Effects of the organizational culture and knowledge exploration and exploitation on results in the EFQM model framework

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

Abstract

Purpose – This paper aims to adopt Cameron and Quinn's analysis of organizational culture and March's learning framework to analyze the type of organizational culture (OC) that promotes learning competences and whether exploration and exploitation competences (ambidexterity) improve the European Foundation of Quality Management (EFQM) results (excellent results). In addition, this research tests if these competences exercise a mediating effect in the relationship between OC and performance.

Design/methodology/approach – A model is proposed whose relationships have been tested using structural equations. The sample was obtained from the SABI database. Two hundred valid questionnaires were returned via a webpage, in which four managers from each of the 200 organizations responded.

Findings – The results support the proposed relationships. Adhocracy, hierarchy and market culture have a positive relationship with excellent results. A hierarchical culture develops exploitation competences, and a market culture develops learning ambidexterity. Moreover, exploration and exploitation increase results. Finally, these two cultures indirectly influence results through exploration and exploitation competences.

Research limitations/implications – The proposed model can help managers who implement the EFQM model to better understand how the culture of their organization promotes learning and how these two variables improve their performance.

Practical implications – Because the EFQM model requires organizations to use a knowledge management system to enhance the effect of the enabliers criteria on excellent results, the managers of these companies must know that only market and hierarchy cultures are suitable for it. Besides, this study highlights the importance of two cultural values for the implementation of the EFQM Model and, therefore, to promote excellent results: market orientation and process control.

Originality/value – This study fills an existing gap in the literature by combining exploitation, exploration, OC and EFQM results in a single model and highlights the importance of market orientation and process control for excellent results and knowledge exploration and exploitation.

Keywords Exploration and exploitation learning competences, Ambidexterity, Organizational culture, EFQM model, EFQM results, Organizational culture

Paper type Research paper

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1. Introduction

Organizations develop their activity in a highly volatile, uncertain, complex and ambiguous environment, in which organizational culture (OC) and knowledge management (KM) allow companies to differentiate themselves from competitors and help them to be competitive (Saleh and Watson, 2017; Rezaei et al., 2017; Osiyevskyy et al., 2020). Companies use quality management systems to offer quality products and services and to be excellent (Wang et al., 2021).

Organizational learning (OL) is a key strategic activity for companies to grow (Seo et al., 2016). Organizations recognize that knowledge and its effective management are a

fundamental source of sustainable competitive advantage in the current environment (Criado-García *et al.*, 2020; Schiuma, 2009). Bueno Campos (1998) called our society "Knowledge Society", because of the high dependence, of both individuals and organizations, on learning. divided learning into two learning capabilities: exploitation and exploration. This is one of the most widely used typologies in different studies (Zhang *et al.*, 2015). Some researchers have suggested that successful organizations should combine exploration and exploitation and be ambidextrous (Alpkan *et al.*, 2012; Tian *et al.*, 2021).

OL is a key success factor for companies because it allows them to develop exploration and exploitation competences which can improve quality and organizational performance (Ponsignon *et al.*, 2019; Kerry and DeSimone, 2019; Marín-Idárraga *et al.*, 2022). Exploitation involves perfecting the current organizational processes, using current skills to become more efficient, improving production processes and seeking relatively secure profits. Knowledge exploitation is the learning process of assimilating, reusing, reinterpreting, applying and leveraging new/existing knowledge. Exploration focuses on research and develops new skills, varying product lines and achieving an uncertain outcome. Knowledge exploration refers to the learning obtained from acquiring/creating, sharing and storing new knowledge (Castillo *et al.*, 2021; Centobelli *et al.*, 2019; Gupta *et al.*, 2006; March, 1991). Therefore, both are essential to improve results.

Organizations have also used programs and models of quality to get excellent results. Among them, the most important are TQM, Six Sigma and the European Foundation of Quality Management (EFQM) Excellence Model (EFQM Model or EEM) (Sciarelli *et al.*, 2020; Carnerud, 2020). The EFQM model provides competitive advantage to organizations and provides a way to measure results. This model is regularly revised and updated, and the EFQM provides a set of subcriteria or items to measure each criterion. This model is used by over 50,000 public and private sector organizations in the world, as it can be used to structure management systems of organizations based on the self-assessment. This self-assessment is a comparison of an organization's activities and results with the criteria of the model (Hillman, 1994). It has a positive relationship with organizational performance (Calvo-Mora *et al.*, 2014a; Calvo-Mora *et al.*, 2020; Bou Llusar *et al.*, 2009; Gómez-Gómez *et al.*, 2017). To achieve sustained success in management, the EFQM proposes the integration of four components (customer, people, society and business results): fundamental concepts of excellence (Gómez-Gómez *et al.*, 2011; Tickle *et al.*, 2016). They can be used as the basis to describe the attributes of an excellent organization. The fundamental concepts of excellence are mainly: succeeding through the talent of people; adding value for customers; creating a sustainable future; and sustaining outstanding results (EFQM, 2013). Therefore, when we speak of excellent results, we refer to results as a variable that integrates these four dimensions (customer, people, society and business) (TickleI *et al.*, 2016; Criado-García *et al.*, 2020).

Regarding KM in the EFQM model, there are some studies, such as, that make a conceptual analysis of the relationships between the EFQM model criteria and the components of intellectual capital (human, structural and relational). They conclude that EFQM is a suitable framework for organizational KM. Allameh *et al.* (2014) provide evidence that organizations that use the EFQM model obtain valuable data on the measurement of knowledge exchange and performance improvement. Calvo-Mora *et al.* (2015) analyze the potential of the EFQM model to design and to implement KM, which improves the key results of the organization. These results show that the EFQM model can be a valid framework for implementing KM.

The European Foundation Quality Management that developed the model does not explain what kind of knowledge is appropriate when applying their model nor how knowledge can affect the EFQM results (Calvo-Mora *et al.*, 2014b). The foundation only indicates that the interpretation of the relationships between the criteria is specified in the so-called transverse axes of the model and assumes a horizontal vision (subcriteria pertaining to different

criteria), as opposed to the traditional or vertical vision (criterion to criterion), and that within these axes, one is expressly called knowledge (Calvo-Mora et al., 2015; EFQM, 2013). Also, the literature shows that KM can coexist with quality management (QM) because they share key factors for success, such as involvement of human resources, leadership, approach to clients and other stakeholders and management based on process management (Marchiori and Mendes, 2018).

To apply this model and improve performance, companies develop an appropriate culture and promote OL (Para-González et al., 2021; Cronemyr et al., 2017). According to Cronemyr et al. (2017), an OC that is not aligned with QM principles is the main cause for the failure of two thirds of TQM programs. Because culture is a feature that is deeply embedded in the daily functioning of companies, it is very difficult to change (Bolboli and Reiche, 2015). So, it is of vital importance to analyze the role that it may play in the excellence model (Carnerud, 2020; Sciarelli et al., 2020).

A typology of OC that is widely accepted was defined by Cameron and Quinn (2005). This classification has been used in many empirical studies (Deshpandé and Farley, 2013; Stock and Gowen, 2007; Zu et al., 2010; Abdualmajed Ali et al., 2017; Cavaliere and Lombardi, 2015). For this reason, it has been chosen for this study.

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 et al., 2011; Wu, 2015). Little attention has been paid to the EFQM model and few empirical studies analyze the relationships between OC, EFQM results and learning competences in an integrated model (Bolboli and Reiche, 2015; Cronemyr et al., 2017; Gómez-López et al., 2017). Moreover, Marchiori and Mendes (2018) affirm that it is necessary to develop a solid theoretical framework that explains the relationship between QM and KM. The literature does not provide evidence of models that can contribute to an effective and efficient integration of OC, QM and KM (Criado-García et al., 2020; Suárez et al., 2017; Laurett and Mendes, 2018). Carnerud (2020) suggests that there are three complementary paradigms that must be mixed to reach organizational objectives. One of those paradigms covers QM systems and business excellence models. An example is the EFQM model, where soft and hard factors interact and where the knowledge is a key variable to optimize performance (Sciarelli et al., 2020). This paper seeks to advance this emerging line of research.

Understanding how KM should be used in the EFQM model is not only useful for more than 500 EFQM Member Organizations but also for the thousands of companies that use it as a self-evaluation tool. Using this model, they can evaluate themselves, to know their strengths and areas to improve and to move toward excellent and sustainable management (Calvo-Mora et al., 2020; Laurett and Mendes, 2018; Jankalová and Jankal, 2020; Fonseca et al., 2021).

The study is guided by the following key research questions:

RQ1. Does organizational culture have a positive effect on excellent results?

RQ2. What type of organizational culture (OC) promotes learning competences?

RQ3. Do exploration and exploitation competences (ambidexterity) enhance excellent results?

RQ4. Do these competences have a mediating effect on the relationship between OC and excellent results?

Based on these research questions, this study sets out to make seven contributions. First, is to find what type of OC is positively related to EFQM results. Second, is to explain whether knowledge exploration and exploitation competences can be developed in the company as a result of its culture. Third, is to reveal whether knowledge exploration and/or exploitation has a positive effect on EFQM results and, fourth, to provide a model that integrates these

variables. Fifth, is to help managers who implement the EFQM model to understand how the culture of their organization promotes learning and how these variables improve results. Sixth, we identify possible spillover effects of OC on EFQM results through knowledge exploration and exploitation. Finally, to study these research questions, a single model has been built that integrates OC, exploration, exploitation and excellent results.

These contributions are of great importance for managers because excellence has become an important factor in recent decades that can determine the success or failure of companies.

The proposed model is shown in Figure 1.

The remainder of this article consists of four sections. In the next section, we describe the relationships between OC, EFQM results and learning competences. In addition, we establish the research hypotheses (epigraph 2). In section 3, we describe the methodology. Then we discuss the data (epigraph 4). Finally, we present some conclusions and discuss the contributions that the study makes to organizations, its limitations and future research that could be done (section 5).

2. Literature review and hypotheses

The literature review starts with a description of OC and its relationship with performance. Subsequently, the relationship between culture and learning competences is discussed. Then, the relationship between learning competences and results is discussed. Finally, the mediating effect of exploration and exploitation competences in the relationship between the OC and excellent results is analyzed.

2.1 Organizational culture and the European Foundation of Quality Management results

The application of any quality model, such as the EFQM model, has very important implications for the company because it affects most of its activities and processes. This is why, in order for the company to succeed in its objective, a series of quality-oriented organizational routines and values must be used. Hence, the need arises to study the effect of OC when using this model of excellence.

In the area of business administration, the concept of "culture" exists at various levels, including national culture and OC (Catanzaro et al., 2010). OC is usually defined as "the set of norms, beliefs and values shared by members of the organization" (Yu, 2007). However, OC is a broad concept and, according to, it implies different levels, such as values, rules and practices. Furthermore, OC affects members of an organization by influencing behavior and performance outcomes and the organization's external environment (George et al., 1999).

Many types of OC have been described since this concept first appeared in the literature (Schein, 1996; ÓRelly et al., 1991; Cameron et al., 1993; Leal-Millán, 1991; Helfrich et al., 2007).

Figure 1 Theoretical model

Source: Authors
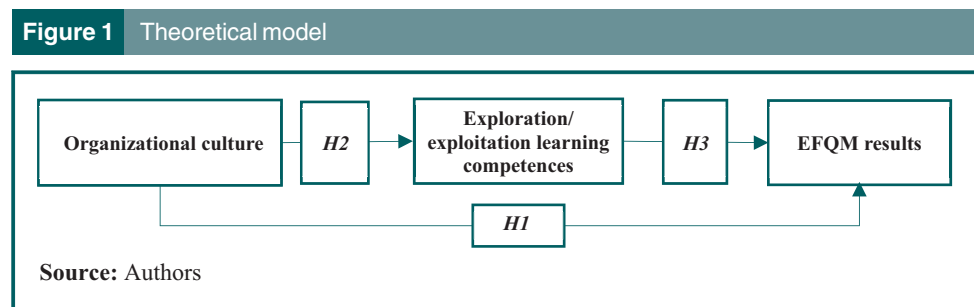
Given the need to use a model for classifying types of culture and studying their effect on EFQM results, we have chosen to use the competing values model (CFV) of Cameron and Quinn (2005). The main reasons for choosing this model are the contrasting values considered, and it is one of the most important OC models and is widely accepted.

The model defines a typology of OCs that has been used in many empirical studies (Desphandé et al., 1993; Lau and Ngo, 2004; Obendhain and Johnson, 2004; Stock and Gowen, 2007; Zu et al., 2010). The definition of culture in this model is accomplished through two dimensions extracted from the 39 performance indicators developed by Campbell (1977). The first dimension relates to the orientation of the company to stability or flexibility, according to the importance given to control and order (stability) or innovation and dynamism to adapt to environmental changes (flexibility). The second dimension refers to the orientation of the company, which may be external, when it is primarily concerned about customers, competitors and the environment or internal, when the focus is on the people, products and processes of the organization.

The CFV establishes four OCs starting from those two dimensions. The four culture types reflect different values about dominant attributes, leadership, bonding and strategic emphases.

Although the literature indicates that OC is a source of competitive advantage (Barney, 1986; Hofstede, 1993; Rezaei et al., 2017), its relationship to performance has been studied very little. Existing studies usually indicate that OC influences results (Gordon and DiTomaso, 1992; Mayondo and Farrell, 2003; Klein et al., 1995; Naor et al., 2010; Rottig, 2017). OC is the key determinant of quality performance (Naor et al., 2008; Naor et al., 2010; Stock and Gowen, 2007; Abdualmajed Ali et al., 2017; Cronemyr et al., 2017) and is considered the key factor in transforming an ordinary organization into an excellent one (Rezaei et al., 2017). Consequently, the first hypothesis of the current study is:

H1. Organizational culture is positively related to organizational performance.

Generally, the effect of each culture type on the results is different (Desphandé et al., 1993). As this research results are measured using the EFQM model, we examine the main characteristics of that model.

The origin of this model lies in the EFQM, which was created in 1988 by the presidents of 14 large European companies (e.g. Bosch, Fiat and Nestle). The purpose of this foundation, based in Belgium, is to help European companies to be more competitive (García-Bernal et al., 2004), provide a framework for self-assessment of organizations and serve as a basis for judging contestants vying for the European Award Quality. In fact, it has become the basis for evaluation of organizations in most national and regional awards for quality across Europe. Today, there are more than 500 members of this foundation, including multinationals, major national companies, universities and research institutes, and more than 15,000 companies use this model worldwide. The main objective of the foundation is to increase the effectiveness and efficiency of European businesses and to improve quality in all their activities. To stimulate quality improvement and support managers to achieve excellent organizations, EFQM awards the European Quality Award annually, using the EFQM model as decision criteria (Zink and Schmidt, 1995).

The EFQM (2013) considers that "the EFQM model is a tool for quality management, which can guide the organization towards the customer." According to the foundation, one of the achievements of the model is the awareness of management teams and other members of the company of the need to improve products and/or services. This is a nonnormative model whose fundamental concept is based on self-assessment of the organization, using the criteria of the model as a guide (Hillman, 1994). This is not a contrast to other approaches (applying certain techniques of QM, ISO, etc.), but rather integrating them into a broader and comprehensive management system. The EFQM model is built on nine criteria grouped into two sections, five criteria for enablers (leadership, policy and strategy,
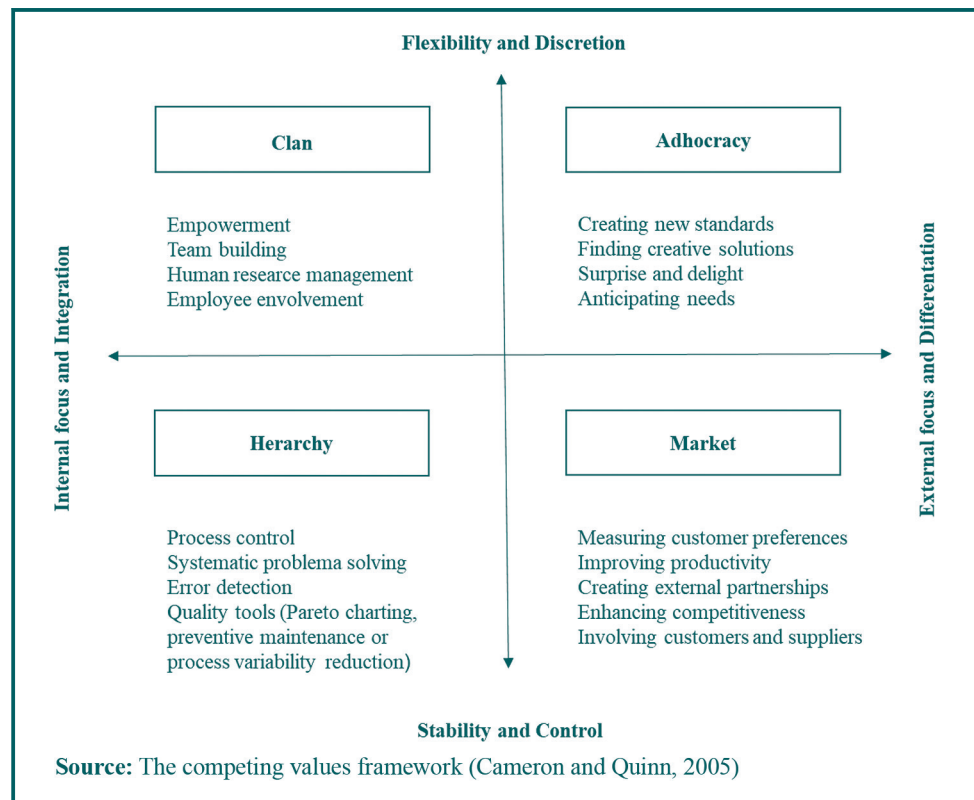
people, partnership and resources and processes) and four criteria for results (customer results, people results, society results and key performance results).

We use EFQM results as a measure of performance because the EFQM model is a tool for the structural management of the organization, based on self-assessment and provides a comprehensive measure of results. Self-assessment is a comparison of an organization's activities and results with the criteria of the model (Hillman, 1994). Self-evaluation has a positive relationship with organizational performance (Ahmed et al., 2003). The model is regularly revised and updated, and the EFQM provides a set of sub-criteria or items to measure each criterion, and results include consumer perception measures and performance indicators (Calvo-Mora et al., 2020; Bou Llusar et al., 2009; Shafiq et al., 2019). While criteria for enablers show how things are done in the organization, the criteria for results illustrate 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, 2010).

Although the literature indicates that OC is the key to organizational excellence (Schein, 1984), no studies analyze what culture type is the most appropriate for the application of the EFQM model. To attain excellence, organizations should foster enabler criteria that possess certain characteristics (Russell, 2000). The most important of these for the CFV model of Cameron and Quinn (1999) are market orientation (Davies et al., 2007) and an emphasis on process management (Russell, 2000) (Figure 2).

On the one hand, the external orientation is necessary to know customers and to satisfy their needs and expectations (Laforet, 2008), to develop products the customer wants (Goffin and New, 2001) and to improve the client, society and key results (Conti, 2007). On

Figure 2 Organizational culture and quality strategies

Flexibility and Discretion

Clan

Empowerment
Team building
Human researce management
Employee envolvement

Adhocracy

Creating new standards
Finding creative solutions
Surprise and delight
Anticipating needs

Internal focus and Integration — External focus and Differentation

Herarchy

Process control
Systematic problema solving
Error detection
Quality tools (Pareto charting,
preventive maintenance or
process variability reduction)

Market

Measuring customer preferences
Improving productivity
Creating external partnerships
Enhancing competitiveness
Involving customers and suppliers

Stability and Control

Source: The competing values framework (Cameron and Quinn, 2005)

the other hand, the control of processes is also necessary because the dynamics of the EFQM model indicates that processes generate results, and this needs stability and control for systematic management (EFQM, 2010; Valmohammadi and Roshanzamir, 2015). So, as EFQM model requires orientation to the market, because it is based on the satisfaction of the needs and expectations of the clients and stability and control of processes, we anticipate that cultures with these characteristics will have a greater effect on the results.

Clan culture focuses on flexibility and internal maintenance (Cameron and Quinn, 2005; Losonci et al., 2017) by emphasizing cohesion, participation and strong human relations. It can be positively related to people results (Eskildsen and Dahlgaard, 2000) but not with customer and society results and therefore not with the key results because this culture is not externally oriented and does not exercise the control that the EFQM model requires on processes (Cameron and Quinn, 2005; Conti, 2007; Bolboli and Reiche, 2015; EFQM, 2013; Prajogo and McDermott, 2011).

Adhocracy culture emphasizes flexibility but with external focus through innovation, growth and adaptation to the environment. External orientation is important to understanding of customer needs (Laforet, 2008) and to developing products the customer wants (Goffin and New, 2001). Adhocracy adapts to changes in customer demand (Naor et al., 2008). This culture is positively related to customer results. In this culture, employees work on projects independently and they are empowered. In addition, the organization offers resources to train employees to enhance their knowledge and skills, improving people results (Yeung et al., 1991; Roh et al., 2008; Naor et al., 2008). This may allow these companies to meet customers' needs and expectations (Laforet, 2008). Moreover, process innovation improves the efficiency and productivity that makes it possible to improve the key results (Eskildsen and Kanji, 1998b). Although this culture is not based on process control, as required by the EFQM model, we believe that it is positively related to EFQM results.

Market culture has external focus and is control-oriented by encouraging competition and achievement of goals (Cameron and Quinn, 2005). These organizations are close to customers to understand their expectations and needs (Flynn et al., 1994; Abdualmajed Ali et al., 2017). Also, these firms develop new products and use process management that enhance their efficiency and productivity, and it leads to better customer satisfaction and higher market and financial performance (Hendricks and Singhal, 2001; Kaynak, 2003). Senior management develops initiatives such as continuous improvement in quality (Beer, 2003), and employee participation (Naor et al., 2008), makes partnerships with customers and suppliers (Cameron and Quinn, 2005), uses quality information, product/service design and process management (Zu et al., 2010). Also, they use systematic collection and analysis of quality data for continuous improvement (Losonci et al., 2017). In the design stage, they use standardization to develop new products faster with fewer components and their process management aim to reduce process variability, the number of defective products and the production costs (Ahire and Dreyfus, 2000; Roh et al., 2008). Process control is good for new product quality (Carbonell and Rodríguez-Escudero, 2016) and produces EFQM results (Cameron and Quinn, 2005; Bolboli and Reiche, 2015).

Finally, hierarchical culture has an internal focus and emphasizes control of process management and standardized rules and procedures (Zu et al., 2010; Losonci et al., 2017). EFQM results require that process management focuses on continuous improvement and stability, through reducing process variability, statistical process control, preventive maintenance and production schedules that focus on satisfying the consumer and other stakeholders, improving customer results (EFQM, 2010). Thus, although these organizations lack external orientation, they train their employees to improve the attention to their customers and to know their needs and expectations, which positively affects people results (Cameron and Quinn, 2005). Also, this culture may manage processes as the EFQM model needs, such as statistical process control, preventive maintenance and reduced process variability (Kaynak, 2003; Rao Tummala et al., 2006; Roh et al., 2008;

Bolboli and Reiche, 2015), which make it possible to improve society results and key results. Therefore, we propose that:

H1a. Clan culture is not related to EFQM results.

H1b. Adhocracy culture is positively related to EFQM results.

H1c. Market culture is positively related to EFQM results.

H1d. Hierarchy culture is positively related to EFQM results.

2.2 Organizational culture and knowledge exploration and exploitation

Huber (1991) states that "a company learns when members change their ways to get useful information." Thus, the learning of an organization will be greater, when more people acquire knowledge and develop different interpretations. However, to make this possible the organization must perform four activities: solving the problems that happen in their current activities; integrating the knowledge acquired in all organizational areas; innovating and experimenting; and integrating external information (Leonard Barton, 1992).

Different types of OL have been considered in the literature and the impact of some OC attributes has been studied (openness to change, innovation, trust, teamwork, morale, information flow, employee involvement, supervision and customer service) (Dominguez and Massaroli, 2018), as well as knowledge exchange (Al-Adaileh and Al-Atawi, 2011) and the success of knowledge sharing (Al-Alawi *et al.*, 2007).

March (1991) established one of the most widely accepted typologies of learning, distinguishing two types of learning skills, exploration and exploitation competences (ambidexterity) (He and Wong, 2004).

Atuahene-Gima (2005) defines exploration learning competence as "the acquisition of new knowledge by the organization from experimenting with new alternatives, skills, abilities and processes so includes things captured by terms such as search, variation, risk taking, experimentation, play, flexibility, discovery or innovation." To do this, the company must invest in resources that allow them to gain new knowledge, develop new tools and processes (Lin *et al.*, 2013). Moreover, it requires a fresh organization with an OC that encourages creativity, brings flexibility to the organization, seeks new knowledge and assets in external environments and pursues results that are uncertain in the long term (Ahmad *et al.*, 2017). March (1991) believes that exploitation learning competences consist "in the redefinition and extension of knowledge, skills, paradigms and technologies in the organization and try to make the best use of existing routines, competences and capabilities, based on the use of past and present knowledge." Exploitation needs an OC based on stability and control (Benner and Tushman, 2003). These competences are two different types of learning, one based on obtaining new knowledge and the other from the reuse of knowledge already held by the company.

March (1991) considered that every activity in an organization requires both types of learning and that both together constitute what has been called ambidexterity. According to ambidexterity can be defined as an organization's ability to achieve different goals at the same time, not only exploit current competencies but also explore new opportunities with balanced dexterity, which means that they can coexist synergistically. This author considers that a successful organization should be ambidextrous. The dichotomy of control and flexibility corresponds to the exploitation and exploration strategies in organizational ambidexterity (Chang *et al.*, 2019). Knowledge exploration is related to organic structure, flexible systems and improvization, whereas knowledge exploitation is related to mechanical structure, control, bureaucracy and routine (Dominguez and Massaroli, 2018). Therefore, we have carried out an exhaustive analysis of these characteristics according to the CVF model (Figure 2).

First, clan culture seeks internal cohesion, through participation and strong human relationships and is characterized by its flexibility (Pakdil and Leonard, 2015; Kumar Rai, 2011). This culture is one of the least innovative (Asaad and Omer, 2016) and is negatively related to exploration (Matzler et al., 2013) and may not facilitate the development of this competence. The managers of these organizations also try to respond to the needs of their workers and encourage commitment and rarely employ systematic process management or reengineering (Cameron and Quinn, 2005). Therefore, it will not have a major effect on exploitation by favoring flexibility, to the detriment of control. As it does not have a direct relationship with either type of learning, it is difficult for it to exert an indirect effect on the results through these competences.

Adhocracy culture is externally oriented and its process management is focused on establishing new standards and finding creative solutions (Cameron and Quinn, 2005; Losonci et al., 2017). To do this, it continually innovates, grows and adapts to changes in the environment and consumer preferences (Naor et al., 2008). In fact, it is considered the most innovative culture (Asaad and Omer, 2016; Kumar Rai, 2011), capable of generating a large number of new products and services (Storey and Hughes, 2013). In addition, its workers are trained and acquire new knowledge and skills (Yeung et al., 1991). Therefore, this culture seems able to generate exploration competences. Instead, given its low emphasis on control, it will not try to exploit its existing knowledge as assiduously, so the use of exploitative powers may be very limited (Matzler et al., 2013).

Market culture is externally oriented and based on stability and control. This characteristic facilitates the development of new products and services, and this is considered the second most innovative culture (Asaad and Omer, 2016). Through innovation, competitive advantage can be secured based on differentiation and market leadership (Hurley and Hult, 1998; Desphandé et al., 1993). To achieve stability, its managers use a systematic management of processes that favors exploitation (Matzler et al., 2013), with which they can improve their efficiency and productivity (Zu et al., 2010; Losonci et al., 2017). In this way, they can better meet the needs of consumers and obtain better results (Deshpandé and Farley, 2004; Kaynak, 2003; Kaynak and Hartley, 2008). Also, senior management carries out continuous quality improvement initiatives (Beer, 2003). Market-oriented companies create value by using knowledge about customers, competitors and markets. These companies do so through constant investments in quality and training and process development related to a systematic articulation and codification of knowledge (Andreas Strobl et al., 2021; Malik et al., 2019). Therefore, this culture can promote the development of both learning competences, that is, ambidextrous learning.

Finally, Cameron and Quinn (2005) consider that a hierarchical culture needs workers who are specialists in administrative tasks and who are oriented to the reengineering of processes. It also has internal orientation and its managers place emphasis on process management, stability and standardization of procedures and rules (Zu et al., 2010; Losonci et al., 2017). In these cultures, managers analyze the environment to detect opportunities, competitive advantage, risks and key success factors (Prajogo and McDermott, 2011; Zu et al., 2010). Therefore, this culture seems more suitable for developing exploitative skills (Matzler et al., 2013). The second set of hypotheses of the current study is:

H2. Organizational culture will support organizational learning.

H2a. Clan culture is not positively related to either exploitation or exploration.

H2b. Adhocracy culture is positively related to exploration.

H2c. Market culture is positively related to both exploitation and exploration.

H2d. Hierarchical culture is positively related to exploitation.

2.3 Learning competences and the European Foundation of Quality Management results

OL has been considered a source of competitive advantage that can drive the success or failure of companies (Teece, 1998). There are two theories or approaches, one based on change and the other related to the perspective of knowledge. The former approach affirms that OL makes it possible to obtain a competitive advantage because it produces incremental changes in the procedures that companies use, which makes it easier for them to adapt quickly to changes in the environment, that is, to react proactively and anticipate them. The empirical study by, with a sample of 451 Spanish companies, showed that OL facilitated innovation in companies, with improvement in both learning variables and organizational results. In addition, organizations that introduce the EFQM model need to incorporate KM. Without proper KM systems, large amounts of information may become a serious issue and the organization's capacity to implement the quality policy can decline (Criado-García et al., 2020).

On the other hand, the knowledge-based approach starts from the theory of resources and capacities. Barney (1986) states that learning is a strategic resource that allows companies to create long-term value because it is a very difficult type of resource to copy. Some authors consider OL the most important asset of organizations (Davenport and Prusak, 1998). Thus, the other hypothesis of the present study is:

H3. Learning competences will support EFQM results.

He and Wong (2004) affirm that the exploration and exploitation skills of OL can strategically differentiate companies and be a source of competitive advantage that improves their results. There are studies that have positively related these competences to organizational results (Tsai and Huang, 2008; Lisboa et al., 2013; Yuen et al., 2019; Osiyevskyy et al., 2020). For example, Uotila et al. (2009) carried out a study with a sample of 279 industrial companies of Standard & Poor's 500 index, in which they concluded that most organizations tried to achieve a balance in their exploration and exploitation activities because in this way they obtained better results. Similarly, the study by He and Wong (2004), conducted with a sample of 206 companies in the secondary sector, indicates that a balance between the two competences is positively related to sales growth, while this relationship is negative when there is no such balance. Also, Gibson and Birkinshaw (2004) conducted an investigation on the direct relationship of ambidextrous competences and business results and on the mediating effect that these competences have on the relationship of the organizational environment and the leadership style in the results. In addition, exploration and exploitation competences improved results for workers and the organization by reducing the costs of monitoring and controlling employees (Lee et al., 2019).

According to Atuahene-Gima (2005), exploitation increases incremental innovations because it is based on reducing the variability of products and components and improving productivity. To do this, changes in products are made taking into account the needs and expectations of customers. In this way exploitation can improve results for customers, workers, society and the company (Benner and Tushman, 2003; Zang et al., 2015). Exploitation also makes it possible to increase the productivity of capital and improve technology, assets and capacities through standardization, the establishment of routines and the systematic reduction of costs (Koza and Lewin, 1998). Standardization and the establishment of routines improve the results in the workers (Lee et al., 2019), and cost reduction allows more competitive products to be made, with the consequent improvement in results for customers and society, which in turn, means better results for the organization. Therefore, we propose that:

H3a. Exploitation is positively related to EFQM results.

H3b. Exploration is positively related to EFQM results.

3. Research methodology

3.1 Sample and data collection

The population includes Spanish manufacturing companies with more than 100 employees according to SABI financial database. Like other studies on these topics, the population of 3,814 organizations was designed to cover an broad spectrum of industries (Escrig-Tena *et al*., 2018).

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

In the first place, only Spanish industrial organizations that were active have been considered. Using only the industrial sector was intended to produce a sample where QM has a certain degree of homogeneity. The service sector was excluded because it is highly heterogeneous and QM policies can 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 statistical tests.

The size of the organization was also considered. Small companies, in which internal processes are usually not structured, were omitted. And large corporations were also excluded because their size and structure makes them atypical in Spanish industry. Thus, the study is aimed at medium-sized organizations with between 100 and 500 employees. Finally, it was considered convenient 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 and have stable and consolidated quality policies, possibly including the application of the EFQM model.

Data were collected through a telephone survey addressed to the quality manager (for data regarding EFQM), human resource manager (for the data regarding OC) and marketing or innovation manager, so three different managers participated in this research. The structured questionnaire was previously tested by six academics and four managers. The quality manager of the company was contacted, and, in case of a successful response, they were required to enroll the participation of the human resource manager. In total, 871 companies were randomly contacted to obtain the 200 desired triple responses, a very large sample that allows the application of the partial least squares through structural equations modeling (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 regarding the frequency of introduction of new products, the ability to manage new technologies and so on. These items have been used to measure other variables, which will be used in other studies.

The distribution by sectors of the companies in the selected sample is shown in Table 1. It shows the number of companies in each sector according to the CNAE-93 at two digits, both for the sample and for the population.

In addition, we checked the representativeness of the sample to the sectoral composition using the Pearson's correlation coefficient (0.767 significant at 1%). This means that the sample can be considered a good representation of the population regarding the distribution across industries.

Similarly, representation was also discussed in terms of size, through an analysis of variance using the measure of the number of employees from each company. This analysis showed that the population and the sample did not have a significantly different size ($F = 0.034$, $p = 0.854$). The average ROA was also studied, and the results of ANOVA analysis did not prove that the resources of the population and the sample were different ($F = 0.724$, $p = 0.395$). Therefore, it can be concluded that the sample is representative of the population, consistent with the object of this study.

Table 1	Distribution by sectors					
		Population			Sample	
CNAE	Activity	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	1,173	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		3,814	100	200	100	

Source: Authors

The data collected are also representative of the population according to the sectoral distribution of enterprises. There is a significant correlation of 0.823 ($p = 0.01$) between the number of companies in the initial population and the number of companies in the final sample (companies that have validly answered the questionnaire).

The information was collected with a structured questionnaire via a webpage. The final sample consisted of 200 valid questionnaires, answered by four managers from each of the 200 organizations. This data is one of the strengths of this research.

3.2 Measures

The questionnaire was designed based on a review of the literature (Appendix). For all the measures we used a multiitem scales using a five-point Likert scale (1 = "strongly disagree;" 5 = "strongly agree"). In the research model, all variables correspond to first-order factors except for EFQM results, which is a second-order factor, which is applicable when there is a latent factor with several correlated dimensions (Hair *et al.*, 2014). The second-order model explains the covariations among first-order factors in a more parsimonious way (Hair *et al.*, 2014). The items for EFQM results were answered by four different managers from each company and computed as the mean of them.

The other items (culture and learning) were answered by the human resource and innovation managers, respectively.

Organizational culture: It was measured using four constructs (clan, adhocracy, market and hierarchical culture), based on the scale of Desphandé *et al.* (1993). These constructs were computed as formative constructs from four items for each culture, similar to other studies (Roldán *et al.*, 2012; Naranjo-Valencia *et al.*, 2017) because the latent variables (each OC type) are caused and formed from the observed variables (Roberts and Thatcher, 2009).

European Foundation of Quality Management results: It argued that the information estimated in the EFQM model is appropriate to develop scales of measurement. On this basis, 16 items referring to the model were included in a similar way to previous studies (Bou Llusar *et al.*, 2005; Shafiq *et al.*, 2019; Santos-Vijande and Álvarez-González, 2007; Calvo-Mora *et al.*, 2014b; Gómez-Gómez *et al.*, 2017). Four items were included for each of

the results criteria of the model: customer, people, society and key performance results. This construct was computed as a reflective construct.

Exploitation and exploration competences: We operationalized these using two separate indicators each composed of five items taken from the scales used by Atuahene-Gima (2005). These items have also been used by other researchers (Jansen *et al.*, 2006; Schulze, 2009). In the case of exploitation, the items focus on the improvement of the organization regarding its knowledge in products and technologies and its ability to solve problems of its clients with solutions developed using its current knowledge. On the other hand, exploration items are associated with the acquisition of new technologies, the adoption of new processes and abilities to develop products or services and the acquisition of new organizational and management abilities. Both constructs were also considered to be reflective.

The impact of common method bias was assessed using post hoc approaches. This potential problem was analyzed with the Harman one-factor test (Podsakoff and Organ, 1986). The results of the unrotated principal component analysis indicated that common method variance does not pose a serious problem in this research because several factors with an eigenvalue greater than 1 were identified, explaining 76.56% of the total variance and no factor accounts for almost all of the variance.

Control variables: We included two control variables: size and age of the company. Size was measured as the number of company's employees, and age was measured by the number of years from its creation. Both variables have been recoded on a 1–5 scale.

All previous reflective dimensions and constructs were purged, following the 0.7 factor loading threshold suggested by. Table 2 shows the results for the correlations among the different variables of the model.

4. Data analysis and results

4.1 Validity and reliability

Hypotheses were tested simultaneously using PLS-SEM, using SmartPLS 3 software (Ringle *et al.*, 2015). SEM employs a principal component-based estimation approach (Chin, 1998a; Hair *et al.*, 2020). In this method, sample size plays an important role in the estimation and interpretation of results. Some researchers have established that 200 observations allow estimates to be made with adequate sensitivity. It is the so-called "critical sample size" (Hair *et al.*, 2008b). In addition, this technique is recommended when the number of observations is below 250 (Reinartz *et al.*, 2009), when model uses formative indicators and data is nonnormal (Henseler, 2017). Our model uses formative indicators, and our data is nonnormal. The composite model is based on the assumption that the construct is composed of indicators or elements as a linear combination of them. The relationships between indicators and the construct are not cause effect. In fact, PLS-SEM always uses the modeling of variables as compounds. In addition, there are a number of other reasons that suggest its use. First, PLS-SEM does not require normal data, unlike other techniques based on covariance. Second, the study is aimed at predicting the dependent variables (Chin, 2010).

For hypothesis testing, we used the bootstrapping procedure recommended by Chin (1998a). Using PLS involves following a two-stage approach (Barclay *et al.*, 1995; Chin, 2010). The first step requires the assessment of the measurement model. This allows the relationships between the observable variables and theoretical concepts to be specified. This analysis is performed in relation to the attributes of individual item reliability, construct reliability, average variance extracted (AVE) and discriminant validity of the indicators of latent variables (Hair *et al.*, 2019; Henseler, 2017). In the second step, the structural model is evaluated.

Table 2 Correlations and reliability

	R^2	AVE	CR	CA	CLAN	ADHOC	HERAR	MERC	EXPLOR	EXPLOT	RESUL	CLIEN	PERS	SOCI	KEY	AGE	SIZE
CLAN																	
ADHOC					0.484												
HERAR					0.248	0.159											
MERC					0.362	0.625	0.162										
EXPLOR	0.305	0.761	0.941	0.921	−0.016	0.158	0.195	0.318	0.872								
EXPLOT	0.210	0.700	0.921	0.892	0.162	0.227	0.301	0.353	0.431	0.837							
RESUL	0.421	0.593	0.952	0.944	0.292	0.359	0.407	0.384	0.415	0.445	0.770						
CLIEN	0.512	0.766	0.907	0.847	0.159	0.249	0.234	0.297	0.405	0.371	0.716	0.875					
PERS	0.567	0.709	0.879	0.791	0.279	0.331	0.309	0.299	0.223	0.291	0.753	0.437	0.842				
SOCI	0.870	0.843	0.956	0.938	0.280	0.341	0.433	0.353	0.428	0.427	0.933	0.553	0.658	0.918			
KEY	0.843	0.895	0.971	0.960	0.256	0.296	0.350	0.340	0.329	0.390	0.918	0.566	0.565	0.811	0.946		
AGE		1.000	1.000	1.000	0.076	−0.074	−0.042	−0.046	0.208	0.011	0.074	0.035	−0.010	0.098	0.083	1.000	
SIZE		1.000	1.000	1.000	−0.020	0.062	0.287	0.190	0.429	0.278	0.387	0.276	0.136	0.450	0.347	0.069	1.000

Notes: CA = Cronbach's alpha; CR = composite reliability; AVE = average variance extracted

Source: Authors

In addition, we confirmed the validity of the formative dimensions using the procedures suggested by Fornell and Larcker (1981) and MacKenzie *et al.* (2005). The indicators are not necessarily correlated and consequently traditional reliability and validity assessment have been dismissed as inappropriate and illogical for a formative construct, with reference to its indicators (Bollen, 1989).

From an examination of the results shown in Table 3, we can state that all the constructs are reliable. They have values for both Cronbach's alpha coefficient and for a composite reliability greater than the value of 0.7 required in the early stages of research and the stricter value of 0.8 required for basic research (Nunnally, 1978). The AVE should be greater than 0.5, meaning that 50% or more variance of the indicators should be accounted for (Fornell and Larcker, 1981). All constructs of our model exceed this condition. For discriminant validity, we have compared the square root of the AVE (i.e. the diagonals in Table 1) with the correlations among constructs (i.e. the nondiagonal elements in Table 1). On average, each construct relates more strongly to its own measures than to others.

4.2 Results

The structural model resulting from the PLS analysis is summarized in Figure 3, where the explained variance of endogenous variables (R^2) and the standardized path coefficients (β) are shown.

As can be seen, all the hypothesized relationships are significant, and therefore, the hypotheses are supported, with only one exception.

Table 3 Results

Paths	Path coefficients	T-values	p-values	Empirical evidence
Hypothesis				
Clan → Performance	0.119	1.266	0.103	Yes
Clan → Exploration	−0.177	1.637	0.051	Yes
Clan → Exploitation	0.007	0.045	0.482	Yes
Adhocracy → Performance	0.155*	1.801	0.036	Yes
Adhocracy → Exploration	0.044	0.445	0.328	No
Adhocracy → Exploitation	0.005	0.048	0.481	Yes
Hierarchical → Performance	0.205**	2.842	0.002	Yes
Hierarchical → Exploration	0.102	1.282	0.100	Yes
Hierarchical → Exploitation	0.207**	2.655	0.004	Yes
Market → Performance	0.166**	2.562	0.005	Yes
Market → Exploration	0.286**	2.946	0.002	Yes
Market → Exploitation	0.284**	2.904	0.002	Yes
Exploration → Performance	0.167*	2.118	0.017	Yes
Exploitation → Performance	0.184**	2.975	0.001	Yes
Second order construct				
Performance → Customer results	0.716***	21.007	0.000	
Performance → People results	0.753***	18.371	0.000	
Performance → Society results	0.933***	111.860	0.000	
Performance → Key results	0.918***	80.287	0.000	
Control variables				
Age → Performance	0.038	0.744	0.228	
Age → Exploration	0.220***	3.957	0.000	
Age → Exploitation	0.021	0.359	0.360	
Size → Performance	0.184**	2.631	0.004	
Size → Exploration	0.324***	4.825	0.000	
Size → Exploitation	0.163	2.440	0.007	

Notes: ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$
Source: Authors

Figure 3 Structural model

Source: Authors
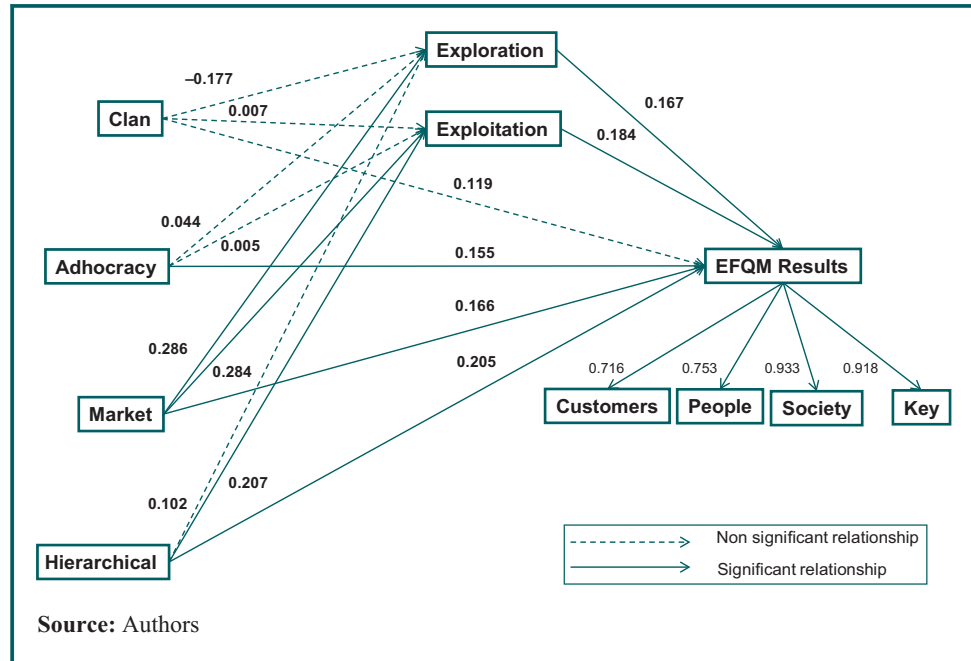
According to Podsakoff and Organ (1986), PLS-SEM avoids many of the restrictive assumptions underlying maximum likelihood techniques and ensures against improper solutions and factor indeterminacy. Also, PLS-SEM is insensitive to sample size considerations and handles both very small and very large samples more easily than does SEM, and PLS-SEM handles both reflective and formative constructs (Hair *et al.*, 2019).

Because PLS makes no distributional assumptions in its parameter estimation, traditional parameter-based techniques for significance testing and modeling were used (Chin, 1998a). One consequence of the comparison between covariance structure analysis modeling approaches and PLS is that no proper overall goodness-of-fit measures exist for models using the latter (Hulland, 1999). The structural model is evaluated by examining the R^2 values and the size of the structural path coefficients.

The stability of the estimates is examined by using the *t*-statistics obtained from a bootstrap test with 5,000 resamples. Table 2 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 adhocracy, market and hierarchical cultures have a positive effect on performance, with a path coefficient (β) of 0.155, 0.166 and 0.205 (*t*-values = 1.801; 2.562; and 2.842, respectively). This is consistent with the results of previous studies (Laforet, 2008; Kaynak, 2003; Losonci *et al.*, 2017; Valmohammadi and Roshanzamir, 2015).

H2 is only partially supported. First, clan culture is not related to learning competences (β = 0.177, *t*-value = 1.637; β = 0.007, *t*-value = 0.045), as suggested in *H2a*. We did not find a positive relationship between adhocracy culture (β = 0.044, *t*-value = 0.445) and exploration competences (H2b). We have found evidence for *H2c* since market culture is positively related to exploration and exploitation (β = 0.286, *t*-value = 2.946; β = 0.284, *t*-value = 2.904) and H2d because hierarchical culture is positive related to exploitation competences (β = 0.207, *t*-value = 2.655). These results are consistent with the literature (Asaad and Omer, 2016; Kumar Rai, 2011; Matzler *et al.*, 2013).

As can be seen in the Figure 3, there is evidence of possible indirect effects, but further elaboration of those relationships requires closer examination. Although have traditionally been used to analyze the mediating effects, this procedure has a low statistical power to detect indirect effects and only provides a binary conclusion about the existence of a mediating relationship or not (Mackinnon *et al.*, 2002). To avoid these limitations, several authors have emphasized tests focused on indirect effects (Hayes, 2013).

In this study, the PROCESS 2.16 statistical software is used to test these effects (Hayes, 2013). This program uses the path analysis method described by that generates bootstrap 95% confidence intervals corrected for bias for the indirect effect on a base of 5,000 bootstrap samples. Table 4 shows the bootstrap 95% confidence intervals of the four cultures and learning competences. The confidence intervals are considered statistically significant when they do not include the value zero (Hayes, 2013).

Market culture has an indirect effect on results through exploration and exploitation competences ($\beta = 0.327$, $p < 0.05$) and hierarchical culture as measured by the exploitation competences ($\beta = 0.296$, $p < 0.05$). So, these cultures improve results in different areas of the company through OL (Ikhsan *et al.*, 2017). However, as these cultures have a direct effect on the results, their mediating effect through the learning competences is only partial. These facts are compatible with the findings of other studies, such as that of Ikhsan *et al.* (2017), who found that the influence of contextual ambidexterity on firm performance is dependent on OC and its effectiveness also depends on other variables such as market dynamism.

5. Discussion, implications and conclusions

5.1 Discussion and implications

The main contributions of this paper is that OC positively contributes to improve excellent results and develops exploration and exploitation competences. However, only adhocracy, market and hierarchy culture have a positive effect on excellent results. In addition, these competences also enhance these performances (He *et al.*, 2021; Osiyevskyy *et al.*, 2020). Specifically, these three cultures improve EFQM results and market and hierarchy culture indirectly influence excellent results through knowledge exploration and exploitation competencies. Previous studies have found that these cultures can positively influence the results obtained by the members of the organization, consumers, company and society (Abdualmajed Ali *et al.*, 2017; Bou Llusar *et al.*, 2009; Flynn *et al.*, 1994; Rezaei *et al.*, 2017; Shafiq *et al.*, 2019). For example, Rezaei *et al.* (2017) demonstrated that culture significantly impacts the EFQM results and knowledge-sharing partially mediates this relationship. The positive effect of adhocracy, market and hierarchy cultures on excellent results (H1) further reinforces the combination of flexibility, control and market orientation. Conceptually, this first combination reflects the importance of a balanced understanding of quality as

Table 4 Bootstrap 95% confidence intervals

Efectos indirectos	*Total*	*Direct*	*Coef*	*SE*	*Indirect 95% CI*	*p-value*
Herarchical → Exploration → EFQM Results			0.060	0.047	[−0.025;0.160]	0.187
Herarchical → Exploitation → EFQM Results	0.296***	0.106	0.118*	0.060	[0.007;0.247]	0.016
Market → Exploration → EFQM Results			0.101*	0.047	[0.012;0.201]	0.038
Market → Exploitation → EFQM Results	0.327***	0.089	0.118*	0.054	[0.008;0.224]	0.018

Notes: ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$
Source: Authors

performance and quality as conformance in the models of quality (Giménez-Espín et al., 2012; Prajogo and McDermott, 2011). Also, external orientation indicates the importance of knowing and anticipating the needs and expectations of customers.

In addition, knowledge exploration and exploitation has a significant positive effect on excellent results (H2). Exploitation makes it possible to increase the productivity of capital and improve technology through standardization, the establishment of routines and the systematic reduction of costs, while exploration allows for the production of new products or services, providing substantial novelty compared with the existing products in the industry (Marín-Idárraga et al., 2022). In both types of competences, changes in products are made taking into account the needs and expectations of customers. Therefore, exploitation and exploration can improve results for customers, workers (Lee et al., 2019), society and company (Benner and Tushman, 2003; He et al., 2021; Tsai and Huang, 2008; Zang et al., 2015).

However, only two of the four cultures have significant effects on learning. Market culture allows the development of exploration and exploitation competences and hierarchical culture enhances the exploitation of knowledge. The results indicate that the only culture capable of generating ambidextrous learning is market culture. These results are consistent with other studies, which show that market orientation favors exploration and exploitation of knowledge while control only stimulates the development of the exploitation competences (Slater et al., 2014; Şanal et al., 2013). This is consistent with the results of Dominguez and Massalori (2018), who consider that knowledge exploration is related to organic structure, in which products are developed considering the consumer, whereas knowledge exploitation is related to mechanical structure, control, bureaucracy and routine.

This is especially relevant for managers who use the EFQM model and wish to stimulate OL to increase their performance and develop an appropriate OC. This result is consistent with those obtained by other authors (Atuahene-Gima, 2005; Benner and Tushman, 2003; Gibson and Birkinshaw, 2004). Atuahene-Gima (2005) found that firms adept at understanding their current and future customers and competitors ensure simultaneous investments in exploitation competences and exploration competences, thanks to their market orientation. The EFQM (2013) considers that, "The EFQM model is a tool for quality management," which can guide the organization toward the customer (Calvo-Mora et al., 2020; Shafiq et al., 2019). Therefore, market orientation, present in the adhocracy and market culture, is very important for the development of both types of learning and obtaining excellent results according to the EFQM model. But hierarchical culture, which is not externally oriented, is also positively related to excellent results. This shows that process control is also essential to achieve positive outcomes, as has been pointed out in previous studies about the EFQM model (Calvo-Mora et al., 2020; Conti, 2007; Russell, 2000; Valmohammadi and Roshanzamir, 2015). Besides, market and hierarchical cultures have a spillover effects on excellent results though knowledge exploration and exploitation.

From an empirical study, we have found important implications for theory and for managers. First, this study indicates that to improve results, it is more appropriate for the company to promote an adhocracy, hierarchical or market culture because our results reveal positive relationships among these types of culture and EFQM results. Although these three cultures are different, they share some characteristics. Market and hierarchical culture are based on stability and control, while adhocracy and market culture are externally focused. Therefore, external focus and control appear to be critical to improving excellent results.

Second, although the OC is one of the most important determinants of successful OL, only cultures focused on control (market and hierarchy cultures) allow the development of these competences. Therefore, because the EFQM model requires organizations to use a KM system to enhance the effect of the enablers criteria on excellent results, the managers of these companies must know that only these two cultures are suitable for it. If a manager

wants to develop both types of competences in his company, a market culture is essential. If the manager only wishes to develop exploitation competences, the organization must have a hierarchical culture. If a company wants to have a balanced learning, because this can provide better results (March, 1991; Uotila *et al.*, 2009; Wu *et al.*, 2010; Zhang *et al.*, 2015), the most appropriate culture could be the market type, because it promotes learning ambidexterity.

Third, exploration and exploitation competences increase excellent results (Tsai and Huang, 2008; Lisboa *et al.*, 2013; Zhang *et al.*, 2015). Therefore, it is important that companies using this model invest financial and human resources to promote exploration and exploitation learning competences because this model can enhance exploitation and exploration (ambidextery), as pointed out by Para-González *et al.* (2021). Thus, in an EFQM environment, managers should consider that knowledge exploitation and exploration must be combined.

5.2 Conclusions, limitations and future research

This research establishes an integrated model that demonstrates the importance of adhocracy, market and hierarchical cultures and knowledge to drive excellent results. However, only the last two cultures promote learning. Specifically, market culture develops learning ambidexterity, while hierarchical culture only favors knowledge exploitation. This finding highlights the importance of two cultural values for the implementation of the EFQM Model and, therefore, to promote excellent results: market orientation and process control. Values that favor the exploration and exploitation of knowledge (Andreas Strobl *et al.*, 2021; Malik *et al.*, 2019; Slater *et al.*, 2014; Şanal *et al.*, 2013). In addition, both learning competences improve excellent results and market and hierarchical cultures have a partial mediating effect on results through learning competences. Therefore, with this study, we begin to understand the important role that knowledge plays in the EFQM model, whose literature is still very scarce (Para-González *et al.*, 2021; Criado-García *et al.*, 2020). Besides, organizations that use the EFQM model need to incorporate KM. Without proper KM systems, the organization's capacity to implement this model and to offer quality products and services to be excellent can fail (Wang *et al.*, 2021; Criado-García *et al.*, 2020).

These findings are very important for the managers of the more than 50,000 organizations that currently use the EFQM model because the EFQM, when it developed this model, did not specify what type of knowledge was the most suitable for the companies that implement the model, nor how knowledge can affect the EFQM results (Calvo-Mora *et al.*, 2014b). Managers should know that, according to our findings, market culture seems the most suitable culture for the management of knowledge ambidexterity and the generation of excellent results in the EFQM model.

However, this research has some limitations, which may condition the results obtained. One of them is the linearity of the relationships between the latent variables determined by the technique used, the structural equations (Hair *et al.*, 2008a). Another is that the sample used is cross-sectional, while management learning requires a longer period. The second limitation refers to the fact that only OC has been considered as a determining variable of learning. However, other variables, such as organizational climate, may influence the development of learning competences. Although different sources of information are used by each company, information has been provided only by managers. This is an important limitation because the direct opinion of the employees is not taken into account.

For these reasons, future research should investigate the relationship between the OC and other types of OL. In addition, it takes a long time to develop learning competences (Li *et al.*, 2010), so a longitudinal study could be used to explore the culture required by the organization at every stage of the implementation of the learning process.

Moreover, more studies are needed on the spillover effects of OC on EFQM results through knowledge exploration and exploitation.

Finally, future research could analyze the proposed model, specifying the model for specific sectors to develop its range of applicability, by examining more specific practices adapted to service sectors such as health, education and justice.

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Appendix. Research constructs and measures

Rank the following statements taking as a reference the actions of the Centre's managers and using the following scale: 1 to 2 (totally disagree); 3 (neither agree nor disagree); 4 to 5 (totally agree).

Results: These variables were operationalized in a similar way to previous studies (Bou Llusar *et al.*, 2005; Shafiq *et al.*, 2019; Santos-Vijande and Álvarez-González, 2007; Calvo-Mora *et al.*, 2014b; Gómez-Gómez *et al.*, 2017). Concretely, four items for each one of the results criteria of the model: customer, people, society and key performance results.

Based on the past three years, indicate the change undertaken on each of the following indicators, according to the following scale: 1 to 2 (very significant decrease); 3 (same as in previous years); 4 to 5 (very significant increase).

Customer results:

- the opinion of the customers about the quality of our product design;
- the opinion of the customers about the quality of our manufacturing products;
- market share; and
- number of claims and complaints of clients.

People results:

- the employees motivation toward improving the organization;
- the employees participation in improving the organization;
- health and safety at work; and
- training of employees.

Society results:

- the knowledge of our organization by society;
- the good public image of the company;
- satisfying relationships with government; and
- surveys of public entities, business organizations or trade unions.

Key performance results:

- the productivity of our company;
- the unit cost of producing our products;
- the benefits of our company; and
- the profitability of our company.

Organizational Culture Assessment Instrument Form: This variable was operationalized based on the scale of Desphandé *et al.* (1993). These constructs were computed as formative ones from four items for each culture, similar to other previous studies (Roldán *et al.*, 2012; Naranjo-Valencia *et al.*, 2017).

Rank the following statements, taking as a reference the actions of the Centre's managers and using the following scale: 1 to 2 (totally disagree); 3 (neither agree nor disagree); 4 to 5 (totally agree).

Dominant characteristics

- My organization is a very personal place. It is like an extended family.
- My organization is a very dynamic and entrepreneurial place. People are willing to stick their necks out and take risks.

- The organization is a very controlled and structured place. Formal procedures generally govern what people do.
- My organization is very results oriented. A major concern is with getting the job done. People are very competitive and achievement oriented.

Organizational leadership

- The leadership in the organization is generally considered to exemplify mentoring, facilitating or nurturing.
- The leadership in the organization is generally considered to exemplify entrepreneurship, innovation or risk taking.
- The leadership in the organization is generally considered to exemplify coordinating, organizing or smooth-running efficiency.
- The leadership in the organization is generally considered to exemplify a producer, a technician, as someone primarily concerned with technical aspects.

Organizational glue

- The glue that holds the organization together is loyalty and mutual trust. Commitment to this organization runs high.
- The glue that holds the organization together is commitment to innovation and development. There is an emphasis on being on the cutting edge.
- The glue that holds the organization together is formal rules and policies. Maintaining a smooth-running organization is important.
- The glue that holds the organization together is the emphasis on achievement and goal accomplishment.

The most important things in my company are:

- The human researches. In your company cohesion and high morale is important.
- The growth and acquisition of resources. It is important to be prepared for new changes and challenges.
- The permanence and stability. It is important to the efficiency and fluency in daily operations.
- The success and competitiveness. It is important to set measurable goals.

Exploration and exploitation competences: these variables have been operationalized using two separate indicators each composed of five items taken from the scales used by Atuahene-Gima (2005). These items were used by other researches (Jansen *et al.*, 2006; Schulze, 2009).

Exploration competences

In the past 3 years in your company…

- It is accepted willingly the innovation from research company.
- Actively seek new ideas.
- Employees are not penalized by the new ideas that do not operate.
- It is promoting innovation, although it can be perceived as a high-risk activity.

    In the past 3 years in your company, for the development and launch of new products our company…

- attaches great importance to being the first company to bring to market new products.
- invests in R&D in an attempt to be the first company in the market.
- tries to do everything that is in hands to be the first to launch an innovative product to market.
- aims to be the first company to use new production processes.

- places great emphasis on being the first to incorporate new technology in the company.

  In the past 3 years in your company, to what extent your company has. . .

- technologies and skills acquired completely new production for the company?
- learned skills and processes of development of entirely new products for the industry?
- acquired new skills and organizational management (market trends, project management,. . .) that are important for innovation?
- i acquired new skills in areas such as support for new technologies?
- reinforced innovation skills in areas where not had experience?

Exploitation competences:

In the past three years, to what extent your company has improved. . .

- its knowledge about their products and technologies?
- its ability to exploit technology for its current operations innovation?
- its ability to solve customer problems with not very different from current solutions?
- its ability to develop products which were already available enough experience?
- its efficiency in existing innovation activities?

In the past 3 years in your company. . .

- often improves existing products
- regularly implements small adaptations to existing products
- introduces improvements in current products for local market
- improves the efficiency of its current products economies of scale increase in current markets
- they expand services to existing customers
- considers reducing the costs of internal processes as an important objective

In the last 3 years in your company. . .

- Demands that go beyond current products are accepted.
- They invent new products.
- It is experimenting with new products in our local market.
- Products that are completely new to our unit sold.
- New opportunities are frequently used in new markets.
- New distribution channels are regularly used.
- They regularly seek new customer.

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