi, M., & Yusoff, R. Z. (2012). Leadership styles, and their relationship with quality management pratices in public hospitals in Saudi Arabia. *International Journal of Economics and Management Sciences*, 5(10), 59-67.

Avolio, B. J., & Bass, B. M. (2002). *Manual for the multifactor leadership questionnaire (Form 5X)*. Redwood City, CA: Mindgarden.

Bass, B. M. (1985). *Leadership and performance beyond expectations*. New York: Free Press.

Bass, B. M., & Avolio, B. J. (1990). The implications of transformational and transactional leadership for individual, team, and organizational development. In: R. Woodman & W. Passmore (Eds.), *Organizational Change and Development* (Cap. 4, pp. 231-272). Greenwich, Connecticut: JAI Press.

Bass, B. M., & Avolio, B. J. (1997). *Full range of leadership: manual for the multi-factor leadership questionnaire*. Palto Alto, CA: Mind Garden.

Bass, B. M., & Riggio, R. E. (2006). *Transformational leadership*. Mahwah, NJ: Lawrence Erlbaum.

Bennis, W., & Nanus, B. (1985). *Leaders: the strategies for taking charge*. New York: Harper & Row.

Berson, Y., & Linton, J. D. (2005). An examination of the relationships between leadership style, quality, and employee satisfaction in R&D versus administrative environments. *R & D Management*, 35(1), 51-60. http://dx.doi.org/10.1111/j.1467-9310.2005.00371.x.

Boone, C., & Hendricks, W. (2009). Top management team diversity and firm performance: moderators of functional-background and locus-of-control diversity. *Management Science*, 55(2), 165-180. http://dx.doi.org/10.1287/mnsc.1080.0899.

Bourgeois, L. J. 3rd, & Eisenhardt, K. (1988). Strategic decision processes in high velocity environments: four cases in the microcomputer industry. *Management Science*, 34(7), 816-835. http://dx.doi.org/10.1287/mnsc.34.7.816.

Brown, L. D. (1991). Bridging organizations and sustainable development. *Human Relations*, 8(8), 807-831. http://dx.doi.org/10.1177/001872679104400804.

Burns, J. M. (1978). *Leadership*. New York: Harper & Row.

Cameron, K., & Quinn, R. E. (2006). *Diagnosing and changing organizational culture – based on the competing values framework (2/e)*. San Francisco: Jossey Bass Inc.

Cameron, K., Quinn, R. E., Degraff, J., & Thakor, A. (2006). *Competing values leadership*. Cheltenham: Edward Elgar.

Carmeli, A., & Halevi, M. Y. (2009). How top management team behavioral integration and behavioural complexity enable organizational ambidexterity: the moderating role of contextual ambidexterity. *The Leadership Quarterly*, 20(2), 207-218. http://dx.doi.org/10.1016/j.leaqua.2009.01.011.

Chen, W. (1997). The human side of total quality management in Taiwan: leadership and human resource management. *International Journal of Quality & Reliability Management*, 14(1), 24-45. http://dx.doi.org/10.1108/02656719710156761.

Clemmer, J., & McNeil, A. (1989). *Leadership skills for every manager*. London: Piaticus.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Hillsdale, NJ: Lawrence Erlbaum.

Conger, J. A., & Kanungo, R. N. (1987). Toward a behavioral theory of charismatic leadership in organizational settings. *Academy of Management Journal*, 12(4), 637-647.

Dean, J., & Bowen, D. (1994). Management theory and total quality: improving research and practice through theory development. *Academy of Management Review*, 19(3), 392-418.

Deming, W. E. (1986). *Out of the crisis*. Cambridge, MA: Center for Advanced Engineering Study, Massachusetts Institute of Technology.

Dubey, R., & Gunasekaran, A. (2015). Exploring soft TQM dimensions and their impact on firm performance: some exploratory empirical results. *International Journal of Production Research*, 53(2), 371-382. http://dx.doi.org/10.1080/00207543.2014.933909.

Feigenbaum, A. V. (1986). *Total quality control*. New York: McGraw-Hill.

Flynn, B. B., Schroeder, R. G., & Sakakibara, S. (1994). A framework for quality management research and associated measurement instrument. *Journal of Operations Management*, 11(4), 339-366. http://dx.doi.org/10.1016/S0272-6963(97)90004-8.

Fonseca, A. M. O., & Porto, J. B. (2013). Validação fatorial de escala de atitudes frente a estilos de liderança. *Avaliação Psicológica*, 12(2), 157-166.

Fotopoulos, C., & Psomas, E. (2009). The use of quality management tools and techniques in ISO 9001:2000 certified companies: the Greek case. *International Journal of Productivity and Performance Management*, 58(6), 564-580. http://dx.doi.org/10.1108/17410400910977091.

Gambi, L. N. (2014). *A influência da cultura organizacional no uso de técnicas da qualidade e seu impacto no desempenho* (Tese de doutorado). Escola de Engenharia de São Carlos, Universidade de São Paulo, São Carlos.

Hart, C., & Schlesinger, L. (1991). Total quality management and the human resource professional: applying the Baldridge framework to human resources. *Human Resource Management*, 30(4), 433-454. http://dx.doi.org/10.1002/hrm.3930300402.

Hirtz, P. D., Murray, S. L., & Riordan, C. A. (2007). The effects of leadership on quality. *Engeneering Management Journal*, 19(1), 22-27.

Idris, F., & Ali, K. A. (2008). The impacts of leadership style and best practices on company performances: Empirical evidence from business firms in Malaysia. *Total Quality Management & Business Excellence*, 19(1-2), 163-171. http://dx.doi.org/10.1080/14783360701602130.

Jitpaiboon, T., & Rao, S. S. (2007). A meta-analysis of quality measures in manufacturing system. *International Journal of Quality & Reliability Management*, 24(1), 78-102. http://dx.doi.org/10.1108/02656710710720349.

Juran, J. M. (1989). *Juran on leadership for quality: an executive handbook*. New York: Free Press.

Lakshman, C. (2006). A theory of leadership for quality: lessons from TQM for leadership theory. *Total Quality Management & Business Excellence*, 17(1), 41-60. http://dx.doi.org/10.1080/14783360500249729.

Laohavichien, T., Fredendall, L. D., & Cantrell, R. S. (2001). Leadership and quality management practices in Thailand. *International Journal of Operations & Production Management*, 31(10), 1048-1070. http://dx.doi.org/10.1108/01443571111172426.

Laohavichien, T., Fredendall, L., & Cantrell, R. (2009). The effects of transformational and transactional leadership on quality improvement. *The Quality Management Journal*, 16(2), 7-24.

McFadden, K. L., Stock, G. N., & Gowen, C. R. 3rd (2015). Leadership, safety climate and continuous quality improvement: Impact on process quality and patient safety. *Health Care Management Review*, 40(1), 24-34. PMid:24566246. http://dx.doi.org/10.1097/HMR.0000000000000006.

Nunnally, J. C. (1978). *Psychometric theory* (2nd ed.). New York: McGraw-Hill.

Ovretveit, J. (2005). Leading improvement. *Journal of Health Organization and Management*, 19(6), 413-430. PMid:16375065. http://dx.doi.org/10.1108/14777260510629661.

Pannirselvam, G. P., & Ferguson, L. A. (2001). A study of the relationships between the Baldrige categories. *International Journal of Quality & Reliability Management*, 18(1), 14-37. http://dx.doi.org/10.1108/02656710110364468.

Parzinger, M. J., Nath, R., & Lemons, M. A. (2009). Examining the effect of the transformational leader on software quality. *Software Quality Journal*, 9(4), 253-267. http://dx.doi.org/10.1023/A:1013763119819.

Prajogo, D. I. (2005). The comparative analysis of TQM practices and quality performance between manufacturing and service firms. *International Journal of Service Industry Management*, 16(3), 217-228. http://dx.doi.org/10.1108/09564230510601378.

Prajogo, D. I., & McDermott, C. M. (2005). The relationship between total quality management practices and organizational culture. *International Journal of Operations & Production Management*, 25(11), 1101-1122. http://dx.doi.org/10.1108/01443570510626916.

Puffer, S. M., & McCarthy, D. J. (1996). A framework for leadership in a TQM context. *Journal of Quality Management*, 1(1), 109-130. http://dx.doi.org/10.1016/S1084-8568(96)90008-5.

Quinn, R. E. (1988). *Beyond rational management: managing the paradoxes and competing demands of high performance*. San Francisco: Jossey-Bass.

Quinn, R. E., & Rohrbaugh, J. (1983). A spatial model of effectiveness criteria: Towards a competing values approach to organizational analysis. *Management Science*, 29(3), 363-377. http://dx.doi.org/10.1287/mnsc.29.3.363.

Quinn, R., & McGrath, M. (1982). Moving beyond the single-solution perspective: the competing values approach as a diagnostic tool. *The Journal of Applied Behavioral Science*, 18(4), 463-472. http://dx.doi.org/10.1177/002188638201800407.

Rahaman, S., & Bullock, P. (2004). Soft TQM, hard TQM, and organizational performance relationships: an empirical investigation. *International Journal of Management Sciences*, 33, 73-83.

Reichenheim, M. E., & Moraes, C. L. (2007). Operacionalização de adaptação transcultural de instrumentos de aferição usados em epidemiologia. *Revista de Saude Publica*, 41(4), 665-673. PMid:17589768. http://dx.doi.org/10.1590/S0034-89102006005000035.

Roesch, S. M. A., & Antunes, E. D. D. (1995). Gestão da qualidade total: liderança top-down versus gerenciamento participativo. *Revista de Administração*, 30(3), 38-49.

Salaheldin, S. I. (2009). Critical success factors for TQM implementation and their impact on performance of SMEs. *International Journal of Productivity and Performance Management*, 58(3), 215-237. http://dx.doi.org/10.1108/17410400910938832.

Saraph, J. V., Benson, G. P., & Schroeder, R. G. (1989). An instrument for measuring the critical factors of quality management. *Decision Sciences*, 20(4), 810-829. http://dx.doi.org/10.1111/j.1540-5915.1989.tb01421.x.

Sila, I., & Ebrahimpour, M. (1992). An investigation of the total quality management survey based research published between 1989 and 2000 – a literature review. *International Journal of Quality & Reliability Management*, 19(7), 902-970. http://dx.doi.org/10.1108/02656710210434801.

Sila, I., & Ebrahimpour, M. (2005). Critical linkages among TQM factors and business results. *International Journal*

& Production Management, 5(1), 1123-1155. http://dx.doi.org/10.1108/01443570510626925.

Sousa, R., & Voss, C. A. (2002). Quality management re-visited: a reflective review and agenda for future research. *Journal of Operations Management*, 20(1), 91-109. http://dx.doi.org/10.1016/S0272-6963(01)00088-2.

Tichy, N. M., & Devanna, M. A. (1986). *The transformational leader*. New York: John Wiley and Sons.

Waldman, D. A. (1994). The contributions of total quality management to a theory of work performance. *Academy of Management Review*, 19(3), 510-536.

Waldman, D. A., Lituchy, T., Gopalakrishnan, M., Laframboise, K., Galperin, B., & Kaltsounakis, Z. (1998). Qualitative Analysis of Leadership and Quality Improvement. *The Leadership Quarterly*, 9(2), 177-201. http://dx.doi.org/10.1016/S1048-9843(98)90004-2.

Wilkinson, A., Redman, T., Snape, E., & Marchington, M. (1998). *Managing with total quality management: theory and practice*. Macmillan: London.

Yukl, G. (1999). An evaluation of conceptual weaknesses in transformational and charismatic leadership theories. *The Leadership Quarterly*, 10(2), 285-305. http://dx.doi.org/10.1016/S1048-9843(99)00013-2.