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Book

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WORKING PAPER

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Organizational models for the major agri-food cooperative groups in the European Union

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Abstract

In this paper, through the analysis of the organizational structure of the 20 largest cooperative groups in the European Union in four sectors (dairy, meat, horticulture and supplies; 80 in all), five organizational models were established, and their economic and financial characterization is provided. In these five organizational models, two groups of entities were analyzed differently: entities which, during their development have created a business corporation (with more or less participation of the cooperative or its members) and entities which have continued with a more traditional model (federated or not); to test whether the creation of business corporations has caused an increase in their size or financial stability, and if it has allowed them to improve their cost efficiency and profitability.

Keywords: cooperative, growth, conversion, transformation.

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1. Introduction

The cooperative form is highly present in all economic sectors in the European Union (EU) and prominently so in the food industry, where the average market share of all agricultural cooperatives in the EU is 40% (Bijman *et al.*, 2012). The degree of development achieved by many large European agri-food cooperative groups is also well-known. In the top 100 world cooperatives, 62 are from Europe, with an operating revenue of 192,700 million euros (Bekkum, 2013).

The influence of agri-food cooperatives is recognized in both institutional and academic fields. Thus, European institutions distinguish their ability to contribute to economic and social development in Member States, especially in those of recent addition (Commission of European Communities, 2001), identifying them as structures capable of: concentrating offer, rebalancing the role of producers in the food chain, increasing their bargaining power and giving more value to their products (Commission of the European Communities, 2009).

The Agri-food industry in which they operate is characterized by high price volatility, a growing demand concentration, and has suffered from a gradual rise in input prices, which has resulted in rising agricultural production costs and reduced income. In this context, increasing productivity desire has led to fewer and larger operations along the production and marketing chain, including farms, cooperatives, processors and retailers, which look for larger operations and reduced per-unit costs. As firms cut their costs, they become more competitive. In this way, they can increase sales and market shares at the expense of less profitable firms (Shields, 2012). Hence promoting integration processes between cooperatives to make them more competitive has become an important issue for EU governments and cooperative organizations (Committee on Agriculture and Rural Development, European Parliament, 2009).

Therefore, cooperatives have adopted various business growth strategies through formulas, such as mergers and acquisitions, joint ventures, creation of federated structures, etc., and by consolidating large cooperative groups in the EU. The final report of the study 'Support for Farmers' Cooperatives' (Bijman *et al.*, 2012) identified four different growth strategies: autonomous growth, horizontal mergers, vertical mergers and acquisitions, as well as international mergers and acquisitions; and stated that growth strategies rely on a high degree of autonomous growth in all sectors (increasing turnover by extending the current market and selling more or attracting new members).

One of the significant challenges for agri-food cooperatives is how to manage growth over time (Mazzarol *et al.*, 2014). In line with this, organizational models are a key element. Classifications of organizational models of cooperatives according to ownership rights or financial structure have been provided by Nilsson (1999); Chaddad and Cook (2004a) or Bekkum and Bijman (2006). This work aims to complement these categorizations, for which a classification of the 20 largest agri-food cooperative groups in four sectors

(dairy, meat, horticulture and supplies) in the EU was formed. This sorting was done after considering the type of companies that integrate them, the relations and interdependence between them (through shareholding in equity capital) or equity stake (for corporations). Based on this classification, a comparative analysis of the different types of groups was performed to verify whether adopting the diverse organizational models shows differential aspects for vital elements of cooperatives and their members, such as stability over time, profitability, expandability and members' benefit.

This paper is outlined as follows: Section 2 provides an overview of prior studies on organizational models (based on ownership structure), conversions and new formulas for expansion used by cooperatives. Section 3 describes the objectives and hypothesis raised in our study. Section 4 illustrates our sample selection procedure and the methodology used for the analysis. Section 5 presents the main results and discussion of our analysis. Section 6 summarizes the results and presents the conclusions. Finally, Section 7 offers the limitations and further directions of our study.

2. Prior research

According to Bijman *et al*. (2012), there are at least three main factors that determine the success of cooperatives in food chains, these being: the position in the food supply chain and the strategy adopted to find the best position along it, internal governance, and the institutional environment.

For previous authors, in a competitive market environment, a cooperative (like any other company) needs to choose its corporate strategy, which often entails choosing a suitable structure. This structure must respond to the cooperative's requirements which, in many cases, will require adjustments, but must preserve the cooperative's intrinsic and defining elements (e.g., farmer ownership and control). Changes in consumer behavior, technological development, chain structure power shifts and globalization have also given rise to capital-intensive strategies (Bekkum and Bijman, 2006).

Many scholars have analyzed the organizational and structural changes made by cooperatives in their growth strategies and internationalization processes (Chaddad and Cook, 2004a; Bekkum and Bijman, 2006), some of which focus especially on United States agricultural cooperatives (Collins, 1991; Barton, 2004) and others on European agricultural cooperatives (Nilsson, 1999; Bijman *et al.*, 2012). Among the studies on European agricultural cooperatives, we especially find works on the dairy sector (Guillouzo and Ruffio, 2005; Van der Krogt *et al.*, 2007).

There is a wide variety of organizational models that range from traditional cooperatives to those that have opted for other formulas, incorporating external investors, setting up listed and non listed corporations, creating hybrid

forms, etc. Sometimes these processes can even lead to the full demutualization[3] of the cooperative, with its complete disappearance and the creation of a business corporation (owned either by the cooperative or cooperative members/new shareholders, or even both). (Chaddad and Cook, 2004b).

Bijman and Hanisch (2012) distinguished different types of classifications of cooperatives/producer organizations in the EU. They called them classifications and not typologies. Later based on the information collected in the EU-27 Member States, they developed typologies that included combinations of classifications. They suggested using the following classifications to describe the types of cooperatives/producer organizations that exist in various EU Member States:

- the sector(s) in which they operate or the main product they handle
- the main functions they perform
- the diversity of functions and products covered
- the position they occupy in the food chain (or extent of vertical integration)
- type of members by distinguishing between primary (or first-tier) cooperatives and federated (or second-tier) cooperatives
- the geographical scope of membership that ranges from local, regional, national to international and transnational
- the financial/ownership structure
- the legal form by distinguishing association, cooperative, partnership, limited liability company (Ltd, BV, SARL., GmbH, SL, etc.), corporation (Plc., NV, AG, SA, etc.), and other forms.

According to the financial/ownership structure, cooperatives have been classified by several authors, among whom the following three stand out:

Chaddad and Cook (2004a) classified agricultural cooperative organizational models based on ownership rights, where the traditional cooperative and the IOF[4] are seen as opposed forms. These models are:

- Traditional Cooperatives, in which ownership is restricted to member-patrons, residual return rights are nontransferable, nonappreciable and redeemable; and benefits are distributed among members in proportion to patronage
- Proportional Investment Cooperatives, in which ownership is restricted to members, residual return rights are nontransferable, nonappreciable and redeemable, but members are expected to invest in the cooperative in proportion to patronage

[3] Other scholars, such as Fernandez Guadaño (2006), employ the term ‘decooperativization or isomorphism’.
[4] Investor-oriented firm (or Investor-owned firm).

- Member-Investor Cooperatives, where ownership is restricted to members, residual return rights are redeemable, and returns to members are distributed in proportion to shareholdings in addition to patronage
- New Generation Cooperatives, where ownership rights are restricted to member-patrons in the form of tradable and appreciable delivery rights
- Cooperatives with Capital Seeking Entities, which attenuates the restriction that cooperative rights are restricted to member-patrons. The cooperative does not convert into an IOF as the equity capital is acquired by a separate entity through a strategic alliance, a trust company or a publicly held subsidiary. So investors acquire ownership rights in a separate legal entity, owned wholly or partly by the cooperative
- Investor-Share Cooperatives, where the cooperative acquires a nonmember equity capital without becoming an IOF, and the investor-share cooperative issues separate classes of equity shares in addition to the traditional cooperative ownership rights held by patrons (preferred stock, nonvoting common stock and participation certificates)
- Investor-Oriented Firms, which chose to not continue operating as user-owned and controlled organizations, but change to a for-profit proprietary organization.

Nilsson (1999) identified five different organizational models for agricultural cooperatives:

- Traditional Cooperatives, in which the main features are that they are controlled completely by members, the enterprise is owned collectively by the society, the legal form is a cooperative society, entry is free, one member-one vote and profits are reimbursed to members as patronage refunds in proportion to members' deliveries
- The participation cooperative model, in which there are two share capital types: member and investor. Investors are paid for their investment with interest, or from the economic results, and can have the right to vote in the General Assembly or in the Board, but control lies in patrons' hands. In this organizational model, the cooperative does business and shares are tradable
- The subsidiary cooperative model, in which investors form part of the subsidiary, but are not directly involved in the cooperative. These external investors can be open (stock exchange) or closed (selected investors). If the subsidiary is owned 100% by the cooperative, it is considered traditional. The cooperative has control over the Board of Directors of the subsidiary company and its economic results are distributed to cooperative members (through the cooperative) and external investors, according to their investment
- New Generation Cooperatives (NGC): these cooperatives, originating from the United States, are not based on entry of capital from new investors (although they may have been in the minority), but on new contributions

from existing members. Membership in these cooperatives is restricted and based on acquisition of delivery rights from the cooperative. So each member's capital contribution is proportional to the volume to be supplied to the cooperative. Thus distribution of income to members is proportional to activity and, at the same time, also to investment in the cooperative. These cooperatives are highly professionalized. Voting rights are distributed equally among members, although this involves differentiation according to the volume delivered by each member.

For Harris *et al.* (1996), a key distinguishing feature of the NGC organizational structure lies in its use of transferable delivery rights, which are directly tied to members' equity contributions to the cooperative.

- The PLC cooperative model: a business corporation is created for the development of cooperative activity, and cooperative members become shareholders of the company (so voting power is in accordance with investments, and returns are in accordance with investment - not in patronage refunds), while also remaining as cooperative members, which is not extinguished. However, if external shareholders shares in the PLC exceed 50%, the company should not be taken as a cooperative.

Preserving members' control of the cooperative is a key and unavoidable element in the cooperative model. Not surprisingly, this is supported by the cooperative principle of autonomy and independence, which states that cooperatives are controlled by their members, who actively participate in setting their policies and making decisions. However as Bijman *et al.* (2012) pointed out, the (international) growth process of cooperatives is often accompanied by changes in internal governance, and entails the risk of loss of member control over the cooperative firm. In fact most cooperatives prefer internationalizing by acquiring or setting up foreign IOFs rather than merging with other cooperatives or inviting foreign farmers to become members. The main reason for this development is to avoid dilution of ownership (income and control rights).

Bekkum and Bijman (2006) studied the evolution of 50 international cooperative groups according to the innovations introduced in their cooperative ownership and how far they were from the classical cooperative form. Specifically focusing on publicly listed cooperatives, two groups were distinguished:

- Cooperatives which converted into limited companies and nothing specifically 'cooperative' remained, with member shares becoming detached from production. This allows members to redeem their shares at their discretion and to either continue or discontinue a transaction relationship with the company (Converted Listed Cooperatives – CLCs or converts)
- Cooperatives which obtained a public listing of their shares on the stock exchange in order to access external capital, but which maintained their cooperative identity. They were able to combine their cooperative objectives

with the benefits of access to external capital. The authors called them hybrid-listed cooperatives (HLCs).

Within hybrid-listed cooperatives, the authors differentiated the following types: external investors as a class of members (comparable with the 'investor-share cooperative model' of Chaddad and Cook, 2004a), the Irish model, the Finnish model, listed subsidiaries and listing value-added half of split business.

These hybrid forms emerge as a response by entities to search the organizational forms that enable them to sustain balanced growth. With them, cooperatives gain access to additional sources of capital apart from members, and also manage to overcome any problems arising from the difficulty of complying with some existing regulations, which as Bijman (2013) notes: on the one hand, promote agglutination under the Common Market Organization within agricultural policies; and on the other hand, do not allow other forms of collaboration through competition policies.

Among the hybrid ownership structures, Bijman *et al*. (2012) distinguish two types: cooperatives that allow foreign investors (nonusers) in either the cooperative or any of its subsidiaries (these outside owners become co-owners of, or part of, the cooperative's assets, and can also be farmer organizations - or farmer unions). And the second type includes the cooperatives that belong to farmers or to one organization of farmers, or more, and are no longer legally cooperatives. His work also remarks that hybrid cooperatives will become increasingly more common in the EU (e.g., HKScan or Atria are examples of hybrid forms, all of which are stock-listed). They combine the features of a traditional cooperative with the features of other legal forms, especially the corporation, and do not strictly comply with the principles that mark the difference of a cooperative: user-owned, user-controlled and user-benefit organizations.

Chaddad and Cook (2004b) showed that some mutual companies in the insurance, savings and loans industries (in the United States) have adopted the mutual holding company (MHC) structure instead of converting them into for-profit corporations. The MHC structure allows the mutual company to access outside equity without relinquishing member control. Therefore, these organizational innovations enable cooperatives to acquire permanent capital both from member and nonmember sources, while leaving control in current members' hands. As these authors conclude, mutual companies are not destined to disappear provided they are well-capitalized and managed while adopting effective corporate governance rules to protect member control.

3. Objectives and hypotheses

Based on the above background, we firstly classify the sample (the 80 major agri-food cooperative groups in the EU - in the meat, dairy, horticulture and supply sectors) by studying their corporate structure (existence of subsidiaries and percentage controlled by the cooperative, existence of a federated structure, creation of a corporation or PLC, and the percentage controlled by the cooperative). This classification allows us to identify five different organizational models and, based on them, we can observe their correspondence to those in another well-known taxonomy, that of Nilsson (1999), to facilitate the comprehension of our findings.

Secondly, we verify by statistical tools whether there are significant differences between the cooperatives included in each identified organizational model in areas such as business size (expandability), cost efficiency, profitability, members' benefit and financial stability. Thirdly from the five organizational models taken from our sample, we then group them into two sets of entities to analyze them differentially and to test the hypotheses put forward below:

- those that have created a business corporation, which acts as the holding company (with varying degrees of cooperative participation) to govern strategic alliances in downstream business, or to acquire a nonmember capital as a trust company, which can be listed or not.
- those that have maintained traditional cooperative structures (both first-tier and second-tier). We include in this model those cooperatives that have not opted for creating a business corporation, being the own cooperative which acts as the holding company, and maintains - if relevant - investments in subsidiaries.

Reality implies the fact that cooperative business strategies focus more on growth, value adding and internationalization, all of which require additional equity capital (Bekkum and Bijman, 2006). However, access to capital is not always an easy task. One of the main weaknesses highlighted in the traditional cooperative business model is its ability to secure access to external capital which, according to Cook and Iliopoulos (1999), is caused by vaguely defined ownership rights, inadequate upfront investment by members, and the fact that a share capital that is tradable, redeemable or appreciable is lacking. Traditional sources of financing cooperatives rely primarily on internally generated equity from operations, usually in the form of retained patronage refunds and debt from bank financing (Barton, 2004).

Accordingly, the need to acquire outside external equity is one of the main reasons that is leading cooperatives to develop new organizational models based, in some cases, on creating corporations in order to obtain nonmember capital to finance their growth. Not surprisingly, many of Europe's largest food

cooperatives have taken this path. Baywa, FrieslandCampina or Agravis are some examples of this.

Although it is usual to think that the legal structure of cooperatives prevents them from raising sufficient equity from outside investors, studies like that by Sangen (2012) state that the legal structure of cooperatives is no dissuasive factor in this respect. Furthermore, Bijman *et al.* (2012) observed that access to finance in many cooperatives was no major barrier to growth.

Hence, we herein attempt to find out if the cooperatives that have chosen to keep a distance from the traditional model by creating business corporations (consequently, this fact facilitates their expansion process and their internationalization) have achieved larger size and growth compared to those that have maintained a traditional structure. This leads us to formulate the first hypothesis (H1):

H1. Cooperatives which have opted for the creation of a business corporation have become larger in size than those that have remained traditional.

Differences in liquidity, financial position and other financial indicators between cooperatives and investor-owned firms (IOFs) have been analyzed by several authors, such as Venieris (1989), Parliament *et al.* (1990), Lerman and Parliament (1990), Gentzoglanis (1997) and Soboh *et al.* (2011). While Lerman and Parliament (1990) and Gentzoglanis (1997) noted significant differences in liquidity between cooperatives and IOFs (in this case, IOFs showed higher liquidity than cooperatives), authors such as Parliament *et al.* (1990) or Soboh *et al.* (2011) have shown that cooperatives occupy a stronger financial position, one that is closely related to solvency, than IOFs (all of which focus on the dairy sector, except Lerman and Parliament, 1990, who focused on the fruit and vegetable sector). Venieris (1989), who examined the wine sector, did not find those differences. These opposed assertions allow us to formulate the second hypothesis (H2):

H2. Cooperatives which have maintained their traditional cooperative structure have achieved greater liquidity and financial stability (solvency) compared to those which have opted for the creation of business corporations.

Regarding cost efficiency and profitability, Chen *et al.* (1985), Venieris (1989), Parliament *et al.* (1990), Lerman and Parliament (1990), Gentzoglanis (1997) and Soboh *et al.* (2011) analyzed differences in profitability between cooperatives and IOFs. Parliament *et al.* (1990), Lerman and Parliament (1990) and Gentzoglanis (1997) found no significant differences between both groups. Chen *et al.* (1985), Venieris (1989) and Soboh *et al.* (2011) affirmed that cooperatives are, on average, less profitable than IOFs. Along the same lines, Bijman *et al.* (2012) also indicated that traditional cooperatives present poorer performance, while cooperatives with outside owners obtain higher returns.

These results support those obtained by Chaddad and Cook (2004b), who concluded that the conversion of cooperatives into business corporations (in the savings, loans and insurance industries) enhances business efficiency and eliminates financial restrictions:

One of the elements that has the strongest impact on corporate profitability are costs. For this reason their knowledge and control are an unavoidable element in business management. Accordingly, once the profitability of the different groups (traditional cooperatives or corporations) has been established, it is interesting to know the reasons for their higher or lower profitability, and specifically those related to cost efficiency. For example, in relation to staff costs, O'Connor and Thompson (2001) stated that cooperatives pay senior managers lower salaries compared to corporations. This leads us to put forward our third hypothesis (H3):

H3. Cooperatives which have opted for the creation of a business corporation during their development have achieved higher cost efficiency and profitability levels.

4. Sample, data and methodology

4.1 Sample selection

For sample selection purposes, we used the COGECA lists provided by one of its publications ("Agricultural Cooperatives in Europe. Main Issues and Trends", 2010), which show the top ten European cooperative groups that belong to the dairy, meat, horticulture and supplies sectors. These have moved up to the top 20 (in each sector), using a list provided by the International Cooperative Alliance (ICA) - which shows the 300 largest and most important cooperatives in the EU - and the Amadeus database, according to the following criteria:

- Being a cooperative in the EU. Business corporations were included if they were owned partly by a cooperative. A group headed by a corporation is commonly accepted as a cooperative group by scholars, while more than 50% of corporation shares are owned by a cooperative or its members, thereby ensuring that the cooperative has control over the group (Bijman *et al.*, 2012). We were unable to gain access to information about the total amount of shares owned by the cooperative or its members, mainly because members are anonymous. For this reason, the established condition to consider a group as a cooperative group - and include it in the sample - has been *to be owned partly by a cooperative*.

- Belonging to the dairy, meat, horticulture or supplies sectors, according to the 'Statistical Classification of Economic Activities in the European Community[5]'.
- The turnover used to select the top 20 cooperatives dating back to 2009 (all the data were obtained from the group's consolidated financial statements).

The final sample, which included the 80 groups under study, is shown in Appendix 1.

4.2 Data and description of variables

Thirteen indicators were chosen for the analysis (Table 1), which analyzed five different areas of the entity: employment, size, financial position, profitability and cost efficiency.

Table 1: Classification of variables

Group	Variable	Ratio explanation
Employment	Number of employees	
Size	Operating Revenue	
	Total assets	
	Shareholder funds	
Financial position	Solvency ratio	(Shareholder funds/total assets)*100
	Liquidity ratio	(Current assets-Stock)/Current liabilities
Profitability	**Traditional profitability ratios:**	
	ROE (Return on Equity)	(Profit and losses before taxes/Shareholder funds)*100
	ROA (Return on Assets)	(Profit and losses before taxes/Total assets)*100
	Members' benefit:	
	(PLBT+Materials)/Total assets	Profit and losses before taxes+ Materials/Total assets
	(PLBT+Materials)/Op.Revenue	Profit and losses before taxes+ Materials/Op. Revenue
Cost efficiency	Cost of employees/Op. Revenue	
	Depreciation/Op. Revenue	
	Materials/Op. Revenue	Cost of goods sold/Op. revenue

The indicators - or ratios - used to measure employment, size, financial position or cost efficiency are commonly used by scholars to analyze these variables in IOFs and cooperatives.

[5] Codes :
- Dairy: 1050/ 1051/ 4633
- Meat: 1010/ 1011/ 1013/ 4632/ 4623
- Horticulture: 1030/ 1031/ 1039/ 4631
- Supplies: 1091/ 4611/ 4614/ 4617/ 4621/ 4623/ 4661/ 4671.

In performance terms, the specificities of the cooperatives recommend, as various authors have pointed out (e.g., Singh *et al.*, 2001; Kyriakopoulos *et al.*, 2004; Guzmán *et al.*, 2006; Soboh *et al.*, 2012), the need to use different instruments to those normally employed to analyze IOFs. The reason is that, as Soboh *et al.*, (2009) stated: "*cooperatives are firms with a dual purpose: they have to cope with the competitive market environment and have to fulfill the objectives of members firms. Members' return and continuity should be viewed as the core of the cooperative's objectives*".

Along these lines, return on assets (ROA) and return on equity (ROE) reflect the enterprise's capacity to provide returns to members through patronage refunds. Yet they do not take into account other benefits of members, such as cooperative capacity to pay high prices for their products. However, cooperative members have traditionally expected to receive their returns in the form of improved prices for their products or lower input prices, rather than direct returns on their equity investment in their cooperative (Parliament *et al.*, 1990). Mazzarol *et al.* (2014) state that members' benefits, rather than profit maximization, are the distinctive feature of cooperatives.

On the contrary, and based on an analysis of marketing cooperatives' structures, Kalogeras *et al.* (2007) stated that members prefer that their cooperatives' equity structure moves from the proportional type of financial arrangements to a more investor-oriented firm, and that the cooperative distributes benefits to members' shareholdings in addition to product price.

One approach to analyze both member returns is the proposed ratio (PLBT+Materials)/Total assets, or operating revenue, which compares the benefit payable to members through both the patronage refunds and productions delivered to the cooperative (materials) to assets and operating revenue. The applicability of these ratios lies in the fact that materials play a different role in cooperatives and IOFs due to the member-supplier dualism in cooperatives (Soboh *et al.*, 2012).

However, these profitability ratios do not apply in supply cooperatives, to the extent that their members act in the cooperative as buyers, and not as sellers. This led us to exclude supply cooperatives from the calculation of both members' benefit ratios.

It should be taken into account that materials (supplies) include not only those provided by members, but also materials purchased from other suppliers. However, the highest percentage of this item in cooperatives is due to members' purchases, so the fact that a cooperative allocates a higher percentage of its turnover to purchase products, implies that the suppliers of these products (mainly including members) have access in concept of payment to a higher proportion of the cooperative income obtained from this sale. This represents for members an improvement in the benefit obtained, from being cooperative members, which comes in the form of a better payment for their deliveries to it.

Thus the point that these ratios contain both the benefit payable to members - through patronage refunds (considered in frequent profitability ratios: ROA and ROE) and that originated from members' production payment - improves the interpretability of profitability in cooperatives. In this sense, large differences between members' benefits ratio tendency and ROA/ROE (the former being the higher) may indicate a better capacity to pay members' production, which is not contemplated in common profitability ratios.

4.3 Methodology

To establish the different organizational models developed by the major agri-food cooperatives groups in the EU that integrate the sample, their organizational structure was analyzed. For that purpose, the cooperative groups structure was examined, more specifically the type of companies that integrate them, the relations and interdependence between them (through shareholding in the equity capital) and equity stake (for corporations). As a result, five categories were formed, which correspond to five different models.

To find out whether there were significant differences among the five identified groups, two tests were run: a one-way ANOVA test was used for the variables with normal distribution and the Kruskal-Wallis test (a nonparametric test analogous to the one-way ANOVA test) was employed when they showed no normality. A *post hoc* test was performed to test the groups where differences were found: a Mann-Whitney test was applied to each pair of groups (for non-normal distributions) and a t-test (for normal distributions).

To test H3, two sets of entities were (differentially) analyzed: entities that created business corporations (with varying degrees of cooperative participation), and those that maintained traditional cooperative structures. To this end, the sample was classified into two groups:

- A: those with a cooperative core (both first-tier and second-tier), where the own cooperative acted as the holding company
- B: those with a business corporation as the holding company.

To test the differences between these two groups, the Mann-Whitney test (for non-normal distributions) and the t-test (for normal distributions) were used.

Finally, a logit function was employed to validate and complement the results obtained from the last hypotheses testing. More specifically, we used logit (models of binary choice - cross section) to compare groups A and B - in 2009 - as the dependent variable was dichotomous. Note that the logit command estimates the discrete dependent variable 'model binomial' by the maximum likelihood method by assuming that the error term was distributed as a (normal) logistic distribution.

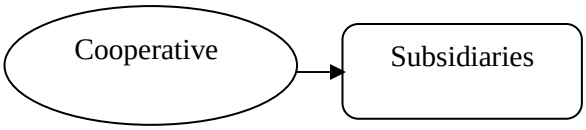
5. Results of the analysis and discussion

5.1 Organizational models in major European agri-food cooperative groups

From the analysis of the sample's organizational structure, five categories were formed that corresponded to five different organizational models.

- **1. - First-tier cooperatives, which act as a holding company and directly manage the group; hereinafter termed the 'traditional first-tier cooperatives group' (TC1):** This group is made up of cooperatives that head the group (parent company), and direct subsidiaries are subordinated to the cooperative. Arla Foods (Sweden-Denmark), Danish Crown (Denmark) and Flora Holland (Holland) are examples of this structural model.

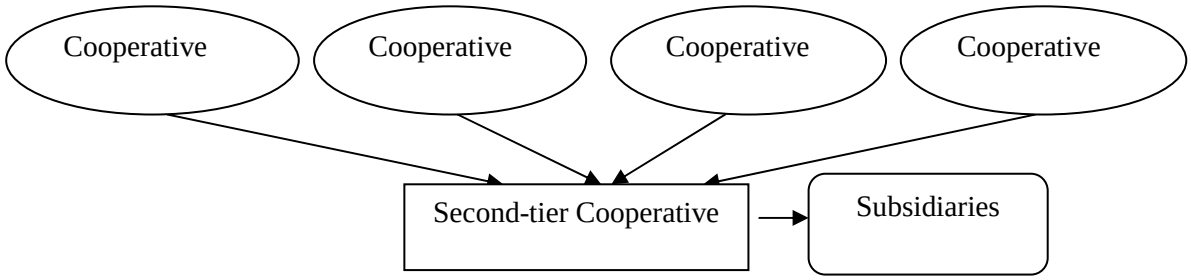
Figure 1: Traditional first-tier cooperatives group (TC1)



- **2. - Federated Cooperatives; hereinafter termed the 'traditional second-tier cooperatives group' (TC2):** Cooperatives whose members are cooperatives. This second-level undertakes activities, normally industrialization and commercialization, to enhance the sale of the products of its member cooperatives and to add value to them. They establish a network of subsidiaries with the second-tier cooperative acting as the holding company. Member cooperatives may also have their own subsidiaries. The Irish Dairy Board (Ireland), COREN (Spain) and Conserve Italia (Italy) belong to this structural model.

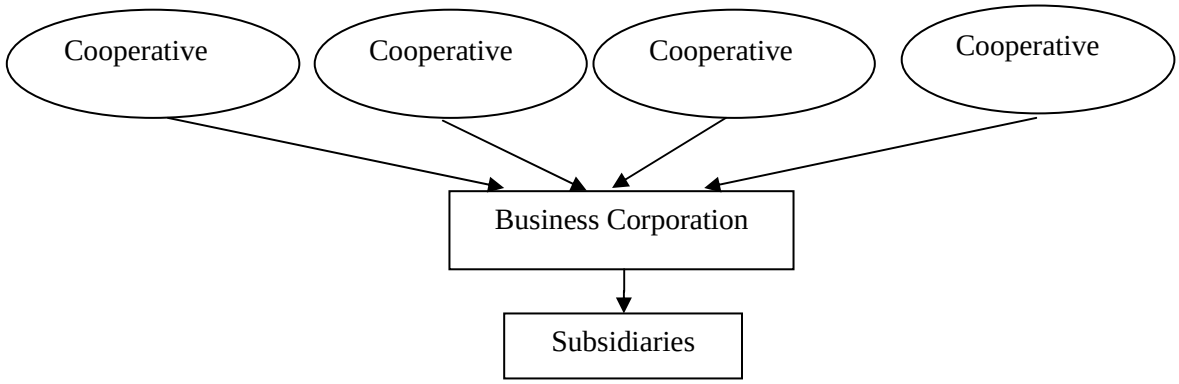
  Federated cooperatives have been much responded in professional and academic fields for several reasons. Among them, it is also worth noting organizational and internal governance problems that sometimes arise and lead to paradoxes, e.g., second-tier cooperatives compete in markets with their own base cooperatives (Meliá, 2003). According to Bono and Iliopoulos (2012), the number of second-tier cooperatives in several EU countries is declining as either a local cooperative is taking over the second-tier cooperative's activities or the second-tier cooperative is being transformed into a primary cooperative. The rationales behind such development are usually the requirement for closer supply chain relations between farmers and the business units of second-tier cooperatives.

Figure 2: Traditional second-tier cooperatives group (TC2)



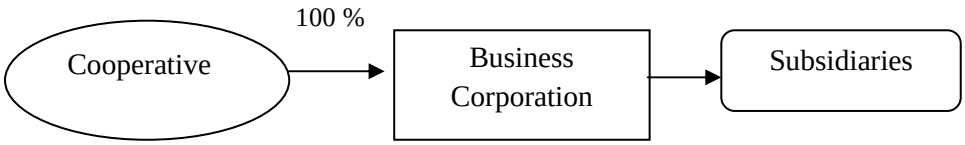
- **3. - Different cooperatives which create a business corporation and act as the holding company; hereinafter termed Federated Cooperative Corporations (FCC):** Different cooperatives (more than one) create a business corporation which acts as the parent company and has control over subsidiaries. Cooperatives can also have their own subsidiaries. It is similar to the federated model, but the enterprise created by cooperatives is a corporation instead of a cooperative. VALIO (Finland) and Maine Viande Socopa (France) belong to this group.

Figure 3: Federated Cooperative Corporations (FCC)



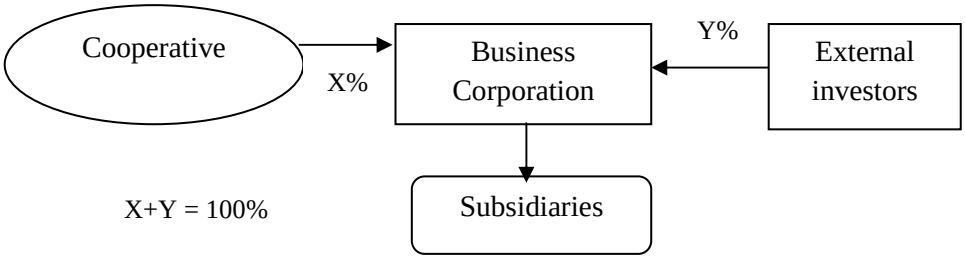
- **4. - Cooperatives that have created a business corporation, of which they own 100% of the capital, and acts as the holding company; hereinafter termed 100% Cooperative Corporation (CC-100):** This group includes those cooperatives that have created a business corporation to act as the parent company, and the cooperative is that which holds the 100% business corporation. In this case, the cooperative has total direct control over the corporation, and through it, indirect (total or partial) control over subsidiaries. FrieslandCampina (Holland) and The Greenery (Holland) are examples of this organizational model.

Figure 4: 100% Cooperative Corporation (CC-100)



- **5. - Cooperatives which have created a business corporation that acts as the holding company of which they own less than 100% of the capital; hereinafter termed Cooperative Corporations (CC):** The cooperative creates a corporation, but does not hold 100% of its capital. In this case, it is common for the company to go public. The cooperative, or its members, hold(s) a percentage of the corporation, and the rest belongs to other investors. In this work, we do not provide information in all cases about the percentage of capital held by the cooperative or its members (especially if it is in the hands of the latter) and other investors. We chose to include as CC all those in which external investors were admitted, even if it is known that if the weight of external investors in the corporation exceeds 50%, the group will no longer be considered a cooperative. Glanbia (Ireland), HKScan (Finland) and Agravis (Germany) have opted for this model.

Figure 5: Cooperative Corporations (CC)



In Appendices 1 and 2, the cooperative groups of the sample are included in each category and some remarks about them have been made. The order of the five above-presented models ranges from 1 to 5, which refers to the closest proximity and the furthest proximity to the traditional cooperative model - in terms of ownership.

The majority type in all sectors is the "first-tier traditional cooperatives group" (TC1), followed by the "second-tier traditional cooperatives group" (TC2), thirdly by "Cooperative Corporations" (CC), then by "100% Cooperative Corporation" (CC-100) in fourth place, and lastly by "Federated Cooperative Corporation" (FCC). It is important to remark that among the top 20 European cooperative groups, no cooperatives in the supplies sector belong to groups FCC and CC-100, and neither are there cooperative groups in the horticulture sector that belong to groups FCC and CC (Table 2).

It is noteworthy that in our sample, almost all the entities that have created business corporations (shown in group FCC, CC-100 or CC) are from northern or central Europe, while southern European countries like Portugal or Italy only have a single entity that belongs to such models. In the case of Spain, there is no entity in our sample that belongs to group FCC, CC-100 or CC.

Table 2: Percentage distribution of the different structural models

	TC1	**TC2**	**FCC**	**CC-100**	**CC**	**TOTAL**
Dairy	40%	5%	10%	20%	25%	100%
Meat	65%	5%	10%	5%	15%	100%
Horticulture	50%	30%	0	20%	0	100%
Supplies	60%	25%	0	0	15%	100%
TOTAL	52.5%	16.25%	5%	11.25%	15%	100%

It is also important to note that the previous classification is not based on another existing categorization, but on an analysis of the organizational structure of the cooperative groups that comprise the sample. For this purpose the following aspects were taken into account:

- The type of companies that integrate them
- The relations and interdependence between them (through shareholding in equity capital)
- The percentage stake in the share equity (for corporations).

However, we do not provide information about:

- Existence of external investors in cooperatives, in addition to members, which would determine, according to Nilsson's (1999) classification, the 'Participation cooperative model' category
- The share-equity distribution of subsidiaries, which would allow us to differentiate (depending on whether it belongs 100% to the cooperative or is a smaller proportion), between the traditional and subsidiary categories established by Nilsson (1999).

To make our classification more understandable, and given the limitations indicated above, in the table below we introduce a comparison with Nilsson's taxonomy (1999).

Table 3: Relationship between the defined organizational models and Nilsson's classification (1999)

Our model	Comments	Nilsson's (1999)
TC1, TC2	Those cases in which all subsidiaries are 100% owned by the cooperative can be assimilated to ….	Traditional cooperatives
	Those cases in which subsidiaries are partly owned by external investors can be assimilated to ….	Subsidiary model
FCC, CC-100	They cannot be directly identified with any of the Nilsson's models as: - They do not belong to a PLC model as the created corporation is owned 100% by the cooperative/s. - They could be assimilated to either traditional models if all the created companies are 100% owned by the cooperative/s or subsidiaries if partly are owned by external investors.	
CC	We do not know if cooperative members have a share, or not, in the PLC (we only have information about the cooperative share), which seems a condition for Nilsson's PLC category, but with this valuation it can be assimilated to …	PLC model

5.2 General Analysis

After defining the variables and the data collected in 2009 for all the groups and sectors, a descriptive analysis was performed to obtain the means and medians for each identified organization model group. Thus in order to verify (using statistical tools) whether there were significant differences between the cooperatives included in each model in areas such as business size, profitability, cost efficiency and financial stability, the Kruskal-Wallis (for non-normal distributions) and the ANOVA test (for normal distributions) was applied. The following results were obtained:

- **Average size achieved**

First of all, we observe (Table 4) that the groups that have created a business corporation (with the cooperative owning a partial or total share - FCC, CC-100 and CC) accomplished higher levels of operating revenue, total assets and shareholder funds than the groups that have remained traditional (TC1 and TC2), being those that belong to the CC groups the largest ones in terms of assets, shareholders funds and operating revenue.

This fact is also noted for number of employees, where groups FCC, CC-100 and CC had more employees than TC1 and TC2 (see Table 4). (This last aspect is based on the mean).

It is not in vain that significant differences were found among the five structural models for the four indicators: operating revenue, total assets, shareholder funds and number of employees.

To test which models presented these statistically significant differences, a Mann-Whitney test was used (because all the variables that presented significant differences showed no normal distributions). Significant differences were found between groups TC1 and CC, and also between groups TC2 and CC, in size variables. Differences were observed for operating revenue, total assets, employees and shareholder funds at the 5% level of significance. So we can state that the cooperatives in groups TC1 and TC2 are smaller in size than those in group CC, and this difference is statically significant.

- **Solvency and liquidity**

Regarding solvency (see Table 4), defined as the weight of shareholder funds as part of the company's total assets, all the groups displayed similar solvency and no significant differences were found among them (within a range from 31% to 32.5% in the mean). This implies that their debt ratio ranged from 67.5% to 69%.

We can state that groups TC1 (first-tier traditional cooperatives group) and CC (business corporations with external investors) obtained similar solvency ratios. As one of the reasons for creating limited liability companies and IPO (Initial Public Offering) is inflow of capital from investors and, therefore equity, the CC group is expected to obtain higher solvency when this does not occur. This is because the expansion process that takes place with the entry of new members, and the equity injection through the creating of the corporation, may require an equally significant increase of external resources (borrowings).

In liquidity terms, which measures the cooperative's ability to pay back its short-term liabilities (debt and payables) with its short-term assets (cash, inventory, receivables), it is noted that, similarly to solvency, no statistically significant differences could be attributed to the organizational model as they all displayed a similar ratio. However, it is noted that the range of liquidity within which they moved was considered from a financial point of view, in almost all cases, below that which is considered advisable. Thus from the financial theory perspective, a ratio of below 1 suggests that the company would be unable to pay off its short-term obligations if was due at that point (Amat, 2005).

- **Profitability**

In profitability ratios, no significant differences were observed between groups or cost efficiency (Table 4). Nevertheless, we can see that group CC obtained the highest profitability for both ROA and ROE compared to groups TC1 and TC2.

Other researchers have reported results along the same lines, such as Chaddad and Cook (2004b), who concluded that converting cooperatives into a business corporation (in the savings, loans and insurance industries) enhances business efficiency and eliminates financial restrictions.

However members' benefit - analyzed through ratios (PLBT+Materials)/Total assets or (PLBT+Materials)/Op. Revenue - which reflect the cooperative's capacity for benefit members through both patronage refunds and payments for their deliveries to the cooperative, obtained different results. In this sense, groups TC1, TC2 and FCC obtained a higher member benefit than those included in groups CC-100 and CC, with the lowest being group CC-100. Based on these results and the cooperative groups analyzed, the closer to the traditional model, the greater capacity to return members (through both products delivered to the cooperative and patronage refunds) compared to assets investment and to operating revenue.

The percentage distribution of major costs (materials, cost of employees and depreciation) indicates that groups TC1 and TC2 had lower labor costs/Op. revenue than groups CC and FCC. The percentage for depreciation was similar among groups as only minor differences were found. It was in the chapter of material costs, usually associated mainly with members, where differences were found as these are the main suppliers of the cooperative. Not surprisingly, groups TC1 and TC2 - closer to the traditional cooperative - were the biggest spenders on this concept (above 80% of revenues if we look at the median, and 78% based on the mean), and over groups CC-100 (73% - 61%, respectively), CC (78% - 74%, respectively) and FCC (72% in both mean and median).

If we consider that members' profile in the supplies sector cooperatives is a customer and not a provider, the profitability analysis and Materials/Op. Revenue ratio was repeated excluding the supplier sector. The obtained results (and their significance) were similar.

Table 4: Means and medians of the five identified groups

VARIABLE (2009)	GROUP									
	TC1		TC2		FCC		CC-100		CC	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Employment										
Number of employees	2,597.71	**782.5 ****	967.67	**586.5 ++**	4,410.00	4,410.00	4,387.80	193.00	8,375.25	**3,907 ** ++**
Size										
Op. revenue (Turnover) - th[6] EUR	1,084,263.16	**561,336.49 ****	813,000.44	**448,940.70 ++**	1,025,081.45	1,025,081.45	1,991,048.67	1,075,049.00	3,064,802.12	**1,820,742.12 ** ++**
Total assets - th EUR	526,391.51	**243,392,57 ****	308,435.13	**150,391 ++**	511,355.78	511,355.78	976,479.93	325,859.50	1,467,595.87	**1,087,668 ** ++**
Shareholders funds - th EUR	160,602.89	**73,966.44 ****	93,141.59	**50,205.23 ++**	210,613.74	210,613.74	336,342.61	69,085.00	459,863.46	**348,044 ** ++**
Financial position										
Liquidity ratio	0.87	0.82	3.03	1.01	0.86	0.86	0.99	0.78	0.86	0.82
Solvency ratio (Asset based) %	32.02	32.16	31.89	25.49	32.20	32.20	32.54	36.71	32.43	31.63
Profitability										
ROE using P/L before tax %	8.04	7.03	11.66	4.79	9.01	9.01	7.71	7.85	15.55	9.52
ROA using P/L before tax %	2.37	2.05	6.00	1.13	2.60	2.60	2.63	2.01	4.01	3.01
(PLBT + Materials)/Assets	2.23	1.66	1.72	1.65	2.00	2.00	1.41	1.27	1.53	1.19
(PLBT + Materials)/Op. Revenue	0.68	0.79	0.75	0.83	0.73	0.73	0.43	0.45	0.52	0.67
Cost efficiency										
Cost of employees/Op. Revenue	0.08	0.07	0.06	0.04	0.10	0.10	0.07	0.07	0.10	0.09
Depreciation/Op. Revenue	0.02	0.01	0.01	0.01	0.02	0.02	0.02	0.01	0.02	0.02
Materials/Op. Revenue	0.79	0.80	0.78	0.83	0.72	0.72	0.61	0.73	0.74	0.78
N	**42**		**14**		**2**		**9**		**12**	

NOTE 1: Difference in means/medians between TC1 and CC are significant at the .01 (***), .05 (**), .10 (*) levels. The difference in the means/medians between TC2 and CC is significant at the .01 (+++), .05 (++), .10 (+) levels

NOTE 2: The final sample is 79, instead of 80, due to a missing value in group FCC.

NOTE 3: Degree of significance is marked in the medians for non-normal distribution and the means for normal distribution.

NOTE 4: The profitability analysis and the Materials/Op. Revenue ratio were repeated after excluding the cooperatives of the supplies sector. The obtained results (and their significance) were similar.

[6] Th → thousand euros.

The reasons for the lower percentage of turnover that FCC, CC-100 and CC groups had intended for payment of supplies can vary, being FCC group which spent less on this chapter (see Table 4 above). This may be possible because provision by members in such entities is lower compared to TC1 and TC2, and also further purchases from third parties are incorporated (adjusting acquisition prices to the latter, in a search criterion for higher returns). So a low Materials/Op. Revenue ratio does not necessarily entail a reduction in the percentage allocated to reward members for their products. It is also possible that the nature of the corporation and investors' interests mark the criteria for members when assessing products less favorably. As Bekkum and Bijman (2006) pointed out, when voluntary investment schemes are introduced - which allow both members and nonmembers to capture the cooperative's residual benefits - interest conflicts could emerge, and the member transaction relationship is bound to suffer.

5.3 Comparative analysis between Traditional Cooperatives and Cooperatives that have created a business corporation

In a second analysis, two sets of entities were compared: entities that maintained a traditional cooperative structure (which correspond to groups TC1 and TC2) and those that chose to create business corporations during their development - with a more or less cooperative participation - (which correspond to groups FCC, CC-100 and CC). This allows us to test the hypotheses posed in Section 3.

The Mann Whitney test for independent (unpaired) samples and the t-test have been used for the hypothesis' contrast (depending on the normality of the distribution of the variables). As shown in Table 5, it is noteworthy that the cooperatives that have created corporations (FCC+CC-100+CC) had a significantly larger dimension (number of employees, operating revenue, total assets and shareholder funds) than traditional cooperatives (federated or not). This difference was statistically significant (at 5%), and means that H1 can be accepted:

H1. Cooperatives which have opted for the creation of a business corporation have become larger in size than those that have remained traditional.... ***Accepted***

Table 5: Traditional groups (TC1 and TC2) versus Corporation Groups

VARIABLE (2009)	Organizational models			
	A (TC1+TC2)		B (FCC+CC-100+CC)	
	Mean	Median	Mean	Median
Employment				
Number of employees	2,310.060	**782.5 ****	7,047.330	**3471.5 ****
Size				
Operating revenue (Turnover) th EUR	1,020,436.640	**529,883.77 ****	2,512,625.190	**1,716,993.44 ****
Shareholders funds th EUR	**143,406.87 ****	70,326.440	**394,951.78 ****	252,677.800
Total assets th EUR	470,834.000	**215,820.26 ****	1,212,820.070	**949,421 ****
Financial position				
Liquidity ratio	1.420	0.830	0.900	0.810
Solvency ratio (Asset based) %	31.985	30.460	32.450	32.576
Profitability				
ROE using P/L before tax %	8.963	6.342	12.547	9.208
ROA using P/L before tax %	3.298	1.827	3.458	2.563
(PLBT + Materials)/Assets	2.102	1.653	1.462	1.241
(PLBT + Materials)/Op. Revenue	**0.694 ***	0.793	**0.515 ***	0.677
Cost efficiency				
Cost of employees/Operating Revenue	0.073	0.063	0.091	0.082
Depreciation/Operating Revenue	0.019	0.016	0.020	0.020
Materials/Operating Revenue	0.789	0.802	0.702	0.754
N	**56**		**23**	

NOTE 1: Difference in the means/medians between both groups are significant at the .01 (***), .05 (**), .10 (*) levels

NOTE 2: Degree of significance is marked in the medians for non-normal distribution and the means for normal distribution

NOTE 3: Similar results were obtained when excluding the cooperatives of the supplies sector

NOTE 4: The final sample is 79, instead of 80, due to a missing value in group FCC.

On the contrary, the second hypothesis (H2) cannot be accepted as no statistically significant differences in financial stability - measured through solvency and liquidity ratios - between groups A (cooperative) and B (corporation) were found. This finding coincides with Venieris (1989), in relation to the current ratio.

H2. Cooperatives which have maintained their traditional cooperative structure have achieved greater liquidity and financial stability (solvency) compared to those which have opted for the creation of business corporations…. ***Not accepted***

Our results differ from those obtained by Lerman and Parliament (1990), Parliament *et al.* (1990), Gentzoglanis (1997) and Soboh *et al.* (2011). Lerman and Parliament (1990), and Gentzoglanis (1997) noted that IOFs had

significantly higher liquidity than cooperatives. Nevertheless, Parliament *et al.* (1990) reported that the median performance of cooperatives was significantly better than that of IOFs in terms of leverage, coverage and liquidity. Soboh *et al.* (2011) showed that cooperatives occupied a stronger financial position.

Regarding the cost efficiency question, Table 5 reveals that, although not statistically significant, the expenses incurred by cooperatives to pay their personnel as a percentage of sales were lower in group A (traditional) than in group B (corporation), which confirms what O'Connor and Thompson (2001) and other scholars reported when they stated that cooperatives pay lower salaries for senior managers compared to corporations. This has a double meaning; while low labor costs can have a positive impact on profitability, the fact remains that may also incur relative performance loss compared to companies with a well-paid staff, and even to the extent that it is difficult to retain talent and maintain motivation with low payments. According to Bijman *et. al.* (2012), employees and managers have to be well-paid to attract and keep expertise and skills; adequate salary is required to be able to recruit such leaders and managers.

Depreciation as a percentage of sales was lower in group A than in group B, but it was not statistically significant. In contrast, the Materials cost/Op. Revenue was higher in group A (traditional) than in group B (corporation), but as mentioned before, it did not entail loss of efficiency in group A as members are recipients of such expense.

Regarding profitability ratios, despite not being statistically significant, it is noteworthy that corporations (group B) showed higher ROA and ROE (indicators of patronage refund capacity) than traditional cooperatives (group A). This is in line with the study of Gentzoglanis (1997), where financial ratios were used to empirically examine the economic and financial performance of cooperatives compared to IOFs (all of them belonged to the dairy industry in Canada). In the last-cited study, no major differences in profitability terms were obtained for the two analyzed groups of companies. Lerman and Parliament (1990) and Parliament *et al.* (1990) found no statistical differences between both groups. On the contrary, authors like Chen *et al.* (1985), Venieris (1989) and Soboh *et. al.* (2011), stated that cooperatives were, on average, less profitable than investor-owned firms. Chaddad and Cook (2004b) concluded the same for the savings and loans and insurance industries, while Biijman *et al*. (2012) stated that traditional cooperatives showed poorer performance and cooperatives with outside owners obtained higher returns.

However, members' benefit (PLBT+ Materials/Operating Revenue) - an indicator of both patronage refund capacity and paying members' production capacity - was higher in group A than in group B, and the difference was statistically significant (at the 10% level of significance). Consequently, we cannot accept the third hypotheses (H3), that is, cooperatives which have opted for the creation of a business corporation during their development have achieved higher levels of cost efficiency and profitability (ROA or ROE). The

results reveal that traditional cooperatives are, by far, those that provide statistically significant higher members' benefit, and there were no statistically significant differences in ROA and ROE.

H3. Cooperatives which have opted for the creation of a business corporation during their development have achieved higher cost efficiency and profitability levels.... ***Not accepted***

In a third approach, a logistic regression analysis was applied to compare and analyze both groups: traditional cooperatives groups (A) and business corporations groups (B). It was applied with non-cooperative/cooperative used as the dependent variable, and independent variables were selected from the main study areas: a size variable (operating revenue), a variable related to members' benefit (Materials/Op. Revenue), a profitability variable (ROA) and a financial position variable (solvency ratio).

The results of the estimation are shown in Table 6, where two variables were significant: Operating revenue and Materials/Op. Revenue.

This analysis confirmed that size (operating revenue) is a significant variable, and that the cooperatives that have created business corporations were larger than traditional ones at the 5% level of significance. It was also reflected that the Materials/Op. Revenue ratio is a significant variable (also at the 5% level of significance), and that traditional cooperatives obtained a higher ratio than corporations.

Table 6: Logit results

	Coefficient	**Standard error**	**Marginal effects**	**Standard error**
Op. Revenue (million €)	**0.6053****	0.2697	0.0883***	0.0332
Materials/Op. Revenue (%)	**-0.0488****	0.0257	-0.0071**	0.0033
Solvency ratio	0.0092	0.0281	0.0013	0.0040
ROA	0.0950	0.1833	0.0138	0.0265
Intercept	1.2569	2.1595		

Correctly classified: 82.14%
Log-likelihood: -25.588 Prob >Chi2= 0.0189
Nº observations: 56
NOTE 1: ***, **, * indicate significance at 1%, 5% and 10%, respectively
NOTE 2: Similar results were obtained when excluding the Supplies Sector.

As shown in Table 6, the higher a cooperative's target Operating Revenue, the greater the probability of creating structures that deviate from the cooperative principles, such as business corporations. So for every 1 million euro increase in a cooperative group's operating revenue, the probability that the cooperative creates a corporation increases by 8.8%. In works like those by Masulis (1987), similar results were obtained in the Mutual Savings and Loans sectors. This author analyzed the conversion of Mutual Savings and Loans into stock charter and stated that within state-wide markets, the large Mutual Savings and Loans Associations and Savings and Loans Associations that obtain a higher percentage of income from specialized assets are likely to exhibit a much greater probability of conversion.

Conversely, the Materials/Op. Revenue ratio had a significant negative effect on the probability of creating a business corporation, which decrease the likelihood of one cooperative group creating a corporation (by 0.7%, for each increase in a percentage point in Materials/Op. Revenue) in those groups that wish to maintain high payment levels for members for their production. Solvency and profitability (ROA) had no significant impact, although their positive signs indicated that the cooperatives that have created a corporation obtained higher ROA and solvency levels, but not statistically significant ones, which is in line with authors like Soboh *et al.* (2011).

The goodness-of-fit of our model properly predicted 82.1%.

6. Conclusions

Aspects such as globalization and deregulation are changing rules and business models around the world by increasing competition. Many cooperatives have embarked on a path marked by implementation of changes in their organizational models which, to a greater or lesser extent, take them away from traditional cooperative principles.

The analysis of the organizational structure of the 20 largest European agri-food cooperative groups in four sectors, allowed us to identify and classify them into five different models, ordered from 1 (nearest proximity) to 5 (furthest proximity) to/from the traditional cooperative model in ownership terms, which are:

- Cooperatives which act as the holding company, the "first-tier traditional cooperative group" - (TC1). They represent 52% of the total sample
- Federated Cooperatives, the "second-tier traditional cooperatives group" - (TC2). They represent 16.25% of the total sample
- Different cooperatives which create a business corporation as the head of the holding (parent company), "Federated Cooperative Corporation" - (FCC). They represent 5% of the total sample
- Cooperatives which have created a business corporation that acts as the holding company, of which they own 100% of the capital, "100%

Cooperative Corporation" - (CC-100). They represent 11.25% of the total sample

- Cooperatives which have created a business corporation that acts as the holding company, of which the cooperative and their members own less than 100% of the capital, and admit external investors, "Cooperative Corporations" - (CC). They represent 15% of the total sample.

When comparing traditional models (entities that have maintained a traditional cooperative structure, federated or not - TC1 and TC2) with those that have chosen to create business corporations during their development (participated to greater or lesser extent by cooperatives or its members - FCC, CC-100 and CC), statistically significant differences were found in two indicators:

- In the size indicators (operating revenue, shareholder funds, total assets and number of employees) with a 5% level of significance. This enabled us to confirm our first hypotheses (H1): *Cooperatives which have opted for the creation of a business corporation have become larger in size than those that have remained traditional (TC1 and TC2).*
- Members' benefit (with a 10% level of significance) - measured through (PLBT+Materials/Op. Revenue) - showed that cooperatives with traditional models (TC1 and TC2) are better able to return to members through a higher percentage of income destined to the products delivered to cooperative and patronage refunds[7]. According to Lerman and Parliament (1990), Parliament *et al.* (1990) and Gentzolagnis (1997), this allows us to reject our third hypotheses (H3): *Cooperatives which have opted for the creation of a business corporation during their development have achieved higher cost efficiency and profitability levels, where no significant differences were found*.

No significant differences were observed in the solvency and liquidity ratios, according to Venieris (1989), which allowed us to reject our second hypotheses (H2): *Cooperatives which have maintained their traditional cooperative structure have achieved greater liquidity and financial stability (solvency) compared to those which have opted for the creation of business corporations*.

This better position of traditional cooperatives in our proposed members' benefit ratio means that groups that have it, spend a higher percentage of their income on paying the products provided by suppliers to the cooperative, as well as patronage refunds. Given that a large proportion of these products come from members, given their cooperative status, we can infer that the traditional cooperatives model (TC1 and TC2) presents a greater possibility or capacity of allowing members to get involved in a higher percentage of the final product price.

[7] In supply cooperatives, members act as buyers (and not as sellers) which led us to exclude supply cooperatives from the calculation of members' benefit ratios.

However from these results, we cannot infer that the models based on business corporations (FCC, CC-100 and CC) reward members worse for their productions, even though they allocate a significantly smaller proportion of revenues to reward the productions provided by suppliers (members and nonmembers). Not surprisingly, it could well be that these groups incorporate further purchases from third parties against members, which would allow to further align prices to the former than to the latter so that the overall percentage intended for product acquisitions can be lower, but not at the expense of reducing that corresponding to members.

Another element that may influence this poorer capacity of the models based on business corporations when allowing providers (and with them, members) to participate in a higher percentage of the final product price is the very nature of the group created, which incorporates the interest of investors who are no members. This can lead to setting less favorable standards for members when assessing products, which is perhaps the reason for them having a higher ROA and ROE. It is not in vain that the conflict or mismatch in the interests of members and investors is a well-studied element (e.g. Bekkum and Bijman, 2006) and confronts member suppliers (whose interests are, apart from a good compensation of the products supplied as a supplier to the cooperative, through returns), with investors (whose interest, while increasing the value of the company, is a good financial return and with it the dividends maximization). We ought not to forget that those dividends would be much higher if costs became tighter, which include product acquisition.

The logistic regression analysis confirms that the organizational model chosen by cooperatives has an impact on their operating revenue, and also on the income percentage destined by cooperatives to acquire materials, and both at the 5% level of significance. It has been shown that for every million euro increase in a cooperative group’s operating revenue, the probability of the cooperative creating a corporation during their expansion process increases by 8.8%. This coincides with authors such as Masulis (1987). Therefore, the corporation model is confirmed as an efficient strategy to expand the company. The proportion of resources used to acquire materials in relation to operating revenue appears as a significant variable, and traditional cooperatives (federated or not) are those that spend the largest volume. Therefore, the likelihood of one cooperative group creating a corporation decreases in those groups that wish to maintain high levels of materials payment (among them, paying members for their productions, by 0.7% for every increased percentage point in Materials/Op. Revenue).

Hence, taking into account that depreciation costs/revenue are similar, and that labor costs/operating revenue are lower in traditional cooperatives compared to the groups that have created business corporations (be it not statistically significant), these statistically significant higher percentages of turnover destined to the materials acquired by traditional cooperatives (federated

or not) seem to cause their lower ROA and ROE. Despite there being no statistical significance found, this scenario is reflected in both the logit analysis and the comparison of means and medians, and coincides with authors such as Soboh *et. al.* (2011), Venieris (1989), Chen *et al.* (1985) and Chaddad and Cook (2004b), who affirmed that cooperatives are - on average - less profitable than IOFs.

These results reflect the dilemma of cooperatives and their members when it comes to deciding the best way to expand. So although they may be attracted by conversion into formulas based on capital - when seeking higher levels of business growth and profitability - they must bear in mind that it may incur an extra cost, which can be paid by members (in the form of lower payments for the products delivered to the cooperative). In this sense, private investors introduce new interests into the cooperative, along with already existing member objectives. Consequently, cooperatives that address changes in their organizational model by creating a corporation should consider that it is essential to satisfy both parties: investors need to be rewarded for their investment (through dividends), as do members, who expect a better reward for their production.

A cooperative is defined by the International Co-operative Alliance as "an autonomous association of persons united voluntarily to meet their common economic, social, and cultural needs and aspirations through a jointly-owned and democratically-controlled enterprise". They are formed by members who, according to (Van Dijk, 1997 and Soboh, 2011), have countervailing power, gain access to industrially produced goods and services, gain access to markets for their products, use the efficiency of economies of scale and manage their risk. All this pursues the common goal of improving their income. However, it is at least contradictory that their growth process that forms part of them (specifically the CC model) drove them into business corporations, and places them at a distance from the reasons that originally motivated their members to create the cooperative, diluting members' benefits (as demonstrated in our study) and, based on one of their cooperative principles (the autonomy and independence principle), it could increase the risk of loss of control by members.

Finally regarding the major contributions of this article, it firstly provides a categorization of the organizational models of major agri-food cooperatives in the EU. The studies in this field, which analyze different organizational models, are more descriptive in nature. Therefore, this work incorporates an empirical study, based on the annual accounts of the organizations that integrate the different models, and contributes to a better understanding of their differential characteristics, specially the economic and financial differences between the groups that have maintained a traditional cooperative structure and the groups that, contrarily, have created a business corporation - such as a holding company. It is important to remark that our study covers different sectors and countries, which can complement previous works in this area.

7. Limitations of the study and future directions

One of the limitations of this paper is that some of the identified organizational models had very few companies to analyze (especially FCC and CC-100). Another limitation is that no information about the existence of external investors in cooperatives was available, in addition to members, which would have allowed us to distinguish between traditional cooperative models and participation cooperative models, as established by Nilsson (1999). Nor did we have information about the owners of shares of subsidiaries, which would have enabled us to differentiate between the traditional or subsidiary categories established by Nilsson (1999) according to whether 100% (or a smaller proportion) belonged to the cooperative.

It should also be noted that we included in the CC group those cooperatives that create corporations in whose capital participates in a lower percentage to 100%. However, we did not have enough information to distinguish among them those in which the cooperative, or its members, held less than 50% of corporation capital, which should have been excluded from the group, to the extent that it cannot be considered a cooperative group.

It should also be taken into account that materials (supplies) include not only those provided by members, but also those purchased from other suppliers. However, as a high percentage of this item relates to members' purchases, we infer that if a cooperative allocates a higher percentage of its income to pay suppliers, its capacity to reward suppliers (with members among them) improves. At this point, one interesting element for analyses in future research works is look more profoundly at the differences between members' benefit of both organizational models - that based on the traditional model and that based on the corporation - to discern what proportion of materials is acquired by members and what is acquired by other suppliers. Therefore, these results in further research should be validated by also using a larger study sample in attempt to overcome previous limitations.

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APPENDIX 1. Classification of the cooperative groups in the sample

DAIRY COOPERATIVE GROUPS	
1. TC1	ARLA FOODS/ TINE/ MILK LINK/ BAYERNLAND/ MILCOBEL/ MILCH-UNION HOCHEIFEL/ BERGALNDMILCH/ MLEKPOL
2. TC2	THE IRISH DAIRY BOARD (U.K.)
3. FCC	VALIO OY/ LACTOGAL
4. CC-100	FRIESLANDCAMPINA/ NORDMILCH/ HOCHWALD/ SODIAAL
5. CC	KERRY GROUP/ HUMANA MILCHUNION/ GLANBIA/ EMMI/ GRANLATTE
MEAT COOPERATIVE GROUPS	
1. TC1	DANISH CROWN/ NORTURA SA/ WESTFLEISCH EG/ ARC ATLANTIQUE/ TICAN AMBA/ UNIPEG/ PRESTOR/ AVELTIS/ ITALCARNI/ PROSUS/ GESCO/ ERZEUGERGEMEINSCHAFT
2. TC2	COREN/ COÖPERATIE KONINKLIJKE CEBECO GROEP U.A.
3. FCC	MAINE VIANDE SOCOPA S.A
4. CC-100	COVALIS
5. CC	HKSCAN/ AIM GROUP/ ATRIA/ VION
HORTICULTURE COOPERATIVE GROUPS	
1. TC1	FLORA HOLLAND/ LANDGARD/ FRUIT MASTERS/ SICA/ CONSORZIO CASOLANO/ CASI/ COOP.VEILING/ AGRINTESA (SOCIETA AGRICOLA COOPERATIVA O PIU BREVEMENTE AGRINTESA SOC)/ COSUN/VEILING HOOGSTRATEN
2. TC2	CONSERVE ITALIA/ APO CONERPO/ ANECOOP/ CONSORZIO MELINDA/ VIP / FRUTTAGEL
4. CC-100	THE GREENERY B.V./ FRESQ/ AGRICO/ CNB
SUPPLIES COOPERATIVE GROUPS	
1. TC1	AGRICOLA TRE VALLI-SOCIETA' COOPERATIVA/ VIVESCIA/ DLG SERVICE A/S/ FELLESKJØPET AGRI SA/ LANTMÄNNEN EK FÖR/ LUR BERRI/ NORIAP/ SCA NOURICIA/ SOCIETE COOPERATIVE AGRICOLE ARTERRIS/ SOCIETE COOPERATIVE AGRICOLE CAP SEINE/ SOCIETE COOPERATIVE AGRICOLE L E GOUESSANT/ STE COOPERATIVE AGRICOLE UNEAL
2. TC2	CAVAC (COOP AGRICOL VENDEE APPROV VENTE CEREALE)/ DLA AGRO A.M.B.A/ EPIS CENTRE/ REG AGRARTECHNIK GMBH (RWZ RHEIN-MAIN)/ UNION INVIVO
5. CC	AGRAVIS RAIFFEISEN AG/ BAYWA AKTIENGESELLSCHAFT/ RWA RAIFFEISEN WARE AUSTRIA AKTIENGESELLSCHAFT

APPENDIX 2. Remarks about the sample

DAIRY

- In 2011, HUMANA MILCHUNION EG and NORDMILCH EG agreed the merger of their subsidiaries HUMANA MILCHINDUSTRIE GMBH and NORDMILCH AG to create the new corporation DMK DEUTSCHES MILCHKONTOR GMBH.
  For that purpose, NORDMILCH AG had to change its legal form and become a GmbH. During that merge, the participation at DMK of both societies was equitable and did not affect both matrix cooperatives (Humana MILCHUNION EG and NORDMILCH EG).

MEAT

- The cooperatives excluded for not having enough information, or for being multifunction, despite having a huge operating revenue, were: MICARNA SA, KERMENE, RASTING, DELPEYRAT, LUR BERRI (LA HEMOS METIDO EN SUMINISTROS), CARNJ SOCIETA COOPER, SICAREV, SICAVYL.

HORTICULTURE

- The cooperatives excluded for not having enough information, or for being multifunction, despite having a huge operating revenue, were: ACOREX S.C.L., AN S.COOP, ASSOCIATION REGIONALE, UNION COOPERATIVE AGRICOLE FRANCE PRUNE, FRANCE CHAMPIGNON.

SUPPLIES

- Remarks on the COGECA list → CHAMPAGNE CEREALES (whose current name is VIVESCIA) appears, and we included it on the list despite being participated by UNION IN VIVIO (4%)
- EPIS CENTRE merged and is nowadays known as AXEREAL, but we considered it because we used data from 2009.
- SCA NOURICIA → in appears in the Amadeus Database to be undergoing dissolution, but we included it in our study because we used data from 2009.
- BAYWA AG → its operating revenue at Amadeus (4,428,726,000 €) is not the same as its annual accounts. For classifications, we took the amount of its annual accounts (in 2009).
- The cooperatives excluded for not having enough information, or for being multifunction, despite having huge operating revenue, were: SUCRERIES-DISTILLERIES DE L´AISNE (SDA), TERRENA, TRISKALIA, M.R.B.B. OF MAATSCHAPPIJ VOOR ROEREND BEZIT VAN DE BOERENBOND (AVEVE), SUOMEN OSUUSKAUPPOJEN KESKUSKUNTA (SOK corporation).

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