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The Effect of the Regulatory Role of Collective Organizations in Relation to the Consumption of Fruits and Vegetables from Cooperatives †

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Abstract: European agri-food-chains are characterized by strong interconnections among all partners, their complexity, their resilience in a period of uncertainty, and their shared commitment to continue to strive for food safety and quality. The regulatory role of Greek collective organizations thus empowers their members and enables small farmers to achieve the above agri-food-chain goals. A large number of academic articles on collective organizations focus on economic analysis of their performance, but there is little research on the impact of regulation on consumer behavior. The objective of this study is (a) to analyze the Greek market of fruit and vegetable cooperatives, (b) to identify consumers' opinions with regard to the regulatory role of Greek collective organizations in the fruit and vegetable supply chain, and (c) to assess whether consumers and producers benefit from the cooperative movement.

Keywords: regulatory role; collective organizations; agri-food-chain

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1. Introduction

According to [1], one in three European citizens (33%) reported that they do not consume any fruits or vegetables daily, while only 12% of the European Union population consumes five portions of fruits and vegetables or even more than five per day. In Greece, the average monthly expenditure per household for fresh fruit and vegetables was found to be EUR 41.87, of which EUR 18.69 concerned fresh fruits and EUR 23.18 was for fresh vegetables [2].

Alternative food networks in Greece are primarily based on social entrepreneurship and solidarity economies (such as women's agro-tourism cooperatives, social cooperative enterprises, and community-supported agriculture).

In order to study consumers, we utilized shopping center sampling, which is primarily used for marketing research [3]. A questionnaire survey was used to collect data and the sample size was determined to be 400 consumers in the urban complex of Thessaloniki [4]. In terms of statistical analysis, PCA (Principal Component Analysis) is used to identify the common factors that contribute to variation [5]. According to a study, two common factors explain why consumers buy fruits and vegetables from cooperatives. This research fills the gap regarding the importance of a regulatory role for consumers.

2. Methods

The urban complex of Thessaloniki was the study area. The city's urban complex is the second largest in terms of population and has a mix of urban, industrial, and working citizens. It also has a sufficient number of government officials. Furthermore, Thessaloniki is

a representative city since it is the administrative, cultural, and spiritual center of Northern Greece. In the regional unit of Central Macedonia, there are 8 agricultural cooperatives that operate as a joint venture. As a matter of fact, this joint venture produces fifty percent of Greek dessert peaches. Collective organizations establish networks to reduce transaction costs and facilitate the exchange of information and resources, increasing their economic efficiency and competitiveness [6].

This survey took place in 2020. The structured questionnaire had questions that were classified into three sections. In the literature, groupings and typologies are usually based on Principal Component Analysis (PCA). PCA is a common method in the social sciences that can describe, to a significant extent, the framework of a set of data [7]. PCA was performed using SPSS v26.0. The significance level of all statistical analyses was predetermined at $p < 0.05$. After the extraction of factors, Orthogonal Rotation Maximum Variation was used because it aims for minimization of the number of variables that appear as high weightings in each factor. Then, reliability analysis was implemented using Cronbach's alpha, which is based on the average of correlations between variables (items). The Kaiser–Meyer–Olkin (KMO) test was used to test sampling adequacy [8]. Also, Barlett's Sphericity Test was utilized to generate the correlation matrix as well as the identity matrix. PCA was limited to indicators with a variation coefficient (VC) over 50% [9].

3. Results and Discussion

Based on descriptive statistics (Table 1), 85.7% of consumers consider agri-food co-operatives to play an important regulatory role. A significant percentage of consumers' agreement, according to the regulatory role of collective organizations, began to prevail after 2016, along with the fact that the first legislative act regarding the concept of the "Solidarity Economy" was introduced in Greece [10,11].

Table 1. Do you consider the regulatory role of collective organizations to be important in the food supply chain?

	Frequency	**Percentage %**
No	57	14.3
Yes	342	85.2
Total	399	99.8
Missing Value	1	0.3
Total	400	100.0

The results of the Principal Component Analysis (PCA) demonstrated that the first two factors explained 54.97% of the total variance. The selection of the factors was based on the percentage of their variation and their eigenvalue (>1). The Kaiser–Meyer–Olkin index was calculated with a value of 0.856 > 0.8 and Barlett's Sphericity Test was statistically significant ($p < 0.01$). These statistical tests determine the suitability of PCA for a sample [12].

The new factors with their content are given below according to corresponding variables:

- E11_1, E11_2, E11_3, E11_4, E11_8, E11_9, E11_10 (Factor 1: Trust)
- E11_5, E11_6, E11_7 (Factor 2: Corroboration)
    - ❖ E11_1: I trust fruit and vegetable cooperatives;
    - ❖ E11_2: I believe in cooperatives and cooperative movement;
    - ❖ E11_3: I believe that agricultural cooperatives form a reliable marketing channel for producers;
    - ❖ E11_4: I consider it important to reinforce the incomes of cooperative producers;
    - ❖ E11_5: Producers ensure fair prices for their products through cooperatives;
    - ❖ E11_6: Consumers ensure fair prices for the products that they buy through cooperatives;

- ❖ E11_7: Agricultural cooperatives have the possibility to reduce the cost of distribution in products from cooperatives;
- ❖ E11_8: I trust the quality of products from cooperatives;
- ❖ E11_9: I find them to be of better quality compared to fruits and vegetables that are not from cooperatives;
- ❖ E11_10: The market of fruits and vegetables from cooperatives creates more job positions in the local community.

Cronbach's alpha coefficient was calculated for new factors. Cronbach's alpha amounted to 0.839 for Factor 1 (Trust) and Factor 2 (Corroboration) amounted to 0.682.

4. Conclusions

This study fills the gap in the analysis of collective organization regulation in Greece; evaluation of the regulatory role is difficult, especially when it refers to all stakeholders in the agri-food-chain. A first step towards improving the regulatory function of collective organizations is to identify consumer perceptions about products from cooperatives. Most consumers buy their food through alternative food networks, supporting the incomes of producers. Consumers emphasize trust and corroboration as key factors in purchasing products from cooperatives. This tendency is based on consumers' belief in the cooperative movement and the regulatory role of collective organizations.

Moreover, consumers consider that producers of collective organizations secure fair prices and a reduction in the distribution cost of their agricultural products, improving the relation between price and quality. Consumers' satisfaction with regard to better qualitative categorization of fruits and vegetables from cooperatives will lead to a rise in sales.

In conclusion, executive officers of collective organizations should meet consumers' demands for quality and reasonable food prices. For this reason, collective organizations have to develop innovative sales techniques to meet the special preferences of consumers.

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