

Sustainable Development Goals in the Andalusian olive oil cooperative sector: heritage, innovation, gender perspective and sustainability

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Abstract

The Sustainable Development Goals (SDGs) represent a commitment to sustainability through innovation, sustainable economic growth and the diversification of economic activities. The social economy and the revaluation of rural heritage play a fundamental role in implementing and progressing towards these goals, especially in agri-food cooperatives. In the case of the Spanish olive oil industry, a substantial percentage of the business in olive oil producing areas revolves around the social economy: 70% of the olive oil produced in Spain is made by cooperatives. For these cooperatives, the implementation of the SDGs offers them a potential tool for sustainable development, diversification and the economic growth of their businesses. This article focuses on analysing the relative importance of the SDGs in the olive oil cooperative sector in Andalusia, using the Qualitative Comparative Analysis (QCA) technique and applying the fuzzy-set approach (fsQCA) to the tenets of the SDGs. Lastly, causal models have been established, the practical implications of which centre on the implementation and development of the SDGs as a means of achieving the sustainable economic growth of these enterprises. The main findings of this study suggest that the sustainable development goals on which the cooperative societies analyzed are focused, in addition to producing olive oil, promote values linked to food security, sustainability, the showcasing of heritage, and gender equality.

Keywords: Sustainable Development Goals, Olive oil cooperatives, Social innovation, Heritage, Gender perspective, Sustainability.

1. Introduction

The Sustainable Development Goals (SDGs), represent one of the most important challenges that governments, companies and consumers must tackle to ensure the preservation and sustainability of our environment. On 25th Septem-

ber 2015, the United Nations General Assembly adopted the agenda “Transforming our world: the 2030 Agenda for Sustainable Development” (2016). A total of 139 countries were signatories to the document, which is organized under the following 17 SDGs: 1) No Poverty, 2) Zero

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Hunger; 3) Health; 4) Education; 5) Gender Equality; 6) Water; 7) Affordable and Clean Energy; 8) Decent Work; 9) Industry, Innovation and Infrastructure; 10) Reduced Inequalities; 11) Sustainable Cities and Communities; 12) Responsible Consumption; 13) Climate Action (climate change); 14) Marine Life; 15) Terrestrial Ecosystems; 16) Peace, Justice and Strong Institutions; 17) Partnerships (United Nations Development Programme, 2016).

In recent years there has been exponential growth in the number of business and management studies contributing to the discussion on the SDGs and their impact on business organizations (Pizzi *et al.*, 2020). The SDGs are a call to action for all countries – rich, poor and middle-income – to promote prosperity and protect the planet. They are an acknowledgement that the implementation of strategies to promote economic growth and address social needs such as education, health, social protection and job opportunities is the most feasible way to definitively end poverty, while emphasizing climate change mitigation and environmental protection (Mio *et al.*, 2020).

As Verano (2020) explains, building a sustainable future is undoubtedly one of the major challenges facing society in the next 10 years. Sustainability involves meeting current needs without compromising the ability of future generations to meet theirs, ensuring a balance between economic growth, caring for the environment and social well-being. In this regard, the agri-food sector is one of the sectors that can contribute the most to the fulfilment of the SDGs in various areas (Mozas-Moral, 2019).

The strategic importance of the olive oil industry in Spain, and more specifically in Andalusia, poses new challenges that companies in the social economy must face, given its substantial weight at a global level (Mozas-Moral, 2019). Spain is the world's leading producer of olive oil, and at national level social economy companies such as olive oil cooperatives are responsible for 70% of that production (CAE, 2021; CES, 2018). In the case of Andalusia, olive cultivation covers just over a million and a half hectares, and plays a particularly important role in the provinces of Jaén, Cordoba, Granada, Mal-

aga and Seville, which make up the so-called “axis of olive groves”. In terms of employment, Andalusian olive groves generate an average of between 15 and 20 million day's wages per year, accounting for around 35% of total agricultural employment in the region (INE, 2020).

In light of the above the objective of the present paper is to analyse the value and relevance that Andalusian cooperatives registered in Designations of Origin and product clubs, assign to the different SDGs, according to the importance for their organizations, and then establish the possible causal relationship among the SDGs that are of greater relative importance and its directly contribution to these cooperatives. To implement this study, a survey was administered to those in charge of the cooperative companies under study, in which they assigned values to the different SDGs, thereby enabling the subsequent application of the fuzzy set Qualitative Comparative Analysis (fsQCA) method. This paper has thus been structured following a classical research sequence. First, a theoretical framework is developed relating to the SDGs and the agri-food sector linked to entities in the social economy; in this case, olive oil cooperatives. Then the method of analysis is established and the results are obtained. Lastly, a discussion is presented with comparisons to other studies and some conclusions are drawn with practical implications when it comes to implementing the SDGs in the olive oil cooperative sector.

2. Theoretical Framework

2.1. *New approaches in Andalusian olive oil cooperatives*

Olive oil cooperatives are organizations that cover the different areas of the territory where they are located, taking a holistic approach that allows them to generate economically sustainable initiatives focused on their continuance (Sánchez-Martínez *et al.*, 2020). The incorporation of the SDGs into these entities entails a shift from systems focused almost exclusively on production and distribution, to new paradigms involving environmental, nutritional and ethical objectives (Antonelli *et al.*, 2020). These

companies are social entities that can articulate the processes of implementation of the SDGs, so it is especially interesting to develop sustainable policies in the sector through cooperative societies. In this way, it is established as a dependent variable in the fuzzy QCA model proposed in this article, that cooperative societies are entities with greater capacity to implement the Sustainable Development Goals than other types of organizations established in the olive oil sector.

In this respect, social innovation is established as a key factor to achieve this transition, especially through four dimensions: economic, cultural, environmental and technological (Parrilla González and Ortega Alonso, 2021a/b). Andalusia is the Spanish autonomous community with the highest production of olive oil and olives in Spain, accounting for around 82.2% of the national average production of olive oil and 79.2% of table olives. Furthermore, Andalusian production of olive oil represents around 35.4% of total global production, and 19.2% of global table olives production. It also produces 48% of the olive oil at European level (IOC, 2021). These data underline the major strategic importance of addressing the link between the Andalusian olive oil cooperative sector and the SDGs, measuring the impact of the goals set by the UN, and examining the results obtained in this agri-food industry. Based on this, we formulate proposition 1, related to SDG 2 Zero Hunger:

Proposition 1: Olive oil cooperatives offer key solutions for development and are critical to the eradication of hunger and poverty.

Territorial policies have prioritized some of the SDGs, such as that relating to food availability, and have overlooked others such as biodiversity, soil quality, and the conservation of natural resources (McIntyre *et al.*, 2009). In fact, as Parrilla-González and Ortega-Alonso (2021) point out in their study of the dimensions of social innovation in agricultural cooperatives, the environmental and technological dimensions are still not sufficiently integrated into the olive oil cooperative sector, despite the fact that some of the main challenges it faces in order to comply with the SDGs are environmental and techno-

logical. This relates to the results of previous studies, such as that by Campopiano and Bassani (2021) focusing on the Italian context, which incorporate the fields of social entrepreneurship innovation and cooperativism, and examine the effects of social enterprises' investments in product, technology and process innovation on social and environmental outcomes.

The identification and design of what are known as "innovation ecosystems" can support business creation processes in the olive oil industry and improve growth opportunities and entrepreneurship development for young people (Antonelli *et al.*, 2020). In this regard, the olive oil cooperative sector can be a strategic tool for local socioeconomic development, if the companies implement innovative and sustainable strategies that can boost the employment rate, with a special emphasis on young people and women (Seyfettinoglu, 2016). In the specific case of rural women, their inclusion in decision-making bodies and access to productive resources can represent an opportunity in terms of sustainable management of available resources and economic development (Sisto and Furst, 2019).

The European Commission, which has pledged to promote gender equality in the field of innovation, establishes a wide-ranging commitment to equality in all EU policies; moreover, it has a well-established regulatory framework on gender equality, which includes binding directives broadly applied in the entire labour market as part of its gender equality strategy for 2020-2025 (European Union, 2020). This is an extension of the context established in Horizon 2020, in relation to which Pollitzer and Schraudner (2015) identified important roles that can be played by gender in innovation ecosystems, both in terms of knowledge activities and the improved capacity of human capital resources to generate market opportunities, ultimately influencing success. This gender perspective leads us to make the following proposition, related to SDG 5:

Proposition 2: Gender equality is not only a fundamental human right, but a necessary foundation for a peaceful, prosperous and sustainable world, and both necessary and beneficial in olive oil cooperatives.

2.2. SDGs for the management of rural heritage in the olive oil cooperative sector

The existing heritage resources in the rural environment provide a source of key economic activities such as tourism, handicrafts and other outputs linked to the exploitation of specific local resources (Abichou *et al.*, 2009). In some territories in the Mediterranean basin, these activities have become a principal source of income in the face of emerging threats such as desertification caused by climate change or deficiencies in industrialization (Rallet, 2001). By recognizing the value of heritage resources, a more balanced development of the territory can be achieved.

Cooperatives act not only as organizations that drive the economic performance of the municipalities where they are located (Rodríguez-Cohard *et al.*, 2020), but also as instruments of social cohesion (Mooney, 2004) that take on an important role as entities whose objective is to provide a sufficient quantity of quality food. The recent inclusion of the olive grove among the candidates for possible World Heritage status in 2023, if accepted by UNESCO, should spur the olive oil industry to accelerate the implementation of the SDGs, emphasizing cross-cutting elements such as their cultural, landscape, heritage, historical, ethnographic or aesthetic value.

In this vein, Echevarría (2008) claims that social innovations, when they affect broad sections of the population, lead to a richer cultural, artistic, educational and, ultimately, heritage character. Olive oil mills are gradually assuming the role of reservoirs of ethnographic values and knowledge about the rural territory, becoming attractive places to visit for people who view the rural environment as secondary (Ortega Alonso, 2020). The elements of museumization introduced in these spaces represent tools that give rise to new stimuli based on social responsibility and the conservation of tangible and intangible heritage (Ortega Alonso and Parrilla Fernández, 2019). On the technological side, the interaction between digitalization and sustainability opens up great opportunities to shape a greener economy and society (Ortega Alonso and Parrilla González, 2021), paving the way towards the achievement of the SDGs, although there is

still little evidence on the contribution of digital paradigms to sustainability (del Río *et al.*, 2020).

The actions undertaken by cooperatives generate collective benefits for rural societies, due to their multiplier effect on the agriculture sector and other related activities (Parrilla González and Ortega Alonso, 2021a/b). Thus, the role assumed by these entities makes them business ecosystems of a social nature (Leick, 2020), spearheading collective action and establishing themselves as pillars supporting the potential development of rural areas (Mozas-Moral and Rodríguez-Cohard, 2000), thus enabling people living in the territories in question to get quality jobs. Based on the above arguments, we formulate the following proposition, related to SDG 8:

Proposition 3: Sustainable economic growth requires societies to create the conditions that allow people to have quality jobs in olive oil cooperatives.

As has been seen in the wine industry, the management of rural heritage by olive oil cooperatives encourages interaction and dialogue between the public, the landscape and the museumized spaces, and takes into account the public's growing interest in sustainability and visitors' prioritization of ecological issues (Montella, 2017). Antonelli *et al.* (2020) place the focus on other relevant factors, such as the cultural acceptance of the food produced in these entities, and the need to work in a context of respect for and conservation of natural heritage and the environment without producing social inequalities.

The growing demand for green or sustainable tourism is therefore a key issue defining the global sustainability of the tourism business to which the management of this heritage is becoming linked (Gössling *et al.*, 2002). It is also linked to the production of healthy, environmentally-friendly food. The cross-cutting nature connecting heritage values with environmental values and health values is another characteristic of the cooperative principles referred to by Alarcón and Álvarez (2020) in their discussion of the merit goods of cooperativism, including those obtained by cooperativists as

a result of democratic decisions to maximize their collective well-being, which are ultimately expressed in non-state public goods. These can help identify the impact of cooperative efforts to improve the quality of life and well-being of their stakeholders (Álvarez, 2017). In light of the above, we put forward proposition 4, related to SDG 3:

Proposition 4: Olive oil cooperatives can help ensure people lead healthy lives and promote their well-being, which is essential for sustainable development.

2.3. The SDGs and their implementation in the olive oil cooperative sector

Mozas-Moral *et al.* (2020) refer to various reports that address the SDGs in relation to this sector (PWC, 2015; Barrero-Barrero and Baquero-Valdés, 2020). Said reports highlight the importance of the SDGs as a vital opportunity to do business, promote corporate responsibility and develop initiatives for sustained growth and equality. Especially relevant is the fact that, for this type of company, the social economy plays a notable role when it comes to developing strategies aimed at

Table 1 - SDGs and impact on olive oil cooperatives.

<i>Sustainable Development Goal</i>	<i>Description</i>	<i>Impact on olive oil cooperatives</i>
SDG 2	<i>Zero Hunger.</i> The food and agriculture sector offers key solutions for development, and is central for hunger and poverty eradication	Production of more olive oil as food
SDG 3	<i>Good Health and Well-Being.</i> Ensuring healthy lives and promoting well-being for all at all ages is essential to sustainable development	Production of sustainable and healthy foods such as olive oil
SDG 4	<i>Quality Education.</i> Obtaining a quality education is the foundation for improving people's lives and sustainable development	Belief in education as the foundation for any change or progress
SDG 5	<i>Gender Equality.</i> Gender equality is not only a fundamental human right, but a necessary foundation for a peaceful, prosperous and sustainable world	Ensuring olive oil cooperatives in rural areas serve as a vehicle for curbing depopulation and the aging of the population, and closing the gender gap
SDG 7	<i>Affordable and Clean Energy.</i> Energy is central to nearly every major challenge and opportunity	Decarbonization and the use of sustainable resources
SDG 8	<i>Decent Work and Economic Growth.</i> Sustainable economic growth will require societies to create the conditions that allow people to have quality jobs	Through the creation of job opportunities and personal development
SDG 9	<i>Industry, Innovation, and Infrastructure.</i> Investments in infrastructure are crucial to achieving sustainable development	Facilitating an economic structure and activity
SDG 12	<i>Responsible Consumption and Production.</i> Responsible consumption and production are essential to ensuring sustainable development	Promotion of more responsible consumption
SDG 13	<i>Climate Action.</i> Climate change is a global challenge that affects everyone, everywhere	Special commitment to the fight against climate change
SDG 15	<i>Life on Land.</i> Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss	Halting terrestrial biodiversity loss
SDG 17	<i>Partnerships.</i> Revitalize the global partnership for sustainable development	Collaboration to achieve truly ambitious goals

Source: Own elaboration based on Mozas-Moral (2019).

the achievement of these goals (TFSSE, 2014). The intrinsic nature of agricultural cooperatives as social economy entities represents an important link to the SDGs (Pacheco *et al.*, 2019) and connects them with the development of proposals and scientific studies relating to the SDGs.

Thus, within the companies committed to the SDGs, social economy entities and companies play a relevant role. This is underscored by various international organizations such as the United Nations Task Force on the Social and Solidarity Economy (UNTFSSSE), Social Economy Europe (SEE), Cooperatives Europe and the International Cooperative Alliance.

Mozas-Moral (2019) provide a classification of the most relevant SDGs for the olive oil cooperative sector, showing the importance of some of these goals based on the critical impact they can have on olive oil cooperatives and olive mills. Based on said classification, we have compiled Table 1 below.

3. Methodology

This study focuses on analysing the level of knowledge about and application of the SDGs in the olive oil industry, specifically in cooperatives and olive oil mills in Andalusia. To that end, a survey was first administered to these entities, given their strategic interest as part of one of the main olive oil producing regions in the world. In order to define the population under study, we contacted the Designations of

Origin and the cooperatives that are included in diversification and sustainable development initiatives, such as Oleotour Jaén, Sabor Málaga or Olearum. This allowed us to obtain a broad sample of the cooperatives that are committed to sustainable development initiatives, and which had previous knowledge about the incorporation of SDGs. Once the population had been determined, a search was carried out by regions of Andalusia in order to check the selected population and the subject of this study. Subsequently, a structured face-to-face survey was given to the organizational heads of these entities, resulting in responses from 129 of the 168 companies selected (76% response rate). The characteristics of the study are detailed in the following table.

First, the heads of the organizations assigned scores to each of the 17 SDGs based on how important they consider these goals to be for the olive oil industry. After obtaining the scores assigned in the questionnaire, the Qualitative Comparative Analysis (QCA) technique was carried out using the fuzzy-set approach (fsQCA), in order to determine the variables that can be used to establish the current relevance of the SDGs in the olive oil cooperative sector, according to the managers. This will make it possible to prioritize the implementation of actions and initiatives that help to achieve the SDGs, and enhance those actions that are already being developed in the Andalusian mills.

The QCA technique, which is based on Boolean algebra, uses a verbal, conceptual and mathemati-

Table 2 - Technical Data Sheet for the study.

SAMPLE UNIVERSE	Cooperatives belonging to Designations of Origin and recognized initiatives such as Oleotour Jaén, Sabor Málaga or Olearum
GEOGRAPHICAL SCOPE	Andalusia
TIME FRAME	April to June 2021
POPULATION REGISTER	Oleotour Jaén, Olearum and the Network of Mills with Andalusian Designation of Origin
UNIVERSE SIZE	168 olive oil mills
SAMPLING UNIT	Cooperative that produces and/or markets olive oil, with knowledge of the SDGs
RESPONSE RATE	76% (129 organizations)

Source: Own elaboration.

cal language that yields both qualitative and quantitative results, combining the main advantages of the two (Ragin, 1987). The application of this technique enables the systematic analysis of a set of cases to determine causal patterns in terms of relationships of necessity and sufficiency between a set of conditions and an outcome (Schneider and Wagemann, 2010). Fuzzy-set QCA (fsQCA) has become one of the most widely-used QCA variants as it overcomes one of the main drawbacks of the original csQCA; namely, its strictly dichotomous approach (Sehring *et al.*, 2013). The fsQCA technique was developed for small sample or population settings (Ragin, 1987), so it is appropriate for the small sample universe in this study. To implement this technique, we have followed the steps recommended in the literature (Schneider and Wagemann, 2012): the calibration of the condition variables and outcome variables, followed by the analysis of necessity and then sufficiency.

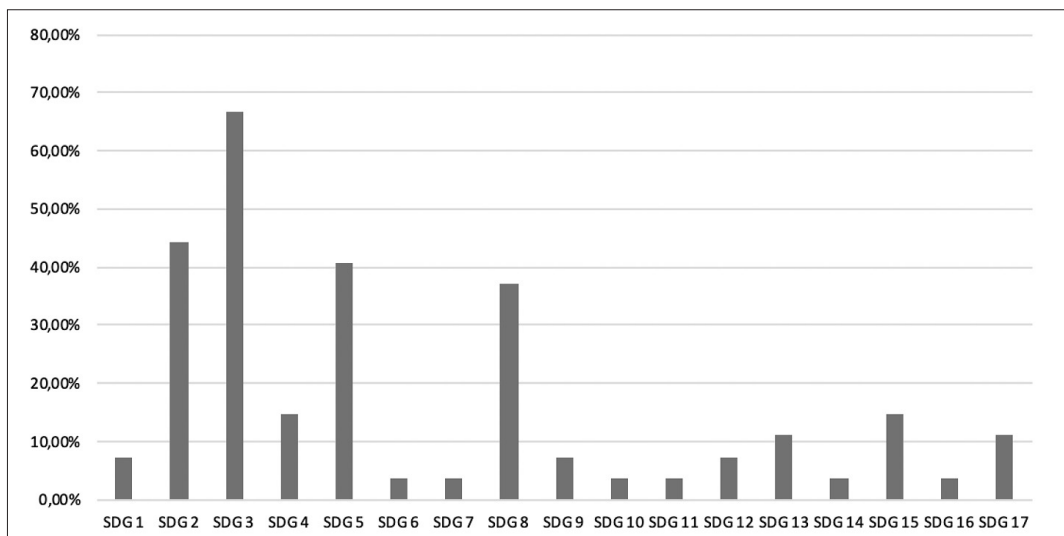
The ultimate output of fsQCA is the identification one or several antecedent combinations that are sufficient for obtaining a specific outcome, such as: $X1 * \sim X2 * X3$ sufficient for an outcome (Y). Using the symbols employed in this technique ($X1 * \sim X2 * X3 \rightarrow Y$), X1, X2 and X3 are antecedents; Y is the outcome; * the union; and \sim the absence or negation, in this case the opposite value to X2 (1 - X2).

4. Results and discussion

The scores assigned to SDGs in the survey given to entities in the sector yield the results shown in Figure 1.

The results indicate that, according to the heads of the entities, there are four SDGs that especially stand out: SDG 2 obtained a score of 44.4%. This corresponds to the *Zero Hunger* goal, which can be explained by the fact that the food and agriculture sector offers key solutions for development, and is central for hunger and poverty eradication. SDG 3, which corresponds to the *Good Health and Well-Being* goal, focused on ensuring healthy lives and promoting well-being for all at all ages as essential to sustainable development, scores 66.70%. As for SDG 5, which scores 40.80%, it corresponds to the goal on *Gender Equality*, which is centred on the fact that gender equality is not only a fundamental human right, but a necessary foundation for a peaceful, prosperous and sustainable world. Lastly, SDG 8 scores 37% and corresponds to the goal *Decent Work and Economic Growth*, which is based on the idea that working for sustainable economic growth will require societies to create the conditions that allow people to have quality jobs. Thus, the analysis focuses on the four SDGs that obtain the highest score

Figure 1 - SDGs addressed in olive oil cooperatives.



Source: Own elaboration.

Table 3 - Summary of the four most relevant scores, according to the weight of the SDGs in the olive oil cooperatives.

<i>SDG</i>	<i>Description</i>	<i>% obtained by cooperatives (that focus on this SDG)</i>
SDG 2	<i>Zero Hunger: the food and agriculture sector offers key solutions for development, and is central for hunger and poverty eradication</i>	44.4%
SDG 3	<i>Good Health and Well-Being: ensuring healthy lives and promoting the well-being for all at all ages is essential to sustainable development</i>	66.70%
SDG 5	<i>Gender Equality: gender equality is not only a fundamental human right, but a necessary foundation for a peaceful, prosperous and sustainable world</i>	40.8%
SDG 8	<i>Decent Work and Economic Growth: sustainable economic growth will require societies to create the conditions that allow people to have quality jobs</i>	37%

Source: Own elaboration.

in the questionnaires carried out, as they are the most substantially representative in the sample. The Table 3 below summarizes the scores recorded in the four most relevant SDGs for those in charge of the entities.

Having clarified the degree of importance of the SDGs for olive oil cooperatives, the fsQCA technique is applied along with different variables related to the results of the survey used in this study to obtain the data. These variables, which make up the proposed model, are detailed in Table 4.

In this model, the business format classified as cooperative is configured as the dependent variable and outcome variable, while the rest of the variables are included as condition variables and are related to the SDGs assigned the most weight within the olive oil cooperative sector. Based on

this, an fsQCA model can be generated, enabling the identification of causal relationships.

Once the variables have been classified and they have been calibrated according to the premises of Ragin (2008), the proposed model has been built in which the dependent variable acts (cooperative and non-cooperative societies) and the variables to be considered as independent, which in in this case, they are the Sustainable Development Goals listed in table 3. Subsequently, a truth table has been obtained in which the configurations and cases that validate the model appear. Finally, the variables have been calibrated using dichotomous variables in which the values 0 and 1 predominate (Ragin and Rihoux, 2004) and the intermediate solution has been proposed, the result of which can be seen in Table 5.

Table 4 - Variables used for the fsQCA technique.

<i>Outcome variable</i>	<i>Description</i>	
Coop	Company type: Cooperative companies	Dichotomous variable
<i>Condition variables</i>	<i>Description</i>	
SDG.healthy	Related to SDG 3 <i>Good Health and Well-Being</i>	Dichotomous variable
SDG.security	Related to SDG 2 <i>Zero Hunger</i> , solutions for development	Dichotomous variable
SDG.sustain	Related to SDG 8 Sustainable Economic growth	Dichotomous variable
SDG.equality	Related to SDG 5 Gender Quality	Dichotomous variable

Source: Own elaboration.

Table 5 - Results of the fsQCA analysis.

	<i>Raw coverage</i>	<i>Unique coverage</i>	<i>Consistency</i>
~SDG.healthy*SDG.security*SDG.sustain*SDG.equality	0.411765	0.411765	0.583333
SDG.healthy*~SDG.security*~SDG.sustain*SDG.equality	0.352941	0.352941	0.461538
SDG.healthy*~SDG.security*SDG.sustain*~SDG.equality	0.191176	0.020316	0.412500
~SDG.healthy*~SDG.security*~SDG.sustain*SDG.equality	0.120588	0.020588	0.433333
Model coverage	0.864706		
Model consistency	0.74430		

Source: Own elaboration.

In Table 5, the presentation of fsQCA results generally involves explaining the two most relevant causal configurations. The results obtained show that in the intermediate solution of the model the first configuration yields a raw coverage of 41.17%, indicating relationships between the business format of the olive oil cooperative and a focus on fulfilling the SDGs linked to food security (SDG 2), development solutions (SDG 8) and equality (SDG 5) while the negative variable (SDG 3) is not relevant for this model. Therefore, it can be deduced that the SDGs that express a causal relationship with cooperatives are SDGs 2, 5 and 8; that is, the promotion of sustainable development, gender equality and socioeconomic equality, and food security play a relevant role in olive oil cooperatives.

Similarly, the second causal configuration should be highlighted: it again includes the business format of cooperative companies as the variable dependent on the SDGs concerning the promotion of health and well-being (SDG 3) and equality (SDG 5). The results of this causal configuration present a raw coverage of 35.29%. In the case of this second model, the SDGs that express a causal relationship in cooperatives are related to SDGs 3 and 5 while the variables related to food security (SDG2) and development solutions (SDG8) are considered negative variables. Therefore, a causal relationship can be identified with the promotion of health and well-being through olive oil, and gender and socioeconomic equality, as tools to improve the social and labour conditions of the olive oil cooperative sector.

Overall, this model presents a coverage of 86.47%, which denotes the proportion of organ-

izations explained by the variables under study, and overall consistency of 74.43% of cases.

The main point for discussion emerging from the results is that the managers of the olive oil producing cooperatives in the sample corresponding to Andalusian Designations of Origin and product clubs show a clear commitment to the implementation of actions aimed at fulfilling the SDGs in the areas of health and well-being, equality, and the production of quantities of this product as means of ending hunger in the world, as well as actions aimed at revitalizing rural heritage and thus rural areas. It is particularly striking that the rest of the SDGs, the remaining 13, barely register in the values assigned by the study universe. This may be due to the fact that these managers opt for a cross-cutting implementation of the SDGs, as is clear from the previous study by Mozas-Moral (2020), or because the initiatives to boost global consumption – with olive oil currently representing 2% of all fats consumed globally (IOC, 2021) – involve promoting the product as a healthy fat, which is at the core of the Mediterranean diet. These promotional efforts are accompanied by support for territorial development, advocacy of the region's cultural, natural and ethnographic heritage identity, and strategies regarding equality policies at the European level.

The results obtained are thus in line with previous studies that have demonstrated the existence of a strong causal relationship between the social economy – represented here by cooperatives – and the SDGs. While it is true that no study to date has related SDGs and cooperativism, Mozas-Moral (2020) also finds that an emphasis on the SDGs serves the social economy and these

agents should promote cooperativism through both wage and gender equality, and a commitment to health and sustainability. Other studies such as that by Sánchez-Martínez *et al.* (2020) present cooperatives as ecosystems of social innovation, which address criteria such as ending hunger or promoting initiatives that stimulate rural development to achieve equality among territories. These studies thus lend support to the results from the model applied here, given that no relevant references have been found on the relationship between olive oil cooperatives and the implementation of the SDGs.

5. Conclusions

This study analyses aspects related to the implementation of the SDGs in the olive oil cooperative sector in Andalusia, applying the different conceptual areas into which this issue is divided, in an effort to identify causal relationships with them. After conducting a literature review of the SDGs, the social economy and the importance of the olive oil sector in Andalusia, a theoretical framework was constructed which covered the key aspects of the implementation of the SDGs in Andalusian cooperatives. The most notable SDGs in that framework were 2, 3, 4, 5, 7, 8, 9, 12, 13, 15 and 17.

The next step in the study was to assign scores and weights to the 17 SDGs, followed by the application of the fsQCA technique and an analysis of its results. The resulting model is both novel and of practical application for companies in the olive oil industry, regarding the implementation and development of the SDGs that have been identified in the causal relationships of the model.

At a practical level, the results obtained in terms of the causal patterns identified by the fsQCA model will enable the design of strategies for the implementation and development of these goals in olive oil cooperatives, taking as a reference those cooperatives that have already incorporated these goals or are in the process of doing so. The design of strategies based around the SDGs provides olive oil mills with higher added value, thus contributing to their individual differentiation and the sustainable growth of the sector. Furthermore, results will

contribute to the design of effective strategies, messaging, and actions aimed at the transfer of knowledge and experience of implementing SDGs in this area.

The results of the fsQCA applied in this study underline the strength of the relationship between the social economy – represented here by olive oil cooperatives – and the implementation of the SDGs. Ultimately, this article focuses on the importance of developing strategies to implement the Sustainable Development Goals in cooperative societies, serving as a model for developing policies in this regard. These cooperative olive oil mills, in addition to producing olive oil, promote values linked to food security, sustainability, the showcasing of heritage, and gender equality. These aspects are hugely important in the current economic crisis triggered by the Covid-19 pandemic (Ranjbari *et al.*, 2021), in which global economic growth involves setting targets aimed at achieving the SDGs.

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