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Exploring the Importance of Innovation Ambidexterity on Performance: Insights from NCA and IPMA analysis

Abstract

Purpose – Agribusiness shows a growing degree of competitiveness and innovation. However, the organizational mechanisms that compete for innovation and organizational performance are not sufficiently studied. Thus, this study aims to analyze the influence of market orientation and organizational structure on innovation generated and its influence on market and financial performance in agribusiness firms in Extremadura (Spain).

Design/methodology/approach – A conceptual model was designed and tested. Data were collected from a questionnaire sent to innovative agri-food companies. The analysis of the model methodologically combines Partial Least Square Structural Equation Modelling (PLS-SEM), Necessary Condition Analysis (NCA), and Importance-Performance Map Analysis (IPMA).

Findings –The main results reveal that low levels of innovation ambidexterity impact significantly performance but when compared to exploitative innovation, explorative innovation shows a stronger influence on the market and financial performance.

Originality/value – The originality of this research lies in the novelty of the proposed mediators, as well as the sector under study. The study expands the knowledge of the influence that market orientation and organizational structure have on the types of innovation (exploitative/explorative).

Practical implications –The results are intended to be useful to managers to improve their innovative performance by incorporating new strategies in the market orientation and organizational structure.

Keywords Explorative innovation; exploitative innovation; market performance; financial performance; agri-food industry

Paper type Research paper

1. Introduction

Today, organizations must operate in an increasingly volatile and complex environment that changes rapidly and makes uncertainty a real and constant threat. In response, adapting to market changes, demands and requirements is one of the biggest challenges facing businesses today. This implies that organizations must implement improvements in their internal and external business strategies, through the incorporation of innovations, to ensure competitiveness, regardless of their sector of economic activity (Reiter-Palmon and Royston, 2017; Kasraoui *et al.*, 2024). Innovation is conceived as a way of avoiding obsolescence, responding to changing market expectations, and as a source of competitive advantage.

A growing body of research on the factors that influence innovation ambidexterity has mostly focused on large firms (Chang *et al.*, 2011; Chang and Hughes, 2012). This research has identified several factors that can affect ambidexterity, including organizational structure (Salehi *et al.*, 2018; Shafique *et al.*, 2022), dynamic capabilities (Borahima *et al.*, 2021; Farzaneh *et al.*, 2022), culture and leadership (Lin and McDonough III, 2011; Salehi *et al.*, 2018; Shafeeq *et al.*, 2023), and resources (Salehi *et al.*, 2018; Cabrilo and Dahms, 2020). However, most of this research has assumed that exploitative and explorative activities are completely incompatible (Shafique *et al.*, 2022). This study addresses the challenge posed by Pinheiro *et al.* (2020, 2022)

to explore the separate relationships between innovation competencies (exploitative and exploratory). The organizational mechanisms that compete for innovation and business performance are not sufficiently studied, and less focused on the agri-food industry (Ogidi, 2014; Camanzi et al., 2018). On the other hand, market orientation has been mentioned in qualitative studies (i.e., van Duren *et al.*, 2003) in the agribusiness field, but not many studies have directly tested hypothesized relationships quantitatively (Johnson *et al.*, 2009; Ho *et al.*, 2018; Kamarulzaman *et al.*, 2023). Previous research has shown that the influence of organizational dimensions such as organizational structure on innovation is not fully understood (Chang *et al.*, 2011), nor is the mediating effect of innovation ambidexterity on organizational outcomes (Chang and Hughes, 2012). We argue that further research is needed to explore the mediating role of innovation ambidexterity and its impact on different organizational outcomes in greater depth. In this sense, we consider that our results will contribute to addressing a research gap related to the influence of these variables (market orientation and organizational structure) and the mediating role of innovation ambidexterity in firms' performance in a specific sector as agribusiness.

The aims of this study are (i) to analyze the mediating role of innovation ambidexterity on innovative agro-industrial firms' performance, and (ii) to obtain in-depth insights about the impact of both innovation competencies (exploration and exploitation) on the market and financial performance.

The originality of this research lies mainly in the novelty of the proposed mediators, as well as in the sector under study. Research on the aspects that mediate innovative performance is usually focused on technology-based companies and those related to the service sector. Few studies refer to the food production sector, which has a significant weight in the world economy, especially in the region of Extremadura (Spain), where this research is framed. In this respect, our contribution to the literature is threefold. First, it expands the knowledge of the influence that market orientation and organizational structure have on the types of innovation (explorative/exploitative). Second, it looks at the mediating role of exploitative and explorative innovation between market orientation and market and financial performance. To our knowledge, there are no previous attempts, either theoretical or empirical, to analyze this aspect in a specific industry such as agribusiness. Finally, we study the influence that types of innovation have on the innovative performance (market and financial) of agri-food firms.

To achieve the objective, a conceptual model was designed and tested. The analysis of the model methodologically combines a Partial Least Square-Structural Equation Modelling (PLS-SEM) procedure with Necessary Condition Analysis (NCA) and Importance-Performance Map Analysis (IPMA). Findings show that the firms' market orientation and the existence of a formal organizational structure represent important elements in developing an explorative innovation orientation. The results from NCA reveal low levels of innovation ambidexterity as a strong influence on market and financial outcomes. However, when compared to exploitative innovation, explorative innovation shows a stronger influence on the market and financial performance of agribusiness firms.

The results are intended to be useful, on the one hand, for managers and executives of agri-food industries in Extremadura, providing useful information to improve their innovative performance through the incorporation of new strategies in the market orientation and organizational structure of the companies. In addition, the results are also intended to be useful for agro-industrial companies in other regions and countries.

2. Literature review and conceptual framework

2.1. Market orientation

Market orientation is primarily approached through cultural and behavioral perspectives. In the cultural view, it is perceived as an organizational culture where the market, customers, and competitors form the core of operations (Narver and Slater, 1990). Narver and Slater (1990) emphasized customer focus, competitor understanding, and inter-functional coordination for

superior customer value. This implies that market orientation embodies shared values and attitudes fostering enhanced customer value creation throughout the organization (Slater and Narver, 1995; Asikhia, 2011; Na *et al.*, 2019).

From the behavioral or operational perspective, market orientation is gauged by how an organization applies marketing concepts in strategic and tactical decisions (Kohli and Jaworski, 1990; Kohli *et al.*, 1993; Jaworski and Kohli, 1993, 1996). Some studies view it as a strategic notion, a complementary contribution to strategy, and integral to strategic orientation (Hunt and Lambe, 2000).

2.2. Organizational structure

The structure of an organization is defined by Miller (1987) as the permanent distribution of work roles and administrative mechanisms that enable an organization to conduct, coordinate, and control its business activities and the flow of resources (Kalay and Lynn, 2016). Organizational structure affects the management choices and market opportunities of the firm. It integrates a set of elements (responsibility, coordination, division of tasks, control) that act in an interrelated manner contributing to the achievement of the organization's objectives (Daft, 1978). The formation of organizational structures, which enable the exchange of knowledge and resources across functions, is a critical element for companies, as it ensures strategic decision-making and an active and effective coordination of the innovation process (Olson *et al.*, 1995; Salehi *et al.*, 2018).

This study distinguishes between formal and organic organizational structures. Formal structures involve consciously established relationships characterized by hierarchy, labor specialization, and centralized decision-making (Burns and Stalkers, 1961). In contrast, organic structures combine formal and informal variables, with the latter arising from unplanned decisions based on interpersonal work relationships. In an organic structure, flexibility is emphasized with fewer hierarchical levels, diminished departmental barriers, and decentralized decision-making (Burns and Stalker, 1961; Aiken and Hage, 1971; Martínez-León and Martínez-García, 2011; Cosh *et al.*, 2012; Gimenes *et al.*, 2017).

2.3. Innovation

Innovation can be defined in various ways, such as the creation of new products or services (Covin and Miles, 1999), embedding new knowledge in products, processes, and services (Quintane et al., 2011), or understanding future customer needs through internal and external knowledge (Rajapathirana and Hui, 2018). Hansen *et al.* (2006) define innovation as the creation and/or adoption of new ideas, processes, products, or services aimed at increasing customer value and enhancing firm performance. Recognized as pivotal in economic development, firm performance, and competitiveness, the choice of innovation strategy requires a balanced strategy aligning with firms' intrinsic characteristics (Rousseau *et al.*, 2016; Chatzoglou and Chatzoudes, 2018; Rambe and Khaola, 2022).

Innovation is a complex activity, involving multiple internal and external variables, combining learning, knowledge, creativity, and management to leverage both internal and external resources for differentiation and competitive advantage (Shahin and Zeinali, 2010). Morales *et al.* (2018) and Niroumand *et al.* (2020, 2021) demonstrated a positive relationship between innovation and business competitiveness, showcasing innovation as a key driver for firm development. Corchuelo and Sama-Berrocal (2022) emphasized the significance of considering innovation in enhancing competitiveness by analyzing objectives and barriers. Thus, innovation serves as a vital competitive advantage, ensuring firm vitality in dynamic environments (Asghar *et al.*, 2021).

Measuring and classifying innovation pose challenges due to varying perspectives and criteria. One classification system focuses on the radicality factor, differentiating between exploitative and explorative innovation strategies (Jansen *et al.*, 2006; Bernal *et al.*, 2019).

Exploitative innovation involves incremental improvements to existing products or services, aligning with existing knowledge to meet current market demands (Hou *et al.*, 2019; Duan *et al.*, 2022). These innovations broaden the expertise and competencies already held by the company, enhance current products and services, refine existing designs, or enhance efficiency in established distribution channels, all based on the foundation of existing knowledge. On the other hand, explorative innovation aims at radical change to address emerging needs or new markets, requiring new knowledge and altering existing organizational knowledge (Hoang and Rothaermel, 2010; Kollmann and Stöckmann, 2014; Shahin *et al.*, 2017). These innovations present novel designs, establish new markets, and build new distribution channels, necessitating the acquisition of new knowledge and the modification of existing knowledge within the organization. The ambidexterity of innovation involves developing both explorative and exploitative innovation, enabling firms to adapt to changes, achieve short-term performance, and secure long-term competitive advantages (Yang *et al.*, 2015; Duan *et al.*, 2022; Saleh *et al.*, 2023). However, it may also introduce challenges related to resource competition and scarcity (Duan *et al.*, 2022).

3. Hypotheses development

3.1. Market orientation and innovation

Market orientation establishes a relationship between the environment and the organization, serving as a source for ideas, recommendations, adjustments, and benchmarks. The debate centers on whether market orientation fosters business innovation or potentially confines it to incremental developments derived from changes in customer preferences (Vázquez *et al.*, 2001; Prifti and Alimehmeti, 2017; Corchuelo *et al.*, 2024).

Bennet and Cooper (1981) and Hayes and Abernathy (1980) argued that a market-oriented strategy leads to the development of exploitative innovations, avoiding the risks associated with radical innovations. They suggest this avoidance is due to uncertainties about the audience's reaction. Conversely, Jaworski and Kohli (1996) stated that a forward-looking perspective, coupled with market orientation, facilitates the development of new products with a higher degree of embedded novelty. Hurley and Hult (1998) suggested that market orientation serves as a precursor to a firm's inclination for developing new ideas, influencing the organizational culture positively, and enhancing innovation capabilities. According to this view, market-oriented companies are better positioned to anticipate and respond to customer needs with innovative products and services. Baker and Sinkula (2002) stated that market-oriented firms are more adaptable to environmental changes, fostering incremental innovation. Vázquez *et al.* (2000) showed that highly market-oriented companies not only display a greater willingness to innovate but also market a higher number of innovations, incorporating a higher degree of novelty. Lado and Maydeu-Olivares (2001) similarly found that embracing market orientation principles positively influences the magnitude and effectiveness of innovation activities. Based on these perspectives, the following hypotheses are established.

Hypothesis 1 (H1): Market orientation positively influences exploitative innovation (H1a.); Market orientation positively influences explorative innovation (H1b).

Several studies have highlighted that market orientation serves as a precursor to delivering enhanced customer value, playing a crucial role in long-term profits, competitive advantage, and improved financial performance (Kohli and Jaworski, 1990; Narver and Slater, 1990; Kumar *et al.*, 1998; Ho *et al.*, 2017; Prifti and Alimehmeti, 2017). Narver and Slater (1990) specifically noted that market orientation enhances the analysis of sustainable competitive advantage sources for firms. The effective utilization of resources and capabilities results in a competitive advantage (Lado *et al.*, 1998). Consequently, it is assumed that market orientation positively impacts the success achieved by commercialized innovations, given its focus on meeting customer needs (Ozkaya *et al.*, 2015). However, Atuahene-Gima's (1996) study only validated the initial stage of

this relationship, indicating a significant contribution of market orientation to innovation but showing a weak association with market success measured in terms of sales and profit performance.

Conversely, the mediating effect of innovation in the connection between market orientation and performance is explored. Yadav *et al.* (2019) examined the mediating effect of incremental innovation in Indian small and medium enterprises, revealing a substantial impact of market orientation on SME performance, supported by the mediating role of innovation. Prifti and Alimehmeti (2017) also delved into the relationship between market orientation, innovation, and the performance of Albanian firms, finding a positive association. They consider that innovation plays a key role in the growth and success of many companies, emphasizing it as a primary concern for organizational development. The organizational structure's role in the hypotheses established is considered a fundamental factor.

Hypothesis 1 (H1): Exploitative innovation mediates the relationship between market orientation and the firm market performance (H1c); Exploitative innovation mediates the relationship between market orientation and the firm financial performance (H1d); Explorative innovation mediates the relationship between market orientation and the firm market performance (H1e); Explorative innovation mediates the relationship between market orientation and the firm financial performance (H1f.).

3.2. The influence of organizational structure on innovation orientation

Recognizing the crucial role of innovation in the growth and success of many companies, it should be a primary focus in organizational development. The organizational structure is an essential factor in either facilitating or hindering innovation (Savvides, 1979). An organizational structure that fosters motivation, values its members and organizes work to enhance human capital positively influences innovative performance. This is achieved through the recognition and support employees receive from management (Aiken and Hage, 1971; Miles *et al.*, 1978; Kalay and Lynn, 2016; Shafeeq *et al.*, 2023). Wilson (1963) emphasized the importance of diversity, asserting that greater organizational diversity increases the likelihood of proposing and adopting significant innovative proposals within the organization.

Schultz *et al.* (2013) found that an organizational structure grounded in formal control can boost innovative performance by facilitating coordination among different functional units, increasing profitability, reducing uncertainty, and minimizing errors. Other studies also highlight the positive impact of a formal structure on innovation (Rogers, 1995; Gosselin, 1997; Cosh *et al.*, 2012). However, most studies conclude that decentralized and less strictly formalized organizational structures are more conducive to innovative performance (Jansen *et al.*, 2006; Kalay and Lynn, 2016). In this sense, Cabello-Medina *et al.* (2011) proposed the idea that organizations with organic structures tend to be more innovative than those with mechanistic ones. They recommended further exploration of these variables and their impact on innovation, given the absence of conclusive findings. In Menguc and Auh's (2010) study, results were mixed. Radical product innovativeness had a negative but not significant effect on new product performance under a formal structure, while the effect was positive under an informal structure. In contrast, the effect of incremental product innovativeness on new product performance was positive in a formal structure and negative in an informal structure. Based on these considerations, the following research hypotheses have been proposed.

Hypothesis 2 (H2): The existence of an organizational formal structure positively influences exploitative innovation (H2a); The existence of an organizational formal structure positively influences explorative innovation (H2b); The existence of an organizational organic structure positively influences exploitative innovation (H2c); The existence of an organizational organic structure positively influences explorative innovation (H2d).

3.3. Innovation orientation and agribusiness firms' performance

Several studies have validated the positive correlation between innovation and firm performance (Geroski *et al.*, 1993; Han *et al.*, 1998; Roberts, 1999; Lado and Maydeu-Olivares, 2001; Rosenbusch *et al.*, 2011; Atalay *et al.*, 2013; Rousseau *et al.*, 2016; Morales *et al.*, 2018; Borahima *et al.*, 2021). Geroski et al. (1993) discovered that the number of innovations made by firms positively influenced their operating profit margin, indicating that innovative firms generally displayed higher profitability than non-innovative firms. Han *et al.* (1998) empirically found a positive impact of the relationship between market orientation and technical innovation on firm performance. Roberts (1999) identified an expected relationship between a high propensity for product innovation and sustained superior profitability. The impact of innovation on firm performance varies depending on the type of innovation (Gunday *et al.*, 2011) and is contingent on firm performance and industry type.

Recent innovation studies have evolved to analyze the relationships between exploration, exploitation, and innovative performance. Some studies have considered exploration and exploitation strategies in aggregate terms, implying that the combined effect of both dimensions equals the sum of their individual effects (Yamakawa *et al.*, 2011; Yang and Li, 2011). However, despite both exploitation and exploration being crucial for innovative performance, firms face resource limitations and must make choices about which strategy aligns best with their needs. A firm opting for an exploitative innovation strategy focuses on refining and expanding current resources, improving efficiency for short-term performance gains. In contrast, a firm adopting an explorative innovation strategy seeks new alternatives to foster long-term improvement, growth, and profitability (Zhang *et al.*, 2017; Moreira *et al.*, 2022). Therefore, both dimensions (exploitation and exploration) independently or jointly contribute positively to the innovative performance of firms. The following research hypotheses are set out based on these considerations.

Hypothesis 3 (H3). Exploitative innovation positively influences the firm financial performance (H3a); Exploitative innovation positively influences the firm market performance (H3b); Explorative innovation positively influences the firm financial performance (H3c); Explorative innovation positively influences the firm market performance (H3d).

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

[Figure 1 about here]

4. Data and data collection

The research investigates the proposed hypotheses using data gathered from agribusiness firms in Extremadura. Due to the limited information available, primary data collection involved administering an *ad hoc* questionnaire to innovative agri-food companies in the region. The initial population was derived from a compiled report/directory created through the cross-referencing and analysis of various databases, including the General Company Directory of the National Statistics Institute, Iberian Balance Sheet Analysis System, and Agri-food Cooperatives of Extremadura.

The questionnaire's development followed a three-step process. Initially, an initial version was crafted by adapting existing scales based on a thorough literature review. The questionnaire's design drew insights from prior literature and validated variables through a qualitative study, utilizing semi-structured interviews with diverse agri-food companies in Extremadura (Corchuelo *et al.*, 2020). Subsequently, the measures for each construct underwent discussions with a panel of academic experts experienced in innovation and management. Finally, a revised version of the

questionnaire underwent a pilot test involving five business owners to ensure clarity, eliminate ambiguities, and rectify errors.

The measures were adapted from existing research. As such, the measure for innovation exploitation and exploration was taken from Jansen *et al.* (2006) and Bernal *et al.* (2019), consisting of three items each. The financial (six items) and market performance (five items) were adapted from Gunday *et al.* (2011). The 11-item measure for market orientation was adopted by Narver and Slater (1990) and Wang *et al.* (2019). The measurement of organizational organic (four items) and formal structure (five items) was adapted from Aiken and Hage (1971). The respondents were asked to identify their degree of agreement on a Likert-type scale, ranging from 1 (equals totally disagree) to 7 (equals totally agree). A 7-point Likert scale is a well-established method for capturing survey participants' opinions on various constructs (e.g., Crick *et al.* 2022 for market orientation; Awan *et al*., 2021 for innovation types). The scale typically ranges from "Strongly Disagree" (1) to "Strongly Agree" (7), allowing for nuanced responses and effective data analysis.

Data collection occurred between September and October 2021. A final sample of 151 completed questionnaires was obtained. The sample characterization is as follows. Firstly, about the informant, the majority were company managers/owners, followed by department heads (Finance, Quality, R&D, Operations, Sales) and administrators. The educational level of the informants was mostly secondary education, followed by higher education. The predominant age of the informants was in the range of 31 to 55 years. Extremadura is a region divided into two provinces: Badajoz and Cáceres. Of the total number of companies that responded to the questionnaire, 52 are in the province of Badajoz (34.7% of the total) and 98 companies in the province of Cáceres (65.3% of the total). Table 1 shows the main companies' characteristics.

[Table 1 about here]

Table 2 shows the distribution of the sample in terms of branches of activity (codes 10, 11, and 12 of the National Classification of Economic Activities-NCEA 2009, which correspond to the agri-food industry). Although all branches of activity are represented, the largest number of companies were engaged in the activities of Processing and preservation of meat and other meat products, Processing and preservation of fruit and vegetables, Manufacture of beverages, Manufacture of animal and vegetable oils and fats, Manufacture of other food products, and Manufacture of animal feed products. These branches represent 78.7% of the sample and are representative of the main products produced in the region (Iberian sausages, wine, oil, paprika, etc., among others).

[Table 2 about here]

5. Results

The conceptual model was tested using partial least squares structural equation modeling (PLS-SEM) using SmartPLS 3 software (Ringle *et al.*, 2015). PLS-SEM is a variance-based SEM technique particularly suited for our research as it prioritizes maximizing the explained variance (R^2) in the model (Ringle *et al.*, 2015). This focus on prediction aligns well with our aim to understand the key drivers of market and financial performance in agri-food firms, a field with limited existing research on innovation ambidexterity.

Several tests were conducted to assess the reliability and validity of the measurement model. More specifically, we followed the suggestion of Hair *et al.* (2017) and analyzed the reliability, convergent validity, internal consistency reliability, and discriminant validity. The results indicators revealed that the standardized factor loadings of all items were significant ($p < 0.001$) and superior to 0.6 (ranging from 0.637 to 0.855) providing evidence for the individual indicator reliability. As shown in Figure 2 and Table 3, Cronbach alphas and composite reliability (CR) values were higher than 0.7 (Hair et al., 2017) confirming, for all the constructs, the internal

consistency reliability.

We also tested for convergent validity which was supported since all constructs' items loaded positively and significantly. Convergent validity was also confirmed since the CR values of the constructs were superior to 0.70, and the average variance extracted (AVE) surpassed the limit of 0.50 (Bagozzi and Yi, 1988). To test the discriminant validity, we adopted the Fornell and Larcker criterion where the square root of AVE of each construct is superior to its biggest correlation with any construct (Fornell and Larcker, 1981), as shown in the diagonal of Table 3. Furthermore, we calculated the heterotrait-monotrait ratio (HTMT) criterion (Henseler *et al.*, 2015). The results in Table 3 show that the HTMT ratios are inferior to 0.85 (Hair et al., 2017; Henseler et al., 2015), providing evidence of discriminant validity.

[Figure 2 about here]

[Table 3 about here]

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 1.698 and 2.188 for exploration and exploitation, and were 2.651 for financial and market performance, meaning that they were inferior to the threshold of 5, revealing no collinearity. We also estimated the R^2 (coefficient of the determination) for the endogenous variables was superior to the limit of 10% as recommended by Falk and Miller (1992), as shown in Table 4. About the Q^2 values, the values obtained were positive providing additional support for the model quality.

[Table 4 about here]

To test the hypothesis, we conducted a bootstrapping analysis with 5,000 subsamples to evaluate the significance of the parameter estimates (Hair *et al.*, 2017). The results presented in Table 5 show that market orientation positively influences exploitative and explorative innovation (β = 0.242, $p < 0.01$; and β = 0.372, $p < 0.001$, respectively). This result provides support for *H1a* and *H1b*, respectively. The existence of an organizational formal structure was also found to have a significant and positive relationship with exploitative and explorative innovation (β = 0.311, $p <$ 0.001; and β = 0.309, $p < 0.001$) which supports *H2a* and *H2b* respectively. The existence of an organizational organic structure positively influences exploitative innovation (β = 0.191, $p < 0.05$), thus supporting *H2c*. However, no significant relationship was found between organizational organic structure and explorative innovation (β = 0.073, *n.s.*), as such *H2d* was not supported. Regarding, the influence of exploitative innovation on financial and market performance, it was found to be positive and significant (β = 0.229, $p < 0.05$; and β = 0.202, $p < 0.05$), providing support for *H3a* and *H3b*. The same conclusion was also faced in the relationship between explorative innovation on financial and market performance (β = 0.338, $p < 0.01$; and β = 0.589, $p < 0.001$), providing support for *H3c* and *H3d*.

[Table 5 about here]

The mediation hypotheses were tested by following the suggestions of Hair *et al.* (2017, p. 232). Thus, we also conducted a bootstrapping analysis to test the significance of the indirect effects

(Preacher and Hayes, 2008). The indirect effects between market orientation and market performance via the mediator of exploitative innovation and between market orientation and financial performance via the mediator of exploitative innovation are not significant ($\beta = 0.049$; *n.s.*; and $\beta = 0.055$; *n.s.*, respectively), thus *H1c* and *H1d* are not supported. The mediating effect of market orientation and market performance via the mediator of explorative innovation and between market orientation and financial performance via the mediator of explorative innovation are significant ($\beta = 0.126$; $p < 0.01$; $\beta = 0.219$; $p < 0.001$), supporting *H1e* and *H1f*. The results of the mediation effects are presented in Table 6.

[Table 6 about here]

For the NCA procedures, we followed the recommendations of Richter *et al.* (2020). First, we estimated the effect size *d* of the latent variables (LV) scores using PLS-SEM for both dependent variables (financial and market performance). As shown in Table 7, the *d* scores are superior to the threshold of 0.1, and the test for NCA permutation revealed that all effects are significant for all relationships.

[Table 7 about here]

After analyzing the signal and significance of the relationships to test the hypotheses and the NCA, in this three-step analysis, we conducted an Importance-Performance Map Analysis (IPMA) that allows extending the results of PLS-SEM by considering the importance of each construct in the model (Dabestani *et al.*, 2016). As such, these procedures may reveal paths to prioritize managerial actions. The results are shown in Figures 3 and 4. According to the procedures, market orientation shows a stronger importance on explorative innovation when compared to its influence on exploitative innovation. The existence of a formal structure reveals equally important for both forms of innovation orientation, and as expected, shows a more important influence compared to the organic structure. Regarding the influence of the two forms of innovation orientation, the results highlight the importance of explorative innovation on both performance constructs (when compared to exploitative innovation), especially the stronger importance on market performance.

[Figures 3 and 4 about here]

6. Analysis and discussion

6.1. Interpretation of the results

According to the results, firstly, it was found that market orientation positively influences explorative and exploitative innovation. Specifically, market orientation shows a stronger importance on explorative innovation when compared to its influence on exploitative innovation. These results are in line with Hurley and Hult (1998) and Lado and Maydeu-Olivares (2001) who argued that the market orientation is an antecedent of the firm's predisposition to innovate, and positively affects innovation activities, their magnitude, and their effectiveness. According to the orientation innovation, as in the studies by Jaworski and Kohli (1996) and Vázquez *et al.* (2000), it is obtained that, in our case, agri-food companies with more market-oriented, in addition to being more innovative, also incorporate a higher degree of novelty in innovations.

Secondly, regarding the organizational structure, the existence of a formal structure was found to have a significant and positive relationship and reveals equally important for explorative

and exploitative innovation. In contrast, the existence of an organizational organic structure positively influences exploitative innovation but does not have a relationship with explorative innovation. This result is according to the study by Menguc and Auh (2010) which found that organic structures have a positive relationship with incremental innovation but not with radical innovation. As expected, the organizational formal structure shows a more important influence on innovation exploration compared to the organic structure. These results are consistent with the studies by Rogers (1995), Gosselin (1997), and Cosh *et al.* (2012) which indicated the beneficial effect of a formal structure on innovation. Schultz *et al.* (2013) argued that formal structures increase innovative performance. Also, Chen and Chang (2012) showed that a high degree of formalization within organizations increases the degree of innovativeness through a stronger absorptive capacity.

Thirdly, the influence of both types of innovation (explorative and exploitative) influence positively on financial and market performance. The NCA results show that low levels of both types of innovation are needed to obtain good results on market and financial performance. The results highlight the importance of explorative innovation on both performance constructs (when compared to exploitative innovation), especially the stronger importance on market performance. These results coincide with studies that confirmed the positive relationship between innovation and firm performance (Geroski *et al.*, 1993; Han *et al.*, 1998; Roberts, 1999; Lado and Maydeu-Olivares, 2001; Rosenbusch *et al.*, 2011; Atalay *et al.*, 2013; Rousseau *et al.*, 2016; Morales *et al.*, 2018; Corchuelo *et al.*, 2020; Wang *et al.*, 2023; Shahin *et al.*, 2023). Also, as it was pointed out in the study by Gunday *et al.* (2011), the effects of innovation on firm performance vary according to the type of innovation (explorative and exploitative) and their effects depend on firm performance and manufacturing industry type, in our case, the agribusiness. So, in our study, both exploitation and exploration are essential strategies for innovative performance, either jointly or separately. As the studies by Moreira *et al.* (2022), and Zhang *et al.* (2017) discussed, each strategy requires a range of capabilities and means that make firms make choices about which strategy best suits their needs.

Finally, the results show that the indirect effects between market orientation, via the mediator of exploration innovation strategy, and market and financial performance are significant (not via the mediator of exploitative innovation). These results are according to studies that indicated that market orientation is an antecedent to delivering superior customer value and contributes to gaining competitive advantages (Narver and Slater, 1990; Lado *et al.*, 1998) and improved financial performance (Kohli and Jaworski, 1990; Narver and Slater, 1990; Kumar *et al.*, 1998; Ho *et al.*, 2017; Prifti and Alimehmeti, 2017). The study by Ozkaya *et al.* (2015) concluded that market orientation has a positive impact on the success achieved by commercialized innovations due to the focus on satisfying customer needs.

6.2. Theoretical implications

This study makes important theoretical contributions. Overall, this research expands the knowledge of how market orientation and organizational structures influence different innovation types in the agri-food industry. Additionally, it highlights the importance of both explorative and exploitative innovation for achieving market and financial performance. More specifically the contributions are: First, at the level of organizational theory, it establishes a relationship between the type of organizational structure and the two forms of innovation, in the context of agribusiness firms. It is found that companies with a more formal structure perform well in both explorative and exploitative innovation. However, in firms with more organic structures, there is no impact on the exploration side. Second, it contributes to the knowledge of the impact of market orientation in this industry by bringing evidence of its importance in both forms of innovation and market and financial performance. However, the results show that the effect of market orientation on performance is more related to companies that adopt a disruptive innovation (exploration) when compared to those that follow an incremental innovation (exploitation). This result is very

important to understand the potential for development in this industry. Third, at the level of knowledge about innovation in this industry, this study advances by bringing evidence about the importance of the two types of innovation in market and financial performance. Fourth, this study presents a fine-tuned analysis of the effect of both types of innovation on financial and market performance, showing that these SMEs, with limited resources, strongly benefit from small investments in innovation, which results in a high increase in performance.

6.3. Managerial implications

The findings of this study offer important and direct implications for managers who want to improve firm performance. Companies should develop, market orientation capabilities that will support competitive innovation behavior, especially when following more disruptive market approaches. This combination can help the firm to be truly effective in developing high performance in a highly competitive market such as the agri-food market. Therefore, management must develop innovation-oriented organizational structures with a view to innovation. As such, the following recommendations can be implemented. First, it is important to cultivate a strong market orientation by actively gathering customer insights and incorporating them into strategic decision-making. Second, managers should leverage formal structures to provide a stable foundation for innovation activities. Third, managers should use organic structures strategically within specific teams or departments focused on exploitative innovation. Fourth, managers should recognize the value of both explorative and exploitative innovation for achieving market and financial success by developing strategies that promote a balance between these approaches, tailoring them to the specific needs and competitive landscape of the agri-food firm.

7. Conclusions

7.1. General considerations

This study investigated the influence of market orientation and organizational structure on innovation and performance within Extremaduran's agroindustry. The findings reveal that explorative innovation has a stronger influence on market and financial performance compared to exploitative innovation. Additionally, both market orientation and organizational structure significantly affect the development of both types of innovation. Particularly, market orientation and formal structures emerge as key factors in fostering explorative innovation compared to exploitative innovation within companies.

7.2. Research limitations and future study agenda

The study was limited to the agri-food industry and a specific region. Although the agri-food industry shares similarities with other natural resource industries, it is different from other manufacturing industries. Therefore, the results presented here are considered industry-specific. In this sense, we identify the need for deeper and broader research. Future lines of research are proposed, firstly, to replicate this study to generalize the results to Spanish agri-food companies, also extending them to other manufacturing industries and companies in the service sector. It would be also of interest to explore other variables related to the Sustainable Development Goals (SDG) that make it possible to expand the effects obtained in the innovative performance of companies. Furthermore, our study can serve as a basis for studying of moderating variables, for instance, exploring how firm size, technological intensity, or the level of competition in the agri-food sub-sector that might influence the impact of market orientation, organizational structure, and innovation types on performance.

Also, examining the role of dynamic capabilities (e.g., technological learning, absorptive capacity) as potential mediators between innovation ambidexterity and performance, could improve our understanding how these capabilities facilitate the translation of innovation strategies into successful outcomes can provide valuable insights.

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Table 1. Characteristics of firms

Province		
	Firms	**%total**
Badajoz	52	34.7
Cáceres	98	65.3
Legal Form		
	Firms	**%total**
Private Limited Company	91	60.7
Cooperative	36	24
Public Limited Company	20	13.3
Other Legal Form	3	2
Size (number of employees)		
	Firms	**%total**
<10	71	47.3
10-49	52	34.7
50-199	23	15.3
>200	4	2.7

Table 2. Distribution of the sample according to branches of activity

	NCEA2009	Firms	% total
Processing and preservation of meat and other meat products	101	37	24.7
Processing and preservation of fish, crustaceans, and mollusks	102	2	1.3
Fruit and vegetable processing and preservation	103	24	16
Manufacture of animal and vegetable oils and fats	104	18	12
Manufacture of dairy products	105	9	6
Manufacture of milling products, starches, and starch products	106	4	2.7
Manufacture of bread and pasta	107	5	3.3
Manufacture of other food products	108	18	12
Manufacture of animal feed products	109	11	7.3
Manufacture of beverages	110	21	14
Manufacture of tobacco products	120	1	0.7
Total		150	100

Note. NCEA2009: National Classification of Economic Activity 2009.

Table 3. Composite reliability, average variance extracted, correlations, and discriminant validity checks

Latent Variables	α	CR	AVE	1	2	3	4	5	6	7
(1) Exploitation	0.782	0.872	0.695	**0.843**	0.824	0.547	0.700	0.797	0.590	0.667
(2) Exploration	0.825	0.895	0.740	0.789	**0.860**	0.559	0.675	0.847	0.636	0.589
(3) Financial perf	0.923	0.938	0.716	0.495	0.518	**0.846**	0.537	0.696	0.487	0.519
(4) Structure	0.802	0.864	0.562	0.568	0.555	0.478	**0.749**	0.646	0.600	0.810
(5) Market perf	0.871	0.905	0.657	0.667	0.749	0.651	0.537	**0.811**	0.748	0.733
(6) Mkt orientation	0.920	0.932	0.555	0.527	0.582	0.471	0.533	0.672	**0.745**	0.716
(7) Org structure	0.822	0.882	0.651	0.549	0.509	0.478	0.667	0.607	0.621	**0.807**

Notes: 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 4. Values for R Square

	R Square	R Square Adjusted	Q Square
Exploitation	0.409	0.397	0.259
Exploration	0.425	0.413	0,.295
Financial perf	0.288	0.279	0.186
Market perf	0.577	0.571	0.364

Table 5. Structural model assessment

Path	Path coefficient	Standard errors	*t* statistics	*p* values
Mkt orientation → Exploitation	0.242	0.082	2.957	0.003
Mkt orientation → Exploration	0.372	0.089	4.160	0.000
Formal structure → Exploitation	0.311	0.071	4.374	0.000
Formal structure → Exploration	0.309	0.076	4.065	0.000
Org structure → Exploitation	0.191	0.084	2.276	0.023
Org structure → Exploration	0.073	0.096	0.756	0.450
Exploitation → Financial perf	0.229	0.116	1.978	0.049
Exploitation → Market perf	0.202	0.083	2.428	0.016
Exploration → Financial perf	0.338	0.105	3.224	0.001
Exploration → Market perf	0.589	0.075	7.908	0.000

Table 6. Bootstrap results for indirect effects

Indirect effect	Estimate	Standard errors	*t statistics*	*p*-value
Mkt orientation → Exploitation → Market perf	0.049	0.030	1.621	0.106
Mkt orientation → Exploitation → Financial perf	0.055	0.035	1.572	0.117
Mkt orientation → Exploration → Market perf	0.219	0.061	3.617	0.000
Mkt orientation → Exploration → Financial perf	0.126	0.048	2.604	0.009

Table 7. NCA effect sizes

Construct	Financial Performance CE-FDH	*p*-value	Market Performance CE-FDH	*p*-value
Exploitation	0.123	0.000	0.220	0.007
Exploration	0.139	0.003	0.222	0.000

Figure 1. Conceptual model

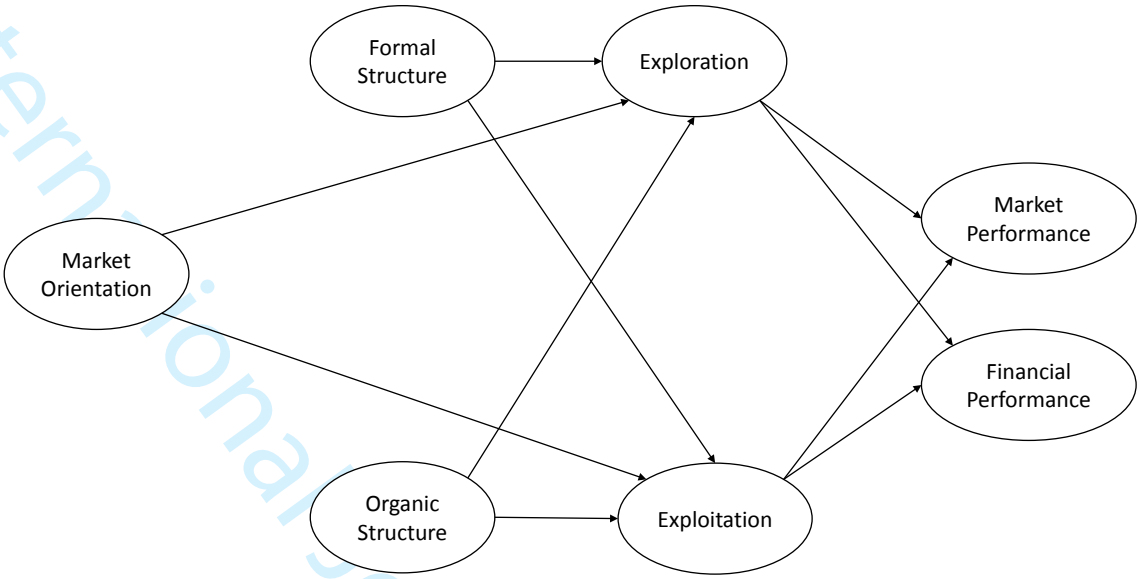


Figure 2. Structural model

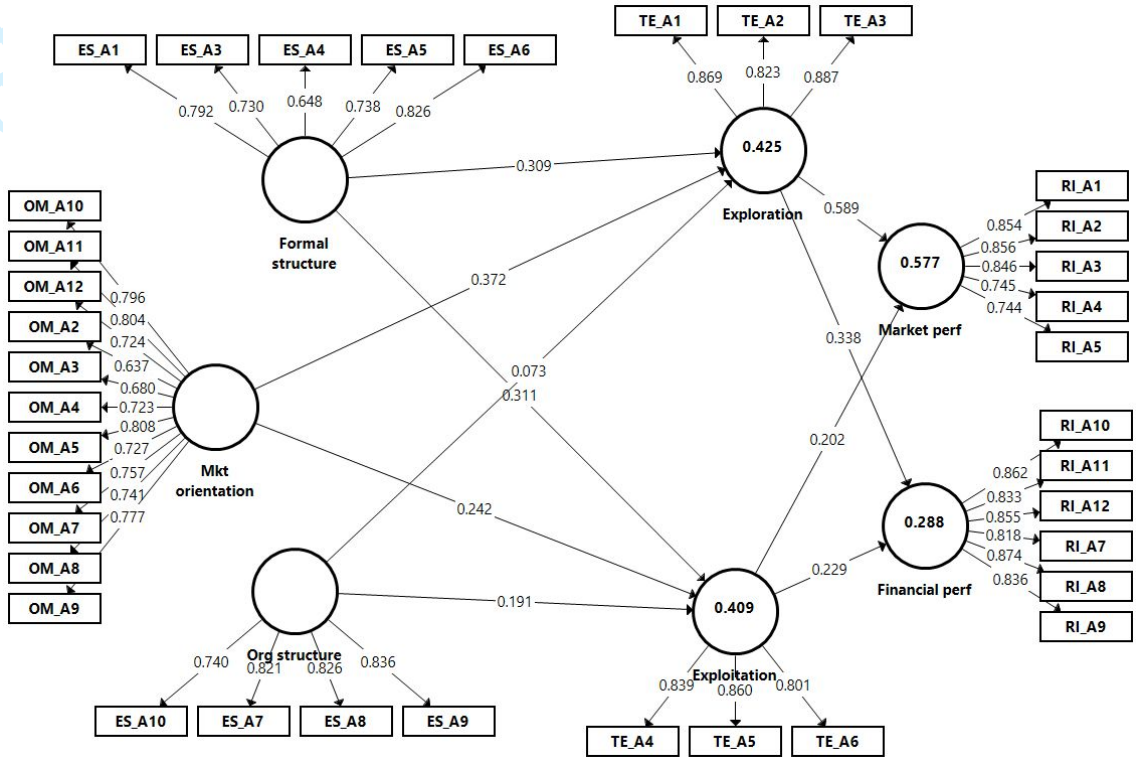
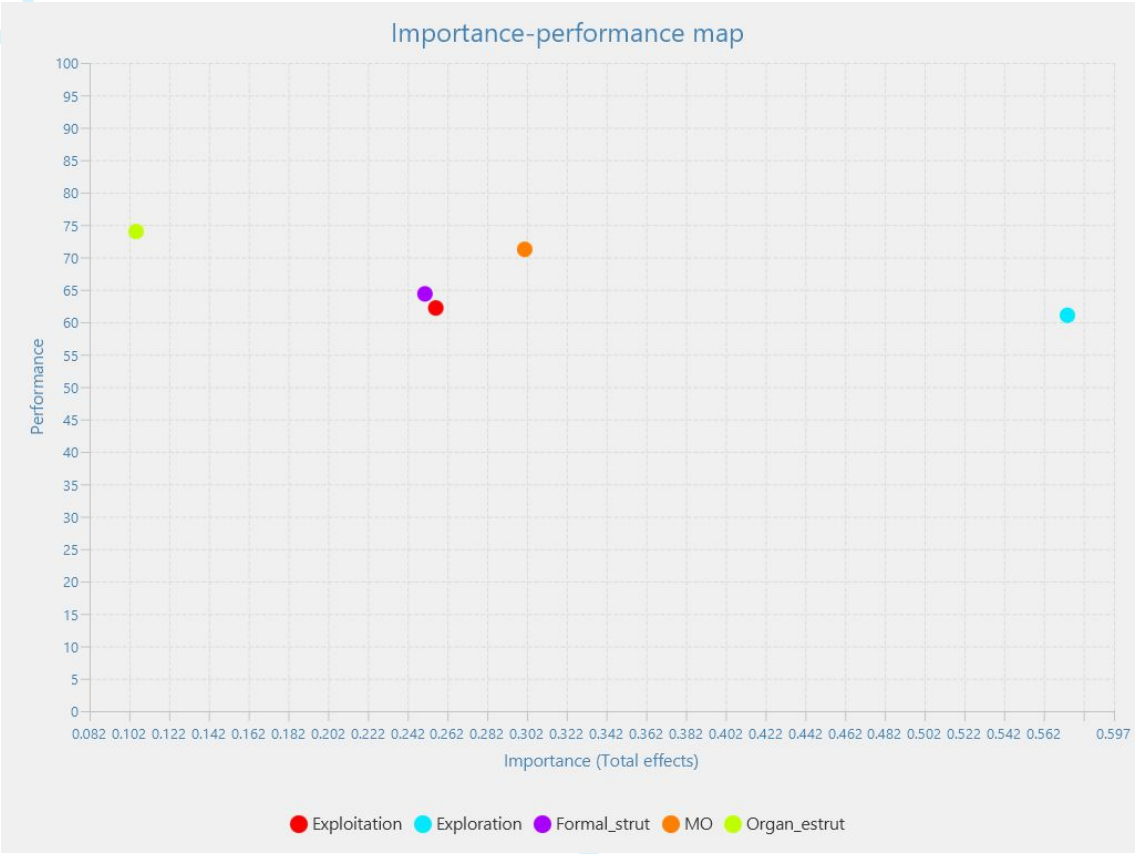


Figure 3. IPMA matrix for market performance



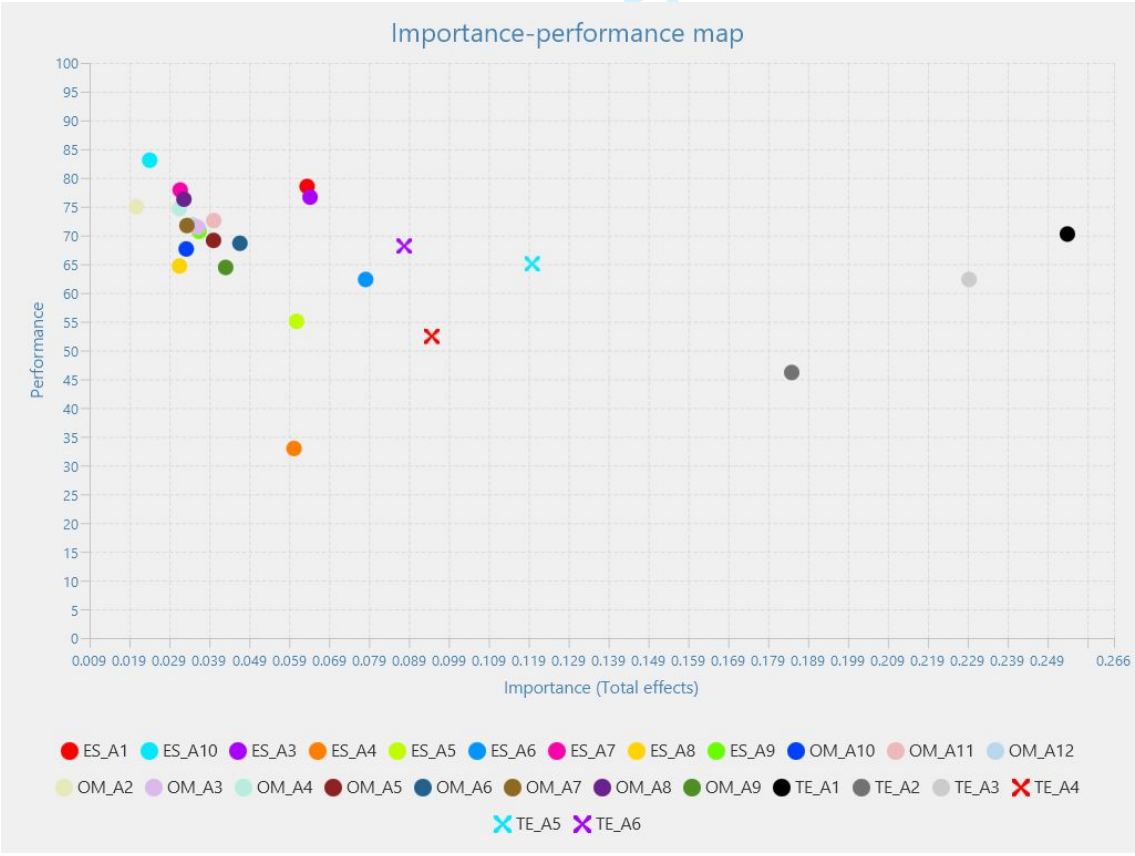


Figure 4. IPMA matrix for financial performance