

Does culture matter for the EFQM model application?

Juan Antonio Giménez Espín, Micaela Martínez Costa & Daniel Jiménez Jiménez

To cite this article: Juan Antonio Giménez Espín, Micaela Martínez Costa & Daniel Jiménez Jiménez (2022): Does culture matter for the EFQM model application?, Total Quality Management & Business Excellence, DOI: [10.1080/14783363.2022.2068408](https://doi.org/10.1080/14783363.2022.2068408)

To link to this article: <https://doi.org/10.1080/14783363.2022.2068408>



Published online: 02 May 2022.



Submit your article to this journal [↗](#)





View related articles [↗](#)



View Crossmark data [↗](#)

Does culture matter for the EFQM model application?

Juan Antonio Giménez Espín, Micaela Martínez Costa  and
Daniel Jiménez Jiménez 

Department of Accounting and Finance, Faculty of Economics and Business, Universidad de Murcia

The main objective of this paper is to analyse which kind of organisational culture is most suitable for the successful application of the EFQM model in the manufacturing sector. Partial Least Squares (PLS) was employed with data from a sample of 200 Spanish companies. Two managers in each organisation provided the data for analysis. The results of the empirical analysis identify the relationships between some of the variables, and contribute to the understanding of how the organisational culture can be a key factor in the company's success by facilitating the utilisation of the EFQM enabling criteria. This research highlights the importance of an orientation towards a culture of control and stability that can support the use of the principles and results suggested by the EFQM model. The research fills the gap in the literature regarding the relationship between organisational culture and EFQM model application. The findings suggest the possibility that TQM and the EFQM model could require different organisational cultures for success.

Keywords: Organisational culture; EFQM model; EFQM enablers; EFQM results

1. Introduction

A major influence on the management of operations of companies has been the emergence of approaches concerned with improving the quality of processes and products. Controversies have arisen about the denomination and scope of different paradigms related to quality management. For instance, Dale et al. (2001) argued that the concept of 'business excellence', referring to the EFQM model, was replacing the term 'quality management', so reinforcing the erroneous belief that quality was a fad that is no longer important in Europe. A year later, Sousa and Voss (2002) made a similar point, highlighting the risk of destroying quality management's convergent and discriminant validity. Now, nearly twenty years later, more than 30,000 companies use the EFQM model worldwide, and the EFQM model has often been used as a synonym for Total Quality Management (TQM) (Bou Llusar et al., 2009, Conti, 2007, Santos-Vijande and Álvarez-González, 2007, Gómez-Gómez et al., 2015a). Nevertheless, some researchers conclude that the EFQM model and TQM, although not the same, follow a similar path (Gómez Gómez et al., 2017).

The fact that the EQFM model establishes a framework and a terminology that is more concrete than TQM, and can be used for self-assessment (Ahmed et al., 2003, Van der Wiele et al., 2000), have contributed to its success. The main pillars of the TQM model can be clearly observed in the EFQM model. In fact, during recent decades research in TQM has evolved from analysing its principles and dimensions and its impact on performance, to research on contextual and contingent factors. Research now should answer the question: Should TQM be implemented in the same way in all types of companies? Some questions have been answered in the quality management area (Radzwill, 2013)

and some research has focused on issues such as size (Yusof and Aspinwall, 1999; Escrig Tena and de Menezes, 2016b, O'Neill et al., 2016), sector (Raharjo et al., 2015, Molina-Azorín et al., 2015), competitors (Veltmeyer and Mohamed, 2017) and organisational culture (Metri, 2005, Schroeder et al., 2008, Prajogo and McDermott, 2005, Abdualmajed Ali et al., 2017) as important variables in the success or failure of TQM implementation. Similarly, studies that focus on the EFQM model have analysed certain contingent variables, such as the size of the organisation, the environment and the activity sector (Saleh and Watson, 2017, Escrig Tena and de Menezes, 2016b). However, there is a lack of empirical studies analysing the effect that the organisational culture has in the success of the EFQM Models' application (Bolboli and Reiche, 2015, Cronemyr et al., 2017, Gómez-López et al., 2017).

According to Cronemyr et al. (2017) an organisational culture that is not aligned with quality management principles is the main cause for the failure of two-thirds of TQM programmes. Since culture is a feature that is deeply embedded in the daily functioning of companies, it is very difficult to change (Bolboli and Reiche, 2014), so it is important to analyse the role that it may play in using the excellence model.

Cameron and Quinn (2005) define a widely accepted typology of organisational culture that has been used in many empirical studies (Deshpande and Farley, 2004, Stock and Gowen, 2007, Zu et al., 2010, Abdualmajed Ali et al., 2017, Cavaliere and Lombardi, 2015). It is based on two dimensions. The first dimension is the orientation of the company to stability or flexibility, according to the importance given to control and order (stability) or innovation to adapt to changes (flexibility). The second dimension is the orientation of the company, externally, when it is primarily concerned about customers, competitors and the environment, or internally, when the focus is on people, products and processes. According to the previous literature, flexible cultures and those with external focus are the most appropriate for TQM (Bou Llusar et al., 2009, Gambi et al., 2015, Wu and Zhang, 2010, Wu, 2015), but little attention has been paid to culture and the EFQM model.

To shed light on this topic, the main objective of this paper is to analyse the kind of organisational culture that is more suitable for successful application of the EFQM model. This study analyses the role of organisational culture in the application of the EFQM Model enablers as a means for attaining competitive advantage. The proposed model is shown in Figure 1.

The remainder of this article consists of four sections. The first section focuses on the EFQM model and organisational culture and the theoretical foundations of the hypotheses. The next section describes the methodology used in this research to test the hypotheses. The last sections present and discuss the results, and conclusions of the paper.

2. Literature review and hypotheses

2.1. EFQM Excellence Model

The European Foundation of Quality Management (EFQM) was created in 1988 by the presidents of fourteen large European companies (e.g. Bosch, Fiat, Nestle).

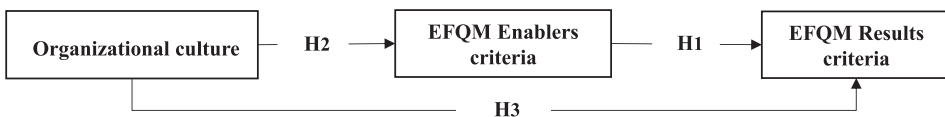


Figure 1. The theoretical model.

The origin of this model lies in this foundation, and its purpose is to help European companies to be more competitive (García-Bernal et al., 2004), provide a framework for self-assessment of organisations, and serve as a basis for judging contestants vying for the European Award Quality. It has become the basis for the evaluation of organisations in most national and regional awards across Europe. Today, more than 500 organisations are members of the foundation, including multinationals, major national companies, universities and research institutes, and more than 30,000 companies use this model worldwide.

EFQM (2013) states that ‘The EFQM model is a tool for quality management, which can guide the organisation towards the customer’. This is a non-normative model whose fundamental concept is based on the self-work of the organisation, using the criteria as a guide for analysis. According to previous studies, self-evaluation has a positive relationship with organisational performance (Ahmed et al., 2003, Calvo-Mora et al., 2014b). The model is regularly revised and updated, and the EFQM provides a set of sub-criteria or items to measure each criterion (Castresana Ruiz-Carrillo and Fernández-Ortiz, 2005). In October 2019 a new version of the EFQM model was released, but this model will not be compulsory until mid-2020, and, consequently, data about the functioning of this model will not be immediately available. The present study analyzes data on the previous version of the EFQM model.

The EFQM model is built on nine criteria grouped into two sections, five criteria for enablers (Leadership, Policy & Strategy, People, Partnership & Resources, Processes), which show how things are done in the organization, and four criteria for results (Customer results, People results, Society results, Key performance results), indicating what is achieved by the enablers. In this model, leadership drives people management, strategy and policy and partnerships and resources, and these three criteria influence the performance through processes (EFQM, 2013).

The literature regarding the EFQM model focuses on the analysis of the functioning of the model itself. Some studies have analysed the relationship between each enabler and the result criteria (Calvo-Mora et al., 2014b, Bou Llusar et al., 2009). For example, Bou Llusar et al. (2005) found that all enabling criteria are related to results criteria, with the exception of policy and strategy. Eskildsen and Dahlgard (2000) found a positive relationship between people and processes and people results. Gómez-Gómez et al. (2011) concluded that policy and strategy, people and partnership and resources have a significant effect on results. Other research has studied the relationship between agents and results, and has considered enablers as a whole and shown their influence on results (Calvo-Mora and Criado García-Legaz, 2005, Santos-Vijande and Álvarez-González, 2007).

Among the enablers, process management has been particularly highlighted in the literature as of vital importance in the model. Conti (2007) focused on processes as the most tangible and measurable part of the system, and found a direct relationship with results. Similarly, Calvo-Mora et al. (2005), in a sample of 111 university centres, found a positive relationship between processes and society, people and consumer results. Álvarez García et al. (2012) found similar results in the tourism industry. Further studies, such as Calvo-Mora et al. (2014a) and Calvo-Mora et al. (2014b) show that the process management fully mediates the influence of strategy, alliances and resource management on overall results. These findings suggest that the hard dimensions of quality management are of great importance. However, other researchers emphasise the importance of the softer dimensions of quality management in the model. Gómez-Gómez et al. (2015b) found that the people enabler is related to

people results and Escrig Tena and de Menezes (2016b) found that people make a difference in attaining high performance.

Although the focus of this research is to identify the organisational culture that best fits the use of the EFQM criteria, our initial hypothesis is that, in line with the previous research, the application of EFQM allows companies to improve their performance. Therefore, the first hypothesis of this research is:

H₁: EFQM Enabler criteria are positively related to EFQM results criteria.

2.2. Organisational culture

The application of any quality model, such as TQM, has very important implications for a company, since it affects most of its activities and processes. In order for the company to succeed in its objective, a series of quality-oriented organisational routines and values must be used. Hence, the need arises to study the effect of organisational culture when using a model of excellence.

In the management field the concept of ‘culture’ exists at various levels, including national culture and organisational culture (Catanzaro et al., 2010, Estrada-Cruz et al., 2019). The latter has frequently been defined generically as, ‘the set of norms, beliefs and values shared by members of the organisation’ (Yu, 2007, Wu, 2015, Stock and Gowen, 2007, Pasricha et al., 2018). It affects members of an organisation by influencing behaviour and performance outcomes, as well as the organisation’s external environment (Schneider et al., 2013).

In the literature, different typologies of organisational culture have been described (e.g. Schein, 1996, Ó'Reilly et al., 1991). Among them, the proposal of Cameron and Quinn (2005) stands out (Pakdil and Leonard, 2015). Their model, the *Competing Values Framework* (CVF), has been used in many empirical studies (Pasricha et al., 2018, Alghamdi, 2018, Stock and Gowen, 2007, Zu et al., 2010, Felipe et al., 2017). The CVF establishes four organisational cultures starting from two dimensions (Figure 1). One dimension shows how far the organisation has a focus on control, stability and order. The second dimension shows the tendency towards the interior (integration of units) or exterior (stimulating differentiation and rivalry). According to these dimensions, four different types of cultures can be identified:

- *Clan culture* is based on flexibility and internal focus. The organisation acts like a family, promoting communication, human development, teamwork and commitment (Cameron and Quinn, 2005, Uz Kurt et al., 2013). Losonci et al. (2017) consider that this type of organisational culture is suitable when there is a stable membership, an absence of institutional alternatives, and continuous interactions among members.
- *Adhocracy culture* is the nature of a temporary institution, and it is dismissed whenever the organisational tasks are ended, and reloaded rapidly whenever new tasks emerge (Yu and Wu, 2009). The adhocracy culture is often found in such industries as filming, consulting, space flight, and software development. This organisational culture fosters flexibility, but its orientation is external. Its objectives include innovation, creativity, risk taking, individuality and initiative (Cameron and Quinn, 2005, Abdullah et al., 2014).
- *Market culture* looks for an external perspective to differentiate it from competitors. It aims to be a market leader (Cameron and Quinn, 2005). It uses stability and control

to achieve its goals of internal and external competitiveness, productivity and profits through market competition (Yu and Wu, 2009, Uzkurt et al., 2013) and business, dealings, and communications with the environment (Ouchi, 1984).

- *Hierarchical culture* is based on stability and control along with an internal focus (Cameron and Quinn, 2005, Uzkurt et al., 2013). It is characterised by a large number of standards, routines, rules, well-defined responsibilities and uniformity with the objective of achieving efficiency, and process and product standardisation (Yu and Wu, 2009, Alghamdi, 2018).

Given the specific characteristics of each type of culture, not all of them will influence the application of quality policies in the same way. This relationship is addressed in the next sub-section.

2.3. Organisational culture and EFQM excellence model

Organisational culture is an intangible variable that is crucial for the success or failure of quality management systems (Metri, 2005, Alghamdi, 2018, Naor et al., 2008). Its relationship with TQM and Six Sigma has been studied previously (Prajogo and McDermott, 2005, Schroeder et al., 2008). Research indicates that flexible cultures are best suited to TQM (Giménez-Espín et al., 2012).

Zu et al. (2010) studied the relationship between culture and quality practices, and found that clan and market cultures were related to seven indicators of TQM and three of six-sigma, while the adhocracy culture was only related to the structure of six-sigma. Other authors found that clan and adhocracy cultures are best suited to implementing TQM (Al-Khalifa and Aspinwall, 2000, Dellana and Hauser, 2000, Giménez-Espín et al., 2012). However, no empirical studies have analysed the type of organisational culture that best suits the application of the EFQM model enablers, and, therefore, the model itself.

In order to achieve excellence, the literature identifies certain characteristics that could be important for the successful utilisation of the enablers criteria (Bolboli and Reiche, 2015, Cronemyr et al., 2017, Russell, 2000). Of these, two may be highlighted as more relevant to the CVF model: market orientation (Bolboli and Reiche, 2015, Davies et al., 2007)

Table 1. Studies highlighting the importance of customer orientation and processes control.

TQM	EFQM	
	Customer orientation	Process control
Alghamdi (2018)	Abdualmajed Ali et al. (2017)	Bolboli and Reiche (2014)
Calvo-Mora et al. (2015)	Conti (2007)	Calvo-Mora et al. (2014b) Conti (2007)
Giménez-Espín et al. (2014)	Goffin and New (2001)	EFQM (2013)
Flynn et al. (1994)	Laforet (2008)	
Hietschold et al. (2015)		
Nabitz et al. (2001)		
Sila and Ebrahimpour (2002)		
Tarí and Sabater (2004)		

and an emphasis on the stability of the process management (Calvo-Mora et al., 2015, Russell, 2000).

Many studies highlight the importance of customer orientation in quality programmes, both for TQM and EFQM models and process control for the dynamic of the EFQM model. Some of these studies have been collected in Table 1.

Cameron and Quinn (2005) identified quality strategies that match their classification of organisational culture. As can be seen in Figure 2, the market culture includes these two values (external orientation and control).

Successful organisations have an external focus and are control-oriented (Cameron and Quinn, 2005). In addition, they measure customer preferences and make partnerships with customers and suppliers (Cameron and Quinn, 2005, Abdualmajed Ali et al., 2017). Therefore these kinds of companies are closely related to customers in order to understand their expectations and needs (Flynn et al., 1994).

Managers of companies with this organisational culture use three techniques focused in TQM practices: quality information, product/service design and process management (Zu et al., 2010). They also use systematic collection and analysis of quality data for continuous improvement (Losonci et al., 2017). In the design stage, they standardise new products faster, so they have fewer components, and their process management is aimed at reducing process variability, the number of defective products and the production costs (Roh et al., 2008, Ahire and Dreyfus, 2000). Process control benefits new product quality (Carbonell and Rodríguez-Escudero, 2016). Therefore, it is expected that this kind of organisational culture supports the process management that the EFQM model requires (Bolboli and Reiche, 2015).

The opposite will happen with the clan culture since it lacks these two values. It emphasises flexibility and internal integration (Losonci et al., 2017), so process management is not systematically applied to reduce process variability but is used to create new and

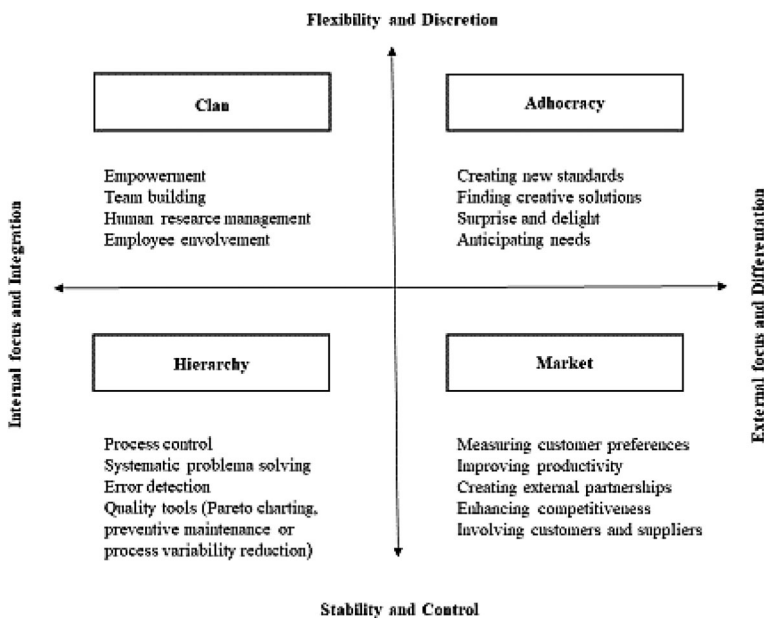


Figure 2. The Competing Values Framework.

different processes and the management of alliances and resources is not oriented to the market as the model needs (Conti, 2007, Bolboli and Reiche, 2015, EFQM, 2013, Prajogo and McDermott, 2011).

Adhocracy culture is externally oriented but its processes management is not based on control but on innovation. This organisational culture emphasises flexibility with an external focus through innovation, and adaptation to changing customer demands. In this culture, employees work on projects independently and they are empowered. The organisation offers resources to train employees so as to enhance their knowledge and skills (Naor et al., 2008, Roh et al., 2008). However, these organisations do not exercise the management that the EFQM model describes in its processes, because the improvement process is based on a replacement to develop new projects (Detert et al., 2000).

Hierarchy culture has an internal focus and emphasises control in process management and standardised rules and procedures (Losonci et al., 2017, Zu et al., 2010). Although organisations with a hierarchical culture are characterised by a lack of external orientation, they train their employees to improve the attention to their customers and to know their needs and expectations (Cameron and Quinn, 2005). Also, they use information from internal indicators to make alliances and control their processes (Wu, 2015, Pakdil and Leonard, 2015). These firms also use strategies of control, clear lines of decision-making authority, routinisation and standardised procedures, and, more importantly, they manage processes as the EFQM model prescribes, because these firms use quality tools such as statistical process control, preventive maintenance and process variability reduction (Roh et al., 2008, Rao Tummala et al., 2006, Bolboli and Reiche, 2015, Kaynak, 2003).

Some research supports these conclusions. Prajogo and McDermott (2011) conclude that clan and adhocracy cultures favour process innovation, while market and hierarchy cultures are positively related to quality processes. According to these authors, the internal orientation is more associated with processes while external orientation is more associated with products. In addition, flexibility is more geared to innovation and control with the quality, as quality control is based on routine processes, stability and regulation of standards (Pakdil and Leonard, 2015).

From the above, the following hypotheses are proposed:

H₂: Different types of organizational culture are related to EFQM enabler criteria.

More specifically, it is proposed that:

H_{2a}: Clan culture is not positively related to EFQM enabler criteria.

H_{2b}: Adhocracy culture is not positively related to EFQM enabler criteria.

H_{2c}: Market culture is positively related to EFQM enabler criteria.

H_{2d}: Hierarchy culture is positively related to EFQM enabler criteria.

In this research, the relationship of organisational culture to the EFQM model are analysed differently for enablers and results, since the two types of criteria are of very different nature and, as a consequence, culture can play a different role. The literature indicates that organisational culture is a source of competitive advantage (Barney, 1986, Hofstede, 1993), and most studies show that organisational culture influences the results (Naor et al., 2010, Mayondo and Farrell, 2003) and this is key in determining quality performance (Stock and Gowen, 2007). However, given the different characteristics of the different types of culture, their relationships with the results criteria may differ, with some cultures being more effective than others.

In this research, we focus on the EFQM model performance measures. These results are a tool to structure the organisational management system based on self-evaluation. For this,

four types of results are identified related to customers, employees, society and a series of key indicators. The literature reports that these model results are positively related to organisational performance (Ahmed et al., 2003). In view of this, we review how different types of culture can contribute to improving organisational performance.

The dynamic of the EFQM model shows that the processes generate the results, and these need stability and systematic management (EFQM, 2010). Therefore, the EFQM model requires orientation to the market, because it is based on the satisfaction of the needs and expectations of the clients, and process stability. As a consequence, we expect the cultures that possess these characteristics to have bigger effects on results (Pakdil and Leonard, 2015).

Clan culture focuses on flexibility and internal maintenance, emphasising cohesion, participation and strong human relations. It can be positively related to people results (Eskildsen and Dahlgaard, 2000), but not with customer (Zu et al., 2010) and society results. Therefore it is unlikely to have a large impact on key results because this culture is not externally orientated and does not exercise the process management that the EFQM model describes (Pakdil and Leonard, 2015, Cameron and Quinn, 2005).

Adhocracy culture emphasises flexibility but is externally focused on innovation, growth and adaptation to the environment. External orientation is important to understand customer needs (Laforet, 2008) and to develop products the customer wants (Goffin and New, 2001). It adapts to changing customer demands (Naor et al., 2008), and this culture is positively related to customer results.

In addition, the organisation offers resources to train employees so as to enhance their knowledge and skills. This may allow these companies to meet their customers' needs and expectations (Laforet, 2008). Moreover, process innovation improves the efficiency and productivity that improve the key results. However, exploration-orientation in this organisational culture is positively related to more radical innovation than continuous and systematic process improvement (Rafailidis et al., 2017). In the EFQM model, it is process management that shapes the results, and this culture will not be positively related to them.

Market culture has an external focus and is control-oriented, encouraging competition and achievement of goals. Firms with this culture develop new products and use process management to enhance efficiency and productivity, leading to better customer satisfaction and better market and financial performance (Hendricks and Singhal, 2001, Kaynak, 2003).

Besides, senior management develops initiatives such as continuous improvement in quality (Beer, 2003), employee participation (Naor et al., 2008), and making partnerships with customers and suppliers. This close relationship with customers helps the firm to understand their expectations and needs (Flynn et al., 1994) and exercise the management that the EFQM model requires in its processes (Cameron and Quinn, 2005). Therefore, this culture can improve results.

Finally, Hierarchy culture emphasises the management of processes that the EFQM model requires (Zu et al., 2010), focuses on continuous improvement and stability, through process variability reduction, statistical process control, preventive maintenance (Kaynak, 2003, Bolboli and Reiche, 2015) and production schedules that focus on satisfying the customer and other stakeholders (EFQM, 2010). Although these organisations lack external orientation, they train their employees to know their clients' needs and expectations (Cameron and Quinn, 2005). So, this culture may manage processes as the EFQM model needs, and that will allow firms to improve their results.

This leads to the following hypothesis:

H₃: Different types of organizational culture are related to organizational performance.

In detail, we present the different sub-hypotheses for each type of culture:

H_{3a}: Clan culture is not positively related to EFQM results criteria.

H_{3b}: Adhocracy culture is not positively related to EFQM results criteria.

H_{3c}: Market culture is positively related to EFQM results criteria.

H_{3d}: Hierarchy culture is positively related to EFQM results criteria.

3. Research methodology

3.1. Sample and data collection

The population includes Spanish manufacturing companies with more than 100 employees that are included in the SABI financial database. Like other studies on these topics, the population of 3814 organisations, covered a wide spectrum of industries.

Although the EFQM model was designed to be applied to any company regardless of its years in operation, size or sector, the present research focuses on a population that meets various criteria that are set out below.

Only Spanish industrial organisations that were active were considered. Only the industrial sector was considered in order to secure a sample where the quality management has a certain degree of homogeneity. For this reason, the service sector was ruled out, since its high heterogeneity means that quality management policies may be very different, depending on the service considered. However, this study is not limited to a specific sector or sectors within the industry, making good coverage more likely and increasing the sensitivity of the statistical tests.

The size of the organisation was considered important for quality management. For this reason, small companies, in which internal processes are usually not structured, were excluded. Finally, it was considered important to establish a criterion of at least 5 years in operations, so that the participating companies have clearly established their procedures and policies to achieve their objectives, as well as more stable and consolidated quality policies including the application of the EFQM model.

Data were collected through a telephone survey addressed to the quality manager (for data regarding EFQM) and human resource manager (for the data regarding organisational culture), so two different managers participated in this research. The structured questionnaire was previously tested on academics and a small sample of managers. Then, the quality manager of the company was contacted and, in case of a successful response, they were asked to enrol the participation of the human resource manager. 871 companies were randomly contacted in order to obtain the 200 desired double responses; this produced a very large sample that allows the application of the PLS-SEM methodology (Felipe et al., 2017, Hoyle, 1995). In addition, the cross-responses of both managers were validated through other questions in the questionnaire about the frequency of introduction of new products, the ability to manage new technologies, and so on. These items were used to measure other variables, which will be used in other studies.

Table 2 shows the number of companies in each sector according to the CNAE-93 at two digits, both for the sample and for the population.

The representativeness of the sample with respect to the composition by sectors was verified through Pearson's correlation coefficient (0.767 significant at 1%), which correlates the variable for organisations in the population with the same variable in the

Table 2. Distribution by sectors.

CNAE	Activity	Population		Sample	
		N	%	n	%
13	Textile	359	9.41%	12	6.00%
15	Food and beverages	669	17.54%	35	17.50%
17	Leather	48	1.26%	3	2%
18	Printing	190	4.98%	5	2.50%
20	Chemical	43	1.13%	8	4.00%
21	Pharmaceutical	9	0.24%	2	1.00%
22	Plastics	349	9.15%	18	9.00%
27	Metalworking	1173	30.76%	43	2.50%
30	Electronics and electricity	281	7.37%	7	3.50%
31	Furniture	388	10.17%	53	26.50%
33	Medical equipment	22	0.58%	2	1.00%
34	Automobile	165	4.33%	5	2.50%
35	Aeronautics	18	0.47%	1	0.50%
35	Naval	30	0.79%	1	0.50%
41	Construction	52	1.36%	3	1.50%
49	Other transport/industry	10	0.26%	1	0.50%
	Others	8	0.21%	1	0.50%
Total		3814	100%	200	100%

sample companies. This means that the sample can be considered a good representation of the population regarding the distribution across industries (see Table 2).

In the same way, representativeness in terms of size was also analysed, through an analysis of variance using the measure of the number of employees of each company. This analysis has shown that the population and the sample are not significantly different in size ($F = 0.034$, $p = 0.854$). Also, the results of the ANOVA analysis did not show that the companies in the population and the sample were different in terms of the financial results variables (ROA) of the company ($F = 0.724$, $p = 0.395$). Therefore, generally, it can be concluded that no evidence of differences between the sample and the population were found, which is consistent with the purpose of this research.

3.2. Measures

For all the measures, a 5-point Likert scale was used (1 = 'strongly disagree'; 5 = 'strongly agree'). Organisational culture was configured as a formative construct, while EFQM enablers and results as reflective constructs (Diamantopoulos and Siguaw, 2006). The questionnaire comprised items to measure the constructs described below.

Following the methodology used in the application of the EFQM model, EFQM enablers were measured as a second-order factors made up of five dimensions related to the EFQM enablers: leadership, strategy, people, alliances and processes. These items were extracted from each sub-criterion from the model (EFQM, 2013), using the same items that are proposed to evaluate the application of the EFQM model, in the same way as some previous studies (Calvo-Mora et al., 2020). The final items, after scale cleaning, are shown in Table 3.

Similarly, EFQM results were measured with four first-order constructs (customers, employees, society and key results) and modelled as a second-order construct. Sixteen items referring to the Model were included, four items for each of the results criteria of

Table 3. Mode A constructs: EFQM variables.

Construct	Measures	Loading	Stand Deviat	T-values	Reliability
Leadership	The cooperation among members in the organisation is stimulated.	0.751	0.037	20.020	$\alpha=0.896$ $\rho_A = 0.902$ $SCR = 0.919$ $AVE = 0.619$ $R^2 = 0.629$ $Q^2 = 0.380$
	The structure of the organisation is proportionated to support the implantation of the policy and strategy.	0.785	0.026	30.093	
	They are interested in the measurement, review and improvement of processes' results.	0.721	0.038	19.133	
	They are accessible, listen actively and answer the persons that integrate the organisation.	0.709	0.047	15.208	
	They recognise the efforts of persons and teams of all organisational levels.	0.838	0.024	34.557	
	They guarantee the investment, the resources and the needed support for changes.	0.840	0.019	44.060	
	They communicate change and reasons that have caused them to employees and other stakeholders that may be affected by them.	0.849	0.021	40.708	
Strategy	Obtained data concerning the competitive position of the company are examined.	0.749	0.032	23.755	$\alpha=0.867$ $\rho_A = 0.872$ $SCR = 0.904$ $AVE = 0.655$ $R^2 = 0.710$ $Q^2 = 0.456$
	Data about social, environmental, security and legal topics are studied.	0.747	0.038	19.905	
	To balance the needs and expectations of stakeholders is tried.	0.840	0.024	35.232	
	Key processes that allow carrying out the organisational policy and strategy are defined.	0.851	0.019	43.757	
	Processes' effectiveness is revised in order to implement policy and strategy.	0.851	0.025	33.688	
People	Training and development plans are adjusted to the current and future capabilities of the organisation.	0.776	0.028	28.061	$\alpha=0.867$ $\rho_A = 0.868$ $SCR = 0.904$ $AVE = 0.654$ $R^2 = 0.792$ $Q^2 = 0.513$
	Individual and team participation in improvement activities is encouraged.	0.788	0.030	26.303	
	Involvement and a creative and innovative behaviour on behalf of employees are stimulated.	0.811	0.026	30.798	
	Reward, compensation and dismissal topics are aligned with the organisational strategy.	0.838	0.024	34.924	
	Acknowledgement is given to	0.829	0.030	27.388	

(Continued)

Table 3. Continued.

Construct	Measures	Loading	Stand Deviat	T-values	Reliability
Alliances	employees in order to get them involved.				$\alpha=0.894$ $\rho_A = 0.898$ $SCR = 0.916$ $AVE = 0.576$ $R^2 = 0.749$ $Q^2 = 0.425$
	Opportunities to establish alliances with other organisations are identified.	0.702	0.041	17.101	
	In the case of alliances, synergies are created with them as a result of the improvement of processes and the chain client/supplier.	0.720	0.039	18.374	
	Economic and financial resources are used to support the strategy.	0.784	0.029	27.463	
	Economic and financial risks are controlled.	0.771	0.029	26.969	
	Security and ergonomics of the assets is managed.	0.767	0.029	26.696	
	Information and Communication Technologies are used in order to improve effectiveness.	0.747	0.042	17.586	
	Access to information to everyone that should know it is facilitated.	0.743	0.046	16.024	
Processes	An innovative and creative environment with the use of information and knowledge is generated.	0.831	0.022	38.332	$\alpha=0.856$ $\rho_A = 0.865$ $SCR = 0.893$ $AVE = 0.582$ $R^2 = 0.599$ $Q^2 = 0.343$
	Process indicators are implemented and performance targets are set.	0.750	0.041	18.138	
	Market research, customer surveys or other information is used to determine current and future customer needs and expectations for products and services.	0.713	0.040	17.683	
	The creativity and core competencies of people in the organisation are used to develop competitive products and services.	0.810	0.021	37.724	
	We promote consumer awareness and appreciation of our products and services.	0.860	0.017	51.179	
	Customer requirements are identified and met as a result of regular contact with customers.	0.729	0.038	19.218	
	Information from regular contacts, complaints and claims is managed.	0.702	0.042	16.751	
Customers	The opinion of the customers about the quality of our product design.	0.905	0.017	51.720	$\alpha=0.850$ $\rho_A = 0.858$ $SCR = 0.908$ $AVE = 0.768$ $R^2 = 0.558$ $Q^2 = 0.404$
	The opinion of the customers about the quality of our manufacturing products.	0.899	0.018	51.255	
	Market share	0.823	0.026	31.811	

(Continued)

Table 3. Continued.

Construct	Measures	Loading	Stand Deviat	T-values	Reliability
Employee	The employees' motivation towards improving the organisation.	0.780	0.039	19.938	$\alpha=0.737$ $\rho_A = 0.739$ $SCR = 0.851$ $AVE = 0.656$ $R^2 = 0.687$ $Q^2 = 0.437$
	The employees' participation in improving the organisation.	0.872	0.022	40.169	
	Health and safety at work	0.773	0.032	24.175	
Society	The knowledge of our organisation by society.	0.851	0.024	35.388	$\alpha=0.891$ $\rho_A = 0.892$ $SCR = 0.924$ $AVE = 0.754$ $R^2 = 0.784$ $Q^2 = 0.585$
	The good public image of the company.	0.888	0.014	62.650	
	Satisfying relationships with government.	0.873	0.021	41.054	
	Surveys of public entities, business organisations or trade unions.	0.860	0.024	35.720	
Key results	The productivity of our company.	0.931	0.013	69.988	$\alpha=0.940$ $\rho_A = 0.953$ $SCR = 0.958$ $AVE = 0.850$ $R^2 = 0.752$ $Q^2 = 0.633$
	The unit cost of producing our products.	0.802	0.039	20.346	
	The benefits of our company.	0.971	0.006	173.525	
	The profitability of our company.	0.974	0.004	247.326	
EFQM agents	Leadership	0.794	0.027	29.438	$\alpha=0.890$ $\rho_A = 0.894$ $SCR = 0.920$ $AVE = 0.697$ $R^2 = 0.306$ $Q^2 = 0.215$
	Strategy	0.843	0.025	34.344	
	People	0.891	0.014	62.421	
	Alliances	0.774	0.031	25.151	
	Processes	0.866	0.019	44.459	
EFQM results	Customers Results	0.750	0.031	24.267	$\alpha=0.817$ $\rho_A = 0.833$ $SCR = 0.880$ $AVE = 0.650$ $R^2 = 0.420$ $Q^2 = 0.266$
	People Results	0.706	0.051	13.769	
	Society Results	0.886	0.014	61.098	
	Key Results	0.868	0.018	48.743	

the model (Table 3). These items include perception measures and performance indicators (Calvo-Mora et al., 2020, Shafiq et al., 2019, Bou Llusar et al., 2009, Calvo-Mora et al., 2014a).

In order to address these dimensions of the EFQM model, second-order constructs have been used in a similar way to previous studies (Gómez Gómez et al., 2017, Shafiq et al.,

2019, Bou-Llusar et al., 2005, Santos-Vijande and Álvarez-González, 2007, Calvo-Mora et al., 2014a). To create these second-order constructs, the latent values of the five first-order dimensions for the agent criteria and the four dimensions for the EFQM performance criteria were used. These two second-order constructs were also computed as reflective ones.

Organisational culture was measured using four constructs (clan, adhocracy, market and hierarchical culture), based on the scale of Deshpandé et al. (1993). These constructs were computed as formative ones from four items for each culture (Table 5). Like other studies, the four culture types were considered formative constructs (Roldán et al., 2012, Naranjo-Valencia et al., 2017), since the latent variables (each organisational culture type) are formed from the observed variables (Roberts and Thatcher, 2009).

According to Henseler et al. (2016b) there are three types of measurement models that can be used in structural equations: common factor models, causal indicator models and composite models. The EFQM and culture variables in this study are modelled as composites, and they are designed constructs or artefacts that are the result of theoretical thinking (Henseler, 2016b, 2017). Mode A (EFQM constructs) and Mode B (culture constructs) composites have been used to operationalise them.

3.3. *Data analysis*

To test the hypotheses partial least squares (PLS) were employed, a variance-based structural equation modeling (SEM) technique (Henseler et al., 2016a).

PLS-SEM makes it possible to build a model that represents a certain theory, simply converting the theoretical concepts into unobservable (latent) variables and the empirical concepts into indicators, which are linked by a series of hypotheses (Cepeda-Carrión et al., 2016). In this case, we have used explanatory objectives (Henseler, 2018).

SmartPLS 3.3.3 software was used to assess the measurement model and to estimate the structural model using bivariate correlations between each indicator and the construct (Sarstedt et al., 2016, Ringle et al., 2015).

4. **Results**

PLS-SEM uses a two-stage approach (Hair et al., 2019). The first step requires the assessment of the measurement model. This allows the relationships between the observable variables and theoretical concepts to be specified. In the second step, the structural model is evaluated (Barclay et al., 1995, Chin, 2010).

4.1. *Measurement model*

The analysis of the measurement model was carried out taking into account the different nature of the modelling of the variables, differentiating between the variables of the EFQM model (Model A) and those of culture (Model B).

In order to confirm the measurement model, several tests have been developed for Mode A in relation to individual item reliability, construct reliability, average variance extracted (AVE), and discriminant validity of the indicators of latent variables. Examination of the results in Table 3 shows that all the constructs are reliable.

The values for both Cronbach's alpha coefficient and for composite reliability are greater than the value of 0.7 required in the early stages of research (Nunnally, 1978). In addition, the value of the Dijkstra-Henseler Rho_A coefficient exceeds the cut-off

Table 5. Mode B constructs: Organisational culture variables.

Construct	Measures	Weights	Stand Deviat	T-values	VIF
Clan	My organisation is a very personal place. It is like an extended family.	0.523	0.347	0.132	1.311
	The leadership in the organisation is generally considered to exemplify mentoring, facilitating, or nurturing.	-0.647	0.447	0.149	1.281
	The glue that holds the organisation together is loyalty and mutual trust. Commitment to this organisation runs high.	0.773	0.415	0.063	1.230
	The human researches. In your company cohesion and high morale is important.	-0.358	0.285	0.210	1.184
Adhocracy	My organisation is a very dynamic and entrepreneurial place. People are willing to stick their necks out and take risks.	0.339	0.187	0.070	1.143
	The leadership in the organisation is generally considered to exemplify entrepreneurship, innovation, or risk taking.	0.155	0.173	0.371	1.130
	The glue that holds the organisation together is commitment to innovation and development. There is an emphasis on being on the cutting edge.	0.532	0.171	0.002	1.179
	The growth and acquisition of resources. It is important to be prepared for new changes and challenges.	0.434	0.187	0.021	1.178
Hierarchy	The organisation is a very controlled and structured place. Formal procedures generally govern what people do.	0.156	0.175	0.371	1.153
	The leadership in the organisation is generally considered to exemplify coordinating, organising or smooth-running efficiency.	0.254	0.198	0.200	1.063
	The glue that holds the organisation together is formal rules and policies. Maintaining a smooth-running organisation is important.	0.748	0.120	0.000	1.132
	The permanence and stability. It is important to the efficiency and fluency in daily operations.	0.323	0.148	0.030	1.093
Market	My organisation is very results-oriented. A major concern is with getting the job done. People are very competitive and achievement oriented.	0.251	0.133	0.059	1.220
	The leadership in the organisation is generally considered to exemplify a producer, a technician, as someone primarily concerned with technical aspects.	0.293	0.148	0.049	1.089
	The glue that holds the organisation together is the emphasis on achievement and goal accomplishment.	0.639	0.142	0.000	1.325
	The success and competitiveness. It is important to set measurable goals.	0.215	0.131	0.103	1.266

value of 0.7. The AVE should be greater than 0.5, meaning that 50% or more of the variance of the indicators should be accounted for (Fornell and Larcker, 1981). All constructs of the model meet these requirements. For discriminant validity, we have compared the

square root of the AVE with the correlations among constructs (below diagonal elements in Table 4). On average, each construct relates more strongly to its own measures than to others. Discriminant validity was also assessed following the heterotrait-monotrait (HTMT) criterion (Table 4), with values under 0.85 (Henseler et al., 2015).

Organisational culture variables are computed in Mode B. We confirmed the validity of the formative dimensions using the procedures suggested by Fornell and Larcker (1981) for Mode B. Because the indicators are not necessarily correlated, traditional reliability and validity assessment were dismissed as inappropriate for a formative construct, with reference to its indicators (Bollen, 1989). The analysis of the measurement model includes the analysis of the weightings of each dimension, as well as a study of the absence of multicollinearity, to avoid redundant dimensions or dimensions that measure similar aspects of effectiveness (Cenfetelli and Bassellier, 2009).

For the formative indicator to be significant it must reach a significance level of $p < 0.05$ of the two-tailed t-statistic (Urbach and Ahlemann, 2010). However, even if an item possesses a low significance, its removal is not recommended, as it would remove part of the value of the exogenous construct (Roberts and Thatcher, 2009). The weights can be interpreted as the canonical correlation and will help to determine the hierarchy of items, according to their contribution to the variable with which they are linked.

Multicollinearity among the formative indicators has been tested by studying the value of the variance inflation factor (VIF). The absence of collinearity is indicated if the VIF does not exceed the recommended value of 3.3 (Belsley 1991; Diamantopoulos y Siguaw, 2006; Roberts y Thatcher, 2009). In this case, Table 5 shows that all values are less than 1.33, indicating that there is no multicollinearity among them, and, therefore, that each indicator has a different meaning.

4.2. Structural model

The structural model obtained from the PLS-SEM analysis is represented in Figure 3. It includes the explained variance of the endogenous variables (R^2) and the standardised path coefficients (β). This shows that some of the hypothetical relationships are significant. In addition, significance tests based on traditional parameters have been made (Chin, 1998, Roldán and Sánchez-Franco, 2012). The structural model has been evaluated by examining the R^2 values and the size of the structural path coefficients using a one-tailed test (Kock, 2015).

Table 4. Discriminant validity assessment.

	1	2	3	4	5	6	7	8	9
1. Leaders	<i>0.787</i>	0.719	0.755	0.487	0.629	0.302	0.527	0.465	0.327
2. Strategy	0.641	<i>0.809</i>	0.769	0.607	0.750	0.348	0.480	0.578	0.422
3. People	0.674	0.672	<i>0.809</i>	0.731	0.809	0.421	0.597	0.618	0.457
4. Processes	0.442	0.533	0.634	<i>0.763</i>	0.723	0.505	0.650	0.702	0.596
5. Alliances	0.574	0.668	0.716	0.641	<i>0.759</i>	0.488	0.581	0.597	0.471
6. Employ Res	0.281	0.318	0.378	0.452	0.440	<i>0.876</i>	0.694	0.578	0.585
7. Custom Res	0.437	0.396	0.486	0.521	0.487	0.597	<i>0.810</i>	0.799	0.698
8. Society Res	0.421	0.508	0.543	0.617	0.534	0.526	0.659	<i>0.868</i>	0.797
9. Key Res	0.307	0.383	0.417	0.541	0.437	0.535	0.592	0.736	<i>0.922</i>

Notes: The diagonal elements (bold and italics) are the square roots of the AVEs; Fornell-Larcker criterion in italics in the lower left corner and heterotrait-monotrait ratio (HTMT) in the upper right corner; off-diagonal lower elements are the correlations between constructs.

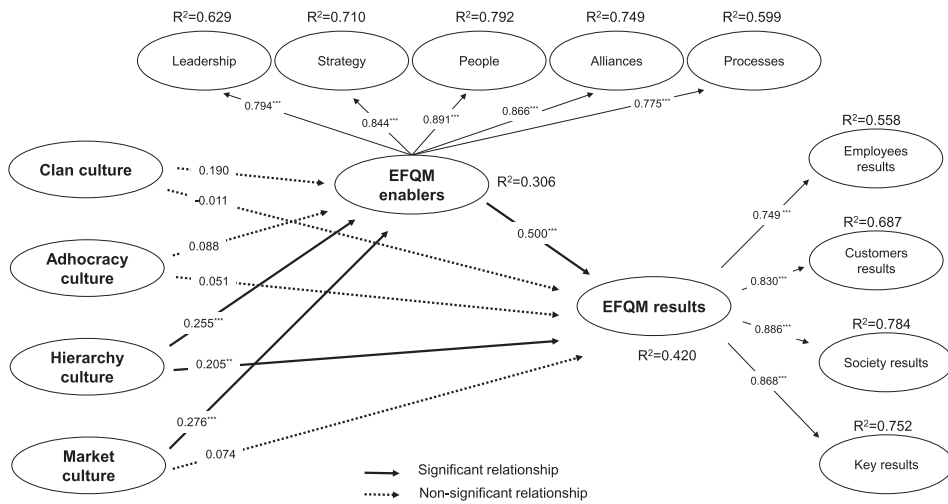


Figure 3. Structural model results.

The stability of the estimates is examined by using the t-statistics obtained from a bootstrap test with 5000 resamples. Table 6 sets out the model statistics, the path coefficients and the *t* values observed with the level of significance achieved from the bootstrap test.

The results support H₁ indicating that enablers of the EFQM model have a positive effect on performance, with a path coefficient (β) of 0.500 (*t*-value = 7.790, *p*-value = 0.000). So, the EFQM Model facilitates the improvement of results in different areas of the company.

The relationship between organisational culture and EFQM enabling criteria (H₂) is supported. Clan (β = 0.190, *t*-value = 1.259, *p*-value = 0.208) and adhocracy (β = 0.088, *t*-value = 1.127, *p*-value = 0.260) are cultures that do not have a positive effect on the EFQM criteria, as proposed in the hypotheses, confirming H_{2a} and H_{2b}. This may be due to a lack of external guidance, in the case of the clan culture, and the absence of a management system based on stability, in both cultures.

Both market (β = 0.276, *t*-value = 3.926, *p*-value = 0.000) and hierarchical (β = 0.255, *t*-value = 4.104, *p*-value = 0.000) cultures have a positive effect on EFQM criteria, supporting H_{2c} and H_{2d}. The market culture has two main features that the EFQM Model requires, while the hierarchy culture has only the management processes required, but these organisations insist that their employees pay attention to their customers and know their needs and expectations (Cameron and Quinn, 2005).

Based on these results, the R² explained for EFQM criteria is 0.320 (0.326 for the adjusted value). This value is close to 0.33, which is considered an important and moderate value (Chin, 1998). The variance explained in an endogenous construct by another latent variable is given by the absolute value of the result of multiplying the path coefficient by the corresponding correlation coefficient between the two variables (Hair et al., 2019). Taking this into account, the explanation of each type of culture on the dependent variable would be 7.22% for Clan, 3.38% for Adhocracy, 9.15% for Hierarchical and 12.25% for Market. Also, the effect sizes (*f*²) of these variables are generally small, with values of 0.042 (Clan), 0.006 (Adhocracy), 0.066 (Market) and 0.090 (Hierarchy), all of which are below 0.15 (Cohen, 1988).

We also explain the effect of the organisational cultures on EFQM results. Only hierarchical culture (β = 0.205, *t*-value = 3.133, *p*-value = 0.002) has a positive effect on

Table 6. Results.

Paths	Coef	Std. Desv.	t-value	p-value	LL	UL
<i>Hypotheses</i>						
H ₁ : EFQM criteria → EFQM Results	0.500	0.064	7.790	0.000	0.361	0.604
H _{2a} : Clan → EFQM criteria	0.190	0.151	1.259	0.208	-0.300	0.332
H _{2b} : Adhocracy → EFQM criteria	0.088	0.078	1.127	0.260	-0.039	0.262
H _{2c} : Market → EFQM criteria	0.276	0.070	3.926	0.000	0.121	0.393
H _{2d} : Hierarchical → EFQM criteria	0.255	0.062	4.104	0.000	0.144	0.382
H _{3a} : Clan → EFQM Results	-0.011	0.073	0.155	0.877	-0.137	0.150
H _{3b} : Adhocracy → EFQM Results	0.051	0.091	0.561	0.575	-0.125	0.235
H _{3c} : Market → EFQM Results	0.074	0.104	0.715	0.475	-0.124	0.256
H _{3d} : Hierarchical → EFQM Results	0.205	0.065	3.133	0.002	0.089	0.333
<i>Second order constructs</i>						
EFQM criteria → Leadership	0.794	0.026	30.620	0.000	0.740	0.841
EFQM criteria → Strategy	0.844	0.024	35.118	0.000	0.795	0.886
EFQM criteria → People	0.891	0.014	64.104	0.000	0.861	0.916
EFQM criteria → Alliances	0.866	0.019	45.397	0.000	0.828	0.901
EFQM criteria → Processes	0.775	0.030	25.503	0.000	0.713	0.830
EFQM Results → Customers Results	0.749	0.029	25.403	0.000	0.686	0.802
EFQM Results → People Results	0.830	0.025	33.284	0.000	0.777	0.878
EFQM Results → Society Results	0.886	0.014	62.668	0.000	0.858	0.911
EFQM Results → Key Results	0.868	0.018	49.392	0.000	0.829	0.900
<i>Indirect effects</i>						
Clan → EFQM criteria → EFQM Results	0.095	0.074	1.291	0.197	-0.149	0.155
Adhocracy → EFQM criteria → EFQM Results	0.044	0.040	1.096	0.274	-0.018	0.138
Market → EFQM criteria → EFQM Results	0.138	0.039	3.542	0.000	0.054	0.206
Hierarchical → EFQM criteria → EFQM Results	0.127	0.035	3.601	0.000	0.067	0.198

Note: based on a Student's $t_{(4999)}$ distribution with one tail [$t_{(0.05, 4999)} = 1.645$; $t_{(0.01, 4999)} = 2.327$; $t_{(0.001, 4999)} = 3.092$]; Bootstrapping based on $n = 5.000$ subsamples; LL = Lower 95% percentile confidence interval; UL = Upper 95% percentile confidence interval.

organisational performance, supporting H_{3a}, H_{3b} and H_{3d}. As hypothesised, clan and adhocratic cultures do not have a clear effect on the EFQM model results, due to the diversity of cultural values that do not support a clear influence. Contrary to expectations, we found no such evidence for market culture. Therefore, it is possible that, for the results with the EFQM model, it is more important that the culture of the company encourages systematic management that increases the efficiency of processes rather than orientates them to the market. This type of culture explains 7.42% of the behaviour of the variable of the EFQM results, which together with the 31.10% explained by the EFQM criteria implies an R^2 explained for EFQM results of 0.434 (0.420 for the adjusted value). According to the values of f^2 suggested by the model, the explanation of hierarchical culture (0.064) would be small, while the effect of the EFQM criteria (0.301) would be moderate (Cohen, 1988).

The predictive importance of the dependent constructs was analysed, using the Stone-Geisser test, also known as Q^2 or Cross Validated Redundancy. It was found that the dependent constructs had values greater than 0. The Q^2 score for EFQM criteria is 0.215 and that of EFQM results is 0.266.

In addition, we analysed the indirect effects of organisational culture types on EFQM results. Table 6 shows that both hierarchy ($\beta = 0.127$, t -value = 3.601, p -value = 0.000) and

market ($\beta = 0.138$, $t\text{-value} = 3.542$, $p\text{-value} = 0.000$) cultures have an indirect effect on results through EFQM enablers. Although no direct association was found between market culture and EFQM results, an indirect effect is observed. Furthermore, these results once again highlight the importance of these two cultures based on stability for the application of the EFQM model. In this case, it has been observed that the EFQM enablers play a mediating role for both hierarchy and market cultures to improve the EFQM results.

5. Discussion, implications and conclusions

5.1. Discussion and implications

One way that companies can differentiate themselves from the competition and improve their productivity by eliminating inefficient processes is the Total Quality Management system. Some researchers believe that the EFQM model represents the social and technical dimensions of TQM (Fotopoulos and Psomas, 2009, Bou-Llugar et al., 2009, Calvo-Mora et al., 2014b). Bou Llugar et al. (2009) conclude that leadership and human resource management are the soft dimension, and processes, partnerships, and resources the technical dimension of TQM. On the other hand, Bou Llugar et al. (2009) and Black and Porter (1996) argue that policy and strategy guide leadership, and this contains items of both dimensions (Escrig Tena and de Menezes, 2016a).

According to some authors, organisational culture is one of the most important determinants of the success of TQM (Pantouvakis and Bouranta, 2017, Roldán et al., 2012, Zu et al., 2010) and organisational excellence (Schein, 1984). However, there are no studies that analyse what type of culture is the most appropriate for the application of the EFQM Model.

Some articles indicate that flexible cultures and cultures with external focus, Adhocracy and Culture for Quality, could be the most appropriate for TQM (Bou Llugar et al., 2009, Giménez-Espín et al., 2012). Although these cultures may be drivers of the EFQM model, this has still not been supported by empirical evidence.

This empirical study has important theoretical and managerial implications. First, this study indicates that in order to apply the EFQM model, it is better if the company has a hierarchical or market type of culture, since our results indicate positive relationships among these types of culture and EFQM enablers. Although the two types of culture differ in their internal and external orientation, they reflect a commitment to systematic process management. This fact may align the cultures the characteristics of the model, such as external orientation (Abdualmajed Ali et al., 2017) and systematic process management. Therefore, managers who wish to apply the model should orientate their company to the intended clientele, and manage processes adequately. The results suggest that successful application of the EFQM Model requires managers to control their human resources, the policies and strategies of their organisation, their resources and alliances and their processes (Suárez et al., 2014). In accordance with these conclusions, Rao Tummala et al. (2006) point out that the market culture allows the enabling criteria to be used effectively in the company. This finding is extremely important in guiding companies that use the model or wish to do so (Suárez et al., 2017, La Rotta and Pérez-Rave, 2017). These results also highlight the differences between the principles of EFQM and those of TQM, since the latter promotes flexibility rather than stability. According to the literature, the emphasis on control produces less successful results in TQM programmes (Zairi and Idris, 2006). In this sense, the TQM philosophy requires flexible cultures while the EFQM Model needs a more control-oriented culture, due to its

operating dynamics, according to which process management must be controlled systematically to generate results. Some researchers conclude that the EFQM model and TQM not are the same, but follow a similar path (Gómez Gómez et al., 2017).

Second, the results show that the application of the EFQM model improves organisational performance (Elshaer and Augustyn, 2016, Escrig Tena and de Menezes, 2016b, Saleh and Watson, 2017). This result is consistent with those obtained by previous authors (Gómez-Gómez et al., 2011, Calvo-Mora et al., 2014b, Bou Llusar et al., 2005). In addition to supporting the principles of the model, these results reinforce the idea that the application of a series of principles of excellence in different areas of the company help the company to be more competitive, not only on key indicators but also in areas related to customers, employees and the reputation of the company.

Third, important evidence about the effect of organisational culture on performance has been obtained. The type of culture has an impact on the results of the model, especially when the company promotes a hierarchical culture. Although this result may seem controversial, it coincides with the unwanted negative effects of a hierarchical culture that have been found in other areas, namely the inhibition of creativity, innovation and flexibility. However, the results indicate that this is the most effective type of culture for effective and systematic process management to meet the company's results criteria.

Therefore, the hierarchical culture may be the most appropriate for companies that intend to implement the EFQM model. Moreover, this type of culture not only has a direct effect in performance, but also an indirect effect through the EFQM enablers.

The main implication for managers is that companies that intend to implement the model should try to promote control-based cultures, specifically a hierarchical culture, for their effect on organisational performance. Organisations should foster the norms, beliefs and values among their employees that are oriented to stability, and should promote an internal orientation. They should aim for the objectives of efficiency, normalisation and standardisation of processes and products. This will facilitate the use of the model's enablers and the consequent improvement in the results of the company.

5.2. Conclusions, limitations and future research

This research reveals the importance of hierarchical and market cultures to drive the results suggested by this model of excellence. The findings show the possibility that TQM and EFQM model require different organisational cultures for their successful application. Hughes et al. (2002) argue that the two systems of quality management should not be considered competitors, but neither should they be considered perfect complements. Therefore, managers who want to implement TQM should not consider doing it through the EFQM model if the organisational culture of the company is not appropriate, even if it is suitable for TQM (Calvo-Mora et al., 2015).

This research is not without limitations, which may condition the results obtained. The first limitation is the use of cross-sectional data. The results of the proposed model must be interpreted with caution. Accordingly, future lines of research examining these relationships should employ longitudinal data. The second limitation is that only the organisational culture was considered as a determining variable of the facilitating criteria. However, other variables, such as organisational climate, may influence the application of the EFQM model. Furthermore, empirical analysis is needed of the cultural traits that are necessary for the application of each criterion of the model. Although different sources of information are used by companies, information has been provided only by managers. This is an important limitation since the opinion of the employees is not taken into account.

Finally, the absence of analysis of other variables that may influence the results of the EFQM model could also be considered. In this research, only organisational culture has been considered, but in the literature it is recognised that other variables such as innovation (Rhee et al., 2010) and human capital (Lopez-Cabrales et al., 2009) have an effect on organisational results.

Regarding future lines of research, the implementation of the EFQM model requires a considerable period of time (Conti, 2007) and the culture of an organisation changes over time. Therefore, future studies should analyse whether, at different stages of the EFQM application process, the company needs different types of organisational culture. For this, it would be appropriate to use a longitudinal database. Future research should also be carried out to extend the study of these relationships, considering other types of organisational cultures or the inclusion of other variables in the model. In addition, this study has used the 2013 version of the EFQM Model, which is not the most recent, which began to be used in April 2021. The latter considers only seven criteria and establishes that the organisational culture is the key to obtaining sustainable value in outstanding organisations (Nenadál, 2020). The two main changes in the latest version of the EFQM model are the partial criterion 5.2, which emphasises the need to transform the company for the future, and criterion 6 (Stakeholder perceptions), which is based on comprehensive feedback from key stakeholders. Their perceptions should be obtained from a number of sources, including social media (Quality 4.0). Therefore, it would be convenient to carry out similar research considering this new version.

Finally, future research could analyse the proposed model, specifying the model in specific sectors that support its understanding, by applying more specific practices adapted to the sector, in service sectors such as health, education or justice.

Disclosure statement

No potential conflict of interest was reported by the author(s).

ORCID

Micaela Martínez Costa  <http://orcid.org/0000-0001-8823-6947>

Daniel Jiménez Jiménez  <http://orcid.org/0000-0002-1790-0799>

References

- Abdualmajed Ali, G., Hilman, H., & Hassan Gorondutse, A. (2017). The effect of entrepreneurial orientation, market orientation, total quality management and organizational culture on the SMEs performance: A theoretical framework. *Journal of Business and Retail Management Research*, 12(1), 26–40. <https://doi.org/10.1108/BIJ-08-2019-0391>
- Abdullah, N. H., Shamsuddin, A., & Hamid, N. A. (2014). The relationship between organizational culture and product innovativeness. *Procedia-Social and Behavioral Sciences*, 129, 140–147. <https://doi.org/10.1016/j.sbspro.2014.03.659>
- Ahmed, A. M., Yang, J. B., & Dale, B. G. (2003). Self-assessment methodology: The route to business excellence. *Quality Management Journal*, 10(1), 43–57. <https://doi.org/10.1080/10686967.2003.11919052>
- Alghamdi, F. (2018). Total Quality Management and organizational performance: A possible role of organizational culture. *International Journal of Business Administration*, 9(4), 186–200. <https://doi.org/10.5430/ijba.v9n4p186>
- Al-Khalifa, K. N., & Aspinwall, E. M. (2000). The development of total quality management in Qatar. *The TQM Magazine*, 12(3), 194–204. <https://doi.org/10.1108/09544780010320250>

- Álvarez García, J., Vila Alonso, M., Fraiz Brea, J. A., & De La Cruz Del Río Rama, M. (2012). Análisis de las relaciones de dependencia entre los factores críticos de la calidad y los resultados. Sector de alojamiento turístico en España. *Investigaciones Europeas de Dirección y Economía de la Empresa*, 19(2), 74–89. <https://doi.org/10.1016/j.iedee.2012.08.001>
- Barclay, D., Thompson, R., & Higgins, C. (1995). The partial least squares (PLS) approach to causal modeling: Personal computer adoption and use as an illustration. *Technology Studies*, 2(2), 285–309. <https://doi.org/10.1017/CBO9781107415324.004>
- Barney, J. B. (1986). Organizational culture: Can it be a resource of sustained competitive advantage? *Academy of Management Review*, 11(3), 656–665. <https://doi.org/10.5465/amr.1986.4306261>
- Beer, M. (2003). Why Total quality management programs do not persist: The role of management quality and implications for leading a TQM transformation. *Decision Sciences*, 34(4), 623–642. <https://doi.org/10.1111/j.1540-5414.2003.02640.x>
- Black, S. A., & Porter, L. J. (1996). Identification of the critical factors of TQM. *Decisions Sciences*, 27(1), 1–21. <https://doi.org/10.1111/j.1540-5915.1996.tb00841.x>
- Bolboli, S. A., & Reiche, M. (2014). Culture-based design and implementation of business excellence. *The TQM Journal*, 26(4), 329–347. <https://doi.org/10.1108/TQM-01-2014-0015>
- Bolboli, S. A., & Reiche, M. (2015). Introducing a concept for efficient design of EFQM excellence model. *TQM Journal*, 27(4), 382–396. <https://doi.org/10.1108/TQM-01-2015-0012>
- Bollen, K. A. (1989). *Structural equations with latent variables*. John Wiley and Sons, Inc.
- Bou Llusar, J. C., Escrig Tena, A. B., Roca Puig, V., & Beltrán Martín, I. (2005). To what extent do enablers explain results in the EFQM excellence model? An empirical study. *The International Journal of Quality & Reliability Management*, 22(4), 337–353. <https://doi.org/10.1108/02656710510591192>
- 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), 1–22. <https://doi.org/10.1016/j.jom.2008.04.001>
- Calvo-Mora, A., Blanco-Oliver, A., Roldán, J. L., & Periañez-Cristóbal, R. (2020). TQM factors and organisational results in the EFQM excellence model framework: An explanatory and predictive analysis. *Industrial Management & Data Systems*, 120(12), 2297–2317. <https://doi.org/10.1108/IMDS-12-2019-0701>
- Calvo-Mora, A., & Criado García-Legaz, F. (2005). Análisis de la validez del modelo europeo de excelencia para la gestión de la calidad en instituciones universitarias: Un enfoque directivo. *Revista Europea de Dirección y Administración de la Empresa*, 14(3), 41–58.
- Calvo-Mora, A., Leal-Millán, A. G., & Roldán, J. L. (2005). Relationships between the EFQM model criteria: A study in Spanish universities. *Total Quality Management & Business Excellence*, 16(6), 741–770. <https://doi.org/10.1080/14783360500077708>
- Calvo-Mora, A., Picón, A., Ruiz, C., & Cauzo, L. (2014a). The relationships between soft-hard TQM factors and key business results. *International Journal of Operations & Production Management*, 34(1), 115–143. <https://doi.org/10.1108/IJOPM-09-2012-0355>
- 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. <https://doi.org/10.1080/00207543.2014.975859>
- Calvo-Mora, A., Roldán, J. L., & Suárez, E. (2014b). A structural analysis of the EFQM model: An assessment of the mediating role of process management. *Journal of Business Economics and Management*, 15(9), 862–885. <https://doi.org/10.3846/16111699.2013.776627>
- Cameron, K. S., & Quinn, R. E. (2005). *Diagnosing and changing organizational culture. Based on the competing values framework*. Addison-Wesley.
- Carbonell, P., & Rodríguez-Escudero, A. I. (2016). The individual and joint effects of process control and process-based rewards on new product performance and job satisfaction. *Business Research Quarterly*, 19, 26–39. <https://doi.org/10.1016/j.brq.2015.04.001>
- Castresana Ruiz-Carrillo, J. I., & Fernández-Ortiz, R. (2005). Theoretical foundation of the EFQM model: The resource-based view. *Total Quality Management & Business Excellence*, 16(1), 31–55. <https://doi.org/10.1080/1478336042000309857>
- Catanzaro, D., Moore, H., & Marshall, T. R. (2010). The impact of organizational culture on attraction and recruitment of Job applicants. *Journal of Business and Psychology*, 25(4), 649–662. <https://doi.org/10.1007/s10869-010-9179-0>

- Cavaliere, V., & Lombardi, S. (2015). Exploring different cultural configurations: How do they affect subsidiaries' knowledge sharing behaviors. *Journal of Knowledge Management*, 19(2), 141–163. <https://doi.org/10.1108/JKM-04-2014-0167>
- Cenfetelli, R. T., & Bassellier, G. (2009). Interpretation of formative measurement in information Systems research. *MIS Quarterly*, 33(4), 689–707. <https://doi.org/10.2307/20650323>
- Cepeda-Carrión, G., Henseler, J., Ringle, C. M., & Roldán, J. L. (2016). Prediction-oriented modeling in business research by means of PLS path modeling: Introduction to a JBR special section. *Journal of Business Research*, 69(10), 4545–4551. <https://doi.org/10.1016/j.jbusres.2016.03.048>
- Chin, W. W. (1998). The partial least squares approach to structural equation modeling. In I. G. Marcoulides (Ed.), *Modern methods for Business research* (pp. 295–336). Lawrence Erlbaum Associates.
- Chin, W. W. (2010). *Handbook of partial least square: Concepts, methods and applications in marketing and related fields. How to write up and report PLS analysis*. Springer.
- Cohen, J. (1988). Statistical power analysis for the behavioral sciences, Hillsdale, N.J. *Erlbaum Associates*, 40(3). <https://doi.org/10.2307/41165941>
- Conti, T. A. (2007). A history and review of the European quality Award model. *The TQM Magazine*, 19(2), 112–128. <https://doi.org/10.1108/09544780710729962>
- Cronemyr, P., Bäckström, I., & Rönnbäck, A. (2017). Quality culture deployment - using behaviours to explain, diagnose and improve a quality culture. *International Journal of Quality and Service Sciences*, 9(3/4), 498–518. <https://doi.org/10.1108/IJQSS-02-2017-0008>
- Dale, B. G., Wu, P. Y., Zairi, M., Williams, A. R. T., & Van Der Wiele, T. (2001). Total quality management and quality: An exploratory study of contribution. *Total Quality Management*, 12(4), 439–449. <https://doi.org/10.1080/09544120123930>
- Davies, J., Douglas, A., & Douglas, J. (2007). The effect of academic culture on the implementation of the EFQM Excellence Model in UK universities. *Quality Assurance in Education*, 15(4), 382–401. <https://doi.org/10.1108/09684880710829965>
- Dellana, S. A., & Hauser, R. D. (2000). Corporate culturés impact on a strategic approach. *Journal of Business*, 15(1), 9–20. <https://doi.org/10.1108/19355181200000001>
- Deshpande, R., & Farley, J. U. (2004). Organizational culture, market orientation, innovativeness, and firm performance: An international research odyssey. *International Journal of Research in Marketing*, 21, 53–73. <https://doi.org/10.1016/J.IJRESMAR.2003.04.002>
- Desphandé, R., Farley, J., & Webster, F. (1993). Corporate culture, customer orientation and innovativeness in Japanese firms: A quadrate analysis. *Journal of Marketing*, 57, 23–37. <https://doi.org/10.1177/002224299305700102>
- Detert, J. R., Schroeder, R. G., & Mauriel, J. J. (2000). A framework for linking culture and improvement initiatives in organizations. *Academy of Management Executive*, 25(3), 850–863. <https://doi.org/10.1080/10686967.2000.11918904>
- Diamantopoulos, A., & Siguaw, J. A. (2006). Formative versus reflective indicators in organizational measure development: A comparison and empirical illustration. *British Journal of Management*, 17(4), 263–282. <https://doi.org/10.1111/j.1467-8551.2006.00500.x>
- EFQM. (2010). *EFQM model for business excellence*. European Foundation for Quality Management.
- EFQM. (2013). *EFQM Model for Business Excellence: Company Guidelines*.
- Elshaer, I. A., & Augustyn, M. M. (2016). Direct effects of quality management on competitive advantage. *The International Journal of Quality & Reliability Management*, 33(9), 1286–1310. <https://doi.org/10.1108/IJQRM-07-2014-0086>
- Escrig Tena, A. B., & De Menezes, L. M. (2016a). What characterizes leading companies within business excellence models? An analysis of “EFQM recognized for excellence” recipients in Spain. *Industrial Journal of Production Economics*, 169, 362–375. <https://doi.org/10.1016/j.ijpe.2015.08.019>
- Escrig Tena, A. B., & De Menezes, L. M. (2016b). What is the effect of size on the use of the EFQM excellence model? *Industrial Journal of Operations & Production Management*, 36(12), 1800–1820. <https://doi.org/10.1108/IJOPM-11-2014-0557>
- Eskildsen, J. K., & Dahlgard, J. J. (2000). A causal model for employee satisfaction. *Total Quality Management*, 11(8), 1081–1094. <https://doi.org/10.1080/095441200440340>
- Estrada-Cruz, M., Verdú-Jover, A. J., & Gómez-Gras, J. M. (2019). The influence of culture on the relationship between the entrepreneur's social identity and decision-making: Effectual and

- causal logic. *Business Research Quarterly*, 22(4), 226–244. <https://doi.org/10.1016/j.brq.2018.10.002>
- Felipe, C. M., Roldán, J. L., & Leal-Rodríguez, A. L. (2017). Impact of Organizational Culture values on organizational agility. *Sustainability*, 9(12), 2–23. <https://doi.org/10.3390/su9122354>.
- Flynn, B. B., Schroeder, R. G., & Sakakibara, S. (1994). A framework for quality management research and an associated measurement instrument. *Journal of Operations Management*, 11(4), 339–366. [https://doi.org/10.1016/S0272-6963\(97\)90004-8](https://doi.org/10.1016/S0272-6963(97)90004-8)
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39–50. <https://doi.org/10.1177/002224378101800104>
- Fotopoulos, C. B., & Psomas, E. L. (2009). The impact of “soft” and “hard” TQM elements on quality management results. *International Journal of Quality & Reliability Management*, 26(2), 150–163. <https://doi.org/10.1108/02656710910928798>
- Gambi, L. D. N., Boer, H., Gerolamo, M. C., Jørgensen, F., & Carpinetti, C. R. L. (2015). The relationship between organizational culture and quality techniques, and its impact on operational performance. *International Journal of Operations & Production Management*, 35(10), 1460–1484. <https://doi.org/10.1108/IJOPM-12-2013-0563>
- García-Bernal, J., Gargallo-Castel, A., Pastor-Agustín, G., & Ramirez-Ale-Són, M. (2004). Total Quality Management in firms: Evidence from Spain. *Quality Management Journal*, 11(3), 20–34. <https://doi.org/10.1080/10686967.2004.11919119>
- Giménez-Espín, J. A., Jiménez-Jiménez, D., & Martínez-Costa, M. (2012). Organizational culture for total quality management. *Total Quality Management & Business Excellence*, October (5-6), 1–15. <https://doi.org/10.1080/14783363.2012.707409>
- Giménez-Espín, J. A., Jiménez-Jiménez, D., & Martínez-Costa, M. (2014). La gestión de calidad: Importancia de la cultura organizativa para el desarrollo de variables intangibles. *Revista Europea de Dirección y Economía de la Empresa*, 23(3), 115–126. <https://doi.org/10.1016/j.redee.2014.02.002>
- Goffin, K., & New, C. (2001). Customer support and new product development-an exploratory study. *International Journal of Operations & Production Management*, 21(3), 275–301. <https://doi.org/10.1108/01443570110364605>
- Gómez-Gómez, J., Martínez-Costa, M., & Martínez-Lorente, A. R. (2011). A critical evaluation of the EFQM model. *International Journal of Quality & Reliability Management*, 28(5), 484–502. <https://doi.org/10.1108/02656711111132544>
- Gómez-Gómez, J., Martínez-Costa, M., & Martínez-Lorente, A. R. (2015a). EFQM Excellence Model and TQM: an empirical comparison. *Total Quality Management & Business Excellence*, 28(1-2), 88–103. <https://doi.org/10.1080/14783363.2015.1050167>
- Gómez-Gómez, J., Martínez-Costa, M., & Martínez-Lorente, A. R. (2015b). An in-depth review of the internal relationships of the EFQM model. *The TQM Journal*, 27(5), 1754–1731. <https://doi.org/10.1108/TQM-05-2013-0056>
- Gómez-Gómez, J., Martínez Costa, M., & Martínez-Lorente, A. R. (2017). EFQM Excellence Model and TQM: an empirical comparison. *Total Quality & Management & Business Excellence*, 28(1-2), 88–103. <https://doi.org/10.1080/14783363.2015.1050167>
- Gómez-López, R., López-Fernández, M. C., & Serrano-Bedia, A. M. (2017). Implementation barriers of the EFQM excellence model within the Spanish private firms. *Total Quality Management & Business Excellence*, 28(7-8), 695–711. <https://doi.org/10.1080/14783363.2015.1106314>
- Hair, J. F., Hult, G. T. M., Ringle, C. M., Sarstedt, M., Castillo Apraiz, J., Cepeda Carrión, G., & Roldán, J. L. (2019). Manual de partial least squares structural equation modeling (PLS-SEM). OmniaScience Scholar.
- Hendricks, K. B., & Singhal, V. R. (2001). Firm characteristics, total quality management and financial performance. *Journal of Operations Management*, 9(3), 269–285. [https://doi.org/10.1016/S0272-6963\(00\)00049-8](https://doi.org/10.1016/S0272-6963(00)00049-8)
- Henseler, J. (2017). Bridging design and Behavioral research with variance-based structural equation modeling. *Journal of Advertising*, 46(1), 178–192. <https://doi.org/10.1080/00913367.2017.1281780>
- Henseler, J. (2018). Partial least squares path modeling: Quo vadis? *Quality & Quantity*, 52(1), 1–8. <https://doi.org/10.1007/s11135-018-0689-6>

- Henseler, J., Hubona, G., & Ray, P. A. (2016a). Using PLS path modeling in new technology research: Updated guidelines. *Industrial Management & Data Systems*, 116(1), 2–20. <https://doi.org/10.1108/IMDS-09-2015-0382>
- Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43(1), 115–135. <https://doi.org/10.1007/s11747-014-0403-8>
- Henseler, J., Ringle, C. M., & Sarstedt, M. (2016b). Testing measurement invariance of composites using partial least squares. *International Marketing Review*, 33(3), 405–431. <https://doi.org/10.1108/IMR-09-2014-0304>
- Hietschold, N., Reinhardt, R., & Gurtner, S. (2015). Measuring critical success factors of TQM implementation successfully - a systematic literature review. *Industrial Journal of Operations Research*, 52(21), 6254–6272. <https://doi.org/10.1080/00207543.2014.918288>
- Hofstede, G. (1993). Cultural constraints in management theories. *Academy of Management Executive*, 7(1), 81–94. <https://doi.org/10.5465/ame.1993.9409142061>
- Hoyle, R. (1995). *Structural equation modeling*. Sage.
- Hughes, D., B. S., Bowes, L., & Bysshe, S. (2002). *The economic benefits of guidance. University of derby: CeGS research report series*. Centre for Guidance Studies.
- Kaynak, H. (2003). The relationship between total quality practices and their effects on firm performance. *Journal of Operations Management*, 31, 1–31. [https://doi.org/10.1016/S0272-6963\(03\)00004-4](https://doi.org/10.1016/S0272-6963(03)00004-4)
- Kock, N. (2015). One-Tailed or Two-tailed *P* values in PLS-SEM? *International Journal of e-Collaboration (IJeC)*, 11(2), 1–7. <https://doi.org/10.4018/ijec.2015040101>
- Laforet, S. (2008). Size, strategic, and market orientation affects on innovation. *Journal of Business Research*, 61(7), 753–764. <https://doi.org/10.1016/j.jbusres.2007.08.002>
- La Rotta, D., & Pérez-Rave, J. (2017). A relevant literary space on the use of the European Foundation for Quality Management model: Current state and challenges. *Total Quality & Management & Business Excellence*, 28(13-14), 1447–1468. <https://doi.org/10.1080/14783363.2016.1150168>
- Lopez-Cabrales, A., Pérez-Luño, A., & Valle-Cabrera, R. (2009). Knowledge as a mediator between HRM practices and innovative activity. *Human Resource Management*, 48(4), 485–503. <https://doi.org/10.1002/hrm.20295>
- Losonci, D., Kása, R., Demeter, K., Heidrich, B., & Jenei, I. (2017). The impact of shop floor culture and subculture on lean production practices. *International Journal of Operations & Production Management*, 37(2), 205–225. <https://doi.org/10.1108/IJOPM-11-2014-0524>
- Mayondo, F., & Farrell, M. (2003). Cultural orientation: Its relationship with market orientation, innovation and organizational performance. *Management Decision*, 31(3), 241–249. <https://doi.org/10.1108/00251740310468054>
- Metri, B. A. (2005). TQM critical success factors for construction firms. *Management International*, 1(1), 12–26. <https://hrcak.srce.hr/19132>
- Molina-Azorín, J. F., Tarí, J. J., Pereira-Moliner, J., López-Gamero, M. D., & Pertusa-Ortega, E. M. (2015). The effects of quality and environmental management on competitive advantage: A mixed methods study in the hotel industry. *Tourism Management*, 50, 41–54. <https://doi.org/10.1016/j.tourman.2015.01.008>
- Nabitz, U., Severens, P., Van Der Brink, W., & Jansen, P. (2001). Improving the EFQM model: An empirical study on model development and theory building using concept mapping. *Total Quality Management*, 12(1), 69–81. <https://doi.org/10.1080/09544120020010101>
- Naor, M., Goldstein, S. M., Linderman, K. W., & Schroeder, R. G. (2008). The role of culture as driver of quality management and performance: Infrastructure versus core quality practices. *Decision Sciences*, 39(4), 671–702. <https://doi.org/10.1111/j.1540-5915.2008.00208.x>
- Naor, M., Liderman, K., & Schroeder, R. G. (2010). The globalization of operations in eastern and western countries: Unpacking the relationship between national and organizational culture and its impact on manufacturing performance. *Journal of Operations Management*, 28(3), 194–205. <https://doi.org/10.1016/j.jom.2009.11.001>
- Naranjo-Valencia, J. C., Jimenez-Jimenez, D., & Sanz-Valle, R. (2017). Impact of organisational culture on New product success: An empirical study of Spanish firms. *European Management Review*, 14(4), 377–390. <https://doi.org/10.1111/emre.12116>
- Nenadál, J. (2020). The New EFQM model: What is really New and could be considered as a suitable tool with respect to quality 4.0 concept? *Quality Innovation Prosperity*, 24(1), 17–28. <https://doi.org/10.12776/qip.v24i1.1415>

- Nunnally, J. C. (1978). *Psychometric theory*. McGraw-Hill.
- O'Neill, P., Sohal, A., & Teng, C. W. (2016). Quality management approaches and their impact on firms' financial performance—An Australian study. *International Journal of Production Economics*, 171, 381–393. <https://doi.org/10.1016/j.ijpe.2015.07.015>
- Ó'Reilly, C. A., Chatman, J. & Caldwell, D. F. 1991. People and organizational culture: A profile comparison approach to assessing person-organization fit. *Academy of Management Journal*, 14 (3), 487–516.
- Ouchi, W. G. (1984). The M-form society: Lessons from business management. *Human Resource Management*, 23(2), 191–213. <https://doi.org/10.1002/hrm.3930230208>
- Pakdil, F., & Leonard, K. M. (2015). The effect of organizational implementing and sustaining lean processes. *Journal of Manufacturing Technology Management*, 26(5), 725–743. <https://doi.org/10.1108/JMTM-08-2013-0112>
- Pantouvakis, A., & Bouranta, N. (2017). Agility, organizational learning culture and relationship quality in the port sector. *Total Quality Management & Business Excellence*, 28(3-4), 366–378. <https://doi.org/10.1080/14783363.2015.1084871>
- Pasricha, P., Singh, B., & Verma, P. (2018). Ethical leadership, organic organizational cultures and Corporate social responsibility: An empirical study in social enterprises. *Journal of Business Ethics*, 151(4), 941–958. <https://doi.org/10.1007/s10551-017-3568-5>
- Prajogo, D. I., & Mcdermott, D. M. (2005). The relationship between total quality management practices and organizational cultures. *International Journal of Operations & Production Management*, 25(11), 1101–1122. <https://doi.org/10.1108/01443570510626916>
- Prajogo, D. I., & Mcdermott, D. M. (2011). The relationship between multidimensional organizational culture and performance. *International Journal of Operations & Production Management*, 31(7), 712–735. <https://doi.org/10.1108/01443571111144823>
- Radzwill, N. (2013). A review of research in the quality management journal: Influential resources, key themes, and emerging trends. *Quality Management Journal*, 20(1), 7–36. <https://doi.org/10.1080/10686967.2013.11918089>
- Rafailidis, A., Trivellas, P., & Polychroniou, P. (2017). The mediating role of quality on the relationship between cultural ambidexterity and innovation performance. *Total Quality & Management & Business Excellence*, 28(9-10), 1134–1148. <https://doi.org/10.1080/14783363.2017.1309122>
- Raharjo, H., Guglielmetti Mugion, R., Eriksson, H., Gremyr, I., Di Prieto, L., & Renzi, M. (2015). Excellence models in public sector. Relationships between enablers and results. *International Journal of Quality and Services Sciences*, 7(1), 120–135. <https://doi.org/10.1108/IJQSS-01-2015-0011>
- Rao Tummala, V. M., Phillips, C. L. M., & Johnson, M. (2006). Assessing supply chain management success factors: A case study. *Supply Chain Management: An International Journal*, 11(2), 179–192. <https://doi.org/10.1108/13598540610652573>
- Rhee, J., Park, T., & Lee, D. H. (2010). Drivers of innovativeness and performance for innovative SMES in South Korea: Mediation of learning orientation. *Technovation*, 30(1), 65–75. <https://doi.org/10.1016/j.technovation.2009.04.008>
- Ringle, C. M., Wende, S., & Will, A. (2015). Smartpls 2.0 M3.
- Roberts, N., & Thatcher, J. (2009). Conceptualizing and testing formative constructs: tutorial and annotated example. 40, 9–39.
- Roh, J. J., Hong, P., & Park, Y. (2008). Organizational culture and supply chain strategy: A framework for effective information flows. *Journal of Enterprise Information Management*, 21(4), 361–376. <https://doi.org/10.1108/17410390810888651>
- Roldán, J. L., Leal-Rodríguez, A. L., & Leal, A. G. (2012). The influence of organisational culture on the Total Quality Management programme performance. *Investigaciones Europeas de Dirección y Economía de la Empresa*, 18(3), 183–189. <https://doi.org/10.1016/j.iedee.2012.05.005>
- Roldán, J. L., & Sánchez-Franco, M. J. (2012). Variance-based structural equation modeling: Guidelines for using partial least squares in information systems research. In M. M, G. O, S. A, & R. M (Eds.), *Research methodologies, innovations and philosophies in software Systems engineering and information Systems*. (pp. 193–221). Hershey.
- Russell, S. (2000). ISO 9000:2000 and the EFQM Excellence Model: Competition or co-operation? *Total Quality Management*, 11(4-6), 657–665. <https://doi.org/10.1080/09544120050008039>

- Saleh, A., & Watson, R. (2017). Business excellence in a volatile, uncertain, complex and ambiguous environment (BEVUCA). *TQM Journal*, 29(5), 705–724. <https://doi.org/10.1108/TQM-12-2016-0109>
- Santos-Vijande, M. L., & Álvarez-González, L. I. (2007). TQM and firms performance: An EFQM excellence model research based survey. *International Journal of Business Science and Applied Management*, 2(2), 21–41. <http://hdl.handle.net/10419/190585>
- Sarstedt, M., Hair, J. F., Ringle, C. M., Thiele, K. O., & Gudergan, S. P. (2016). Estimation issues with PLS and CBSEM: Where the bias lies!. *Journal of Business Research*, 69(10), 3998–4010. <https://doi.org/10.1016/j.jbusres.2016.06.007>
- Schein, H. E. (1984). Coming to a New awareness of organizational culture. *Sloan Management Review*, 25(2), 3–16.
- Schein, H. E. (1996). Culture: The missing concept in organization studies. *Administrative Science Quarterly*, 41(2), 229–240. <https://doi.org/10.2307/2393715>
- Schneider, B., Ehrhart, M., & Macey, W. (2013). Organizational climate and culture. *Annual Review of Psychology*, 64(1), 361–388. <https://doi.org/10.1146/annurev-psych-113011-143809>
- Schroeder, R. G., Liderman, K., Liedtke, C., & Choo, A. S. (2008). Six Sigma: definition and underlying theory. *Journal of Operations Management*, 26(4), 536–554. <https://doi.org/10.1016/j.jom.2007.06.007>
- Shafiq, M., Lasrado, F., & Hafeez, K. (2019). The effect of TQM on organisational performance: Empirical evidence from the textile sector of a developing country using SEM. *Total Quality Management & Business Excellence*, 30(1-2), 31–52. <https://doi.org/10.1080/14783363.2017.1283211>
- Sila, I., & Ebrahimpour, M. (2002). An investigation of the total quality management survey based research published between 1989 and 2000. *International Journal of Quality & Reliability Management*, 19(7), 902–970. <https://doi.org/10.1108/02656710210434801>
- Sousa, R., & Voss, C. A. (2002). Quality management re-visited: A reflective review and agenda for future research. *Journal of Operations Management*, 289(1), 1–19. [https://doi.org/10.1016/S0272-6963\(01\)00088-2](https://doi.org/10.1016/S0272-6963(01)00088-2)
- Stock, G. N. M., & Gowen, C. R. (2007). Organizational culture. *Critical Success Factors, and the Reduction of Hospital Errors. International Journal of Productions Economics*, 106(2), 368–392. <https://doi.org/10.1016/j.ijpe.2006.07.005>
- Suárez, E., Calvo-Mora, A., Roldán, J. L., & Perriñez, C. (2017). Quantitative research on the EFQM excellence model: A systematic literature review (1991–2015). *European Research on Management and Business Economics*, 23(3), 147–156. <https://doi.org/10.1016/j.iedeen.2017.05.002>
- Suárez, E., Roldán, J. L., & Calvo-Mora, A. (2014). A structural analysis of the EFQM model: An assessment of the mediating role of process management. *Journal of Business Economics and Management*, 15(5), 862–885. <https://doi.org/10.3846/16111699.2013.776627>
- Tarí, J. J., & Sabater, V. (2004). Quality tools and techniques: Are they necessary for quality management? *Industrial Journal of Production Economics*, 92(3), 267–280. <https://doi.org/10.1016/j.ijpe.2003.10.018>
- Urbach, N., & Ahlemann, F. (2010). Structural equation modeling in information systems research using partial least squares. *Journal of Information Technology Theory and Application*, 11(2), 5–40. <https://aisel.aisnet.org/jitta/vol11/iss2/2>
- Uzkurt, C., Kumar, R., Kimzan, H. S., & Eminoglu, G. (2013). Role of innovation in the relationship between organizational culture and firm performance: A study of the banking sector in Turkey. *European Journal of Innovation Management*, 16(1), 92–117. <https://doi.org/10.1108/14601061311292878>
- Van Der Wiele, A., William, A. R. T., & Dale, B. G. (2000). ISO 9000 series registration to business excellence: The migratory path. *Business Process Management*, 6(5), 417–427. <https://doi.org/10.1108/14637150010353911>
- Veltmeyer, J., & Mohamed, S. (2017). Investigation into the hierarchical nature of TQM variables using structural modelling. *International Journal of Quality & Reliability Management*, 34(4), 462–477. <https://doi.org/10.1108/IJQRM-04-2015-0052>
- Wu, S. J. (2015). The impact of quality culture on quality management practices and performance in Chinese manufacturing firms. *International Journal of Quality & Reliability Management*, 32(8), 799–814. <https://doi.org/10.1108/IJQRM-12-2013-0199>

- Wu, S. J., & Zhang, D. (2010). Customization of quality practices: The impact of quality culture. *International Journal of Quality & Reliability Management*, 28(3), 263–279. <https://doi.org/10.1108/02656711111109883>
- Yu, L. (2007). Corporate culture in numbers. *MIT Sloan Management Review*, 48(3), 4–9.
- Yu, T., & Wu, N. (2009). A review of study on the Competing Values framework. *International Journal of Business and Management*, 4(7), 37–42. <https://doi.org/10.5539/ijbm.v4n7p37>
- Yusof, S. M., & Aspinwall, E. (1999). Critical success factors for Total Quality Management implementation in small and medium enterprise. *Total Quality Management*, 10(4-5), 803–809. <https://doi.org/10.1080/0954412997839>
- Zairi, M., & Idris, M. A. (2006). Sustaining TQM: A synthesis of literature and proposed research framework. *Total Quality Management and Business Excellence*, 17(9), 1245–1260. <https://doi.org/10.1080/14783360600750535>
- Zu, X., Robbins, T. L., & Fredendall, L. D. (2010). Mapping the critical links between organizational culture and TQM/Six Sigma practices. *International Journal of Production Economics*, 123(1), 86–106. <https://doi.org/10.1016/j.ijpe.2009.07.009>