



The key role of market orientation in innovation ambidexterity in agribusiness firms

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Abstract

The objective of this study is to examine the relationships between *market orientation*, *organizational culture*, *proactive management*, *organizational climate*, and *organizational structure* on the *innovative orientation* (exploitative and exploratory innovation). Little research has been conducted to examine the relationship between these organizational dimensions and innovation orientation. This study offers this and provides a particular type of companies (agribusiness) and context (Extremadura, Spain). Quantitative approach, by using structural modelling equations, to analyze data from 151 innovative agri-food firms was used in this study. Then, using a fuzzy set qualitative comparative analysis (fsQCA), was carried out to obtain additional insights. The main result find that market orientation plays a key role both in exploitative and exploratory innovation in agribusiness firms. Innovation exploitation is influenced by the firm's organic structure. Results from fsQCA provide valuable findings showing that innovation exploitation and exploration result from distinct organizational configurations, thus providing valuable insights for decision and policy-making.

Keywords Innovation · Organic structure · Organizational culture · Organizational climate · Proactive management

JEL Classification O31 · O32 · M21 · L22

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1 Introduction

In the agri-food industry (food, beverages, and tobacco), and according to the latest available data (National Institute of Statistics-NIS: Survey on Innovation in Companies), in 2020 the number of companies in Spain with expenditure on innovative activities was 1490, representing 23% of all companies with 10 or more employees in this industry and 71% of all innovative companies in the agri-food sector. The amount spent on technological innovation in the agri-food industry was only exceeded by the pharmaceutical and motor vehicle industries (MAPA 2022).

Innovation in the agri-food industry is a subject little studied in the academic world and yet of great relevance given the changes that are taking place in this sector, especially after the COVID-19 pandemic. In particular, the pandemic caused changes in food consumption patterns and consumer perceptions, and modified the channels of marketing, communication, and promotion of products. This led to various actions and activities in agribusiness, mainly related to the search for new forms of product promotion, the creation of marketing platforms, the use of technologies in communication activities, and the development of new products (Corchuelo et al. 2021). Innovation is one of the main determinants of productivity and competitiveness in the agri-food sector and is essential for economic growth (Trott and Simms 2017; Corchuelo and Sama-Berrocá 2022). There are several aspects that influence the innovative orientation in companies (Smith et al. 2008; Castillo-Valero and García-Cortijo 2021). The study by Smith et al. (2008) identified nine factors that impact the ability to manage innovation in an organization and especially focused on companies in the agricultural field: management and leadership style, resources, organizational structure, corporate strategy, technology, knowledge management, employees, and innovation process.

In this study, we analyze the role of various business variables (*organizational culture, market orientation, proactive management, organizational climate, and organizational structure*) in guiding innovation in agri-food companies, distinguishing between *exploratory* and *exploitative innovation*. This study is focused on companies in the agricultural field because of the importance and weight of these organizations in the economic development of different economies. However, it is mainly these organizations that present the greatest difficulties when it comes to innovating. The study by Corchuelo and Sama-Berrocá (2022) concluded that especially uncertainty regarding demand and lack of knowledge are barriers that negatively influence the willingness to innovate. Other barriers detected by agri-food firms to innovate were high costs, high economic risk, markets dominated by established companies, and lack of internal financing. For that reason, the results obtained in the present study can help explain how to promote innovation in agro-industrial companies.

In our knowledge, little research has been done to examine the relationships between these variables (*organizational culture, market orientation, proactive management, organizational climate, and organizational structure*) and innovation orientation, so this is the main novelty of this study. The influence of these

variables simultaneously is only studied from a qualitative methodology in agri-food industry in the study by Corchuelo et al. (2020). The present study offers this and provides a particular context: innovative Extremaduran agri-food companies.

The analysis of each of these variables with the *innovative orientation* of firms has been also not sufficiently studied, especially in the agrifood industry. Regarding the variable *organizational culture*, there are studies that analyze this aspect in terms of definitions, theoretical scopes, conceptualizations, characteristics, and types (e.g., Lavine 2014). Also, arguing that organizational culture contributes to innovation (Kim and Chang 2019; Naranjo-Valencia et al. 2019), but not referring to agribusiness. The influence of *organizational climate* (Lafta et al. 2016; Tan et al. 2021) and *management* (Ureña-Espaillet et al. 2022) in agribusiness have been studied, but we do not find references to the relationship of these variables with the *innovative orientation*. *Market orientation* has been mentioned in qualitative studies (i.e., van Duren et al. 2003) in the agribusiness field, but are less the studies that have directly tested hypothesized relationships in a quantitative manner (Johnson et al. 2009; Mirzaei et al. 2016; Ho et al. 2018; Kamarulzaman et al. 2023). There are also few studies that analyze the *organizational* mechanisms that influence *innovation*, especially focused on the agri-food industry (Ogidi 2014; Camanzi et al. 2018). In this sense, this study contributes to the literature on the factors influencing innovative orientation and the type of innovation developed by agribusiness firms, filling a research gap. To fill this research gap, this study poses the following research questions: (i) Do organizational variables (*organizational culture*, *market orientation*, *proactive management*, *organizational climate* and *organizational structure*) influence the *innovation orientation* of innovative agribusiness firms? (ii) What types agribusiness firms can be identified based on their innovation orientation? In this sense, we consider that our results will contribute to addressing the lack of empirical studies related to the influence of these business variables in the innovative orientation of innovative agribusiness companies. As such, this study aims: (i) to explore the influence of organizational dimensions such as market orientation, organizational culture, proactive management, organizational climate, and organizational structure on the innovative orientation (exploitative and exploratory innovation); (ii) to explore the different configurations of the organizational dimensions that contribute to innovation ambidexterity.

This study adopts a quantitative approach, by using structural modelling equations to analyze data from 151 innovative agri-food firms. Then, we use a fuzzy set qualitative comparative analysis (fsQCA) to obtain additional insights. The main result find that market orientation plays a key role both in exploitative and exploratory innovation in agribusiness firms. Innovation exploitation is influenced by the firm's organic structure. Results from fsQCA provide valuable findings showing that innovation exploitation and exploration result from distinct organizational configurations, thus providing valuable insights for decision and policy-making. These results provide understandings on how managers and policy makers should focus on innovation policies and strategies to exploit competitive advantage.

2 Theoretical framework

This study draws on the Resource-Based View (RBV) and organizational innovation theories to elaborate on the conceptual model and hypotheses development. The RBV theory is a management theory that posits that a firm's unique resources and capabilities are the primary source of its competitive advantage, regardless of its industry or external environment (Pinheiro et al. 2022). The RBV theory is important in studying innovation because it provides a framework for understanding how firms can develop and sustain their innovative capabilities (Zhang and Jedin 2022). According to the RBV theory, firms can innovate by developing new resources and capabilities, or by recombining existing resources and capabilities in new ways (Valaei et al. 2022). Organizational innovation theory is a field of study that examines how organizations develop and implement new ideas, products, processes, or practices. It aims to understand the factors that influence innovation, such as organizational culture, structure, strategy, leadership, learning, and change management. It also explores the outcomes and impacts of innovation on organizational performance, competitiveness, and survival (Damanpour 2018). RBV and organizational innovation theory consider that each company has different resource configurations that make it important to relate their study methodologically through configurational theory. Configurational theory allows transcending the qualitative-quantitative divide through the formulation of formal statements that explain how causally relevant conditions combine in configurations associated with the outcome of interest (Iannacci and Kraus 2022). Specifically, RBV and organizational innovation theory suggest that companies should be studied in terms of their unique resource configurations, which can be achieved through the use of configurational theory. Configurational theory provides a way to understand how different causal conditions combine to produce a given outcome, which is particularly useful when studying complex phenomena such as organizational innovation. By using configurational theory, researchers can move beyond the traditional qualitative-quantitative divide and develop a more nuanced understanding of the relationship between resource configurations and organizational innovation.

2.1 Innovation ambidexterity in agribusiness firms

Innovation is generally characterized by changes in a complex and interrelated system between product/service, market, knowledge, and society. Nowadays, the concept of innovation is beginning to be seen as a system that is an accumulation of several interrelated innovations. In this system, the fundamental role of the firm as a driver of innovation is emphasized and attention is also given to informal activities as sources of knowledge and generators of new innovative processes (Corchuelo and Sama-Berrocal 2022).

Innovation can be conceptualized as the development of new products or services (Cumming 1998), as new knowledge embedded in products, processes and services (Quintane et al. 2011), or the ability to understand and identify future customer

needs, expectations and potential customers through the organization's internal and external knowledge (Rajapathirana and Hui 2018). Innovation is considered a key factor in the creation of new firms and industries, economic development, firm performance and competitiveness, as well as effective firm management (Corchuelo et al. 2020).

Innovation is a complex activity in an organization, involving multiple internal and external variables (Castillo-Valero and García-Cortijo 2021; Corchuelo and Sama-Berrocal 2022). Complexity is the result of a blend of learning, knowledge, creativity, and management. This combination encourages the use of both the company's own and external resources, thus seeking to enhance the process of differentiation, with the aim of gaining a competitive advantage. In this sense, innovation is a dynamic in which internal and external aspects interact at the beginning and at the end of the process. Furthermore, it seeks to satisfy internal needs to achieve better levels of efficiency and quality that result in increased competitiveness through better satisfaction of market needs (Corchuelo et al. 2020). Innovative capabilities are important for companies to maintain their competitive advantage. In this sense, the study by Sun and Ju (2022) found that congruence between exploitative and exploratory innovation positively influences firm performance. In the case of incongruence, the combination of high exploitative innovation and low explorative innovation outperforms the opposite.

Applied to the agri-food industry, the study by Corchuelo et al. (2020) used a multiple case study to measure the level of importance that managers attached to six business variables (*Management, Strategy, Structure, Culture, Climate and Market Orientation*). The study validated the proposed model in which all the variables tested had a high weight for the achievement of innovative performance. These assumptions were also validated in the study by Sama-Berrocal and Corchuelo (2023) in a multi-case study in which agri-food cooperative enterprises were analyzed. Based on these studies, this research quantitatively analyzes whether the variables proactive management, organizational culture, organizational climate, organic structure, and market orientation influence the innovative orientation of agri-food companies.

Innovation orientation is an innovation-driven strategy launched by an organization to respond to ongoing market challenges and is a form of control that affects the innovative behavior of employees (Siguaw et al. 2010). Some studies have shown a positive correlation between innovation orientation and the introduction of innovations (Wei et al. 2020). In practice, one aspect to consider is how to measure innovation and how to classify it. One classification system that determine the innovation orientation of a firm and which is used in this research, is based on the radical factor of innovation in terms of innovation strategies (exploitative innovation and exploratory innovation) (Jansen et al. 2006; Bernal et al. 2019). Exploitative innovation refers to incremental innovations that meet emerging customer and market demand. In this innovation, new knowledge is generated and created by the development of new products, services, markets, and distribution channels based on existing knowledge (Duan et al. 2022). Exploratory innovations, on the other hand, are radical innovations designed to meet emerging customer needs or target new markets. These innovations offer new designs, create new markets, and develop new distribution,

thus requiring new knowledge and modifying existing knowledge in the organization (Kollmann and Stöckmann 2014). Ambidexterity of innovation refers to the development of both exploratory and exploitative innovation (Duan et al. 2022; Saleh et al. 2023; Weigel et al. 2023). Firms that develop innovation ambidexterity can constantly adapt to changes in the environment and achieve high short-term performance and long-term competitive advantage, although it can also create problems due to competition for firm resources and the problem of resource scarcity (Duan et al. 2022).

2.2 Hypotheses development and conceptual model

2.2.1 Organizational culture of agribusiness firms and innovation orientation

According to Miron et al. (2004) organizational culture is defined as the values, beliefs and hidden assumptions that members of an organization hold in common. Lee and Kim (2017) refer to organizational culture as the shared set of values and behaviors within an organization. Hofstede (2015) characterize the organizational culture as a shared cognitive system that acts as a guide for people's perceptions, thoughts, and language. These aspects form the basis for communication and mutual understanding and affect employee behavior through its two main functions: internal integration and coordination (Martins and Terblanche 2003). Since organizational culture is a characteristic of the organization as a set of hierarchical, functional or departmental sub-groups, the organization will harbor several, possibly conflicting, cultures within it. If the different subcultures collaborate, one can speak of a strong organizational culture. Otherwise, the organizational culture will be weak (Sousa et al. 2022). Thus, culture can stimulate an organization's innovative orientation as it can lead its members to accept innovation as an organizational philosophy (Hartmann 2006).

In this study, and, following the study by Lam et al. (2021) organizational culture is considered as the "internal characteristics of a company that plays a determining role in its long-term development. It represents the way in which the members of the organization interact with each other and the way in which the organization associates with its stakeholders. In this sense, company culture is conceived as a guide that directs the functioning, workflow, and customer management within an organization" (Lam et al. 2021, p. 3). In this context, organizational culture can affect innovative orientation in two ways. On the one hand, socialization teaches individuals how to behave and act towards each other. On the other hand, organizational structure and management orientation can be affected by core "values, beliefs and assumptions" (Martins and Terblanche 2003).

The literature shows a significant relationship between organizational culture and innovation (Miron et al. 2004; Büschgens et al. 2013; Chen et al. 2018; Aboramadan et al. 2020). Shayah and Zeliou's (2019) literature review study concludes, based on the studies reviewed, that organizational culture is one of the factors that can most stimulate the innovative behavior of organizational members playing an integral role in all organizations. Referring to the agri-food industry, the study by Castillo-Valero

and García-Cortijo (2021) concludes that the internal factors or characteristics of a company are those that most influence its propensity to innovate. In particular, innovative culture has the potential to exert a multiplier effect through mechanisms such as knowledge spillovers or learning by doing. Given this discussion, the following hypotheses are put forward:

H1a: Organizational culture of the agribusiness firms is positively related to their innovation exploitation.

H1b: Organizational culture of the agribusiness firms is positively related to their innovation exploration.

2.2.2 The influence of market orientation of agribusiness firms on innovation orientation

Approaches to the concept of market orientation are basically from two perspectives: cultural and behavioral or operational. Under the first approach, market orientation is seen as a form of organizational culture in which the market, customers and competitors are at the core of the firm's operations. Market orientation represents a set of values and attitudes shared throughout the organization, from which it seeks to stimulate the creation of greater value for customers (Narver and Slater 1990; Slater and Narver 1995).

Under the second approach, market orientation is the degree to which an organization applies the marketing concept in its strategic and tactical decisions. Several studies argue that market orientation is a complementary contribution to strategy and is important for strategic orientation (Kohli et al. 1993; Jaworski and Kohli 1993, 1996; Hunt and Lambe 2000; Varadarajan 2020).

Market orientation establishes the environment-organization relationship as a source of ideas, recommendations, adjustments, and benchmarks. A matter of debate is whether market orientation encourages exploration or exploitation business innovation. On the one hand, some studies conclude that market orientation limits innovation to incremental developments that derive from changes in customer preferences. It tends to avoid the risks that radical innovations might produce by not knowing how the target audience will react (Prifti and Alimehmeti 2017). On the other hand, other studies point out, in a different line, that the vision of the present and future environment and market orientation allow the development of new products with a higher degree of novelty incorporated (Jaworski and Kohli 1996). Firms that are more market-oriented, in addition to being more willing to innovate, market a greater number of innovations than their competitors and, moreover, incorporate a greater degree of novelty in these innovations (Akman and Yilmaz 2008).

In relation to the previous hypotheses (*H1a* and *H1b*), Hurley and Hult (1998) argued that market orientation is an antecedent of the firm's predisposition towards the development of new ideas and this predisposition is an aspect of the organizational culture that positively influences the ability to innovate. According to these authors, market-oriented companies are better positioned to anticipate customer needs and are therefore in a better position to respond to them with innovative products and services.

Regarding to the agri-food industry, the study by Mirzaei et al. (2016) showed that market-oriented agribusinesses in Ontario were more likely to adopt new products and services. Ho et al. (2018) also found a positive relationship between market orientation and innovation, as well as between innovation and financial performance in agricultural value chains in emerging economies (Vietnam). Kamarulzaman et al. (2023) conclude that all dimensions of market orientation had significant relationships with innovative marketing strategies. Innovative marketing strategies, in particular promotion, had the strongest influence on the performance of Malaysian agri-food manufacturers. In a different view, Johnson et al. (2009) revealed that the most successful agri-food companies focus more on the internal (cross-functional coordination and innovation) than on the external (competitive and market orientation). Based on these considerations, the following hypotheses are established.

H2a: Market orientation of the agribusiness firms is positively related to their innovation exploitation.

H2b: Market orientation of the agribusiness firms is positively related to their innovation exploration.

2.2.3 Proactive management of agribusiness firms and innovation orientation

According to Tidd and Bessant (2014), the innovation process in organizations needs to be managed in a systematic or integrated way, which would require strategic leadership and management, the creation of an innovative organization, and the creation of networks for innovation. Thus, management is not an isolated task, as it is related to parallel concepts such as the organizational structure, the organizational culture and climate that enables people to innovate, and the market orientation.

Proactive management is about anticipating problems and taking action to prevent them from occurring. A proactive management style is based on prevention and thinking in the long term, looking for ways to improve the business. Proactive management encourages innovation and adaptation (Crant 2016). The study by Talke et al. (2011) showed that the diversity of the management team and a proactive focus on customer needs has a strong positive effect on the innovative orientation of the firm through new products with higher market novelty which increase the firm's performance. In this vein, Chen et al. (2012) found that proactive management is determinant for innovation, and the main driver of proactiveness are internal resources (e.g., organizational culture of firm's capabilities) rather external forces (e.g. regulations or stakeholder influence). The study by Safari and Raza (2015) concluded that knowledge-oriented leadership influences knowledge creation and application and innovation performance. In the agro-industrial sector, Ureña-Espallat et al. (2022) found that knowledge and innovation management can play a key role in fostering and managing creativity in the agro-industrial sector. We establish the following hypotheses.

H3a: The existence of a proactive management in agribusiness firms is positively related to their innovation exploitation.

H3b: The existence of a proactive management in agribusiness firms is positively related to their innovation exploration.

2.2.4 The organic organizational structure of agribusiness firms and innovation orientation

The structure of an organization can be defined as the permanent distribution of job functions and administrative mechanisms that enable an organization to direct, coordinate and control its business activities and the flow of resources (Miller 1987). Organizational structure affects the management choices and market opportunities of the firm.

In this research, we consider the organic organizational structure. In contrast to a formal structure, characterized by the existence of a hierarchy, specialization of work and centralized decision-making, in the organic structure there is a combination of formal and informal variables (Burns and Stalkers 1961). Informal variables consist of a set of decisions that have not been consciously defined in advance and that respond to the relationships between the individuals who meet each other at work. Both types of relationships develop together and are not always clearly distinguishable. Inside an organic organizational structure, there is a "more flexible" structure: the hierarchy consists of fewer levels, barriers between departments disappear and decision-making is usually more decentralized (Burns and Stalker 1961; Aiken and Hage 1971; Martínez-León and Martínez-García 2011; Gimenes et al. 2017).

The structure of an organization is an essential factor in the role of innovation that serves to benefit or impede it (Savvides 1979). An organizational structure in which people feel motivated and valued and with which work is organized in a way that enhances human capital has a positive effect on innovative performance through the recognition and support employees receive from management (Aiken and Hage 1971; Kalay and Lynn 2016). Most studies conclude that decentralized and not strictly formalized organizational structures are more conducive to innovative performance (Jansen et al. 2006; Menguc and Auh 2010; Cabello-Medina et al. 2011; Kalay and Lynn 2016). Cabello-Medina et al. (2011) stated the idea that organizations with organic structures are more innovative than those with mechanistic ones. Menguc and Auh (2010) found that the effect of radical product innovativeness on new product performance is positive under an informal structure. Kalay and Lynn (2016) concluded that centralization has a significant negative impact on management innovation. Based on these considerations, the following research hypotheses have been put forward.

H4a: The existence of an organic organizational structure in agribusiness firms is positively related to their innovation exploitation.

H4b: The existence of an organic organizational structure in agribusiness firms is positively related to their innovation exploration.

2.2.5 The organizational climate of agribusiness firms and innovation orientation

According to Ekvall (1996) organizational climate is conceived as an attribute of the organization, consisting of behaviors, attitudes, and feelings, which are characteristics of life in the organization. Organizational climate expresses the workplace and its environment, as well as the factors surrounding it. It can

be defined as the set of distinctive features of the internal work environment in which employees perform their functions and jobs (Lafta et al. 2016).

Organizational climate can be seen as a situation in which there is cooperation between employees which contributes to knowledge sharing and contributes to the generation of ideas (Xu et al. 2022). The fact that employees feel supported by the organization in a way that is actively promoted, actively participate in the creation of ideas and stimulates innovation (Johannessen and Olsen 2011). A climate conducive to innovation fosters innovation at the organization level (Jung et al. 2008). Climate affects the results of an organization's operations, as it "influences organizational processes such as problem solving, decision making, communications, coordination, control, and the psychological processes of learning, creativity, motivation and commitment" (Ekvall 1996, p. 10). Successfully developing a new product, service or production process involves complex and dynamic changes and therefore requires an organizational climate that fosters innovation. The study by Acosta-Prado (2020) found a positive relationship between organizational climate and innovativeness (organizational ambidexterity, exploration and exploitation) in Colombian new-technology based firms. Related to proactive management, Malabari and Bajaba's (2022) study found that entrepreneurial leadership significantly influences employees' innovative behavior through their innovation climate and intellectual agility. The following hypotheses are set out.

H5a: A positive organizational climate in agribusiness firms is positively related to their innovation exploitation.

H5b: A positive organizational climate in agribusiness firms is positively related to their innovation exploration.

Based on these hypotheses, Fig. 1 shows the proposed conceptual model.

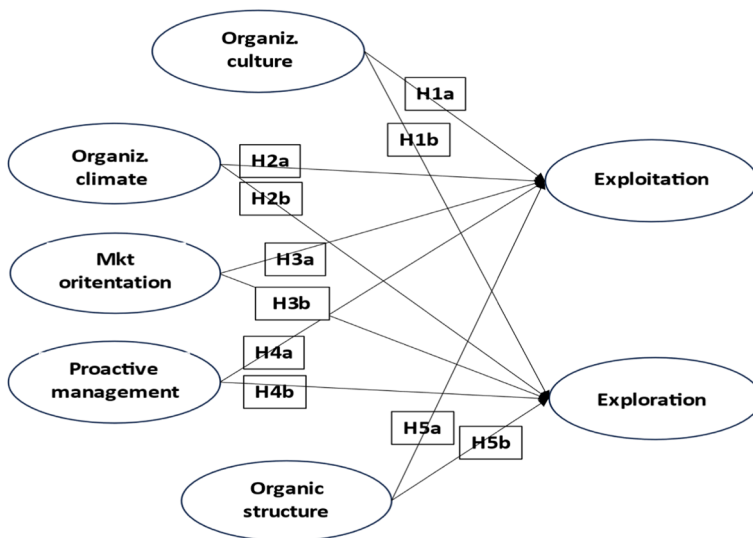


Fig. 1 The conceptual model

In this research we posit that achieving innovation ambidexterity is challenging because it requires balancing the trade-offs and synergies between different types of innovation that may have conflicting demands and goals. Therefore, it is important to understand the factors that enable or constrain innovation ambidexterity in different organizational contexts (Duan et al. 2022). According to RBV and organizational innovation theory, there is no single best way to achieve innovation ambidexterity. Rather, multiple paths exist that depend on the interaction of various organizational dimensions, such as market orientation, organizational structure, organizational culture, organizational climate, and proactive management. To better understand these complex relationships, we draw on configurational theory, which provides a more contextual understanding of how causal conditions can combine to produce a given effect. Unlike traditional methods that focus on the net effects of causal variables, configurational theory allows researchers to analyze the multiple possible ways in which causal conditions can interact to produce a given outcome (Iannacci and Kraus 2022). Based on these assumptions, we can formulate the following hypothesis:

H6: Different configurations of organizational dimensions may lead to innovation ambidexterity.

3 Methodology

The study uses data collected from agribusiness firms in Spain to test the proposed research hypotheses. The population was self-elaborated and obtained through by crossing and analyzing different databases (National Institute of Statistics, Extremaduran Agri-food Cooperatives, and Iberian Balance Analysis System) using the Extremaduran companies of the National Classification of Economic Activities (CNAE-2009), codes 10 (agri-food industry), 11 (beverages), and 12 (tobacco), as a search base. This total population was the one we sent the questionnaire to, and they answered both by the Google Docs form and by telephone. The data was collected through an ad hoc questionnaire sent to agrifood innovative companies in the region. Data collection occurred between September and October 2021. The participation of the companies was voluntary. Of the 283 innovative agribusinesses in Extremadura that were contacted, a final sample of 151 completed questionnaires from innovative agri-food companies was obtained. It is assumed that the sample is adequate (confidence level 95% and margin of error 5.5%) calculated following Krejcie and Morgan (1970) formula for the objectives of this study. We also tested the Harman's single factor to detect common method bias. We followed the recommendations of Podsakoff and Organ (1986) and estimated the variance of a single factor which was 39.32%, below the limit of 50%, revealing no common method bias in our dataset.

The sample characterization is as follows. Firstly, in relation to the informant, the majority was company managers/owners, followed by department heads (Finance, Quality, R&D, Operations, Sales) and administrators. The educational level of the informants is mostly secondary education, followed by higher education. The predominant age of the informants is in the range of 31 to 55 years. Secondly, regarding the characteristics of the companies, in terms of size, they are mainly micro

enterprises (less than 10 employees that represent 47.3% of the total), followed by small (10–49 employees, 34.7%), medium-sized enterprises (50–199 employees, 15.3%) and large enterprises (more than 200 employees, 2.7%). In terms of legal form, they are mostly limited companies (60.7% of the total), followed by cooperatives (24%), public limited companies (13.3%) and other legal forms (2%).

The questionnaire was developed following a three-step approach. First, based on the literature review an initial version of the questionnaire was developed by adapting existing scales as described below. Second, the measures of each construct discussed within a panel of academic experts with knowledge innovation and management. Third, a revised version of the questionnaire was subject to a pilot tested with five business owners to validate the wording and eliminate ambiguities and errors (Corchuelo et al. 2020).

The measures were adapted from existing research. As such, the measure for innovation exploitation and exploration was taken from Jansen et al. (1996) and Bernal et al. (2019), consisting of three items each one. The market orientation (11 items) was adapted from Narver and Slater (1990). The measurement of organizational climate (nine items), organic structure (four items), organizational culture (eight items), and proactive management (eight items) was adapted from Hage and Aiken (1967), Martins and Terblanche (2003), Ekvall (1996) and Safari and Raza (2015), respectively. The respondents were asked to identify their degree of agreement in a Likert-type scale, ranging from 1 (equals to totally disagree) to 7 (equals totally agree) (“Appendix 1”). To ensure normality of our data, we verified that the skewness and kurtosis values were within ± 1 and ± 2 respectively; all the measures met this criterion, indicating a normal distribution.

First, partial least squares structural equation modelling (PLS-SEM) was applied to evaluate the conceptual model (Ringle et al. 2015). Based on the hypotheses set out in the previous section, Fig. 2 shows the proposed structural model. The items used to measure the constructs are listed in “Appendix 1”.

Second, to obtain additional information on the influence of independent variables on innovation exploration and exploitation, we conducted a configurational analysis using fuzzy set qualitative comparative analysis (fsQCA). This technique is based on a statistically-informed configurational approach to draw predictive conclusions (Kraus et al. 2018; Kumar et al. 2022). It is grounded on set theory and allows for a detailed investigation of causal complexity (Misangyi et al. 2017). The basic assumptions of this procedure are: (i) conjunctural causation: the effect of a single condition unfolds in combination with other conditions; (ii) equifinality, which means that different configurations of conditions may lead to the same outcome; (ii) casual asymmetry, which means that the condition leading to a positive outcome, are not necessarily the opposite of its negation (Iannacci and Kraus 2022).

4 Results

Using the SmartPLS 3 software (Ragin and Davey 2016), partial least squares structural equation modelling (PLS-SEM) was applied to evaluate the conceptual model (Ringle and Sarstedt 2017; Ringle et al. 2015). Multiple experiments were run to

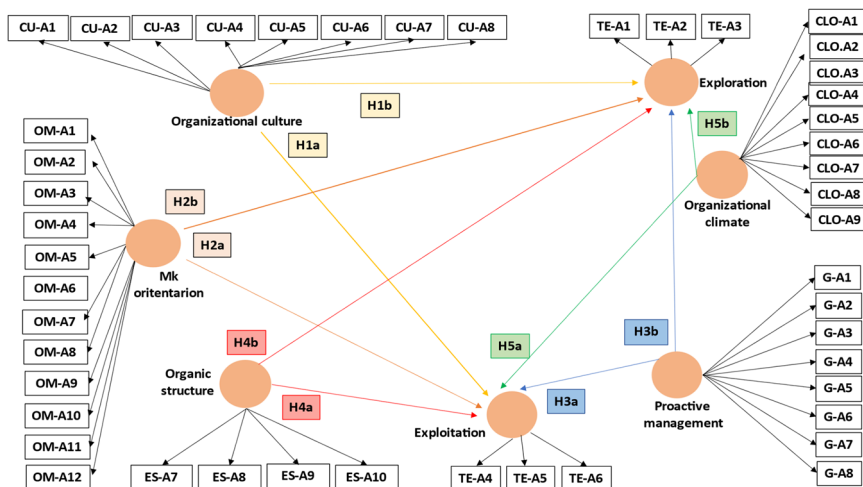


Fig. 2 The structural model

gauge the measurement model's validity and reliability. More particularly, we examined the reliability, convergent validity, internal consistency reliability, and discriminant validity in accordance with Hair et al. (2017). The results demonstrate that all items' standardized factor loadings were significant ($p < 0.001$) and more than 0.6 (varying from 0.701 to 0.905), supporting the reliability of each individual indicator, according to Table 1. Internal consistency reliability was supported by Cronbach alphas and composite reliability (CR) values that were higher than 0.7 (Hair et al. 2017).

Additionally, we investigated for convergent validity, which was shown to be true given that all constructions' components loaded significantly and positively. Convergent validity was further supported by the constructs' CR values exceeding 0.70 and the average extracted variance (AVE) exceeding the 0.50 threshold (Bagozzi and Yi

Table 1 Composite reliability, average variance extracted, correlations, and discriminant validity checks

Latent Variables	α	CR	AVE	1	2	3	4	5	6	7
(1) Culture	0.943	0.949	0.717	0.847	0.635	0.605	0.665	0.670	0.798	0.679
(2) Exploitation	0.758	0.781	0.671	0.562	0.819	0.762	0.650	0.560	0.745	0.626
(3) Exploration	0.816	0.868	0.725	0.560	0.773	0.852	0.691	0.527	0.611	0.567
(4) Mkt orientation	0.924	0.928	0.593	0.631	0.564	0.633	0.770	0.652	0.680	0.700
(5) Proact Management	0.916	0.927	0.631	0.637	0.499	0.498	0.613	0.795	0.748	0.711
(6) Organic Structure	0.844	0.850	0.680	0.717	0.610	0.541	0.602	0.662	0.825	0.789
(7) Org Climate	0.921	0.938	0.647	0.641	0.551	0.525	0.652	0.667	0.689	0.804

α , Cronbach Alpha; CR, Composite reliability; AVE, Average variance extracted. Bolded numbers are the square roots of AVE. Below the diagonal elements are the correlations between the constructs. Above the diagonal elements are the HTMT ratios

Table 2 Values for R square and Q square

	R Square	R square adjusted	Q square
Exploitation	0.447	0.425	0.375
Exploration	0.456	0.435	0.392

Table 3 Structural model assessment

Path	Path coefficient	Standard errors	<i>t</i> statistics	<i>p</i> values
Organiz Culture → Exploitation	0.129	0.156	0.902	0.367
Organiz Culture → Exploration	0.165	0.189	1.365	0.172
Mkt orientation → Exploitation	0.225	0.226	2.198	0.028
Mkt orientation → Exploration	0.402	0.400	3.852	0.000
Proact Management → Exploitation	0.005	−0.002	0.052	0.959
Proact Management → Exploration	0.030	0.024	0.274	0.784
Organic structure → Exploitation	0.304	0.285	2.732	0.006
Organic structure → Exploration	0.126	0.109	1.087	0.277
Organiz climate → Exploitation	0.108	0.108	0.979	0.328
Organiz climate → Exploration	0.050	0.051	0.422	0.673

1988). The Fornell and Larcker (1981) criteria, which is illustrated in the diagonal of Table 1 and states that each construct's square root of AVE should be greater than its largest correlation with any other construct, was used to assess the discriminant validity. Additionally, we determined the heterotrait-monotrait ratio (HTMT) need (Henseler et al. 2015). Table 1's findings demonstrate the discriminant validity of the HTMT ratios as being below 0.85 (Hair et al. 2017; Henseler et al. 2015).

Before assessing the quality of the research model, we first confirmed the collinearity as suggested by Hair et al. (2017). As such, we estimated the variance inflation factor (VIF) values that ranged from 2.111 and 2.693, values pointing to no collinearity since are below the limit of 5 (Hair et al. 2017). We also tested for the coefficient of the determination (R^2) and Q^2 for additional confirmation of the model quality. Accordingly, the results for the two endogenous variables reported a R^2 surpassing the threshold of 10% (Falk and Miller 1992), and positive Q^2 values, as shown in Table 2.

We used 5000 subsamples in a bootstrapping approach to assess the significance of the parameter estimations to test the hypothesis (Hair et al. 2017). The results presented in Table 3 show that organizational culture and organizational climate do not influence both types of innovation (for organizational culture $\beta=0.129$, *n.s.*; 0.165, *n.s.*; and for organizational climate 0.108, *n.s.*; 0.050, *n.s.* respectively for exploitation and exploration). As such, *H1a,b* and *H5a,b* are not supported. Market orientation positively influences innovation exploitation and exploration ($\beta=0.225$, $p<0.05$; and $\beta=0.402$, $p<0.001$, respectively), thus *H2a,b* are supported. This result provide support for *H1a* and *H1b*, respectively. Regarding, the influence of a proactive management on both types of innovation was not significant ($\beta=0.005$, *n.s.*; and $\beta=0.030$, *n.s.*), providing no support for *H3a* and *H3b*. The existence of

an organizational organic structure was also found to have a significant and positive relationship with innovation exploitation, however such relationship with exploration was not supported ($\beta=0.304$, $p<0.01$; and $\beta=0.126$, n.s.) which supports *H4a* but not *H4b* respectively.

To gain additional insights about the influence of the independent variables on innovation exploration and exploitation, we performed a configurational analysis by means of fuzzy set qualitative comparative analysis (fsQCA). As such, in this study, we assumed that proactive management, culture, organic structure, organizational climate and market orientation could be combined in multiple ways to achieve an innovation exploration and exploitation.

The first procedure consisted of analyzing the necessary conditions, meaning that the consistency of each construct must be equal to or greater than 0.9 (Ragin 2014). The consistency values ranged from 0.73 to 0.79, meaning that none of the five conditions nor their negation were a necessary condition for innovation exploration and innovation exploitation nor for their negation.

The second procedure focused on the analysis of sufficiency of the causal conditions. We followed the recommendations of Rihoux and Ragin (2009) and Fiss (2011) to verify this parameter for all the independent constructs. This analysis was performed using three steps. First, the truth table was elaborated considering all logical combinations of the five conditions. Second, the reduction of the truth table was conducted considering a minimum frequency of three cases, and a lowest acceptable frequency of 0.8 (Ragin 2014). Third, the proportional reduction in inconsistency (PRI) was also taken into consideration by eliminating the configurations that had this indicator inferior to 0.7.

After testing the quality of the results, the simplified configurations were extracted using Boolean minimization and Quine–McCluskey algorithm (Ragin 2014). The results of the intermediate solution are shown in Table 4 for

Table 4 Configurations for high and low innovation exploration

Configuration	High exploration			Low exploration		
	C1 _{expl}	C2 _{expl}	C3 _{expl}	C4 _{expl}	C5 _{expl}	C6 _{expl}
Proact Management	⊗	•				⊗
Organ. Culture		•	•			⊗
Organic structure	⊗	•	•	⊗	•	
Organ. climate	⊗		●	⊗	•	
Mk Orientation	●	●	●	⊗	⊗	⊗
Consistency	0.80	0.84	0.85	0.80	0.84	0.85
Raw coverage	0.33	0.40	0.61	0.33	0.40	0.61
Unique coverage	0.13	0.26	0.12	0.13	0.26	0.12
Overall solution consistency	0.81			0.80		
Overall solution coverage	0.77			0.80		

Notes: Large circles indicate core conditions and small circles peripheral conditions. Black circles (“●”) indicate the “presence” of a condition, and circles with a cross-out (“⊗”) indicate its “negation”. Blank spaces in the configurations indicate “do not care”

innovation exploration and in Table 5 for innovation exploitation. The consistency values for all combinations and for the overall solution were superior to 0.8 (Ragin 2014). As such, all configurations could be considered sufficient for innovation exploration and for innovation exploitation.

Considering the results of Table 4, hypothesis 6 is supported. In fact, three configurations competed to high innovation exploration and three to low innovation exploration. Market orientation was not only considered a core condition, but it was also present in the three configurations related to high innovation exploration. The first configuration (C1_{expl}) considered that firms with high market orientation but with low proactive management, low organic structure (formal structure) and low organizational climate are capable of high innovation exploration.

As mentioned, fsQCA considers an asymmetric approach. As such, we also analyzed the configurations leading to low innovation exploration. The first combination (C4_{expl}) considered low market orientation combined with low organic structure and low organizational climate. The fifth combination (C5_{expl}) incorporates high proactive management and culture and low organizational climate and market orientation. Finally, C6_{expl} combines low proactive management, culture, and market orientation.

Similar number of combinations can be found in Table 5 in relation to innovation exploitation. Similarly, market orientation is core condition and common to two of the configurations leading to high innovation exploitation.

The first configuration C1_{expt} considers that high innovation exploitation is the result of the combination of high organizational climate with low culture and market orientation. C2_{expt} combines high market orientation and low organic structure and organizational climate. The third configuration (C3_{expt}) integrates high market orientation, proactive management, and culture. For low innovation exploitation three configurations were identified. The fourth and sixth

Table 5 Configurations for high and low innovation exploitation

Configuration	High Exploitation			Low Exploitation		
	C1 _{expt}	C2 _{expt}	C3 _{expt}	C4 _{expt}	C5 _{expt}	C6 _{expt}
Proact Management			•		•	⊗
Culture	⊗		•		•	⊗
Organic structure		⊗		⊗		
Organiz climate	•	⊗		⊗	⊗	
Mk Orientation	⊗	●	●	⊗	⊗	⊗
Consistency	0.83	0.84	0.89	0.85	0.83	0.89
Raw coverage	0.37	0.59	0.34	0.35	0.31	0.65
Unique coverage	0.17	0.15	0.13	0.13	0.16	0.12
Overall solution consistency	0.82			0.80		
Overall solution coverage	0.83			0.82		

Notes: Large circles indicate core conditions and small circles peripheral conditions. Black circles (“●”) indicate the “presence” of a condition, and circles with a cross-out (“⊗”) indicate its “negation”. Blank spaces in the configurations indicate “do not care”

configurations are equal to the one identified in innovation exploration. The fifth configuration (C5_{expl}) corresponds to low proactive management, culture, and market orientation.

5 Discussion and implications

5.1 The importance of market orientation for the agribusiness

Both the results obtained in the structural model and through fsQCA highlight the role of market orientation in both exploratory and exploitative innovation. The market orientation proves to be a predictor of both innovation orientations, and the structural model revealed that it constituted the single factor for exploitation and, in combination with a more organic structure, fostered innovation. The fsQCA results also show the importance of market orientation, with almost all combinations incorporating high innovation in both orientations. A low level of market orientation is an integral part of all combinations associated with low innovation of agri-food firms, in both orientations. This result supports the findings of previous studies that showed the influence of market orientation on both exploitative (Akman and Yilmaz 2008; Prifti and Alimehmeti 2017) and explorative innovation (Jaworski and Kohli 1996). Moreover, this result is also in line with other studies applied to the agri-food industry (Mirzaei et al. 2016; Ho et al. 2018; Kamarulzaman et al. 2023) that also showed the existence of a positive relationship between market orientation and innovation. In addition, and in line with the study by Hurley and Hult (1998) who considered that market orientation is an antecedent of the firm's predisposition towards the development of new ideas, this predisposition constitutes an aspect of the organizational culture that positively influences the capacity to innovate.

In the first combination of exploration and in the second of exploitation, market orientation emerges as the only factor. This fact reveals that, for a given group of agri-food companies, it is sufficient to develop market orientation capabilities to generate ambidextrous innovation, and the type of company structure and management is irrelevant. This finding is an important contribution of this study, given that previous studies had not detected this unique effect of market orientation.

5.2 Do organizational factors really influence innovation in agri-food firms?

With respect to the remaining organizational and management factors, the fsQCA results allow for a more refined analysis when compared to the structural model. While the structural model only indicates the organic structure as a predictor of innovation exploration, the configurational analysis reveals that there are combinations that integrate some of those factors. Thus, the second innovation exploration configuration encompasses proactive management, organizational culture and organic structure, excluding only organizational climate. The third combination integrates this last factor but excludes proactive management. Concerning to the agri-food industry, these findings extend existing knowledge by specifying which

factors are effectively contributing to both types of innovation orientation. Previous research in this industry revealed that the internal factors or characteristics of a company are those that most influence its propensity to innovate (Lam et al. 2021; Castillo-Valero and García-Cortijo 2021). In particular, they found that innovative culture is particularly important for innovation. The study by Chen et al. (2018) concluded that the fit of organizations with exploratory and exploitative innovation strategy and organizational culture, improve and accelerate innovation quality. Our study confirms these results and specifies that culture should be associated with an organic structure to promote innovation exploration and with proactive management to generate innovation exploitation.

In the structural model, the organic organizational structure only influences innovation exploitation, but not innovation exploration. The fsQCA results provides different findings since organic structures are part of two configurations leading to high innovation exploration and does not integrate in any of the configurations for high exploitation. Previous research revealed this inconsistency regarding the role of the organizational structure in innovation generation (c.f. Savvides 1979). Studies by Jansen et al. (2006), Menguc and Auh (2010), Cabello-Medina et al. (2011) and Kalay and Lynn (2016) conclude that an organic structure in organizations favors innovation and innovative performance. However, Kalay and Lynn (2016) showed otherwise by concluding the negative effect of organic structure in radical innovation. As such, our study clarifies that an organic structure is not sufficient for both types of innovation orientation and needs to be combined with other organizational elements to generate innovation.

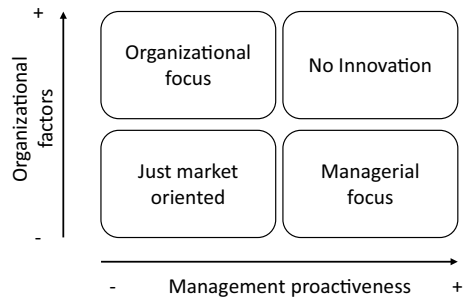
6 Conclusion

6.1 Theoretical contributions

This study makes several theoretical contributions. First, this study examines the separate effect of various organizational factors on innovation exploration and innovation exploitation. By doing so, it is possible to see that organizational antecedents do not influence both types of innovation equally, contributing to the organizational innovation theory. Second, this study highlights the unique effect of market orientation, not to say ubiquitous, as the main determinant in the generation of both types of innovation in agribusiness firms. Third, that some factors are less relevant such as organizational climate or proactive management. Fourth, this study shows that different combinations of organizational resources contribute to the same outcome, in this case innovation exploration and exploitation. The last two contributions are significant additions to the RBV theory. Fifth, the methodological use of the configurational theory explains how causally relevant conditions combine into configurations associated with the outcome of interest. Figure 3 provides a diagram that illustrates and details these contributions.

This study also shows that the business environment in this sector is far from homogeneous with respect to the innovation generated. That is, different groups have different combinations of factors leading to innovation. As such, Fig. 3 depicts

Fig. 3 Groups of innovation exploration-oriented agribusiness firms



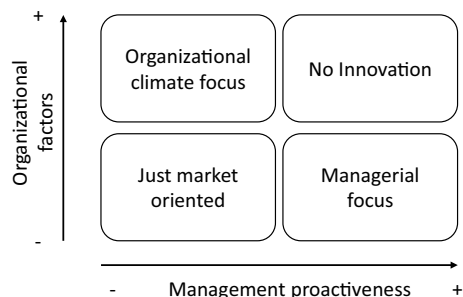
the three groups of firms oriented to innovation exploration. On the left bottom are the firms fully committed to market orientation as a source of innovation. Above are the firms focused on organizational factors such as culture, structure and climate, showing less concern about managerial proactiveness. The bottom right group is composed of firms combining market orientation with proactive management. Finally, on the upper left, a group that combines all the elements, but no innovation is expected.

In the same perspective, Fig. 4 presents the groups of firms associated with innovation exploitation. Similar to the previous one, a group just market oriented can be identified, as well as the group focused on management proactiveness. The main difference is related to the organizational focused group, which, in this case, is just based on organizational climate development. As in innovation exploration figure, the group combining all the factors is associated with no innovation.

6.2 Practical implications

The knowledge about the various configurations leading to exploration and exploitation innovation allows a more accurate definition of the competencies to be developed by agribusiness companies, helping to identify areas of improvement for firm management and for policymaking. The importance of market orientation was clearly seen in this study, pointing the way to managers in the close monitoring of competitors and customers, as well as alerting to the need to improve organizational

Fig. 4 Groups of innovation exploitation-oriented agribusiness firms



processes towards a better ability to respond to changes in the environment. Policy makers are responsible for the development of market orientation competencies, which can be accomplished through training, identification and dissemination of best practices, and the implementation of consulting programs that support the transition of companies to an effective market orientation. For agribusiness firms' management some important processes can be implemented, such as (i) closely monitor competitors and customers through market research, surveys, and customer feedback; (ii) improve organizational processes to better respond to changes in the environment by becoming more agile and adaptable, and investing in new technologies; (iii) develop market orientation capabilities through training, identifying and disseminating best practices, and providing consulting support.

On the organizational side, it was found that some factors such as organizational structure or culture may also play an important role, being essential areas to focus on by the companies' management. These are complex and long-term processes, and it is therefore important that policy makers can support companies in defining lighter structures, as these companies are often traditional and with long years of activity. Thus, the provision of skills that allow companies to lighten their structure can be achieved through incentive programs for operational efficiency. Agribusiness firms' managers must (i) define lighter structures by simplifying hierarchies, reducing bureaucracy, and empowering employees; (ii) provide skills that allow companies to lighten their structure, specially by developing incentive programs for operational efficiency.

Here are some additional recommendations; (iii) foster a culture of innovation by encouraging employees to come up with new ideas, and by providing them with the resources and support they need to implement those ideas; (iv) collaborate with other organizations such as universities, research institutes, and other businesses to access new knowledge and resources, and to develop new products and processes.

Our study has social implications because innovation is essential for achieving sustainability goals and ambitions of international agreements (e.g., the European Green Deal), and developing lighter structures and fostering a culture of innovation creates a framework for understanding innovation holistically and systemically, and for engaging different stakeholders in the innovation process. This can help ensure that innovation serves a collective social purpose, rather than generating private returns and externalizing social and environmental costs. Additionally, since most agribusiness firms are located in less populated and developed areas, local communities can benefit from more innovative and competitive firms.

6.3 Limitations and future research

This study has some limitations. First, although the sample is considerable, a larger sample would allow for an even more detailed analysis. For example, it would be interesting to analyze the data according to the size of the firms or their position in the agri-business value chain.

Second, in this study we focus on studying some organizational and managerial dimensions of firms, following an organizational theory perspective.

However, realizing that there are several configurations leading to innovation, alluding to organizational idiosyncrasy, this study suggests that this phenomenon can be studied in the light of resource-based theory, exploring the resources and capabilities that best explain both forms of innovation orientation.

Finally, this study is limited to the agri-food industry and to a specific region. Although the agri-food industry shares similarities with other natural resource industries, it is clearly different from other manufacturing industries. Therefore, the results presented here are considered industry-specific. In this sense, we identify the need for further and broader research. Future lines of research are proposed to replicate this study to generalize the results to Spanish agri-food companies, extending them also to other manufacturing industries and service sector companies.

Appendix 1: Measures

Innovation exploration

TE_A1	The company is constantly seeking to introduce new products and processes that will allow it to differentiate and access new markets
TE_A2	The company is a pioneer in the design of lower cost products
TE_A3	The company is a pioneer in the design of unique products that increase in value to the customer

Innovation exploitation

TE_A4	The company engages in creative imitation for the development of its products
TE_A5	Sustainable competitive advantages are sought, supported by technological developments
TE_A6	The company targets a specific market segment

Organizational culture

CU_A1	There is a constant demand for information about the integration of new technologies
CU_A2	The company is open and receptive to change
CU_A3	New ideas can come from anywhere in the company
CU_A4	In general, individual autonomy is encouraged
CU_A5	Experimentation and innovation is encouraged in order to improve work processes
CU_A6	Learning and flexibility in the innovation process are valued
CU_A7	Failure is understood as a natural part of the innovation process
CU_A8	Both innovation and risk-taking are valued positively in the company

Market orientation

OM_A1	The company's objectives are basically oriented towards customer orientation
OM_A2	The strategy for achieving competitive advantage is oriented towards understanding customer needs
OM_A3	Customer satisfaction is measured frequently and systematically
OM_A4	The company targets those customer segments where there is an opportunity for competitive advantage
OM_A5	The company communicates information on successes and failures in customer experiences
OM_A6	Customers are invited or involved in new product development
OM_A7	Sales staff regularly discuss customer needs with other departments
OM_A8	Customer suggestions are regularly communicated to all departments
OM_A9	Frequent meetings are held between departments to discuss market trends
OM_A10	Information on competitors' strategies is regularly shared
OM_A11	Competitive actions that threaten the company are promptly addressed
Organic structure	
ES_A7	Teamwork is important for efficient and innovative performance
ES_A8	Teams are always self-managed
ES_A9	The company is very flexible and can quickly change procedures to meet new conditions and solve problems that may arise
ES_A10	Communication in the company is free and open
Proactive management	
G_A1	Innovation processes are managed through an orderly set of rules and procedures
G_A2	Management oversees the development of the idea and its implementation
G_A3	Sharing of knowledge is a measure of employee performance
G_A4	Inter-area meetings are held
G_A5	Management has created an environment of accountability and teamwork
G_A6	Management assumes the role of knowledge leaders, characterized by openness, tolerance of mistakes and mediation for the achievement of company objectives
G_A7	Management promotes learning and tolerates mistakes
G_A8	Internal, external and inter-institutional collaboration is well managed
Organizational climate	
CLO_A1	Employees have a high sense of belonging and commitment to the company
CLO_A2	Employees are independent in carrying out their daily tasks
CLO_A3	The company provides time and resources for employees to generate, share or exchange innovative ideas
CLO_A4	Employees frequently encounter non-routine and challenging work that stimulates creativity
CLO_A5	Employees are recognized and rewarded for their creativity and innovative ideas
CLO_A6	New and original ideas are considered by those in charge of the company
CLO_A7	There is good collaboration during the processes of developing innovative activity
CLO_A8	There is a good relationship between employees and managers

CLO_A9 There is flexibility at work

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Data availability Data will be made available on request.

Declarations

Conflict of interest The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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