



Mediation effect of TQM technical factors in excellence management systems[☆]



Arturo Calvo-Mora^{*}, Carolina Ruiz-Moreno, Araceli Picón-Berjoyo, Lourdes Cauzo-Bottala

University of Seville, Spain

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ABSTRACT

This study seeks to examine the relationship between TQM social and technical factors and their effects on organizational results, and takes the EFQM model as a reference. Moreover, through structural equation modeling (Partial Least Squares), the study hypothesizes and tests a mediation model between social factors, technical factors and overall results. The study uses a sample of 116 Spanish firms undergoing complete assessment processes according to RADAR logic. The results show that: (1) an open, flexible and continuous improvement oriented culture, a committed and involved leadership, and efficient management of human resources (TQM social factors) exert a direct and significant impact on the effectiveness of the quality system deployed (TQM technical factors) and on the results; (2) the management and improvement of processes, the alliances with suppliers and other partners, and the management of resources (TQM technical factors) also directly influence results; moreover, (3) this variable partially mediates the effect of social TQM practices on organizational results.

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1. Introduction

In recent decades, the growing interest in total quality management (TQM) as a management reference system and as strategic support to obtain a sustainable competitive advantage is enabling organizations to achieve superior performance. Yusuf and Aspinwall (2000) differentiate between three types of TQM implementation frameworks: (1) based on experts, quality leaders or gurus; (2) the Excellence Models or Quality Awards; and (3) those extracted after theoretical and empirical research or measurement studies (Saraph, Benson, & Schroeder, 1989). In this context, further studies (Kim, Kumar, & Murphy, 2010) show how excellence models offer the suitable reference framework for the implementation of TQM in an organization.

The TQM critical factors are management values, principles, practices and techniques necessary to yield the desired effects on the organization's performance. Those receiving most attention in the literature include: management leadership, quality culture, strategic planning, people management, processes management, product design, quality data analysis, supplier quality management, customer focus, and continuous improvement (Sila & Ebrahimpour, 2003). As a

framework, TQM presents two complementary aspects (Black & Porter, 1996): (1) a soft aspect, which corresponds to social and behavioral factors; and (2) a hard aspect, associated with technical factors of the quality management system (QMS).

Researchers from various fields, such as quality management, operations management, and strategic management study the relationships between TQM and results. However, a consistent pattern of how TQM affects organizational results has yet to emerge. Studies in the literature show that the TQM implementation can exert a positive influence on several measures of financial and operational performance (Corredor & Goñi, 2011; Lai & Cheng, 2005). However, very few studies analyze the specific role which the TQM social and technical dimensions play in the organizational results. Furthermore, as Rahman and Bullock (2005) point out, in order to achieve an improvement in the results, the QMS requires an appropriate combination of social and technical factors. This aspect reflects the global and systemic character of the TQM's initiatives for the desired effects on results to take place. Prajogo and Sohal (2006), via a structural equations model, analyze the mediating effect of the TQM practices on the relationship between strategy and performance. Their findings indicate that TQM is positively and significantly related to differentiation strategy, and only partially mediates the relationship between differentiation strategy and performance measures. Ho, Duffy, and Shih (2001) examine the relationship between infrastructure and core TQM practices and their direct and indirect effects on quality performance, through a mediation model using a hierarchical multiple regression. The results show that core TQM factors mediate the effect of supportive TQM factors on quality performance.

In the field of TQM and excellence models, very few studies analyze the mediation relationships which can occur between the social and

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^{*} Corresponding author at: Department of Business Administration and Marketing, University of Seville, Av. Ramón y Cajal, n°1, 41018, Seville, Spain. Tel.: +34 954556989; fax: +34 954556989.

E-mail address: schmidt@us.es (A. Calvo-Mora).

technical factors of TQM present in the EFQM model and the results. In this context, the following objectives arise: 1) to analyze the relationships between the TQM social and technical factors present in the EFQM model and the global results of firms and, 2) to study the mediator effect of the TQM technical factors on the relationship between the social factors and the results.

After the introduction, the following section describes the literature review and hypotheses. Section 3 covers the research method. Section 4 presents the results. Section 5 offers a discussion of results, and Section 6 draws conclusions and outlines limitations.

2. Literature review and research hypotheses

2.1. Critical TQM factors and results in the EFQM model

Black and Porter (1996) group the TQM critical factors into two complementary aspects. The soft aspect corresponds to social and behavioral factors, such as open and flexible culture, the management's commitment and leadership and the focus on stakeholders (social factors). The TQM hard aspect consists of the technical factors of the design, implementation and improvement of the QMS, such as processes control and management, the use of analysis, measurement and problem-solving tools, the management of different resources, and supplier management (technical factors).

The EFQM model does not explicitly distinguish between social and technical factors. From an empirical point of view, Calvo-Mora, Picón, Ruíz, and Cauzo (2013) group together the facilitating agents of the EFQM model into three dimensions via a factorial analysis. A so-called *soft dimension* corresponds to the criteria of leadership, people and certain sub-criteria concerning policy and strategy. They also identify the other two dimensions (the strategic management of partners and resources, and processes management) as technical factors and include the criteria of partners and resources, process management and various sub-criteria of policy and strategy.

A large quantity of recent research focuses on TQM critical factors and their relationship with organizational performance (Ho et al., 2001). The conclusions of these studies remain contradictory. One of the reasons for the lack of agreement is that the studies use different dimensions of the TQM or consider, as social and technical factors, aspects that do not always coincide. Another factor leading to difficulties in generalizing the conclusions is the use of different units of measure of the organizational result (Kaynak, 2003). The measures in use are highly dissimilar and are both objective and subjective. In this sense, the EFQM model evaluates the results through qualitative and quantitative measurements related to the customers, people, society, and key results. That is to say, the model covers the main relevant areas for the measurement of the results of any kind of organization (Kim et al., 2010). These arguments cause certain researchers to defend the use of the criteria of excellence models in their studies about TQM.

2.2. TQM social factors and organizational results

The literature points out that TQM social factors constitute significant predictors of results and play a crucial role in the drive towards continuous improvement (Abdullah, Uli, & Tarí, 2008). In any case, the results of their work posit varying degrees of influence on the results according to the factor analyzed (leadership, culture, human resources). Samson and Terziovski (1999) consider leadership as the major driver of TQM, in such a way that leadership enables the establishment of the strategic directions and the construction of a system that facilitates a greater result. Indeed, the literature shows how the management's leadership commitment to quality has a positive impact on performance (Abdullah et al., 2008). An alignment of human resource practices with the organization's strategic directions must accompany this leadership. This alignment can have a great impact on performance. Variables, such as workforce commitment, employee involvement, and employee training, are critical in

achieving an improvement in the results (Rahman & Bullock, 2005). Finally, the customer focus enables attention to be centered on the current and emerging customer requirements, improves both the relations with the customers as well as their satisfaction, and, therefore, improves the firm's results (Samson & Terziovski, 1999). Indeed, the vast majority of studies that analyze the social factors include this variable as one of the main drivers of the organizational result.

H1. TQM social factors are positively related to organizational results.

2.3. Social factors, technical factors, and organizational results

The empirical literature gathers together work that analyzes the possible influence of social and technical factors on results. Yet very few studies analyze the mediator effect of the technical factors in the relationship between social factors and results. For example, Gadenne and Sharma (2009) propose that, in order to achieve an improvement of the organization's results, both social factors and technical factors must be present. On the other hand, Fotopoulos and Psomas (2010) indicate that certain factors, such as leadership and human resources, influence the results indirectly through processes and resource management. Along these lines, Rahman and Bullock (2005) point out that social factors impose a direct influence on results and that, moreover, social TQM factors indirectly affect performance through hard elements. Although the aforementioned studies point towards the existence of these relationships, they do not empirically analyze the mediator effect of the technical factors. Likewise, in the research developed by Ho et al. (2001), the results show that core TQM factors mediate the effect of supportive TQM factors on quality performance.

As mentioned earlier, leadership is a highly significant factor for TQM success. Thus, the management must show their involvement through the efficient assignment of resources, which supports the achievement of the aims and the improvement of all the processes. Furthermore, the management remains responsible for the commitment and involvement of all personnel and, in exchange, management must empower personnel for their participation in decision-making and improvement in activities. In brief, an appropriate management of human resources must influence the correct execution and improvement of the organization's processes; thereby leading to the attainment of better results.

Regarding processes management, the EFQM model establishes that processes are the nexus of union between the remaining critical factors of quality and results. Hence, identification, understanding, and management of the processes interrelated as a system contribute towards the efficacy and efficiency of an organization in the achievement of its aims. Management by processes is a broad concept which includes the design of products, services and organizational processes, error prevention, control and continuous improvement, the search for zero-defects, the reduction of cycle times, and innovation (Sila & Ebrahimpour, 2003). These aspects exert a direct influence on the operational and economic results of any kind of business (Kaynak, 2003). Likewise, according to the EFQM model, management of the alliances or other forms of the organization's cooperation must exist, as well as of the financial-economic resources, the infrastructure and of other intangible resources, such as technology, information, and knowledge. Cooperation with suppliers is necessary for any QMS which intends to attain success, as this cooperation constitutes a key link in any organization's value chain (Fotopoulos & Psomas, 2010). Firms must make an effort to commit suppliers to specific operations and internal processes and work closely with these suppliers; these activities contribute towards fostering excellence from the first phases of product creation and generation of value for the final customers, and, they therefore contribute towards the achievement of better results.

H2. TQM technical factors mediate the relationship between TQM social factors and organizational results.

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