The role of strategic planning in excellence management systems

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Abstract

The paper examines the role of the strategic planning process in excellence management systems (EMSs) and attempts to contribute evidence of how the efficient EMS works, by an analysis of the synergies and relationships between the critical factors of total quality management (TQM) and the organisation's results. In order to reach these objectives, the excellence model of the European Foundation for Quality Management (EFQM) was used as a framework. The methodology used was the Partial Least Squares (PLS) technique. The data were collected from a sample of 225 Spanish firms, candidates for excellence awards, which have been subjected to the complete self- and external-assessment process. The results showed that the actions and the commitment of the leaders and the people to quality (EFQM enablers social factors) must be made effective through the design and implementation of a schematic of the key processes, suitable resource management and the establishment of alliances with the main suppliers and partners. Another critical issue for the success of TQM is the need to achieve integration of the quality values, objectives and practices into the strategic planning process. Moreover, the results also show how the management of the EFQM enablers technical factors differs based on the degree of excellence with which the strategic planning process is employed in the organisations which form the sample.

1. Introduction

Total Quality Management is a comprehensive organisational management approach. This approach is based on the correct integration of certain cultural values and principles (continuous improvement, innovation and dynamism) in the strategy, structure and processes of the organisation. To put these values and principles into practice, organisations use a series of techniques, models and systems oriented towards stakeholder satisfaction and strengthening the competitiveness of the organisation. Moreover, for this management approach to achieve the desired effects, the implementation, development and improvement of a series of critical or key factors are needed. These factors must form a management system, i.e. synergies and relationships are produced between the critical factors of TQM (Bou-Llusar, Escrig-Tena, Roca-Puig, & Beltrán-Martín, 2009). Recognising and managing these synergies and relationships are funda- mental for the implementation and improvement of the management system and the achievement of the planned objectives and results (Calvo-Mora, Picón-Berjoyo, Ruiz-Moreno, & Cauzo-Bottala, 2015).

In the last 50 years TQM has been widely adopted (Zatzick, Mo- literno, & Fang, 2012).

As a consequence, numerous contributions have appeared that show how the implementation of TQM can help to achieve the objectives and to improve the performance of the organisations (Williams, Bertsch, Van der Wiele, Van Iwaarden, & Dale, 2006). There are also cases in which the implementation of TQM has not produced the anticipated results. This may be due, for example, to the effect of contextual variables, such as size, experience or the sphere of operations, which moderate the effects of the quality practices on the results (Nair, 2006; Taylor & Wright, 2003). In other cases, the research has not achieved the anticipated results due to design errors (Powell, 1995), such as inadequate selection of the sample, the indicators, or the statistical techniques used for the analysis of the data (Marín-Vinuesa, 2009).

Conca, Llopis, and Tarí (2004) and Prybutok and Ramasesh (2005) differentiate three types of framework for the implementation of TQM:

- Frameworks based on quality experts or gurus. This group would include the teachings and contributions of Deming, Juran, Crosby, Feigembaum, Ishikawa, Garvin, and Taguchi, among others.
- Excellence models or quality awards. The most representa- tive are the Deming Prize (Japan), the Malcolm Baldrige Na- tional Quality Award (USA), the European Quality Award and the Ibero-American Model of Management Excellence.
- Models extracted from theoretical and/or empirical research that attempt to identify and develop scales of measurement for the dimensions or critical factors and the results of TQM. Theworks of Anderson, Rungtusanatham, and Schroeder (1994), Saraph, Benson, and Schroeder (1989) and Flynn, Schroeder, and Sakakibara (1994) were pioneering in this field.

In this regard, diverse research has shown how the excellence models offer the ideal reference framework for the implementation and improvement of TQM in an organisation (Bou-Llusar et al., 2009; Kim, Kumar, & Murphy, 2010).

Among the critical factors of TQM identified in the literature are: a flexible organisational culture oriented to innovation and continuous improvement; a determined commitment and leadership by the management; strategic planning; continuous improvement; a client and other stakeholder focused approach; management based on data and information analysis, as well as the management of personnel, processes and suppliers or other partners (Sila & Ebrahimpour, 2003). In this respect, Rahman and Bullock (2005) classify the critical factors of TQM as:

(1) Soft aspects, corresponding to social and behavioural factors, such as an open and flexible culture, the management's commitment and leadership, the human resources management and the focus on stakeholders.
(2) Hard aspects, associated with the technical factors of the de- sign, implementation and improvement of the quality management systems, such as the control and management processes, the use of analysis, measurement and problem-solving tools, the management of different resources and supplier management.

(3) Strategic aspects, i.e. the need to integrate the quality objectives, plans and policies into the general strategic process of the organisation. In this sense, effective TQM ensures that management adopts a strategic overview of quality and fo- cuses on prevention of problems (Oakland, 2011).

In the EFQM model, and in the excellence models in general, no explicit distinction is made between social (soft), technical (hard) and strategic factors. Brown (2002) and Bou-Llusar et al. (2009) suggest the leadership and people criteria represent the TQM social factors in the model, whereas the criteria that refer to the processes, alliances and resources reflect the technical character of TQM. Finally, policy and strategy are the most difficult criteria to classify, as they contain items which relate to both soft and hard issues (Calvo-Mora, Picón- Berjoyo, Ruiz-Moreno, & Cauzo-Bottala, 2014a). For Castresana and Fernández-Ortiz (2005, p. 37) policy and strategy criteria reflect the business strategy as a tool or instrument of integration and coordination of other business resources and capabilities.

From the research point of view, studies that have the analysis and understanding of how the excellence models work as their central objective are a few. More numerous are those that analyse the management systems based on the ISO 9000 international standards or other tools related to quality management and improvement, such as Benchmarking, Six Sigma, Just in Time, Lean, Enterprise Resources Planning and the Balanced Scorecard (Dahlgaard-Park, Chen, Jang, & Dahlgaard, 2013).

Topics of research on excellence models have been focused on analysing the barriers to implementation (Ritchie & Dale, 2000; Sand- brook, 2001); the criteria of the models that are considered more critical to achieving success (Kim et al., 2010; Samuelsson & Nilsson, 2002; Tutuncu & Kucukusta, 2007); the possible internal improvements derived from the application of the models (Davies, 2008); the internal structure of relationships (Eskildsen, Kristensen, & Juhl, 2001; Calvo-Mora, Leal, & Roldán, 2005); the impact on the performance or the results of the organisations (Corredor & Goñi, 2010; Nazemi, 2010); and the usefulness of identifying the more representative resources and capacities of the company, which identify the key resources for generating competitive advantages (Castresana & Fernández-Ortiz, 2005; Martín-Castilla & Rodríguez-Ruiz, 2008).

In this sense, Kim et al. (2010) and Dahlgaard-Park et al. (2013) point out that there is a serious lack of attention to some topics such as policy and strategy. Strategic planning constitutes a key piece in all quality systems, since it is a fundamental factor in the initiation and development of change in the organisation which requires the whole TQM initiative (Pfeifer, Schmitt, & Thorsten, 2005). Moreover, inefficient planning, or not considering quality as a strategic question, is one of the main causes of failure in the implementation of TQM (Taylor & Wright, 2003).

Rusjan (2005) points out that assessment through the EFQM model does not advise on improving weak points or preserving strengths. For Ritchie and Dale (2000), this problem would be resolved by integrating the results of the self-assessment process

into the strategic planning. In this case, strategic planning should be the bridge that connects the improvement of processes with priorities that support the organisation's long term success and change (Samuelsson & Nilsson, 2002). It is important to explore these questions because the purpose of the EFQM model is to support organisations in achieving business excellence through continuous improve- ment, learning, creativity and innovation. In addition, when analysing the integration and adjustment of the strategic planning into a quality system, we must be aware that the critical factors do not act independently but form a management system (Bou-Llusar et al., 2009; Tarí, Molina, & Castejón, 2007). In this context, the following research questions are raised:

(1) What role does strategic planning play in EMSs?
(2) Do the critical factors of TQM form a management system in the context of the EFQM excellence model?
(3) How does an efficient EMS work in practice?

To answer these questions, the paper is organised as follows. First, a review is made of the literature on the relationships between the TQM social, technical and strategic factors, and their effect on an organisation's results. Second, a multiple mediating model based on the EFQM model is proposed. The results are then presented, with a discussion based on the analysis of data collected from 225 Spanish firms. This study concludes with the conclusions and limitations of the study.

2. Literature review and hypotheses

The EFQM model presents a framework that analyses the relationships between what an organisation does and the results that it is able to attain (Dror, 2008). The criteria that the model proposes represent the indicative elements of the degree of progression that a certain organisation follows to achieve excellence. These criteria are specified in five key implementation factors or "Enablers" (leadership, policy and strategy, partnerships and resources, people, and process), and the four remaining dimensions reflect the "Results" which the organisation attains, concerning their customers, employees, society and other key factors. The "Enablers" criteria cover what an organisation does and how it does it. The EFQM model establishes how the general performance of an organisation is reached by means of a leadership that directs and impels the policy and strategy, which will become reality through the management of people, resources, alliances and processes. As can be seen, in the EFQM model, strategy (policy & strategy criteria) is specifically included as a key factor of TQM implementation. However, no explicit mention is made of TQM social or technical type factors. Nevertheless, the leadership and people criteria correspond with TQM social factors, and the other two criteria, partnerships and resources, and processes, are associated with TQM technical factors (Abdullah, Uli, & Tarí, 2008; Brown, 2002; Reiner, 2002; Bou-Llusar et al., 2009).

The literature includes numerous works that analyse the rela- tionship between

TQM practices and the results of the companies. In many cases the conclusions of these works are contradictory.

Thus, no clear results are obtained regarding which factors affect the results directly or indirectly or through the mediating effect of other factors (Ho, Duffy, & Shih, 2001). Controversy also exists over which are the critical factors of a social, technical or strategic nature that have a more positive and significant influence on the results (Gadenne & Sharma, 2009). In addition, the success of TQM is con- ditioned by the interrelationships between the factors that form the company's quality system (Bou-Llusar et al., 2009; Calvo-Mora et al., 2005).

In the EFQM model, the "Results" criteria cover what an organisation achieves, regarding their customers, employees, society and other key results. The logic of the model is based on the fact that obtaining excellent results is directly related to the leadership capacity, the strategy quality and the deployment of the model through peo- ple, partners, resources and processes (EFQM, 2010). However, the relationships between the "Enablers" and the "Results" criteria are not explicitly established. For that reason, a research model (Fig. 1) is proposed which attempts to establish the possible relationships be- tween the social, technical and strategic factors of the EFQM model and their relationship with the results of the organisation. Also, the role of strategic planning in this context is analysed in detail. Whereas Fig. 1A depicts the total effects of the TQM social factors on both the TQM Technical Factors and the Results constructs, Fig. 1B includes the policy & strategy as a mediating variable, thereby illustrating the indirect relationships postulated in Hypotheses 2–5.

2.1. The relationship between EFQM enablers social and technical factors

The leadership of the management acts as a driving force in the implementation, development and improvement of TQM within a flexible, innovative and stakeholder oriented organisational culture. The commitment of the leaders must be shaped by objectives, strate- gies and plans that allow the company to obtain a greater performance (Rahman & Bullock, 2005). In this sense, the way of managing and assigning the technological, information and infrastructure resources is a key element in assessing management's commitment to quality (Fotopoulos & Psomas, 2010). In addition, in the current business environment, the management of the relationships with the main suppliers of resources, and other partners, is a key element of the strategy of any organisation (Vanichchinchai & Igel, 2011). On the other hand, the effectiveness of other TQM technical factors such as product and service design, process management and the use of quality improvement tools, requires the participation of the workers through continuous training, empowerment and teamwork. In short, the TQM social and technical factors do not act independently within a Quality Management System (QMS). On the contrary, to obtain the implementation, development and improvement of a QMS, both types of factors must be integrated effectively (Rahman & Bullock, 2005). Thus, the following hypothesis is proposed:

H1. *EFQM enablers social factors are positively related to EFQM enablers technical factors.*

2.2. The mediating role of policy and strategy

In the present context, TQM plays an important strategic role for organisations. The reasons are, on one hand, the possibility of reach- ing a sustainable competitive advantage through the implementation and improvement of quality (Zatzick et al., 2012). Powell (1995) maintains that quality is an intangible strategic resource that is difficult to imitate by competitors. Reed, Lemak, and Montgomery (1996) maintain that TQM can be used in different strategic contexts, both for obtaining a costs advantage and in differentiation. Differentiation is associated with stakeholder orientation, and costs advantage with the process orientation. Prajogo and Sohal (2006) identify that TQM is related to the generic strategy of differentiation. Whereas Zatzick et al. (2012) find that TQM is positively related to performance for cost leaders.

On the other hand, quality must be considered as a basic compo-nent of the strategy of any organisation, as it guarantees its survival and growth (Deming, 1982). Thus, Oakland (2011) considers that the objectives and practices of TQM

must be incorporated into the strategic plan of the organisation in a systematic manner. For Dean and Evans (1994), the integration of TQM and strategic planning into an organisation's culture and practices generates synergies that accelerate and increase the probabilities of success of the strategic process, as well as the achievement of the organisation's mission and vision in a more efficient manner.

In the EFQM model, strategic planning is contemplated in the pol- icy and strategy criterion. This criterion refers to the way in which organisations instil their mission and vision through the development and deployment of stakeholder focused strategies, policies, plans, objectives and processes. In addition, they must take into account the characteristics of the business environment and the relative internal strengths and weaknesses of the organisation (EFQM, 2010). More specifically, it is a question of analysing and assessing: (1) the process of becoming attuned to the needs and expectations of the interest groups and to the relevant information in the business environment; (2) how information is translated into ideas, statements, approaches, objectives and plans; (3) the manner in which resources are assigned and activities are programmed to reach the proposed objectives; (4) how the communication and deployment of the objectives and plans is undertaken; and (5) the effectiveness of the mechanisms for the monitoring and improvement of the strategic planning process.

For Oakland (2011), the policy and strategy criterion serves as guidance, and is related to the other criteria or key management fac- tors of the EFQM model, and it indirectly conditions the results that the company is able to attain. This is because the criteria plays a crucial role in management, as it defines the foundations of the business, the stakeholders, the market segments, the objectives, processes and resources necessary to attain the results. In addition, it is the responsibility of management to establish and to communicate the strategic direction of the organisation, as well as to try to obtain the collaboration of all the relevant people and partners, to make the mission, vision and objectives a reality (Kaynak, 2003). Finally, the strategy must be put into practice through the deployment of the key processes, the correct allocation of resources and the establishment or strengthening of alliances with the organisation's main suppliers and partners (Hung, 2006). Thus, the following hypothesis is proposed:

H2. *The relationship between EFQM enablers social factors and EFQM enablers technical factors is mediated by the policy and strategy.*

2.3. The relationship between EFQM enablers social factors and results

In general, TQM social factors exert a positive influence on an organisation's results (Rahman & Bullock, 2005), as they establish the basis of an open culture, adaptable to changes in the business environment, and play a crucial role in the orientation towards continuous improvement (Abdullah et al., 2008). Thus, the

social factors should be considered as high-priority and essential for the design and implementation of effective and efficient QMSs.

The EFQM model considers that the leadership concept must be applied to the people who have decision making capacity and, through their performance and behaviour, are benchmarks for others (EFQM, 2010). The mission of the leader must be to direct and manage people and other resources in order to reach the set objectives (Dean & Bowen, 1994). In addition, the strategy must create a structure and processes that are appropriate for an effective management of people, resources and alliances (Sila & Ebrahimpour, 2005). The leadership style must be both people and task focused, based on the needs and maturity of the quality system. In short, whether an organisation fails, or achieves success, will depend, to a great extent, of the quality of its leadership (Kaynak, 2003; Nair, 2006).

Human resources management is another critical element of TQM. Without the involvement and commitment of all the employees, the quality programmes and initiatives are doomed to failure (Oakland, 2011). According to the EFQM model, the results that organisations attain depend to a great extent on human teamwork and its management. People management must include aspects related to the functions and formal tasks of the workers, as well as to the in- terpersonal and informal relationships between the workers and of these with management. Thus, human resources practices such as teamwork, continuous training, assessment and recognition systems, empowerment and the motivation or the development of creative abilities, affect the effectiveness of quality management systems and, therefore, the results of the companies (Abdullah et al., 2008; Taylor & Wright, 2003). The positive relationship between TQM social fac- tors and results has been confirmed by empirical works such as those of Gadenne and Sharma (2009), Powell (1995), Rahman and Bullock (2005) and Calvo-Mora et al. (2014a). Based on the above contribu- tions, the following hypothesis is proposed:

H3. EFQM enablers social factors are positively related to results.

2.4. The mediating role of EFQM enablers technical factors

Calvo-Mora, Ruiz-Moreno, Picón-Berjoyo, and Cauzo-Bottala (2014b) and Fotopoulos and Psomas (2010) suggest how certain of the EFQM enablers social factors, such as leadership or human re- sources, influence results indirectly through process and resource management. Rahman and Bullock (2005) point to the existence of a direct influence of social factors on results and that these factors also indirectly affect performance through hard TQM elements. Prajogo and Sohal (2006) analysed the mediating effect of TQM practices on the strategy–results relationship, and found a partial mediation in the relationship between differentiation strategy and performance measures.

As mentioned previously, leadership is a very important factor for the success of TQM. Thus, the management must show its involvement through the efficient allocation of the resources that support the attainment of the objectives and the improvement of all the processes (Jabnoun & Sedrani, 2005). In addition, it is the responsibility of management to attempt to obtain the commitment and involvement of all the personnel (Tutuncu & Kucukusta, 2007) who, in turn, should be empowered to participate in decision making and improvement activities. In short, people management should be integrated into the process management approach and include aspects related to the formal functions and tasks of the workers, as well as to the personal and informal relationships between the workers and with management.

With respect to process management, the EFQM model establishes that the processes are the connecting link between the other critical quality factors and the results. Thus, identifying, understanding and managing the interrelated processes as a system, contributes to the effectiveness and efficiency of an organisation. Process management is a broad concept that includes the design of the organisation's products, services and processes, the prevention of errors, the search for zero-defects and innovation (Sila & Ebrahimpour, 2003). These aspects have a direct impact on the results of any type of business (Kaynak, 2003). Organisations must also make efforts to involve the suppliers and other key partners in the internal processes, as they are a very important link in the value chain of the whole organisation (Vanichchinchai & Igel, 2011; Wang, Plante, & Tang, 2013), and there- fore, will contribute to achieving better results. On the other hand, the efficient management of tangible and non-tangible resources impacts on productivity, yield and financial results (Kaynak, 2003). Thus, the following hypotheses are proposed.

H4. *The relationship between EFQM enablers social factors and results is mediated by EFQM enablers technical factors.*

H5. *The relationship between EFQM enablers social factors and results is mediated sequentially by policy and strategy and EFQM enablers tech- nical factors.*

3. Research method

The data were obtained from the self- and external-assessment processes followed by Spanish organisations that received excellence awards between 2003 and 2010, and which use the EFQM model as a reference. The scores are derived from applying RADAR logic (Results–Approach–Deployment–Assessment and Review) to these processes (Table 1). The elements of Approach, Deployment, Assessment and Review are applied for the Facilitating Agents or Enablers, and analyse the evidence of what the organisation is doing. The Results element is used to assess the criteria related to the results. This analyses what the organisation

achieves as a consequence of the efforts made.

The scoring scale of the RADAR matrices for the Enablers is divided into 5 intervals ranging from value 0 (without evidence or anecdotes) to value 100 (total evidence). For the Results, the scale also varies be- tween 0 and 100, but the significance of the extreme values changes according to the type of result that is being analysed (trend of the results, fulfilment of objectives, comparisons with other companies, causes of the results or sphere of application). The RADAR logic is a dynamic assessment framework and a powerful management tool that provides a structured approach to questioning the performance of an organisation (Williams et al., 2006).

3.1. Sample

According to data contributed by the Centres of Excellence (an Association which unites the efforts of Excellence Promoting Centres throughout Spain, and which manages the Excellence Awards of the different Spanish Autonomous Communities), the total number of organisations subjected to complete assessments during the period 2003–2010 was 355. After contacting the different regional associations, a total of 225 (63.4%) complete assessments were provided. As shown in Table 2, the sample is composed of organisations in public and private ownership, of small and medium sized enterprises (SME's) and large companies. For the purposes of this paper, and according to the definition by the European Commission, SME's will be considered to be those companies which employ less than 250 people, whose annual business volume does not exceed 50 million euros or whose annual general balance does not exceed 43 million euros.

3.2. Measures

Most of works that analyse the management of an organisation through the EFQM model use scales adapted from the original model (Bou-Llusar et al., 2009; Calvo-Mora et al., 2005; Eskildsen et al., 2001). This methodology is termed *"self-assessment through questionnaires"*. Management personnel from the different functional departments take part in this self-assessment, and they assign individual scores which are later used in the consensus meetings to arrive at the final score for each criterion and sub-criterion of the model. These scores are the basis for identifying strongpoints and areas for improvement and for designing action plans.

In this study, the data were obtained through the methodology termed *"assessment through participation in excellence awards"*. In this case, the scores derive from the self-assessment reports made by the companies, and which are later validated by independent experts through an external assessment. In this assessment, the evidence contributed in the self-assessment reports are analysed and visits are made to the companies to obtain the definitive scores. The reliability and validity of the measures obtained in this way have been con- firmed by

Pannirselvam and Ferguson (2001).

The TQM critical factors and results are measured through the 9 criteria and 32 sub-criteria of the EFQM model (Table 3). In addition, due to the used methodology *("assessment through participation in excellence awards"),* sub-criteria were scored on the basis of more than 200 questions or, as the EFQM model describes, "Elements to con- sider". These elements set out in detail the actions taken by organisations (evidence) and the specific tools, techniques and practices that they use in relation to the sub-criteria being assessed.

This study uses four variables, with the policy and strategy variable modelled as a first-order construct, i.e. these theoretical concepts are considered inferred from manifest variables or indicators. The TQM social factors, TQM technical factors and the Result variables were designed as a multidimensional construct. This means that those variables consist of a number of dimensions, and the construct is measured by such first-order factors. Specifically, the TQM social factors variable is formed by two dimensions, leadership and people; the TQM technical factors variable by the partners and resources, and processes dimensions; and the Results variable by the four results related dimensions of clients, people, society and the key results of the business. Finally, all the measures used are reflective in character.

3.3. Data analysis

The research models depicted in Fig. 1 were tested using a variance-based structural equation modelling. Specifically, the Par- tial Least Squares (PLS) technique (Hair, Hult, Ringle, & Sarstedt, 2014) was applied. PLS allows the assessment of the measurement model and testing of the links proposed between constructs (Roldán & Sánchez-Franco, 2012). The choice of PLS in this study is based on the following reasons: (1) this research is focused on the prediction of dependent variables (Chin, 2010) and tackles a theory building environment (exploratory analysis) (Peng & Lai, 2012); (2) the research model is complex, both in the hypothesised relationships (direct and mediated) and the measurement model applied (large numbers of indicators, and first and second order constructs) (Peng & Lai, 2012); (3) the sample is not too large (n = 225), and following Reinartz, Haenlein, and Henseler (2009, p. 342) "PLS should be the method of choice for all situations in which the number of observations is lower than 250"; (4) scores for latent variables have been used in subsequent analysis (second order construct modelling) for predictive relevance (Chin, 2010). The software used was SmartPLS 2.0. M3 (Ringle, Wende, & Will, 2005).

4. Results

Barroso, Cepeda, and Roldán (2010) indicate two stages in any PLS analysis: the assessment of the measurement model (outer model) and the evaluation of the structural model (inner model).

4.1. Measurement model

Given that the measurement model was designed as reflective, its assessment has to be based on reliability and validity (Roldán & Sánchez-Franco, 2012). In this vein, loadings of both indica- tors and dimensions exceed the 0.7 threshold (Table 3); consequently, indicators and dimensions are reliable. Constructs and dimensions present high internal consistency as its composite reliability indexes are above 0.7 (Table 3). In addition, convergent validity is achieved for all latent variables because the average variance extracted (AVE) ratios surpass the 0.5 benchmark (Table 3).

Finally, Table 4 shows that the square root of the AVE of each latent is greater than its correlations with any other la- tent variable. Thus, the discriminant validity is reached, and it can be concluded that the main constructs measure different aspects.

4.2. Structural model

The structural model was evaluated based on the algebraic sign, magnitude and significance of the structural path coefficients, the R^2 values, and the Q^2 (redundancy) test for predictive relevance (Roldán & Sánchez-Franco, 2012). Consistent with Hair et al. (2014), bootstrapping (5000 resamples) was used to generate standard errors, *t*-statistics, and percentile 95% confidence intervals. This first analysis shows that the five direct relationships included in Fig. 2B are statistically significant. Accordingly, Hypotheses 1 and 3 find support Tables 5 and 6.

In addition, the endogenous constructs achieve R^2 values higher than 0.55, even attaining an outstanding figure of 0.771 for TQM technical factors (Table 5). This is higher than the substantial level indicated by Chin (1998). The predictive relevance of the theoretical/structural model is assessed with the cross-validated redundancy index (Q^2) for endogenous constructs. Since all Q^2 values are greater than 0, evidence was found that this model has predictive relevance (Chin, 1998; Table 5). In addition, Table 5 shows the amount of variance on each dependent variable explained by each antecedent variable.

The three mediation hypotheses postulated were tested applying the approach described by Preacher and Hayes (2008) to the PLS con- text. Fig. 2A depicts the total effects of TQM social factors on both TQM technical factors (c) and results (d) respectively. These total ef- fects can be arrived at through a variety of direct and indirect forces (Hayes, 2009). On one hand, this means that the total effect of TQM social factors on TQM technical factors can be expressed as the sum of the direct influence (c') and the indirect effect ($a_1{}^*a_2$) via the policy & strategy variable, the latter being the relationship proposed by

H2 ($a1*a2$). Consequently, $c = c' + a1*a2$. On the other hand, the total effect of TQM social factors on results (d) equals the sum of direct (d') and indirect effects (c'∗b1+'a1∗a2∗b1), with the latter two terms being the mediated relationships described by H4 (c'∗b1) and H5 (a1∗a2∗b1).

Bootstrapping is a recommended approach for testing the significance of indirect effects, i.e., mediating relationships. Bootstrap- ping represents a nonparametric resampling procedure that does not impose the assumption of normality on the sampling distribution (Preacher & Hayes, 2008). Following Chin (2010), a two-step procedure was applied for testing mediation in PLS: (1) starting from the research model included in Fig. 1B, which contains both direct and indirect paths, an n = 5000 bootstrap resampling is performed with the explicit calculation of the product of the direct paths that form the indirect path being tested. (2) Significance estimates are obtained using a percentile bootstrap (Williams & MacKinnon, 2008). This produces a 95% confidence interval (CI) for each indirect effect under evaluation: (H2) a1∗a2, (H4) c'∗b1, and (H5) $a1*a2*b1$. When a CI for a mediated relationship does not contain zero, this means that the indirect effect is significantly different from zero with 95% confidence.

Table 6 shows the results for mediation models. In the first model, the TQM social factors construct has a significant total effect on the TQM technical factors variable (c = 0.813, t = 27.337) (Fig. 2 A). How- ever, when the policy & strategy construct is introduced as mediator (Fig. 2 B.), the TQM social factors variable substantially reduces its direct effect on the TQM technical factors construct although it re- mains significant (H1 = c' = 0.272, t = 3.51), while its indirect effect through the policy & strategy variable achieves an important and significant point estimate of 0.541 ($a1*a2$). We have additionally calculated the variance accounted for (VAF) index (Hair et al., 2014) that determines the size of the indirect effect ($a1*a2$) in relation to the total effect (c). A VAF value between 20% and 80% indicates a partial mediation. In our case, the indirect effect $a1*a2$ achieves a VAF of 66.54%. Therefore, we can find further evidences of a partial mediation. Correspondingly, H2 (a_1 a_2) is supported and it means that the policy & strategy variable partially mediates the influence of the TQM social factors variable on the TQM technical factor. In addition, an increase of R^2 of the TQM technical factors construct can be observed (from 0.66 to 0.771). The second mediation model shows that the TQM social factors construct has a significant total effect on results (d = 0.720, t = 23.578) (Fig. 2 A; Table 6). When mediators (policy & strategy, and TQM technical factors) are inserted (Fig. 2 B), the TQM social factors variable maintains a significant effect on results, albeit rather low (H3 = d' = 0.47, t = 6.145). The indirect effects, (H4) $c'*b1$ = 0.083 and (H5) $a1*a2*b1$ = 0.166, are significant. In addition, the total indirect effect ($a1*a2*b1 + c'$ $b1$) reaches a VAF in-

5. Discussion

The results support the reliability and validity of the measurement model (Tables 3 and 4), and hence the high predictive power of the EFQM model as a framework for the implementation of EMS's based on TQM principles. It presents explained variance (R^2) values over
0.55 (Table 5 and Fig. 2). The proposed model shows a high predictive validity, since the Q^2 coefficient value of the dependent reflective variable is over 0 (Table 5).

Moreover, the hypotheses that represent the direct effects be- tween the variables (Fig. 2 and Table 5) are confirmed, as well as the indirect or mediation relationships (Table 6). These results con- firm the existence of multiple interdependences and synergies in the implementation of the key factors of TQM, or put another way, the results confirm the systemic character of the quality management (Bou-Llusar et al., 2009). More specifically, the main objective of this research is to examine the role of strategic planning in ex- cellence management systems. From the results generated by PLS methodology, the policy & strategy variable, or strategic planning, has
a very important weight and plays a key role in the model. Firstly, the high predictive relevance ($Q^2 = 0.595$) and the percentage of variance explained of this variable ($R^2 = 72.5\%$) are highlighted. Secondly, the results show the importance of strategic planning when effectively implementing the technical part of a QMS. This fact is con- firmed by the high direct effect between both variables ($a_2 = 0.635$, $t = 8.742$), as well as by the important percentage of variance of the TQM hard factor dimension which explains the policy and strategy variable ($R^2 = 55\%$) (Table 5). The importance of strategic planning is reinforced by the mediating effect that this variable exerts between the TQM social factor dimensions (leaderships and people) and TQM technical factors (partners and resources, and processes). In Fig. 2A, TQM social factors have a significant total effect on the TQM technical factors ($c = 0.813$, $t = 27.337$). However, when strategic planning is introduced as mediator (Fig. 2 B), the TQM social factors substantially reduce the direct effect on the TQM technical factors. Nevertheless, the percentage of explained variance of the TQM technical fac- tors dimension increases importantly ($R^2 = 66\% \rightarrow R^2 = 77.1\%$) when introducing the strategic planning into the model. These results indi- cate that the commitment of the management, and the involvement of the people, constitute a key piece in the EMSs when implementing process management, boosting the development of alliances with the main partners and suppliers, as well as efficiently managing the organisation's resources. Nevertheless, these actions are more effective, dex of 34.58%. Accordingly, it means that policy & strategy and TQM and will be maintained and improved over time, if they are integrated

systematically into the management of the organisation through the strategic planning process.

Thirdly, the research model does not suggest a direct relation- ship between the policy and strategy variable (criteria 2) and the results variable, although an indirect relationship ($a_2{}^*b_1 = 0.195$) is established through the TQM technical factors (criteria 3 and 4 in the EFQM model; Fig. 2). This is because policy & strategy criteria contemplate the process for (1) understanding the needs and expectations of stakeholders; (2) obtaining data about the business environment and translating it into objectives and plans; (3) defining and planning the allocation of necessary resources and the establishment of necessary alliances (criteria 3) and (4) deploying the schematic of key processes for the attainment of the proposed objectives and plans (criteria 4). Therefore, it is through the ability of the organisation to manage its resources, establish its alliances of cooperation and de- ploy and improve its key processes, that it will achieve better results over time. At this point it can be asked if the companies that make a better job of the strategic planning process, according to the directives of the EFQM model, also manage the TQM technical factors more efficiently (processes and partnerships and resources variables). This question was investigated by using the independent-samples t-test to compare the difference between means).

As can be seen from Table 7, Levene's test of equality of variances is not fulfilled (sig. $>$ 0.05) for the Processes variable, which is why a nonparametric test had to be made, specifically, the Mann–Whitney test (z). The results obtained show that the management of the TQM technical factors differs based on the degree of excellence with which the strategic planning process is undertaken in the sample organisations. In this sense, the companies that obtain higher scores in the policy and strategy variable manage their processes, resources and key alliances more efficiently. On the contrary, the companies that obtain lower scores in strategic planning, that is to say, have a lower degree of excellence in this aspect, and obtain worse scores when their management of the TQM technical factors is assessed.

The other research question is to analyse the synergies and relationships between TQM social and technical factors, strategic planning and organisational results. In this sense, for TQM to produce the desired effects on the organisation's results, the critical factors must be implemented in such a manner that they form a management system. In this system, the social factors act as a driving force by having a very important impact on the rest of the elements that compose the model. Specifically, the high direct effect on the policy & strategy variable ($a_1 = 0.851$, $t = 36.992$) is emphasised, which explains the 72.5% of its variance (Fig. 2 and Table 5). In this sense, it is the people, at different levels of responsibility, who shape the values and principles which guide policy and strategy with their behaviour and actions.

In addition, TQM social factors also exert an important influence on the most operative part of the management system. This effect takes place directly (H1 = c'= 0.

272, t = 3.510; R^2 = 22.1%) (Table 5), and indirectly, through the mediating effect exerted by pol- icy & strategy (H2 = $a_1 * a_2$ = 0.541) (Table 6). In this case, it is shown how it is the management that must make the decisions relating to the allocation of resources, the establishment of strategic alliances with suppliers and partners and the design of the schematic of the key processes of the organisation. Later, the workers carry out the decisions and the plans, established by management, by undertak- ing their functions. On the other hand, TQM social factors also have a very significant influence on the results that an organisation can at- tain (H3 = d' = 0.47, t = 6.145; R^2 = 33.8%) (Table 5). In addition, when boosting the implementation of the other factors that also form the management system, there is also an indirect effect on the results through strategic planning (H5 = $a_1 * a_2 * b_1$ = 0.166) and TQM techni- cal factors (H4 = $c' * b_1$ = 0.083) (Table 6).

Finally, within the management system, the direct influence of processes and alliance and resource management on the results (b_1 = 0.307, t = 3.712) is highlighted, which explains 21.2% of its vari- ance (Table 5). Therefore, the results of the organisation are seen to be directly influenced by the way in which the processes are carried out, by the way the products and services are developed, by the efficiency in the management of the financial, material or knowledge resources, and by the management of the alliances and cooperation agreements that the company maintains with suppliers and other partners.

6. Conclusions

The present research provides several practical recommendations for organisations immersed in management processes and quality improvement according to the EFQM model, as well as for organisations which, although not formally undertaking EFQM self- assessment processes, are involved in a TQM philosophy implementation project.

Firstly, although the EFQM model is a non-prescriptive frame- work, i.e. it can be used in different ways, the research shows its systemic character. Therefore, if an organisation attempts to attain satisfactory and consistent results over time, it must not focus its efforts solely on improving those facets of management that are distant from excellence. On the contrary, it must analyse and, where necessary, globally improve and strengthen both the management facet and the results achieved. For example, it will serve an organisation little to focus its efforts on improving or strengthening process, and resource and alliance management (TQM technical factors), if it does not have the support and involvement of the management and the workers (TQM social factors) or if these efforts are not systematically integrated into the strategic planning of the organisation.

Secondly, the research emphasises the crucial role played by strategic planning in the success of an EMS; and more so today when organisations are action-oriented, and daily activity seems to be what gives direction to management. Nevertheless, excellence involves us questioning who we are and where we want to go. This is where the management and the people play an important role when establishing the organisation's mission, vision and values. Subsequently, the organisation would have to be asked what can facilitate, and what can prevent, the attainment of the mission and vision; in short, it must design its selected strategy to reach its proposed future.

The strategy has to be coherent with the values, and take into account stakeholder needs and expectations, and the business environment in which the organisation's activity in undertaken. Therefore, it is essential to have updated information on what is happening outside the organisation, and on the internal indicators of the results of the internal activity. In this point it is crucial to create a systematic method for the monitoring and review of the strategy and the objectives which allows possible changes to be anticipated quickly. Accordingly, transforming strategic planning into a daily element of management involves the development of an efficient communication dynamic. However, nothing will be achieved by planning alone; it will be necessary to specify the strategic objectives and to deploy the strategy in the different organisational levels by designing a schematic of the key processes. In addition, for these processes to work, it will be necessary to involve and train the people who participate in their execution, and to have suitable allocation and management of various resources (material, financial and knowledge). Finally, the management must continuously monitor the proposed actions and the degree of achievement of the objectives. The EFQM model offers a wide variety of indicators for this purpose in the section dedicated to the assessment of the results that the organisation is reaching in terms of clients, people, society, and the key results of the business, mainly of an economic-financial nature.

6.1. Research limitations

The interpretation of the results and conclusions of this study are subject to a series of limitations, principally of a methodological character. The first limitation is due to the technique used for the proposed model: structural equation modelling, which assumes the linearity of relationships between the latent variables. The second is related to the notion of causality. Our study considered a soft modelling approach oriented more towards prediction than causality. While causation guarantees the ability to control events, predictability only allows a limited degree of control (Falk & Miller, 1992). Notwithstanding, establishing causation is not easy in social research. Following Cook and Campbell (1979), determining causation requires demonstrating association, temporal precedence, and isolation. Statistical analysis alone cannot tentatively prove causation, because it does not establish isolation or temporal ordering (Bullock, Harlow, & Mulaik, 1994). Finally, the research design is cross-sectional instead of longitudinal. In this case, with a longitudinal study it would be possible to analyse the effects of TQM on the results in more detail, as the benefits of the management and quality improvement are appraised over the medium and long term.

References

Abdullah, M. M. B., Uli, J., & Tarí, J. J. (2008). The influence of soft factors on quality improvement and performance. *The TQM Journal, 20*(5), 436–452.

Anderson, J. C., Rungtusanatham, M., & Schroeder, R. G. (1994). A theory of quality management underlying the Deming management method. *Academy of Management Review, 19*(3), 472–509.

Barroso, C., Cepeda, G., & Roldán, J. L. (2010). Applying maximum likelihood and PLS on different sample sizes: studies on SERVQUAL model and employee behaviour model. In V. Esposito Vinzi, W. W. Chin, J. Henseler, & H. Wang (Eds.), *Handbook of partial least squares: Concepts, methods and applications* (pp. 427–447). Berlin, Germany: Springer-Verlag.

Bou-Llusar, J. C., Escrig-Tena, A. B., Roca-Puig, V., & Beltrán-Martín, I. (2009). An empirical assessment of the EFQM excellence model: evaluation as a TQM framework relative to the MBNQA model. *Journal of Operations Management, 27*, 1–22.

Bullock, H. E., Harlow, L. L., & Mulaik, S. A. (1994). Causation issues in structural equation modeling research. *Structured Equation Modeling, 1*(3), 253–267.

Brown, A. (2002). Using HR strategies to support business excellence. In *Proceeding of the 7th world congress for total quality management: vol. 2* (pp. 339–346).

Calvo-Mora, A., Leal, A., & Roldán, J. L. (2005). Relationships between the EFQM model criteria: a study in Spanish Universities. *Total Quality Management, 16*(6), 741–770.

Calvo-Mora, A., Picón-Berjoyo, A., Ruiz-Moreno, C., & Cauzo-Bottala, L. (2014). The relationships between soft-hard TQM factors and key business results. *International Journal of Operations & Production Management, 34*(1), 115–143.

Calvo-Mora, A., Ruiz-Moreno, C., Picón-Berjoyo, A., & Cauzo-Bottala, L. (2014). Mediation effect of TQM technical factors in excellence management systems. *Journal of Business Research, 67*, 769–774.

Calvo-Mora, A., Picón-Berjoyo, A., Ruiz-Moreno, C., & Cauzo-Bottala, L. (2015). Contextual and mediation analysis between TQM critical factors and organisational results in the EFQM excellence model framework. *International Journal of Production Research, 53*(7), 2186–2201.

Castresana Ruiz-Carrillo, J. I., & Fernández-Ortiz, R. (2005). Theoretical foundation of the EFQM model: the resource-based view. *Total Quality Management, 16*(1), 31– 55.

Chin, W. W. (1998). The partial least squares approach to structural equation modelling. In G. A. Marcoulides (Ed.), *Modern methods for business research* (pp. 295– 336). Mahwah, NJ: Lawrence Erlbaum.

Chin, W. W. (2010). How to write up and report PLS analyses. In V. Esposito Vinzi, W. W. Chin, J. Henseler, & H. Wang (Eds.), *Handbook of partial least squares: concepts, methods and applications* (pp. 655–690). Berlin, Germany: Springer-Verlag.

Conca, F. J., Llopis, J., & Tarí, J. J. (2004). Development of a measure to assess quality management in certified firms. *European Journal of Operational Research, 156*(3), 683–697.

Cook, T. D., & Campbell, D. T. (1979). *Quasi experimentation: design and analytical issues for field settings*. Chicago, IL: Rand McNally College.

Corredor, P., & Goñi, S. (2010). Quality awards and performance: is there a relationship? *The TQM Journal, 22*(5), 529–538.

Dahlgaard-Park, S. M., Chen, C. K., Jang, J. Y., & Dahlgaard, J. (2013). Diagnosing and prognosticating the quality movement – a review on the 25 years quality literature (1987–2011). *Total Quality Management, 24*(1), 1–18.

Davies, J. (2008). Integration: is it the key to effective implementation of the EFQM excellence model? *International Journal of Quality & Reliability Management, 25*(4), 383–399.

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

Dean, J. W., & Evans, J. R. (1994). *Total quality management, organisation, and strategy*. Minneapolis: West Publishing Company.

Deming, W. E. (1982). *Quality, productivity and competitive position*.

Dror, S. (2008). The balance scorecard versus quality award models as strategic frame- work. *Total Quality Management, 19*(6), 583–593.

Eskildsen, J. K., Kristensen, K., & Juhl, H. J. (2001). The criterion weights of the EFQM excellence model. *International Journal of Quality & Reliability Management, 18*(8- 9), 783–795.

Falk, R. F., & Miller, N. B. (1992). *A primer for soft modeling*. Akron, OH: The University of Akron.

EFQM. (2010). *EFQM excellence model*. Brussels: European Foundation for Quality Man- agement.

Flynn, B., Schroeder, R. G., & Sakakibara, S. (1994). A framework for quality manage- ment research and an associated measurement instrument. *Journal of Operations Management, 11*(4), 339–366.

Fotopoulos, C. V., & Psomas, E. L. (2010). The structural relationships between TQM factors and organisational performance. *Total Quality Management & Business Ex- cellence, 22*(5), 539–552.

Gadenne, D., & Sharma, B. (2009). An investigation of the hard and soft quality man- agement factors of Australian SMEs and their association with firm performance. *International Journal of Quality & Reliability Management, 26*,

865–880.

Hair, J. F. Jr., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2014). *A primer on partial least squares structural equation modeling (PLS-SEM)*. Thousand Oaks, CA: SAGE Publica- tions, Incorporated.

Hayes, A. F. (2009). Beyond Baron and Kenny: statistical mediation analysis in the new millennium. *Communication Monographs, 76*(4), 408–420.

Ho, D. C. K., Duffy, V. G., & Shih, H. M. (2001). Total quality management: an empirical test for mediation effect. *International Journal of Production Research, 39*(3), 529– 548.

Hung, R. Y. Y. (2006). Business process management as competitive advantage: a review and empirical study. *Total Quality Management, 17*(1), 21–40.

Jabnoun, N., & Sedrani, K. (2005). TQM, culture, and performance in UAE manufacturing firms. *Quality management journal, 12*(4), 8.

Kaynak, H. (2003). The relationship between total quality management practices and their effects on firm performance. *Journal of Operations Management, 21*, 405–435. Kim, D. Y., Kumar, V., & Murphy, S. A. (2010). European Foundation for Quality Man- agement Business Excellence Model: an integrative review and research agenda. *International Journal of Quality & Reliability Management, 27*(6), 684–701.

Marín-Vinuesa, L. M. (2009). Enfoques de estudio y modelos de investigación sobre calidad y resultados: una revisión crítica. *Cuadernos de Gestión, 9*(2), 89–110.

Martín-Castilla, J. I., & Rodríguez-Ruiz, O. (2008). EFQM model: knowledge governance and competitive advantage. *Journal of Intellectual Capital, 9*(1), 133–156.

Nair, A. (2006). Meta-analysis of the relationship between quality management prac- tices and firm performance-implications for quality management theory develop- ment. *Journal of Operations Management, 24*, 948–975.

Nazemi, J. (2010). A process model for improvement through EFQM. *World Applied Sci- ences Journal, 8*(3), 279–287.

Oakland, J. S. (2011). Leadership and policy deployment: The backbone of TQM. *Total Quality Management & Business Excellence, 22*(5), 517–534.

Pannirselvam, G. P., & Ferguson, L. A. (2001). A study of the relationships between the Baldrige categories. *International Journal of Quality and Reliability Management, 18*(1), 14–34.

Peng, D. X., & Lai, F. (2012). Using partial least squares in operations management re- search: a practical guideline and summary of past research. *Journal of Operations Management, 30*(6), 467–480.

Pfeifer, T., Schmitt, R., & Thorsten, V. (2005). Managing change: quality-oriented design of strategic change processes. *The TQM Magazine, 17*(4), 297–308.

Powell, T. C. (1995). Total Quality Management as competitive advantage: a review and empirical study. *Strategic Management Journal, 16*, 15–37.

Prajogo, D. I., & Sohal, A. S. (2006). The relationship between organisation strategy, total quality management (TQM) and organisation. *European Journal of Operational Research, 168*, 35–50.

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assess- ing and comparing indirect effects in multiple mediator models. *Behavior Research Methods, 40*(3), 879–891.

Prybutok, V. R., & Ramasesh, R. (2005). An action-research based instrument for mon- itoring continuous quality improvement. *European Journal of Operational Research, 166*, 293–309.

Rahman, S., & Bullock, P. (2005). Soft TQM, hard TQM, and organisational performance relationships: an empirical investigation. *Omega- International Journal of Manage- ment Science, 33*, 73–83.

Reed, R., Lemak, D. J., & Montgomery, J. C. (1996). Beyond process: TQM content and firm performance. *Academy of Management Review, 21*(1), 173–202.

Reinartz, W., Haenlein, M., & Henseler, J. (2009). An empirical comparison of the efficacy of covariance-based and variance-based (SEM). *International Journal of Research in Marketing, 26*(4), 332–344.

Reiner, A. (2002). Analysis of critical factors of company success based on EFQM Excellence model. In *Proceeding of the 7th world congress for total quality management: Vol. 2* (pp. 361–366).

Ringle, C. M., Wende, S., & Will, A. (2005). SmartPLS 2.0 *(beta)*.. Hamburg, Germany: University of Hamburg.

Ritchie, L., & Dale, B. G. (2000). Self-assessment using the business excellence model: a study of practice and process. *International Journal of Production Economics, 66*(3), 241–254.

Roldán, J. L., & Sánchez-Franco, M. J. (2012). Variance-based structural equation mod- eling: guidelines for using partial least squares in information systems research. In

M. Mora, O. Gelman, A. Steenkamp, & M. Raisinghani (Eds.), *Research methodologies, innovations and philosophies in software systems engineering and information systems* (pp. 193–221). Hershey, PA: Information Science Reference.

Rusjan, B. (2005). Usefulness of the EFQM excellence model: theoretical explanation of some conceptual and methodological issues. *Total Quality Management, 16*(3), 363–380.

Samuelsson, P., & Nilsson, L. E. (2002). Self-assessment practices in large organisations. Experiences from using the EFQM excellence model. *International Journal of Quality & Reliability Management, 19*(1), 10–23.

Sandbrook, M. (2001). Using the EFQM excellence model as a framework for improve- ment and change. *Journal of Change Management, 2*(1), 83–90.

Saraph, J. V., Benson, P. G., & Schroeder, R. G. (1989). An instrument for measurement the critical factors of quality management. *Decision Sciences, 20*(4), 810–829.

Sila, I., & Ebrahimpour, M. (2003). Examination and comparison of the critical factors of total quality management (TQM) across countries. *International Journal of Pro- duction Research, 41*(2), 235–268.

Sila, I., & Ebrahimpour, M. (2005). Critical linkages among TQM factors and business results. *International Journal of Operations & Production Management, 25*(11), 1123– 1155.

Tarí, J. J., Molina, J. F., & Castejón, J. L. (2007). The relationship between quality man- agement practices and their effects on quality outcomes. *European Journal of Oper- ational Research, 183*(2), 483–501.

Taylor, W. A., & Wright, G. H. (2003). A longitudinal study of TQM implementation: factors influencing success and failure. *Omega – The International Journal of Man- agement Science, 31*, 97–111.

Tutuncu, O., & Kucukusta, D. (2007). Relationship between organisational commitment and EFQM business excellence model: a study on Turkish quality award winners. *Total Quality Management, 18*(10), 1083–1096.

Vanichchinchai, A., & Igel, B. (2011). The impact of total quality management on supply chain management and firm's supply performance. *International Journal of Produc- tion Research, 49*(11), 3405–3424.

Wang, W., Plante, R. D., & Tang, J. (2013). Minimum cost allocation of quality improve- ment targets under supplier process disruption. *European Journal of Operational Research, 228*(2), 388–396.

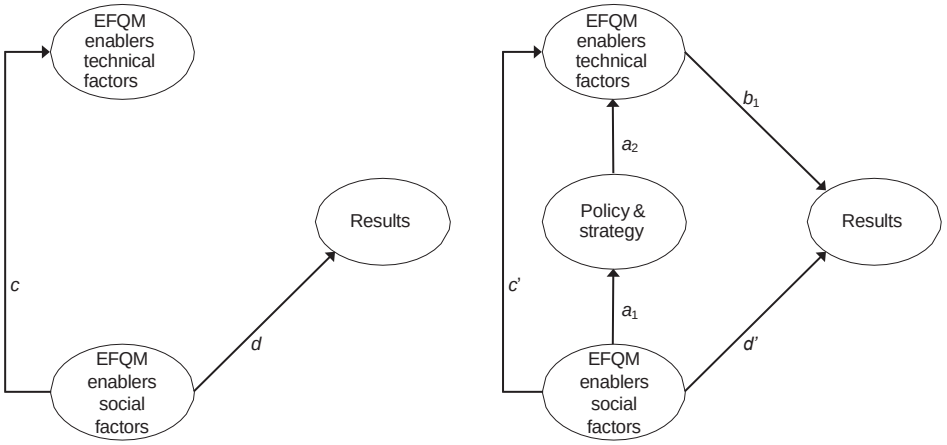
Williams, J., & MacKinnon, D. P. (2008). Resampling and distribution of the product methods for testing indirect effects in complex models. *Structural Equation Model- ing, 15*(1), 23–51.

Williams, R., Bertsch, B., Van der Wiele, A., Van Iwaarden, J., & Dale, B. (2006). Self- assessment against business excellence models: a critique and perspective. *Total Quality Management, 17*(10), 1287–1300.

Zatzick, C. D., Moliterno, T. P., & Fang, T. (2012). Strategic (MIS) Fit: the implementation of TQM in manufacturing organisations. *Strategic Management Journal, 33*, 1321– 1330.

(A) Model with total effects

(B) Model with mediated effects



H1 = EFQM enablers social factors → EFQM enablers technical factors = c'

H2 = EFQM enablers social factors → Policy & Strategy → EFQM enablers technical factors = a_1a_2 H3 = EFQM enablers social factors → Results = d'

H4 = EFQM enablers social factors → EFQM enablers technical factors → Results = $c'b_1$

H5 = EFQM enablers social factors → Policy & Strategy → EFQM enablers technical factors → Results = $a_1a_2b_1$

Fig. 1. Research model and hypotheses.

Table 1
RADAR logic.

	Assessment element
Results How much	Analyses to what extent: (1) the results show positive trends and/or a good sustained yield; (2) suitable objectives are established, and if they are attained or exceeded; (3) the yield is good compared with other organisations; (4) a clear relationship exists between the causes (adopted approaches) and the effects (results obtained); and (5) the scope of application of the results approached the relevant areas
Approach What and Why	Includes what an organisation plans to do and the reasons for it. It analyses if the approach: (1) has a clear logic, well defined and developed processes, as well as a clear orientation towards stakeholder needs; and (2) is based on the defined policy and strategy
Deployment Where and How	Refers to whether the approach is implemented: (1) in the relevant areas of the organisation; and (2) in a systematic way
Assessment and Review	Refers to what an organisation does to review and to improve the approach and the deployment. Specifically, it analyses if: (1) the approach and its deployment will be subject to regular measurements and if learning activities are undertaken; and (2) the results of both aspects are used to identify, establish priorities, plan and to implement improvements

Table 2

Sample characteristics.

	Frequency	Percentage
Ownership of capital		
Private	188	83.5
Public	37	16.5
Total	225	100
Company size		
Small and medium	146	64.8
Large	79	352
Total	225	100

Table 3

Measurement model: individual reliability, construct reliability and convergent validity.

Construct/*dimension*/indicator	Loadings	Composite reliability	AVE
EFQM enablers social factors		**0.961**	**0.926**
Leadership	*0.963*	*0.961*	*0.831*
1a. The leaders develop the mission, vision, values and ethical principles and act as a reference model of an excellence culture	0.937		
1b. The leaders personally involve themselves to guarantee the development, introduction and continuous improvement of the organisation management system	0.916		
1c. The leaders interact with clients, partners and representatives of society	0.880		
1d. The leaders reinforce an excellence culture among the people of the organisation	0.933		
1e. The leaders define and boost change in the organisation	0.892		
People	*0.962*	*0.952*	*0.800*
3a. Planning, management and improvement of human resources	0.911		
3b. Identification, development and maintenance of the people's knowledge and capacities	0.899		
3c. Involvement and assumption of responsibilities by people in the organisation	0.904		
3d. Existence of a dialogue between the people and the organisation	0.897		
3e. Rewards, recognition and attention to the people of the organisation	0.859		
Policy & strategy		**0.950**	**0.826**
2a. Policy and strategy is based on the current and future needs and expectations of the stakeholders	0.915		
2b. Policy and strategy is based on the information of the indicators of performance, research, learning and external activities	0.931		
2c. Policy and strategy is developed, reviewed and updated	0.914		
2d. Policy and strategy is communicated and deployed via a schematic of key resources	0.875		
EFQM enablers technical factors		**0.939**	**0.886**
Partnerships and resources	*0.944*	*0.915*	*0.683*
4a. Management of the external alliances	0.795		
4b. Management of the economic resources	0.852		
4c. Management of the buildings, equipment and materials	0.815		
4d. Management of technology	0.825		
4e. Management of information and knowledge	0.842		
Processes	*0.938*	*0.933*	*0.738*
5a. Systemic design and management of the processes	0.721		
5b. Introduction of the necessary improvements via innovation, in order to fully satisfy the customers and other interest groups, increasingly generating a greater value	0.879		
5c. Design and development of the products and services based on the needs and expectations of the customers	0.903		
5d. Production, distribution and attention service of the products and services	0.889		
5e. Management and improvement of the relationships with customers	0.890		
Results		**0.928**	**0.765**
Customers results	*0.919*	*0.951*	*0.907*
6a. Perception measures	0.952		
6b. Performance indicators	0.953		
People results	*0.924*	*0.929*	*0.868*
7a. Perception measures	0.930		
7b. Performance indicators	0.933		
Society results	*0.738*	*0.914*	*0.841*

8a. Perception measures	0.903		
8b2. Performance indicators	0.931		
Key results	*0.903*	*0.953*	*0.911*
9a. Key performance outcomes	0.953		
9b. Key performance indicators	0.956		

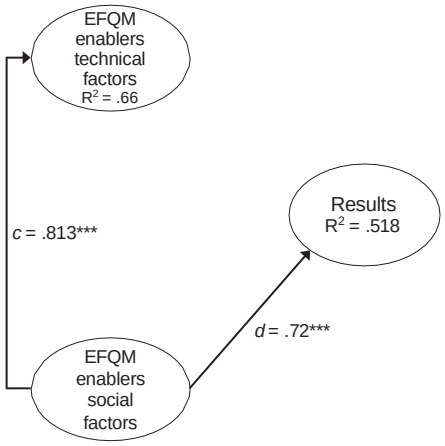
Table 4
Correlations and discriminant validity.

	EFQM enablers social factors	Policy & strategy	EFQM enablers technical factors	Results

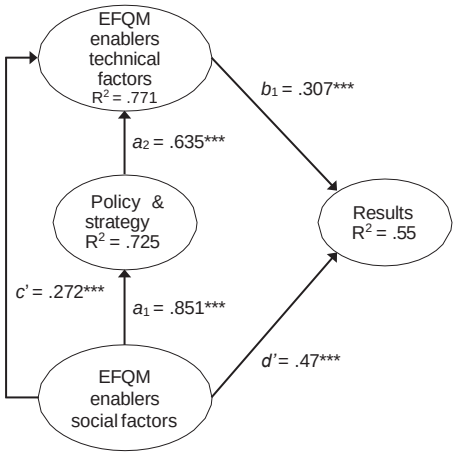
EFQM enablers social factors	**0.962**			
Policy & strategy	0.851	**0.941**		
EFQM enablers technical factors	0.813	0.867	**0.909**	
Results	0.720	0.689	0.732	**0.875**

Diagonal elements (bold) are the square root of the variance shared between the constructs and their measures (average variance extracted). Off-diagonal elements are the correlations among constructs. For discriminant validity, diagonal elements should be larger than off-diagonal elements.
All of the correlations are significant at $p < 0.01$ level.

(A) Model with total effects



(B) Model with mediated effects



H1 = EFQM enablers social factors → EFQM enablers technical factors = c'
H2 = EFQM enablers social factors → Policy & Strategy → EFQM enablers technical factors = a_1a_2
H3 = EFQM enablers social factors → Results = d'
H4 = EFQM enablers social factors → EFQM enablers technical factors → Results = $c'b_1$
H5 = EFQM enablers social factors → Policy & Strategy → EFQM enablers technical factors → Results = $a_1a_2b_1$

*** p < 0.001, ** p < 0.01, * p < 0.05, (based on t(4999), one-tailed test)

Fig. 2. Structural model results.

Table 5
Effects on endogenous variables.

Effects on endogenous variables	Direct effect	*t*-value (bootstrap)	Percentile 95% confidence intervals	Explained variance
Policy & strategy (R^2 = 0.725/Q^2 = 0.595)				
EFQM enablers social factors (a_1)	0.851***	36.992	[0.802; 0.892] Sig.	72.5%
EFQM enablers technical factors (R^2 = 0.771/Q^2 = 0.670)				
H1: EFQM enablers social factors (c')	0.272***	3.510	[0.130; 0.433] Sig.	22.1%
Policy & strategy (a_2)	0.635***	8.742	[0.482; 0.767] Sig.	55.0%
Results (R^2 = 0.55/Q^2 = 0.416)				
H3: EFQM enablers social factors (d')	0.470***	6.145	[0.336; 0.634] Sig.	33.8%
EFQM enablers technical factors (b_1)	0.307***	3.712	[0.132; 0.456] Sig.	21.2%

Sig. denotes a significant direct effect at 0.05. Bootstrapping based on n = 5.000 subsamples.
*** p < 0.001, (based on t(4999), one-tailed test). t(0.05, 4999) = 1.645, t(0.01. 4999) = 2.327, t(0.001, 4999) = 3.092.

Table 6
Path coefficients and indirect effects for mediation models.

	Total effects	Direct effects to			Indirect effects	
		PS	EFQMTF	R		
Estimate						
Percentile bootstrap 95% con						

fidence intervals

EFQMSF → EFQMTF = c 0.813*** (27.337)
EFQMSF → R = d 0.720*** (23.578)
EFQMSF a_1: 0.851*** (36.992)
H1 = c': 0.272*** (3.51) H3 = d': 0.47*** (6.145) PS a_2:
0.635*** (8.742)
EFQMTF b_1: 0.307*** (3.712)
H2 = EFQMSF → PS → EFQMTF → $a_1 a_2$

0.541

[

0.417; 0.651] Sig.
H4 = EFQMSF → EFQMTF → R = $c' b_1$

0.083

[

0.034; 0.136] Sig.
H5 = EFQMSF → PS → EFQMTF → R = $a_1 a_2 b_1$

0.166

[

0.062; 0.272] Sig.

Note: EFQMSF: EFQM enablers social factors; PS: policy & strategy; EFQMTF: EFQM enablers technical factors; R: Results.
*** $p < 0.001$, t (0.001, 4999) = 3.092, (based on t (4999), one-tailed test); t values in parentheses. Sig. denotes a significant direct effect at 0.05; bootstrapping based on n = 5,000 subsamples.

Table 7
Analysis of difference between means.

	Mean difference		Levene's test		t-test		95% confidence interval of the		Mann–Whitney test	
Policy & strategy	0	1	F	Sig.	T	Sig.	Lower	Higher	z	Sig.
EFQM enablers technical factors	28.182	42.0	0.077	0.781	−14.056	0.000**	−15.7634	−11.8867	–	–

Partnerships and resources	07									
Processes	32.516	45.381	4.951	0.027	–	–	–	–	9.122	0.000**

Note: (0) = companies that obtain lower than average scores in the policy & strategy variable.
(1) = companies that reach higher than average scores in the policy & strategy variable.
** $p < 0.05$.