

Article

Does Gender Diversity Affect Performance in Agri-Food Cooperatives? A Moderated Model

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Abstract: Existing research about the relationship between gender diversity and performance in cooperatives is not conclusive. In view of this reality, this paper aims firstly to analyse the effectiveness of gender diversity and equality management systems (GDMS) in promoting gender diversity in the decision-making bodies (GDDB) as well as in the performance of agri-food cooperatives. Secondly, the objective is to establish the relationship between GDDB and performance, and subsequently, to analyse the moderating effect of GDDB on three of the business strategies adopted by cooperatives in order to achieve competitive advantages: Integration strategies, internationalisation strategies, and environmental concern, based on a survey carried out in 2018 using a sample of 2489 Spanish agri-food cooperatives. A moderation analysis was conducted to test the proposed model and hypotheses. The results obtained confirm a positive relationship between the implementation by cooperatives of GDMS and GDDB. The relationship between GDMS, GDDB, and performance was not significant. The moderating effect of GDDB was only statistically significant in the case of export intensity (EI) and environmental concern (EC), although, contrary to expectations, this effect was negative, meaning that the impact of both strategies on performance becomes more apparent as GDDB is reduced.

Keywords: gender; cooperatives; agri-food; export; environmental concern; organic products; alliances; cooperation; performance

1. Introduction

Gender equality is the United Nations' fifth sustainable development goal. Since the adoption of the Beijing Platform for Action there has been progress in this field (131 countries enacted 274 legal and regulatory reforms in support of gender equality), yet many challenges remain (as a world average, women are paid 16% less than men, only one in four managers are women, and women continue to be underrepresented at all levels of political leadership, etc.). Though the gender gap has decreased (especially in developed countries), progress remains insufficient and many inequalities between women and men still persist [1,2].

Cooperatives, by their very nature, which stems from the cooperative values that characterise them, are considered at least in theory to be particularly gender-sensitive. Not surprisingly, the cooperative values of equality (each member has equal rights and benefits), equity (members are treated justly and fairly), as well as that of solidarity (members support each other) make them more sympathetic to many gender equality demands [3]. However, cooperatives, like other company forms, reflect the broader society in which they operate, and it is therefore not surprising that gender imbalances exist, with low levels of active female participation and underrepresentation in decision-making and leadership positions [4].

In this sense, a survey carried out in 2015 by the International Labour Organization (ILO) and the International Cooperative Alliance (ICA) suggested that in every region of the world, women's participation in both membership and leadership in cooperatives was significantly below average, especially in the traditionally male-dominated agriculture and finance sectors [5]. This poor participation was especially salient in positions of leadership. According to ILO studies, barriers to gender equality do not come from regulatory schemes, as cooperative laws around the world are generally "gender neutral", and do not discriminate against women. Instead it is cultural issues that constitute the most significant hurdles encountered by cooperatives [5].

The agri-food sector has a particularly masculine culture, which reflects on the different human collectives that make up its companies. Regardless of the level of development achieved by the respective economies, women play a pivotal role in agriculture and in rural development in many countries [6]. According to the FAO, women comprise on average 43% of the agricultural labour force in developing countries [7]. In the European Union, a recent study commissioned by the European Parliament stated that women in rural areas represent 45% of the economically active population, about 40% of them work on family farms, and they are more likely than men to work in the overall informal economy. Around 30% of farms across the EU-28 are managed by women, with the average rate of self-employed women standing at around 38%. However, despite increasing attention to gender issues, rural women still face serious disadvantages, compared not only to rural men, but also compared to urban women, with weak participation in decision-making bodies, especially in positions of leadership [2,7].

With regard to cooperatives, some studies state that cooperatives are much more open to female participation than investor-owned firms [8], and their role in these organisations to socially and economically empower female producers through their membership is acknowledged [9]. Despite these facts, the number of women in the corporate governing bodies of social economy entities is still lower than that of men [10,11]. As a result, more and more cooperatives are incorporating policies and programmes to reduce the gender gap in different areas of entrepreneurship.

There are many reasons for this under-representation: First, boards of directors are elected from member patrons, and as a majority are men, it is normal that the latter should have greater representation. However, the percentage of women is usually far smaller than it should be, considering the percentage of female members. Therefore, there are other reasons that influence the scarce presence of women in decision-making teams. Individual-level obstacles play an important role in this phenomenon including social expectations of family responsibilities, personal conflicts of work/family balance [12], and women's concerns related to the lack of professional credibility, credentials, confidence, know-how, social capital, and networking opportunities [13].

The greater or lesser gender diversity in the firms' decision-making bodies has diverse consequences for them. There is no consensus among researchers about the influence that a greater proportion of women on boards of directors and firm performance exerts, given the numerous factors involved and the way they are interrelated, rendering it difficult to distinguish this particular effect. While existing research in developing countries tends to support the notion that gender diversity is conducive to performance, studies conducted in developed countries show inconclusive results on the relationship between gender diversity and business performance [14]. Previous studies have shown that female directors behave differently to men in the boardroom [15]. Accordingly, it would seem obvious to state that if boards of directors have the greatest influence on a company's strategic decision-making process [16], then including women in these boards of directors will affect firms' strategy [17], and their performance.

On the other hand, the effect of gender diversity in decision-making bodies (GDDB) goes way beyond purely economic aspects, including performance, instead affecting the overall sustainability of firms, through its three core dimensions [18]: Economical, environmental, and social. Accordingly, members of the Board of directors are considered as the key decision-makers in terms of corporate sustainability (CS) strategies. Although research on board diversity has predominantly concentrated

on its effect on the firm's financial performance, with a weaker focus on how board diversity influence CS practices, there is a large body of evidence that confirms and demonstrates the link between board diversity and corporate sustainability, especially in developed countries [19]. In this regard, some studies have demonstrated a positive significant link between GDDB and environmental sustainability practices [20], social sustainability practices [21], and economic sustainability practices [22].

In view of this reality, this paper aims firstly to analyse the effectiveness of gender diversity and equality management systems (GDMS) in promoting gender diversity in the decision-making bodies of cooperatives (in terms of the percentage of women in them) as well as in the performance of the cooperatives. Secondly, the objective is to establish the relationship between GDDB and performance, and subsequently, to analyse the moderating effect of GDDB on three of the business strategies adopted by cooperatives in order to achieve competitive advantages and improve their performance: The first of these is the development of integration strategies through partnerships with other cooperatives to create larger organisations. The second is companies' internationalisation strategies, through which they expand their markets and potential customers, and finally their environmental strategies, in this case, via cooperatives' commitment to organic production. Along these lines, we argue that in cooperatives with GDDB, the effects of intercooperation, internationalisation, and environmental concern on performance are strengthened. Our analyses have controlled for the effects of organisational size and organisation type, as both factors have an influence on performance.

The empirical application is based on a database of agri-food cooperatives in Spain, provided by the organisation that represents Spanish agri-food cooperatives, Cooperativas Agroalimentarias de España, obtained from a survey it carried out in 2018, based on information given by cooperatives for 2017.

This article is structured as follows: The Section 2 appraises the extant literature on GDDB and GDMS and its effect on performance, as well as on export intensity, environmental concern, cooperation among cooperatives, and their relation to performance and GDDB. The Section 3 introduces the data collection and methods used in our study. The Section 4 presents the findings of our empirical analysis and the discussion of these findings, in light of the literature. Finally, the conclusions, implications, limitations, and areas of further research are presented.

2. Literature Review and Hypotheses

2.1. Agri-Food Cooperatives in Spain and Female Participation

Analysing the agri-food industry in the EU is important, as it is by far the largest global exporter of agri-food products, with exports reaching €151.2 billion in 2019. Agricultural products accounted for a solid 7% share of the value of total EU goods exported in 2018 [23]. In 2018, the Spanish agri-food sector (if we consider the entire value channel, including the primary sector, industry, and marketing) generated 9.2% of GDP (€100,742 million) and employed 12.3% of the total Spanish workforce (2.5 million jobs) [24].

However, despite the importance of the agri-food industry in international markets, research into this sector has been very limited in comparison with studies covering other industries [25].

In the cooperative area, Spain is one of the European countries with the highest presence of agri-food cooperatives (3699 agri-food cooperatives and other similar social economy firms), which have a total of 1,172,226 members. It is not surprising that they are a cornerstone of the food industry In Spain, representing 13% of the total Spanish food sector, 26% of its total turnover, and 20% of its employment.

However, according to the last report about gender published by Cooperativas Agroalimentarias de España, there is still a gender gap in cooperatives; in their labour force, in their membership, and especially in their decision-making bodies.

There are few studies about gender in cooperatives' membership, labour force, and boards of directors in Spain. Fregidou, M. and Berenguer et al [26,27] found that female directors were located in

service sectors, traditionally linked to women, and in younger and bigger cooperatives. Mateos et al. [8], in a study about gender in Spanish cooperatives, found that the share of women in the cooperative workforce was higher than in other types of firms, which led them to state that cooperatives foster female labour participation more than capital-based companies

In the agri-food sector, González, E. [28] pointed out that most of the females in cooperatives were members for family reasons and very few participated because they managed their own estates. In this sense, it was common for male members to include their wives as members for tax reasons. In the labour aspect, women occupy fewer positions of responsibility, working mainly in the areas of fruit quality, sorting, and sizing [28]. If we analyse their participation in managerial positions, large cooperatives are the most likely to have female managers in their teams [29]. According to Meliá-Martí [30], 85% of cooperatives with a turnover of over €50 million had at least one woman on the management team, compared to 70% of those with a turnover of between €25 and €50 million, and 50% of those with a turnover of between €10 and €25 million. However, their involvement in management teams is very low, with an average of 1.9 women on management teams in cooperatives with a turnover of over €10 million, with the majority of women working in the administration department.

In terms of their board participation, although 26% of cooperative members are women, only 7.4% of women are on cooperative boards, and only 3.6% chair these boards [31].

2.2. General Measures Concerning Gender in Spain and Specifically Focused on Cooperatives

Several measures have been adopted in Spain to balance opportunities between men and women in various social settings. These include the Spanish Equality Act (Organic Act 3/2007, of 22 March), which aims to ensure equal treatment and opportunities for women and men in every area of life, and especially in the political, civil, labour, economic, social, and cultural spheres [32]. This law established the obligation for companies with more than 250 employees to draw up an Equality Plan, which includes the measures adopted to achieve equal treatment and opportunities between women and men in the company and to eliminate discrimination on the basis of gender. The approval of Spanish Royal Decree 6/2019, of 1 March, extended this requirement to all companies with more than 50 employees, although its effectiveness cannot yet be verified because, depending on their size, companies have up to three years to implement these measures.

In terms of cooperatives, Spain has been a pioneer in developing specific legislation on the social economy (Act 5/2011, of 29 March, on the Social Economy), of which cooperative firms are the most genuine members. The regulatory framework of this law establishes the principles and values guiding organisations that define themselves as social economy enterprises, highlighting the principle of equal opportunities between men and women (Art. 4.c).

Moreover, in Spain, the competences for cooperative legislation are in the hands of the different autonomous regions, and as a result there is one national cooperative law and 16 regional laws. Regarding gender, 3 of the 16 regional cooperative laws have incorporated specific recommendations about the need to include women in governing bodies, such as the Valencian Region Law (Art. 42.6), the Catalan Law (Art. 10), and the Andalusian Law (Art. 113.7).

2.3. Gender Diversity and Equality Management Systems (GDMS) and Their Effect on Gender Diversity and Performance

GDMS can be defined as integrated bundles of diversity and equality management-related policies, practices, and programmes intended to enhance workplace diversity and inclusion [33]. They include a wide variety of practices such as training, mentoring and networking programmes, and management tracks for minorities [34], in order to increase the inclusion of diverse groups (racial minorities, women, etc). The reason that leads firms to implement them is not only because they are compulsory by law. There is also a voluntary ideal as GDMS can help firms achieve their goals by creating a diverse set of employees with the ability, motivation, and opportunity to contribute to goal attainment [35], providing firms with a sustained competitive advantage [36].

Companies whose diversity and equality policies are integrated into overall corporate strategy tend to be larger multinationals, and within sectors, agricultural firms do not have a strong culture of introducing them. In a study of medium to large companies in Ireland [37], agricultural firms had the lowest % of GDMS (only 14.2% of firms), while the percentage in energy, health services, financial services, and other service companies was over 25%.

In the area of gender, the GDMS that are usually implemented by companies revolve around the recruitment and selection of personnel, training in equal opportunities for staff, the implementation of non-sexist communication policies, work-life balance programmes, etc. However, there is limited empirical evidence to support that these practices do actually facilitate greater diversity [38]. In fact, there are often concerns as to whether companies eventually comply with these measures after they have included them in their equality plans. Likewise, studies on their impact on profitability do not offer consistent results either. Work such as the study by Brusca-Alijarde et al. [38] concluded that GDMS does not have a significant impact on company profitability. Conversely, Cavero-Rubio et al. [39] found a positive effect on performance after adopting GDMS, in firms chaired by women. Martínez-León et al. [40] studied the impact of the inclusion of GDMS in education co-operatives and found that these practices did not lead to improved staff satisfaction.

In this area, we expect the cooperatives that have implemented gender equality measures to have a higher GDDDB and, in turn, that these measures will have a positive effect on performance, leading us to propose the following hypotheses:

Hypotheses 1a (H1a). *GDMS has a positive effect on GDDDB in cooperatives.*

Hypotheses 1a (H1b). *GDMS has a positive effect on performance.*

2.4. Gender Diversity in Decision-Making Bodies in Cooperatives and Its Effect on Performance

The Board of Directors is deemed to be an important part of the governance structure of firms, and there is robust empirical research about its structure and effectiveness. The relationship between the board's composition and the quality of its monitoring role and thus the financial performance of the firm has been studied in several works. They have proved that differences in the proportion of independent directors [41], in the number of directors and size of the board [42,43], in the percentage of ownership in the board's hands [44], and more recently in the presence of women on these boards [15,45,46], have an effect on performance.

Board diversity can be defined as the inherent variety in the board's composition. This variety can be measured in a number of dimensions: Gender, age, ethnicity, nationality, educational background, industrial experience, and organisational membership, among others [45].

The positive influence of gender diversity on performance has been approached through different theories: The agency theory, which argues that gender diversity on a board is a mechanism to reduce the costs associated with agency problems [47]; the resource dependency theory, which states that diversity expands the directors' profiles to improve relations with competitors and customers, knowledge about the industry, and the possibilities of access to finance [48]; the stakeholder theory, on the basis that larger numbers of women on boards, who are particularly attuned to stakeholder interests, are more likely to create valuable resources that can positively affect performance [49,50]; and the upper echelon theory, which is "the organization as a reflection of its top managers" [51], stating that women in corporate upper echelons increase a board's cognitive variety and also influence performance [14].

Regarding gender, several studies have demonstrated the advantages of increasing gender diversity in boards of directors. Diversity enhances problem-solving as it enriches the perspectives and alternatives discussed when addressing problems and challenges [52] and improves the connection with the relevant stakeholders of the company, thus enhancing the firm's reputation [46].

Studies on the relationship between gender diversity and business performance are contradictory. Some works have found a positive relationship between gender diversity and performance [14,46,49,53], while others have found no relationship at all [45]. Some have found a partial relationship, such as the

one found by [15], which concludes that, on average, the greater the gender diversity of the board, the poorer the firm's performance. Yet, this effect differs in firms with different levels of shareholder rights (it has a positive effect in companies with weak shareholder rights, and a negative outcome when they are strong). Finally, some studies have found a negative relationship [54].

In cooperatives, studies about the influence of gender diversity in decision-making teams on performance are scarce, and the results that have emerged are mixed. Some studies were positive, such as the one by [32], which analysed a sample of 672 agricultural cooperatives in Spain. Their results revealed that GDDDB increased the returns of the cooperatives, lowered their debt level, but also increased operational risk. Others established a negative relationship, such as [55], who found weak support for the hypothesis that the structural attributes of the board impact on performance, and specifically found a negative relationship between female directorships and cooperative performance. In their sample, only 11.7% of cooperatives reported having at least one female board member, and only four had more than one director. They considered that under-representation of women on boards could be the cause of these results, given that according to the mass theory [56], a critical mass of female directors is needed to have a considerable impact on board discussions and decisions [57].

Palomo-Zurdo et al. [58] developed a study of the effect of having women on credit cooperative boards on profitability, and although a negative effect was obtained in crisis periods, this effect became positive in periods of economic expansion. Ortiz et al. [59] analysed gender diversity in Spanish agri-food cooperative boards and their influence on profitability and obtained a positive and significant relationship between the percentage of women on the board and the cooperative's Return on Assets.

However, most of the studies found that the relationship was not significant. The authors of [10] analysed the variables that predicted the probability of a man or a woman chairing a cooperative, based on a sample of 6419 Spanish cooperatives, and found that performance, measured through return on assets and profit per employee, had no statistically significant relationship with the chair of the Board of directors. Huang et al. [60] explored the association between cooperative governance and performance in cooperatives in Malaysia, based on a sample of 39 cooperatives. The results did not show any significant relationships between the number of men on the board and directors' participation with performance. Meliá-Martí et al. [61], in a study based on a survey of the largest Spanish agri-food cooperatives (turnover of more than €50 million), found no significant relationship between women on boards of directors and in top management positions and performance. Based on the previous studies, and taking into account that they are not conclusive, this study hypothesises that:

Hypotheses 2 (H2). *GDDDB in cooperatives is positively associated with performance.*

2.5. Cooperation among Cooperatives (CAC), Performance and the Moderating Role of GDDDB

The ICA principle of "cooperation among cooperatives" states that cooperatives serve their members most effectively and strengthen the cooperative movement by working together through local, national, regional, and international structures. In this sense, cooperatives aim to satisfy their needs by cooperating with other cooperatives and organisations.

Specifically, in the agri-food sector, current developments in the external environment (industry consolidation, consumer segmentation, price volatility, and policy changes) have led agri-coops to develop strategic adaptations by means of organisational growth, with strategic alliances becoming a way to ensure their existence [62]. Strategic alliances help cooperatives to consolidate their financial position and to concentrate supply upline in the food chain (cooperative federations, joint subsidiaries), and to promote the development of processing activities [63,64].

In this context, federated cooperatives have been widely used as a way to capture essential economies of scale [65] and provide access to complementary skills. In Spain, federated cooperatives are the most common form of alliance between cooperatives [66], and currently there are 128 s-tier cooperatives, which concentrate 22% of the total turnover of agri-food cooperatives and have an average turnover of €45 million [31].

Theory suggests a positive relationship between interfirm cooperation and corporate performance [67]. Strategic alliance literature has demonstrated that alliances create value for partners in different areas such as access to new technologies and complementary skills, economies of scale, and the reduction of risk [68]. This area of research has identified several critical success factors for alliance relationships [69,70], such as exchanging operational information [71], partner-specific experience [72], and the content and direction of partnering, especially those based on R&D and technology, as these provide higher profit margins [73].

In agri-food cooperatives alliances, and in the Spanish case particularly, federated cooperatives have proved to be a useful tool to overcome limitations about information asymmetry, financial constraints, and limited size [66]. However, their influence on productivity and profitability has not received much attention from scholars. Hernández-Espallardo et al. [74], in a sample of 278 first-tier cooperatives that distributed their products through second-tier cooperatives, demonstrated the positive effect of second-tier cooperatives on the objectives of first-tier cooperatives, such as increases in sales and profits, improvements in image and prestige, and product launches. Accordingly, this study hypothesises that:

Hypotheses 3 (H3). *CAC is positively associated with performance in cooperatives.*

Board composition can affect performance in different ways. The willingness of men and women to cooperate is one of them. Accordingly, the extent to which directors engage in strategic alliances and the types of strategic alliances forged will depend on their perceptions of the competitive advantages derived from these strategic partnerships [75].

Despite the important repercussions of strategic alliances for firms, the influence of GDDB on a firm's capacity to develop strategic alliances has been scarcely studied. Francis et al. [76] analysed whether firms with female directors forged more alliances compared to firms with all male directors, using a panel dataset of alliances in U.S. firms between 1997 and 2014, and found support for this hypothesis. Post et al. [17] analysed strategic alliance formation as a way in which women on boards can influence firm performance, and after analysing 36 firms in the U.S. oil and gas industry, the authors found that as the representation of women on the board increased and the number of independent directors grew, firms were more likely to form renewable energy alliances.

Bae & Skaggs [77] examined the moderating role of networks on gender diversity in the relationship between management and productivity and found no significant effect for the interaction between gender diversity in management and networks.

Otieno & Ogutu [75] tried to determine the perceptions of cooperative insurance group managers towards strategic alliances and found that women rated higher than men that various strategic alliances led to a greater competitive advantage.

To our knowledge, there are no studies in cooperatives about the influence of GDDB on the likelihood of developing alliances, and specifically, their moderating effect on performance. Accordingly, this study hypothesises that:

Hypotheses 3a (H3a). *GDDB moderates the relationship between CAC and performance, to the extent that the expected positive relationship becomes stronger in cooperatives with greater GDDB.*

2.6. Export Intensity Performance and the Moderating Role of GDDB

There are multiple works that analyse the relation between export intensity (EI) and performance. There is relative consensus about the fact that exporting firms have higher productivity, higher employment, wages, capital intensity, and profitability, compared to their non-exporting counterparts [25,78–80]. This superiority of exporters versus non-exporters generates what has been named export premium, which has been calculated in several variables (profitability, R&D, etc). Scholars have investigated the cause and effect relationship between exporting firms and productivity. There are two alternative, though not exclusive, hypotheses that aim to explain it: Are exporting firms already

over-performing before they export or, conversely, do they become more productive as a result of exporting? [81,82]. The first hypothesis points to self-selection of the most productive firms: Differences between exporters and non-exporters may, in part, be explained by ex-ante differences between firms and, as a consequence, the most productive firms are the ones that become exporters [78,82,83]. The second hypothesis points to the role of learning-by-exporting, stating that exporting makes firms more productive [84–86], as there is a positive influence of exports on productivity obtained in different ways (technical assistance provided by buyers to exporters, knowledge acquired by exporters about more advanced technologies, learning about market opportunities for new products, and increasing use of capacity by expanding sales, etc.) [86]. Although there is evidence supporting both hypotheses, self-selection and learning-by-doing, the first hypothesis—that firms are more productive before they start to export—has gained consensus [81].

Irrespective of these approaches, and without seeking to delve deeper into the direction of this causal relationship, this study aims to identify the relationship between EI and performance. Therefore, we posit the following hypothesis:

Hypotheses 4 (H4). *EI is positively associated with performance in cooperatives.*

One of the weaknesses of these studies is that they do not distinguish clearly between the effects of exporting and the unobservable differences between exporting and non-exporting firms [86]. In fact, export status is correlated with firm characteristics that have an influence on performance.

The firm characteristics that have a relationship with internationalisation and export behaviour include corporate governance, and within this, the composition of boards of directors. In this sense, board members' experience (foreign education, previous experience in an international background, immigrant background), board size, degree of independence, family ownership and domination, foreign ownership, involvement of board members in technical functions, and gender, have an effect on exports [87]. Out of these characteristics, the influence of gender has been deemed as “virtually unexplored” [88].

Existing research has reached different conclusions. Some studies found that female-owned firms and female-led firms were less likely to export [87–90], while others found that the presence of women (as the CEO) [91], or on the Board of directors [87,92] did not affect export orientation.

Idris & Saridakis [93], in a study about small and medium-sized enterprises (SMEs) in the UK, examined the link between the presence of female directors and exporting activity and found that SMEs with women on the Board of Directors were less likely to be involved in exporting compared to SMEs without female directors. However, when female directors used network advice, the negative effect of women directors on boards was significantly reduced. In this sense, [87] stated that while female-led boards are generally more oriented to domestic markets, this effect could be reversed when recruiting female directors with successful exporting experience.

Song et al. [94] examined the contingent role of internationalisation on the relationship between board diversity and firm performance in the lodging industry and found that as the degree of internationalisation of a lodging firm increased, the positive effect of gender diversity on firm performance appeared to grow. In other words, the operational complexity of internationalisation provides greater opportunities for female board members to display their range of abilities and to harmonise the different perspectives of each board member for optimal decision-making.

The explanations provided by certain authors about the lower likelihood of exporting in female-owned firms or female-led firms point to the significant and varied challenges faced by women entrepreneurs compared to their male counterparts, such as smaller company size, difficulties in accessing financial capital, lower risk tolerance, work and family priorities, and a lack of foreign marketing information [12,87,95].

In fact, the international success of firms is highly dependent on whether they are equipped with adequate firm-specific advantages such as innovation and marketing capabilities, which are gendered. Lee et al. [89] stated that it is not simply a matter of having male entrepreneurs if one wants to achieve

better performance in foreign markets. Accordingly, once female-owned start-ups adequately possess upstream and downstream firm-specific advantages, they can be as profitable as or even better than their male-owned counterparts in exploiting business opportunities through foreign market exports.

Based on these prior studies, if a negative relationship between gender diversity and exporting activity is predicted, this study hypothesises that:

Hypotheses 4A (H4a). *GDDB moderates the relationship between EI and performance to the extent that this positive relationship becomes weaker in cooperatives with more GDDB.*

2.7. Environmental Concern (EC), Performance and the Moderating Role of GDDB

The current agri-food sector is characterised by high levels of environmental and social impacts, causing the deterioration of ecosystems, public health, and livelihoods. As a consequence, over the last few decades, firms have adopted environmental management practices as a reaction to the increased environmental legislation, concern over liability, the direct and indirect costs of regulatory compliance, concern about overall firm competitiveness, and public concern about environmental degradation [96].

Firms need to balance these practices while staying competitive. The effects of EC and the practices derived from it on firm performance have also been widely analysed, and although there are studies that state that environmental practices are not significantly related to performance [97], the majority show a positive relationship, even in times of crisis [98]. Rabadán et al. [99] stated that companies operating in the agri-food industry improved their performance through eco-innovative strategies, by developing new markets and reducing costs (energy, raw materials, cost of capital). Another study [100] showed that green supply-chain management practices (internal environmental management, collaboration with customers, green purchasing, eco-design and packaging, warehousing, and green building) had a positive effect on organisational performance.

Other scholars proved that revenues can be fostered. In this regard, D'Souza et al. and Kong et al. [101,102] claimed that the improvement of green corporate perception has proven to be positively related with green purchasing intentions; while [103] found that the stronger the environmental consumer perceptions, the greater the intention to pay the price premium incurred by companies for resorting to clean technology, and process and product stewardship practices.

In turn, green product development creates new opportunities for firms and specifically for agri-coops [104], such as opening up new markets and introducing new technologies [105], and enhances financial performance compared to companies that do not develop these products [106,107]. Accordingly, we hypothesise that:

Hypotheses 5 (H5). *EC is positively associated with cooperative performance.*

Environmental concern is a response to one of the so-called real-world social dilemmas, which refer to situations involving tension or conflict between individual and collective interests, and whose solutions require a cooperative attitude, which entail personal sacrifices for the greater good [108].

The majority of the existing literature shows that women are more concerned about EC than men [109]. However, differences between men and women in this regard depend on the sphere considered. Some scholars have found that women are significantly more pro-environmental in the private sphere (household upkeep and purchases), while men are equally or more likely to demonstrate concern at a political level (economic participation in environmental groups, signing petitions about environmental issues, attending meetings, etc.) [108,110].

Men and women's green attitudes, in terms of consumers' willingness to purchase environmentally friendly products [111], have been analysed by scholars and have yielded mixed results. While Lee, K. [112] found significantly higher purchasing intentions in women than men, ref. [113] and [114] found no significant differences between men and women's attitudes towards purchasing green products.

At an entrepreneurial level, board diversity has proved critical to environmental engagement [115] with some studies proving that female entrepreneurs are more engaged in green issues than their male counterparts [116]. However, the effect of female board members on strategic decision-making related to environmental sustainability has been scarcely explored. Post et al. [17] found that company commitment to environmental performance was higher in firms with a greater representation of female directors and/or independent directors. In a sample of 142 French innovative firms, ref. [117] found significant evidence of a positive relationship between environmental innovation and gender diversity on boards of directors. Liao et al. [106] examined the impact of corporate board characteristics on the voluntary disclosure of greenhouse gas emissions (GHG) in a sample of the 329 largest companies in the United Kingdom, and found a significant positive association between gender diversity (measured as the percentage of female directors on the board) and the willingness to disclose GHG information as well as the extensiveness of these disclosures. Conversely, Glass et al. [115], using a dataset of all Fortune 500 CEOs and boards of directors over a 10-year period, found no evidence that, net of other factors, female CEOs were more likely than male CEOs to strengthen a firm's environmental practices, while gender diversity on the board only had a small positive effect on a firm's likelihood of supporting positive environmental initiatives.

Accordingly, based on these prior studies and considering a positive relationship between gender diversity and environmental concern, this study hypothesises that:

Hypotheses 5a (H5a). *GDDDB moderates the relationship between environmental concern and performance to the extent that this positive relationship becomes stronger in cooperatives with more GDDDB.*

The set of hypotheses put forwards leads us to define the research model illustrated in Figure 1.

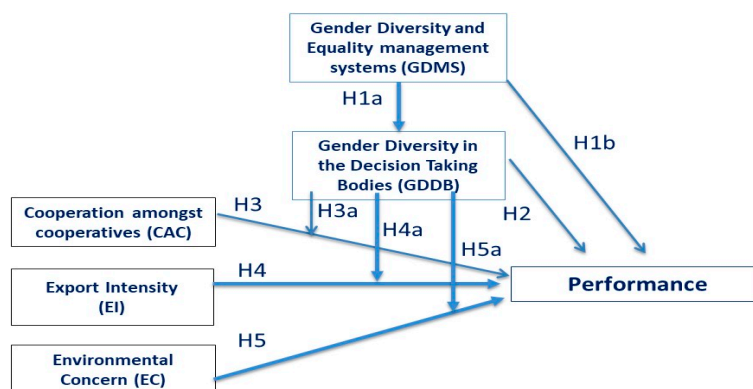


Figure 1. Research model and hypotheses.

3. Materials and Methods

3.1. Sample and Data Collection

The hypotheses were tested in a sample of 2489 Spanish agri-food cooperatives. The data correspond to 2018 and were provided by the Spanish Agri-food Cooperatives' Socioeconomic Observatory (Observatorio Socioeconómico del Cooperativismo Agroalimentario Español—OSCAE), which is part of Cooperativas Agroalimentarias de España, an umbrella organisation for Spanish agri-food cooperatives and SATs (Agricultural processing companies), which currently encompasses 3699 organisations. The OSCAE has been conducting surveys since 2005 and as of 2016, it began to include a question on gender policies. The survey response rate was 67.3%. Only 12% of the participating organisations indicated that they were implementing some kind of gender policy measures.

In terms of the legal form of businesses in the sample, the majority were agricultural cooperatives (90.2%), 6.5% were agricultural processing companies (SATs), which was the second most widespread form of social economy enterprise in Spain, 1.1% were community-based cooperatives, and 2.2% were cooperatives for the use of common machinery (CUMA). The sample companies were located

mainly in Andalusia (24.4%) and Castile La Mancha (23.3%), but also in the Valencian Region (9.6%), Extremadura (9%), Catalonia (7.4%), Aragon (5.9%), Navarre (5.2%), Castile and Leon (5.1%), Murcia (2.8%), Basque Country (2.35%), and Galicia (2.3%).

3.2. Measures

3.2.1. Predictors

Cooperation among cooperatives (CAC). In this study, CAC was measured by the number of federated cooperatives of which cooperatives were members. '0' represented stand-alone entities and 1,2,3, etc., represented the number of federated cooperatives they were members of.

Environmental concern (EC). We defined EC as cooperative concern with regard to the effects and consequences of ongoing environmental deterioration, which is reflected in firm strategies. We measured EC as the sales of organic products in 2017 as a percentage of total turnover.

Export intensity (EI). EI represented the degree of exporting activities measured as the percentage of exports compared to total sales in 2017.

Gender diversity and equality management systems (GDMS). GDMS were related to policies, practices, and programmes intended to enhance workplace gender diversity and inclusion [33]. A dummy variable called "GDMS" was created, with 0 representing "non-gender diversity policies in the cooperative" and 1 representing "gender diversity policies".

3.2.2. Moderators

Gender diversity in decision-making bodies (GDDB). GDDB was defined as the degree of gender heterogeneity in decision-making bodies (DMB), using Blau's index [118]. Blau's index has been suggested as an optimal measure of diversity to capture variations within a group of people [119].

Therefore, gender diversity was measured using Blau's index of heterogeneity ($1 - \sum \rho_i^2$), where ρ represents the proportion of group members in each category (for men and for women). The index can range from 0 when there is only one gender on the board (complete homogeneity) to 0.50 when there are equal numbers of men and women on the board.

To obtain the GDDB Index it was first necessary to calculate the composition of women in the DMBs, and this is proposed below:

Decision-making bodies (DMBs). Decision-making in cooperatives is conducted at different levels. While operational decisions are made by the management teams, strategic decisions are made by the Board of Directors and the General Assembly. Though the General Assembly is the highest decision-making body in a cooperative, the fact is that the decisions made by this body are influenced by the Board of Directors, which previously discusses the strategic issues to be debated, and prepares the proposals that are to be submitted to the General Assembly. The reality is that these proposals are normally ratified. Therefore, the actual power that the Board of Directors has in the decision-making of the cooperatives is much higher than that of the members. Consequently, in this study, in order to reflect the reality in the strategic decision-making of cooperatives, the participation or influence of the board in decision-making was set at 80%, and that of the General Assembly at 20%. These percentages were established based on the information provided in interviews with Cooperative Directors about the importance of both bodies (Board and Assembly) in the effective decision-making of the cooperatives.

Gender gap (GP). This variable represented the percentage difference between men and women in the cooperative's DMB. The same percentages were assigned as above (80% Board and 20% cooperative members). The value ranged from -100 when only women were on the DMB to 100 when the board was completely made up of men.

3.2.3. Outcomes

Performance. Performance has been measured by 2017 total sales divided by the number of cooperative members. There is no one best way to evaluate performance in cooperatives [120], and it

has been measured in different ways, including return on assets, return on investment, efficiency, price, income, and other asset turnover ratios [62,121]. Sales per member has also been considered as an useful indicator to measure performance in cooperatives [122,123].

3.2.4. Controls

The analyses controlled for the effects of organisational size and organisation type.

Size: In line with previous research, organisational size was operationalised as the total number of members in the cooperative, following [124–126]. This variable has a proven incidence on performance [127,128].

Social economy enterprise type (Type). This represents the company's legal form and may have an impact on performance. Accordingly, a dummy variable called 'Type' was created with '0' representing agricultural cooperatives, '1' representing SATs, '2' representing community-based cooperatives, and '3' representing CUMA [129,130].

4. Results

Before we conducted the main analyses, a correlation analysis was carried out to examine the relationships between all the variables in the study, as well as to consider the possibility of multicollinearity (in Table 1). Five regression models were then estimated to test the hypotheses posited; two models examining the direct influence of GDMS on GDDB and GDMS on Performance (in Tables 2–5) and three different models to assess the direct effect of CAC, EI, and EC and the moderating effect of GDDB on performance (in Tables 6–8). In addition, to test the differences between cooperatives with respect to GDMS on GDDB, we used Mann-Whitney U tests (in Tables 3 and 4).

Table 1 sets out the means, standard deviation, and correlation coefficients for all variables. Multicollinearity did not seem to be an issue because of low or moderate correlations between the controls, predictors, moderator and outcome variables, and VIF values.

Multivariate analysis was applied to test the hypotheses. We used multiple regression to test H1a and H1b.

To test H1a, GDDB was regressed on the control variables and GDMS (see Table 2). The results in Table 2 show that GDMS had a significant positive effect on GDDB ($B = 0.029$ $p < 0.001$). Thus, we found support for H1a.

To test the differences between cooperatives that had GDMS versus those without GDMS on GDDB, we used Mann-Whitney U tests, given that the exploratory data analysis identified the presence of severe non-normality in the distribution of both variables. The test results (see Table 3) indicate that there were differences between the two groups and that these were statistically significant (U test = 269,581.5 p -value = 0.000).

Table 4 shows our findings (mean, median, and standard error) for GDDB, revealing significant differences in cooperatives with GDMS as opposed to those without GDMS. These differences implied a higher GDDB in cooperatives, which had GDMS policies (0.166 versus 0.137)

In addition, as shown in Table 4, the gender gap was higher (in favour of men) in cooperatives that had not implemented any equality policy (78.56 versus 74.87). These differences were statistically significant (U test = 269,895.5, p -value = 0.000). See Table 3.

In turn, GDMS was regressed on the control variables and on performance (see Table 5). The results show that GDMS did not have a significant positive effect on performance ($B = 11,961.224$ $p > 0.05$). Thus, we did not find support for H1b.

To test the influence of CAC, EI, and EC on performance and the moderating role of GDDB, we used the Process macro [131], which is based on ordinary least square regression and uses the bootstrap method for inference.

Table 1. Means, standard deviations, and correlations.

	VIF	Mean	SD	1	2	3	4	5	6	7	8	9
1. Performance (n = 2498)		79,821.714	381,392.240									
2. Cooperation among Cooperatives (n = 2498)	1.050	0.580	0.814	-0.061 **								
3. Export Intensity (n = 2446)	1.029	6.618	18.777	0.262 **	-0.001							
4. Environmental Concern (n = 2446)	1.007	2.283	11.466	0.108 **	-0.011	0.070 **						
5. Gender Diversity in Decision-Making Bodies (n = 2446)	1.006	0.141	0.137	-0.030	0.003	-0.004	0.003					
6. Gender Diversity and Equality Management Systems (n = 2446)	1.024			0.031	0.098 **	0.147 **	0.007	0.069 **				
7. Size (n = 2498)	1.030	392.100	823.445	-0.078 **	0.140 **	0.025	-0.021	0.012	0.138 **			
8. Type1 (n = 2244)	3.723			-0.149 **	0.178 **	-0.080 **	-0.016	0.021	0.055 **	0.103 **		
9. Type2 (n = 162)	3.329			0.194 **	-0.120 **	0.142 **	0.036	-0.024	-0.012	-0.063 **	-0.783 **	
10. Type3(n = 28)	1.428			-0.005	-0.067 **	-0.038	0.012	0.056 **	-0.039 *	-0.038	-0.316 **	-0.028

* $p < 0.05$, ** $p < 0.01$.

Table 2. Regression results for gender diversity and equality management systems and performance—H1a.

Gender Diversity in Decision-Making Bodies			
	B	t	p
Constant ***	0.105	6.112	0.000
Cooperative Size	0.000	0.017	0.987
Type1	0.033	1.867	0.062
Type2	0.020	1.002	0.317
Type3 ***	0.018	3.461	0.001
GDMS ***	0.029	3.340	0.001
Model Summary			
R2	0.010		
F	11.15 **		

N = 2489; Unstandardised regression coefficients were reported: ** $p < 0.01$, *** $p < 0.001$.

Table 3. Mann-Whitney test (U test) for gender diversity in decision-making bodies.

	M-W Test	p Value
GDDB ***	269,581.5	0.000
Gender Gap ***	269,895.5	0.000

*** $p < 0.001$.

Table 4. Mean, median, and SE for gender diversity in decision-making bodies and gender gap.

	n = 2446			GDMS n = 299			NON GDMS n = 2147		
	Mean	Median	SE	Mean	Median	SE	Mean	Median	SE
GDDB	0.141	0.086	0.137	0.166	0.096	0.008	0.137	0.084	0.003
Gender Gap	78.11	87.39	27.09	74.87	83.95	26.00	78.56	87.84	27.22

Table 5. Regression results for gender diversity and equality management systems (GDMS) and performance—H1b.

Performance			
	B	t	p
Constant	43,184.928	0.957	0.339
Cooperative Size ***	−32.146	−3.587	0.000
Type1	3623.595	0.078	0.938
Type2 ***	234,397.700	4.363	0.000
Type3	14,626.163	0.179	0.858
Export Intensity ***	4786.534	12.133	0.000
Environmental Concern ***	2815.930	4.451	0.000
Cooperation among Cooperatives	−15,297.408	−1.677	0.094
GDMS	11,961.224	0.525	0.600
Model Summary			
R2	0.108		
F	0.276		
n = 2489			

Unstandardised regression coefficients were reported: *** $p < 0.001$.

Table 6. Regression for the moderating effect of gender diversity in decision-making bodies (GDDB) on performance (cooperation among cooperatives)—H3 and H3a.

	Performance		
	B	t	p
Constant	32,008.4	0.693	0.489
Cooperative Size ***	−32.17	−3.550	0.000
Type1	7514.58	0.160	0.873
Type2 ***	229,340.50	4.205	0.000
Type3	23,629.58	0.285	0.776
Export Intensity ***	4887.19	12.334	0.000
Environmental Concern ***	2818.53	4.413	0.000
GDDB	−65,621.44	−1.210	0.226
Cooperation among Cooperatives (CAC)	−15,151.20	−1.635	0.102
GDDB × CAC	39,077.14	0.565	0.572
Model summary			
R2	0.108		
F	32.676 **		
n = 2489			

Mean-centred variables. ** $p < 0.01$, *** $p < 0.001$.

Table 7. Regression for the moderating effect of GDDB on performance (export intensity)—H4 and H4a.

	Performance		
	B	t	p
Constant	73,760.52	1.607	0.108
Size ***	31.05	3.442	0.001
Type1	7277.92	0.156	0.876
Type2 ***	219,813.83	4.049	0.000
Type3	16,188.09	0.196	0.845
Environmental Concern ***	2736.81	4.413	0.000
Cooperation among Cooperatives	−14,775.55	−1.605	0.109
GDDB	−88,175.00	−1.646	0.100
Export Intensity (EI) ***	4905.78	12.443	0.000
GDDB × EI ***	−15,144.19	−4.953	0.000
Model summary			
R2	0.117		
F	35.691 **		
n = 2489			

Mean-centred variables. ** $p < 0.01$, *** $p < 0.001$.

Table 8. Regression for the moderating effect of GDDB on performance (environmental concern)—H5 and H5a.

	Performance		
	B	t	p
Constant	49,387.29	1.081	0.280
Cooperative Size ***	31.71	3.517	0.000
Type1	4800.58	0.103	0.918
Type2 ***	226,669.10	4.178	0.000
Type3	40,879.44	0.495	0.621
Cooperation among Cooperatives	−14,505.14	−1.576	0.115
Export Intensity ***	4854.78	12.314	0.000
GDDB	−60,991.49	−1.141	0.254
Environmental Concern ***	2724.09	4.285	0.000
GDDB × EI ***	−19,301.92	−5.009	0.000
Model summary			
R2	0.117		
F	35.761 **		
n = 2489			

Mean-centred variables. ** $p < 0.01$, *** $p < 0.001$.

As shown in Table 6, no evidence was found to support the effect of CAC on performance, moderated by GDDB. The interaction effect was negative and non-statistically significant ($B = 39,077.14$,

$t = 0.565$, $p > 0.1$). Likewise, there was no CAC effect on performance ($B = -15,161.20$; $t = -1.635$; $p > 0.1$).

The effect of EI and EC on performance was both positive and statistically significant (Tables 7 and 8) ($B = 4905.78$; $t = 12.443$; $p = 0.000$) and ($B = 2724.090$; $t = 4.285$; $p = 0.000$). Thus, we found support for H4 and H5.

Our findings about the moderating effect of GDDB on the EI and EC relationship with performance (H4a and H5a) show that both of them (EI and EC) interacted with GDDB to positively affect performance (see Tables 7 and 8).

As shown in Table 7, the interaction term was statistically significant ($B = -15,144.19$; $t = -4.953$; $p = 0.000$) in the model, indicating that GDDB was a significant moderator of the effect of export intensity on performance. The R2 change due to the moderating effect was 0.009.

Figure 2 shows a positive and statistically significant effect of EI on performance at low, medium, and high GDDB (Low GDDB = 0.0035; Medium GDDB = 0.1410; and High GDDB = 0.2785). In addition, as discussed in hypothesis H4a, the effect was greater when there was less GDDB diversity in the cooperatives. As diversity increased, the effect of exports on performance, while positive, decreased. Specifically, more EI led to higher performance in cooperatives with low levels of GDDB. Thus, we found support for H4a.



Figure 2. Moderating effect of GDDB on the export intensity–performance relationship.

Likewise, and in terms of hypothesis H5a, we found that the interaction term was statistically significant ($B = -19,301.92$; $t = -5.009$; $p = 0.000$) in the model, indicating that GDDB was a significant moderator of the effect of environmental concern on performance (see Table 8). The R2 change due to the moderating effect was 0.009.

However, contrary to expectations, this effect was greater the weaker the gender diversity in the decision-making team of the cooperative. In other words, the effect of EC on performance was positive but decreased as the degree of diversity rose.

Figure 3 shows a positive and statistically significant effect of environmental concern on performance at low, medium, and high gender diversity in decision-making bodies (Low GDDB = 0.0035; Medium GDDB = 0.1410), but it was not statistically significant at high GDDB = 0.2785. We see from the figure that the slope between EC and performance became increasingly positive at low and medium GDDB levels.

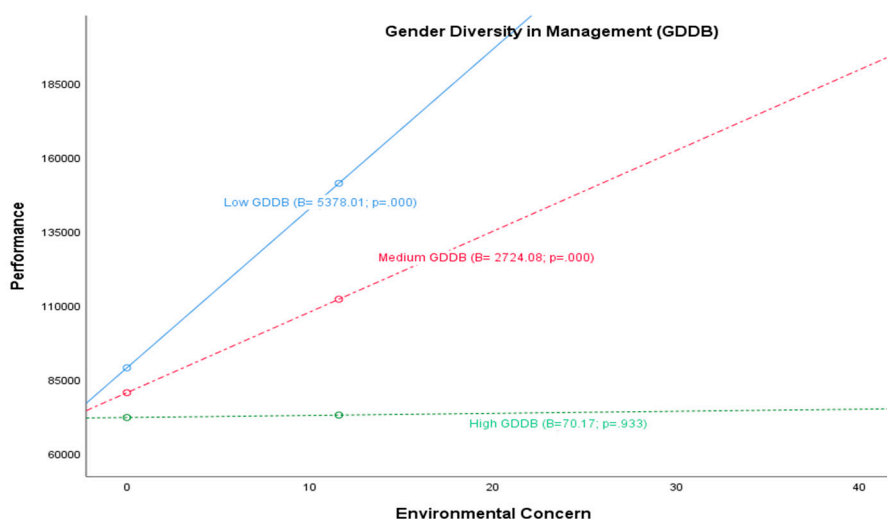


Figure 3. Moderating effect of GDDB on the environmental concern–performance relationship.

Specifically, more EC led to higher performance in cooperatives with low levels of GDDB. Thus, we cannot support H5a.

Finally, the relationship between GDDB and performance was not confirmed either, as it appeared with a negative sign, although not in a statistically significant way. See Table 6 ($B = -65,621.44$; $t = -1.210$; $p > 0.100$), Table 7 ($B = -88,175.00$; $t = 1.646$; $p > 0.100$), and Table 8 ($B = -60,991.00$; $t = -1.141$; $p > 0.100$). Thus, we did not find support for H2.

Table 9 shows a summary of the results.

Table 9. Hypothesis Summary.

Hypothesis	Result	Hypothesis	Result
H1a	Supported	H4	Supported
H1b	Not Supported	H4a	Supported
H2	Not Supported	H5	Supported
H3	Not Supported	H5a	Not Supported
H3a	Not Supported		

5. Discussion

The results obtained require discussion, both in terms of the expected confirmation of some of the hypotheses, and conversely, the non-confirmation of others. This will lead to an explanatory analysis of the reasons that may be behind the results.

The confirmation of the first hypothesis (H1a. GDMS has a positive effect on GDDB in cooperatives) leads us to corroborate the effectiveness of GDMS in promoting greater gender diversity in the different governing bodies of cooperatives, proving that cooperatives that have implemented GDMS have more women in their decision-making teams than those that have not implemented GDMS, with the differences being statistically significant. This was foreseeable since the implementation of these systems already shows the company's commitment to comply with this objective. These results are especially valuable in the agri-food sector, since it is one of the sectors with the weakest implementation of this type of measures in its companies [37]. Therefore, its effectiveness can undoubtedly serve as a stimulus for greater implementation.

However, the hypothesis (H1b. GDMS has a positive effect on performance) regarding its impact on the improvement of the cooperative's performance has not been validated, and the effect is not significant, coinciding with the results obtained by [39]. Although previous studies point to the

enhanced competitive advantage that may result from its implementation [36], the non-significance (though with a positive effect) may be due to the fact that many of the measures and policies related to gender in cooperatives have been recently implemented, and it could be argued that there has been little time for their development and consequent effects.

The results have also failed to corroborate the positive effect of GDDB on performance (H2. GDDB in cooperatives is positively associated with performance), showing the relationship as not significant. This coincides with the results of other studies, such as the one by [45] on capital companies and those by [10,60,61] on cooperative societies. However, these results have to be understood in the general context of a still very low number of women in the DMBs of cooperatives, which may explain their poor impact as a group. This is in line with the Critical Mass Theory [56], which states that the impact or effect of a subgroup on a group needs the group to acquire a minimum critical mass. More recent work has established that the relationship between GDDB and profitability is not linear, but instead U-shaped, and has found evidence that a “critical mass” of 30% of female representatives on the Board is sufficient for their effect on performance to be significant [132]. Other works, such as that of [133], established a minimum of three women on a board (the study was conducted on a sample of 328 companies with boards of between 8 and 12 members) for their effect on innovation to be significant, which seems to affirm the goodness of 30%.

Spanish agri-food cooperatives are still a long way from attaining this overall level of women on their boards of directors. In fact, the average number of women on the boards of cooperatives with a turnover of more than €10 million was 1.6 [61]. In our case, 67.3% of the cooperatives stated that there were no women on their boards of directors; 20.2% had only one woman, 8.2% had two women, 2.7% had three, and only 1.5% had four or more. The average number of women on boards of directors was 0.52 (SD = 0.915) while the average number of men was 7.23 (SD = 2.896).

Therefore, we agree with Burrell & Cook [55] in that this under-representation of women on boards of directors could be the cause of this scarce significance.

On the other hand, the results of contrasting the three hypotheses related to the impact of three of the most highly developed competitive strategies in agri-coops: CAC, EI, and EC (H3. CAC is positively associated with performance in cooperatives; H4. EI is positively associated with performance in cooperatives, and H5. EC is positively associated with performance in cooperatives) were positive and significant in the case of H4. (EI) and H5. (EC), and negative, although not statistically significant in the case of H3. (CAC).

With regard to the impact of CAC on performance, it is worth noting that it was not significant, when the literature extensively highlights the positive effect of alliances and other forms of integration on the competitiveness of cooperatives [64,134–136] and this is particularly true in the case of federated cooperatives [74].

These results can be explained by the fact that several studies indicate that intercooperation processes often involve integration processes from a legal point of view or form, but do not necessarily entail complete integration from an economic point of view. Thus, many cooperatives group together to obtain economies of scale in some fields of activity (normally supplies and marketing), yet their integration is not complete, and they are not subject to single common management, which is typical of real business groups. This may explain why their results were lower than expected.

With regards to the effect of EI and EC on performance, its positive and significant nature coincided with expectations (H4 and H5).

In the case of EI (H4), we should not forget that the agri-food sector is facing increasingly global and open markets. The opening of markets logically tends to be aligned with improved sales performance. In addition, there is an enormous concentration of the demand for food which, in most developed markets, means that these activities are concentrated in the hands of just a few global distribution firms (between three and five in a large number of countries) [137]. Therefore, it is logical for agri-coops to have intensified their internationalisation strategy in order to become more competitive and appealing

to these large distribution firms, and to do business with them, since not doing so would mean being left out of an important segment of the market.

With regard to EC (H5), it is very clear that the growth of environmental awareness in the population with increasing social demand for more environmentally friendly produce leads to firms that have intensified this strategy to be more competitive and have better performance, something that can be clearly seen in the agri-coops that are the focus of this study.

The results are less conclusive regarding the moderating effect of GDDB on these three strategies. In the first case (H3a. GDDB moderates the relationship between CAC and performance to the extent that the expected positive relationship becomes stronger in cooperatives with greater GDDB), it was found that the moderating effect of GDDB on the impact of CAC on performance, although positive, was not significant. This was also true in the case of the effect of CAC itself on performance. This was attributable to the same reasons already mentioned above.

In terms of the moderating effect of GDDB on the relationship between EI and performance (H4a. GDDB moderates the relationship between EI and performance to the extent that this positive relationship becomes weaker in cooperatives with more GDDB), this was significant and negative, confirming the hypothesis. This can be seen in Figure 2, which shows that the positive effect of EI on performance grew and intensified as GDDB decreased. In general terms, we can highlight two reasons for this, which may also be complementary. Firstly, the reluctance to export may be the real reflection of a lack of willingness to export on the part of the women on the boards. This is aligned with the results obtained by [93], and this, in turn, may be due to women's greater risk aversion, as confirmed by several authors, such as [138], and their more limited experience in international markets [87], probably due to their recent membership of the boards. The second reason, which is not incompatible with the first one, is that the voice and opinion of these women on boards of directors is not sufficiently prominent or influential in the boards' decisions, due to the aforementioned theory of not achieving enough critical mass.

Finally, regarding the moderating effect of GDDB on the relationship between EC and performance (H5a. GDDB moderates the relationship between environmental concern and performance to the extent that the positive relationship becomes stronger in cooperatives with more GDDB), this was significant and, as in the previous hypothesis, negative, which leads us to reject the hypothesis. As shown in Figure 3, the positive effect of EC on performance increased and intensified as GDDB decreased. These results go somewhat in the opposite direction to those provided by the existing literature, which point to greater environmental engagement and commitment among female entrepreneurs compared to their male counterparts [116], and more gender-diverse boards of directors [17]. Although some studies, such as the one carried out by [115], obtained less significant impacts, yielding a smaller positive effect between GDDB and performance.

The negative sign obtained may be due to different reasons. Perhaps, as Irwin et al. [108] pointed out, the supposedly greater environmental awareness of women is more limited to the private sphere (household upkeep and purchases), whereas men's environmental commitment is greater at the political and public level, a sphere that could include boards of directors. Although the most likely reason for this negative evolution is that the EC indicator we used, from the data we had available, was the percentage of organic products marketed by the cooperative as a percentage of the total, and the evolution of this may respond more to criteria linked to the launch of new products by the cooperative (in this case, organic products), rather than solely to greater environmental awareness. In this case, once again, the greater risk aversion of women and incipient knowledge of the markets, as in the previous example, could explain the negative impact of GDDB on the effect of this indicator on performance.

6. Conclusions

It can be stated that having more women in DMBs as a challenge of the gender equality objective, which is included in the United Nations Sustainable Development Goals, has not yet

reached a satisfactory level even in the most advanced countries and, despite the progress made, it is still insufficient.

Cooperatives, as the most representative expression of the social economy, shape their identity on the principles and values declared by the ICA and, therefore, they are the business formulas that are more sensitive to attaining this goal, as is the case with their social commitment [139].

Social economy legislation as a basic framework for the concept and definition of this sector's organisations sets out their legal identity based on a series of guiding principles that expressly include equality between men and women.

However, reports published by the ILO and ICA [5,6] express their concern about this issue because there are still poor numbers of female members in these organisations, especially on their boards of directors, even in sectors where women play an important role at grass roots level, as is the case of the agri-food sector.

Previous studies on GDDB (in cooperatives and in firms in general) have focused mainly on its effect on performance, while this study contributes to the literature by introducing the role of GDDB as a moderator of the effect of different strategies implemented by cooperatives to promote competitiveness on performance. In addition, to the best of our knowledge, there are no articles dealing specifically with the effect of GDMS in promoting gender diversity and performance in cooperatives' DMBs.

In this study, we have analysed the effects that gender policies and management have in agri-food cooperatives, firstly, regarding the level of gender diversity achieved in their DMBs, and secondly, the relationship of GDDB on the performance of these companies.

In addition, given the importance of certain key strategies in the agri-food sector in terms of the need to become more competitive in increasingly global and open markets, as a consequence of major changes in the demand for food, the effects of strategies such as cooperation among cooperatives (CAC), internationalisation through EI, and EC have been studied.

The results obtained are not as conclusive as might be expected, but they do testify on the one hand to a positive relationship between the implementation by cooperatives of GDMS and GDDB.

The hypotheses relating the competitiveness strategies analysed (CAC, EI, and EC) to performance were positive and significant for EI and EC. In the case of CAC, its negative effect and non-significance can be attributed to the fact that CAC implies a more formal rather than real and complete form of integration in its actual implementation.

The moderating effect of GDDB on the relationship between these competitive strategies and performance was only statistically significant in the case of EI and EC. This effect was negative in both cases, which in the second case was contrary to expectations. This means that the impact of both strategies on performance becomes more apparent as GDDB is reduced. These results must undoubtedly be understood in temporal terms and may be due in part to the limited experience and knowledge of women in management areas and specifically in markets, due to their recent inclusion in DMBs. It should be remembered that the social base of cooperatives is made up of producer members who, for the most part, do not have a university education, so the number of directors who have this type of qualification is small (although this has increased in recent years). These members gain their know-how from their own experience on the Board, and from training programmes that the cooperatives provide for them. In addition, there are still very few women in the DMBs of cooperatives (on average, in our sample there were 0.52 women on every Board of directors ($SD = 0.915$) which, according to the so-called critical mass theory, may be the reason for their limited significance.

Our results on the efficiency of cooperatives' implementation of GDMS in the generation of GDDB will undoubtedly be an element that policymakers can consider when designing gender policies. They will also help to promote the application of gender measures and policies in cooperatives in the agri-food sector, where such policies have very little real application [37]. At the same time, the findings of this study can assist cooperatives in making their boards of directors more efficient, insofar as, as we have pointed out, they need to bear in mind that it is not sufficient to include one or two women on these boards. Instead, all evidence points to the fact that a minimum critical mass is required

for their presence to have a significant effect on results. Likewise, the results about the existence of a negative relationship between CAC and performance should undoubtedly make cooperatives reflect on the real effectiveness of this type of integration model, and may serve to drive changes in federated cooperatives, moving towards greater commitment on the part of cooperatives and greater managerial unity.

Finally, it is worth suggesting some important avenues for future research in this field. An interesting line of work to be developed in this area is the identification of the critical mass threshold of women in the DMBs of cooperatives. This is a determining factor in raising the visibility of the effects of gender in decision-making and, therefore, its effect on the hypotheses studied. Its study and quantification could bring about changes and nuances to the results obtained in the present research.

Another line that could be worth analysing is the effect of CAC on performance, and specifically the analysis of the moderating effect that the greater or lesser degree of integration and commitment of the cooperatives in the established intercooperation/integration formulas exerts on this relationship.

It is worth highlighting some of the limitations of this study, stemming mainly from the database on which it was constructed, and the methodology employed. The first refers to the way in which profitability is calculated. Beyond their turnover, there was no economic and financial information available about the cooperatives, which meant that the performance analysis could not be complemented with other criteria based on commonly used ratios such as return on assets and return on investment. However, it should also be stated that agri-coop operations sometimes detract from the ability to explain results-based ratios, so we believe that the ratio used is just as appropriate (turnover/member). Second, the data used were cross-sectional, which did not enable us to establish a cause and effect relationship. Longitudinal research would be useful in this respect, though we believe that this study brings valuable and interesting results in this initial exploration.

It would also have been interesting to complete the CAC and EC predictors, as they were based on only one measurement, which may have biased the analysis. Thus, we based the likelihood of establishing CAC only on their participation in federated cooperatives, when these were not the only type of alliance developed by agri-coops. However, it should be noted that, in the case of Spain, it is not the only type of alliance, but it is the most important and widespread among cooperatives.

The case of measuring cooperatives' EC was also based on only one indicator: The percentage of organic products sold as a proportion of the total, when there are numerous actions carried out or in which cooperatives participate as part of their environmental commitment.

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