

Article

Local Proximity Cheeses: Choices That Guiding Consumers and Orienting Producers—Case Studies

Donatella Di Gregorio [†] , Matteo Bognanno [†], Valentina Rosa Laganà ^{*†}  and Agata Nicolosi 

Department of Agriculture, Mediterranean University of Reggio Calabria, 89122 Reggio Calabria, Italy

* Correspondence: vale_laga@yahoo.it

† These authors contributed equally to this work.

Abstract: In Italy, in ten years, the national production of sheep's cheese has gone from 60 thousand tons to almost 80 thousand tons at present, a sign of a lively dynamism of the sector mainly due to a growth in demand. The significant leap in production is accompanied by that of consumption and is mainly due to pecorino (fresh and seasoned), which, together with fresh ricotta, is gaining acceptance in the national and international markets. The objective of the paper is to examine, in a study area of southern Italy, consumer preferences for locally produced pecorino cheese near kilometer zero and the profit margins of the dairy companies producing pecorino. The interviews with consumers made it possible to explore purchasing preferences based on the reasons for choosing and the points of sale where consumers buy the cheese. The interviews with the manufacturing companies highlighted a different business organization of the single production units whose economic results show, despite the difficulties, the resilience of the companies. The company's net margins per quintal of processed milk are more or less satisfactory and supported by the positive interest of consumers. As for the latter, they show increasingly pushed trends towards the purchase of niche products at Km0, made with more sustainable production systems.

Keywords: dairy industries; livestock farms; pecorino cheese; dairy farm; economic results; production cost; net margin; economic sustainability



Citation: Di Gregorio, D.; Bognanno, M.; Laganà, V.R.; Nicolosi, A. Local Proximity Cheeses: Choices That Guiding Consumers and Orienting Producers—Case Studies.

Sustainability **2023**, *15*, 740. <https://doi.org/10.3390/su15010740>

Academic Editor: Michael A. Long

Received: 21 November 2022

Revised: 17 December 2022

Accepted: 28 December 2022

Published: 31 December 2022



Copyright: © 2022 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

1. Introduction

The production of sheep's milk and its subsequent processing are typical activities of the Mediterranean countries: these countries, in fact, as a whole, produce two-thirds of the sheep's milk in the world [1].

The production of sheep's milk accounted for around 2.8 million tons, and 1.9 million tons went to the dairy. The leaders in Europe include Greece, Turkey, Romania and Italy. Almost all of the sheep milk produced is used for cheese-making, whether on the farm or in industrial dairies. Spain, Italy and France produced 93% of the total EU production of cheese from ewe's pure milk [2].

In the Italian dairy panorama, sheep cheeses, as well as goat cheeses, represent a decidedly relevant reality, which, although with fluctuating trends, has maintained a positive trend over the last ten years, reaching a production of cheese from ewe's pure milk of around 80 thousand tons [3].

In Italy, farms are mainly located in the center and south of the country and constitute an important resource for the economy of the hilly and mountainous areas where other activities are difficult to develop [4]. Their existence also potentially allows the protection of natural resources [5], the conservation of lifestyles and the prevention of rural exodus [6]. In these territories, sheep farming has very ancient roots [7]. Multiethnic influences mean that very similar productions are identified with different denominations, sometimes depending on the places of production, as well as the maturing time: in Southern Italy, toma is the fresh unsalted cheese, sold as soon as it is made; primosale is the semifresco subjected to

salting; and pecorino is the cheese subjected to salting over 20 days. Overall, pecorino, fresh and semi-seasoned, and ricotta are fueling a lively growth market, so much so that the national production of sheep's milk has gone from 300 thousand tons to over 460 thousand at present, while, with reference to the cheeses produced, has gone from 60 thousand tons to almost 80 thousand today [3,8].

With over ten GIs (POD, GPI), the sheep sector is characterized by a strong incidence of geographical indication productions. Pecorino cheeses, in the various PDO and generic meanings, increasingly represent Italian consumption and rank among the top 10 cheeses consumed, both in terms of the overall volume of purchases and in terms of the number of family buyers: 53.5% of Italian families and therefore more than one in two (over 13 million families) makes at least one purchase of pecorino cheeses every year [9]. The role of PDOs in local development is extremely significant, above all, because they seem to intercept many of the main values required by modern consumers, such as the aspects of quality, tradition, taste and sustainability [10–12].

Given the importance of the GI, it should be emphasized that at the local level, the production of generic pecorino cheese is significant, widespread in the territories of southern Italy, historically maintained by local businesses and appreciated by consumers [3]. In support of this consumption is the type of product and not the reputation of the brand [13], which plays a secondary role, and the formats and packaging methods are also marginal factors of choice [3]. Moreover, the great strength of the sheep sector, not only Italian but also French and Greek, lies in the fact that the cheeses obtained are typical products that have no competition at the European level, which is why they enjoy the possibility of strong exports advantageous [14]. The only exception was the period of the COVID-19 pandemic when, due to the restrictive anti-COVID measures that led to the almost total closure of the Ho.Re.Ca channel (Hotel/Restaurant/Café-Catering) and the sharp contraction in catering, the segment of fresh food and products from the table with a strong resizing of demand. In this case, however, the destination of sheep's milk above all towards long-matured products has led to a stabilization in prices and, in some cases, as in that of Pecorino Romano, to an increase in sales prices up to 6–7 points percentages [10,11,15].

As pointed out by Bizikova et al. [16], Heather Paxson [17], Nicolosi [18] and Brunori [19], the place of origin of food products has become a powerful attraction for consumers. In particular, cheeses produced in specific areas increasingly influence the perception and propensity to purchase by the consumer. In fact, terroir products are recognized and appreciated for the qualitative aspects and for the economic, social, environmental and ethical values that the producers invest in the production [2,12,13,15]. They identify in the "terroir" the taste of the place to identify a wide range of environmental, social, agricultural and gastronomic values that are summarized in the production of local cheese.

Furthermore, both producers and consumers are increasingly interested in traditional food, and regional and traditional specialties have become an important part of the tourist experience. At the local level, traditional products are increasingly a vehicle for promoting tourism and strengthening the local cultural heritage [14,16].

In this study, the research objective is two-fold: (1) analyze the propensity of the consumers interviewed for the proximity pecorino cheese produced at Km0; (2) identify the conditions of economic convenience of the transformation of milk into pecorino cheese of a group of companies that operate in the sheep chain in a region of Southern Italy, Calabria.

The contribution is organized into three sections. An introductory part opens up to the dairy sector and to the dairy production of the sheep segment in the international and national context. Subsequently, the study is described in two different segments, that of consumption and that of production of local pecorino. Followed by the methodology adopted, data collection, processing and results obtained on both study segments. The latter allows us to advance certain conclusive considerations and reflections.

2. Sheep Breeding and Dairy Production

Sheep breeding is a traditional activity in many regions of the world, especially in difficult areas that offer limited alternatives to agroforestry destinations, where this activity sometimes represents the only possibility of economic exploitation. In these areas, sheep production, as well as goat, is often fundamental to guarantee the existence of economic and social activities and to keep the vegetation out of the danger of fire [20]. Therefore, it has an important role in the protection of the territory [21] by positively contributing to the equilibrium of rural areas by favoring the associated increase in plant diversity and promoting the maintenance of ecosystem services [20,22,23], as well as in preventing the rural exodus of the population to urban and periurban areas [4]. In Europe, sheep farming is limited to a few environments, of which two are representative: the Mediterranean basin and the Balkan area [20,21,23].

These areas are also important worldwide: over 80% of the sheep's milk collected in the world comes from these areas. In both cases, these are territories not suitable for the development of intensive agriculture. Rocky soils and poor pastures with too hot or too cold climates that do not lend themselves to other forms of breeding, such as cattle, are well suited to small ruminants with lower nutritional needs [24,25]. Outside these two areas, other sheep farming areas, albeit more limited, are to be considered in the central-western part of France and in the Netherlands [20]. Conversely, in northern and central Europe, over time, most of the semi-natural grasslands have been destined for intensive agriculture, with the consequent disappearance of the areas used for the breeding of small ruminants [26]. All this is under the impetus of past EU policies designed to increase the production of animal products in need of large quantities of forage resources [27].

In Italy, the sheep sector is historically linked to the environments and economies of the central–southern areas of the peninsula, where, by virtue of the triple attitude of the animals (wool, milk and meat), it has provided essential goods to satisfy the primary needs of rural communities [28] and where sheep production, together with goat ones, represent an important resource, especially for the economy of the hilly and mountainous areas [4]. Following the strong territorial concentration, this sector assumes an important role in the economic performance of some regions, especially Sardinia [29], whose sector accounts for over 18% of the total value of agriculture [3]. By the number of farms and heads, Sardinia is the region most affected (17%), followed by Sicily (10%), Lazio (9%) and Calabria (8%). Compared to the past, in almost all these territories presently, sheep farming has an economic significance almost exclusively for the production of milk for cheese-making, and, to a lesser extent, for the production of meat. If the production of cheeses from sheep's milk is a specific activity for Italy and Greece, sheep farming for meat is prevalent in Spain, which is a leading country in sheep farming for meat [20,30].

3. Consumers

3.1. Materials and Methods

3.1.1. Study Design and Sample

The survey was conducted between the end of 2019 and the first two months of 2020, with consumers available for interview and intercepted in the territory of the province of Reggio Calabria (Italy). A total of 378 useful questionnaires were administered face to face in order to observe the ways in which consumers organize their purchases, in particular, to examine the appreciation or not for pecorino cheese and for local/artisan cheeses of proximity to Km Zero made in local dairies. In order to validate the representativeness of the sample, two variables were considered: age and sex. The breakdown by sex and age between the sample and the population present in the province of Reggio Calabria for people aged 15 or over in 2019 is compared in Table 1. The interviewed sample has an average age of 45 years, ranging from a minimum of 17 years to a maximum of 89 years.

Table 1. Comparison between gender and composition of the age group between the sample of consumers interviewed and the population in Calabria (percentage values).

Calabria ^a Population in 2019		Sample ^b 2019–2020	
male	49.0%	Male	51.6%
female	51.0%	Female	48.4%
18–29 age	20.68%	18–29 age	21.16%
30–39 age	15.44%	30–39 age	16.67%
40–49 age	17.02%	40–49 age	17.20%
50–59 age	17.52%	50–59 age	17.72%
60–69 age	14.50%	60–69 age	14.55%
>69 age	14.85%	>69 age	12.70%

^a Official Istat 2019 data. ^b Source: the authors.

The research questions included in the questionnaire were designed to evaluate the respondents' attitudes and preferences toward pecorino cheese and to identify the frequency of purchase and preferred points of sale. The reasons for the purchase were identified, and the influences exercised in the purchase by the conscience and ethical sensitivity; the sustainability of the production process; the perception of the quality of food, from the safety and nutrition aspects; from one's own experience; from gastronomic habits; the support you want to give to the territory; and, finally, by the trust placed in the brand and/or the seller.

The preferences for the place of purchase can be motivated by loyalty to the point of sale, to the brand and to the seller. It can be a choice of convenience (it is close to the house, has parking, meets friends, etc.).

In particular, we addressed the following main research questions concerning perceptions/representations, impacts and motivations regarding the consumption of pecorino cheese and whether, for the interviewees, each of the indicated variables influenced "little" or "a lot" in their decision of purchase based on research hypotheses: constructs, measures and choices foreseen in the questionnaire for the purchase of cheese by consumers in the province of Reggio Calabria.

3.1.2. Methodological Approach

In order to examine the ways in which consumers organize their food purchases, the survey used simple correspondence analysis (CA) and multiple correspondence analysis (MCA) followed by the hierarchical cluster analysis HCA.

From a technical point of view, CA is used to highlight buying habits, and the MCA is used to analyze a set of observations described by a set of nominal variables. We refer to the literature for more detailed information on the properties and objectives of MCA [31–35]. MCA attributes factorial scores to each observation and to each category in order to express relative frequencies in terms of distances between individual rows and/or columns in a low-dimensional space.

The multivariate analysis techniques applied to the study applied MCA in order to identify consumer profiles based on their choices. This technique is widely used by researchers to observe the variables that characterize consumer behavior.

In this case, a simple correspondence analysis was first conducted, followed by the MCA and HCA.

The simple correspondence analysis was carried out by comparing two variables: age and places of purchase preferred by consumers. The "Points of sale" variables were therefore used in five ways: hypermarket, retail, city market, dairies and fairs/festivals/events. Six modalities have been envisaged for the "age groups": 16–29 years; 30–39 years; 40–49 years; 50–59 years; 60–69 years; >69 years.

Therefore, we used the questions posed in the questionnaire, which predict dichotomous answers, and coded them as binary variables: 1 for the answer "a lot" and 2 for the answer "little" (slightly); the missing answers were discarded. Or categorical responses

organized into sub-ranges (e.g., age classes, frequency of purchase, gender, education level, income, etc.).

After running the MCA, an HCA was conducted for validation [32]. In the HCA, hierarchical clustering was performed, then optimized with K-mean clustering [35,36]. Analyses were performed using IBM SPSS Statistics (version 26).

The consumer profiles were identified through the representation in a small space, planned on the basis of the components. The MCA is obtained using a standard correspondence analysis on a matrix of indicators (X). This is a $J \times M$ matrix where J is the level vector for each nominal variable K (with $\sum J k = J$) and M is the number of observations. Running MCA on X will yield two sets of factorial scores. These factor scores are, in general, reduced so that their variance is equal to their corresponding auto-value.

In our case, the number of observed variables (k) was 10, to which cluster number 1 and cluster number 2 were added as additional variables as a result of the clustering computations performed.

Since our overall goal is to understand the psychosocial processes that contribute to the selection process in the choice preferences of pecorino cheese, we drew and used qualitative data from questionnaires provided to consumers. The dataset, properly organized and structured, was used for the MCA, which allowed us to identify the key issues to follow/raise/propose hypotheses based on the data and to be tested in further research.

The questionnaire also revealed the socio-demographic characteristics of the consumers interviewed. This allowed the segmentation of the sample to verify the preferences of cheese consumption (mainly from the proximity or from other places) on the basis of age groups, sex and income (Table 2).

Table 2. Questions reported in the questionnaire. Source: the authors.

1.	Do you mainly buy local cheeses, local cheeses or industrial cheeses?
a.	I mainly buy local cheeses
b.	I mainly buy industrial cheeses
c.	I don't buy cheeses
2.	The consumer buys proximity cheese for the following reasons:
d.	to contribute to environmental and agricultural sustainability
e.	because he considers himself an ethical consumer
f.	for the craftsmanship of the production process
g.	for taste and sensory characteristics;
h.	because it is a product of its own territory, at km 0, and for the link with the territory and for the knowledge of the product (consumer experience, family habits);
i.	to support the local economy and help local agricultural producers;
j.	for the advice of the trusted seller;
k.	for the reputation of the product and the manufacturer;
l.	for the presence of a certification mark (POD, PGI, etc.)
m.	because it is a safe and quality product.
3.	which points of sale does the consumer mainly buy the cheese?
a.	Hypermarket
b.	Retail
c.	City Market
d.	In addition to the previous ones, it buys: in dairies, at fairs, festivals, events;
e.	He does not buy them.
4.	how often do you buy cheese?
a.	several times a week;
b.	once, twice a month;
c.	once every two to three months;
d.	never.

For each of the questions, the interviewees replied with the following categorical methods (declared preferences): 1 = a lot; 2 = slightly; 0 = don't answer (don't buy). Source: the authors.

The collected data were processed, analyzed and first interpreted through descriptive analyses to highlight the main characteristics, and the MCA multivariate analysis technique was applied.

In the analysis, consumers were grouped on the basis of whether or not they buy local pecorino cheese from 0 km, where they buy it, with what frequency and why. Consumer preferences and reasons for their choices were analyzed.

3.2. Consumption Preferences: Results

3.2.1. Characteristics of the Sample of Consumers Interviewed

Consumers interviewed were Male in 51.6% and Female in 48.4% of cases; they were aged between 18 and 89 years. The average age is 45 years, and a standard deviation of 17,811 (Table 3).

Table 3. Characteristics of the sample.

Indication *	Mean	Std. Deviation	Minimum	Maximum
Gender	1.48	0.500	1	2
Age	45.22	17.811	18	89
Education	2.21	0.953	1	5
Employment	2.60	1.411	1	5
Income	2.55	1.022	0	4
N° of family members	3.37	1.401	1	6
Place of purchase	2.59	1.238	1	7

* Gender: 1—male; 2—female. Education: 1—middle school; 2—high school; 3—bachelor's degree; 4—master's degree; 5—no reply. Occupation: 1—employee; 2—self-employed; 3—retired; 4—unemployed; 5—students, housewives, other. Family income: 1—high; 2—medium-high; 3—medium-low; 4—low; 0—no reply. Place of purchase: 1—retail; 2—city market; 3—hypermarket; 4—not buy; 5—fairs and festivals.

From the following table (Table 4), a balance emerges between the age groups of the consumers interviewed. This ensures that the results are representative of the age groups of the population. In 38% of cases, the consumers interviewed were aged between 18 and 39, followed by those between 40 and 59 (35%) and those over 59 (27%). A total of 51.6% were men, and 48.4% were men.

Table 4. Descriptive statistics of the sample. Age class and number of members of the family unit.

Age Class	%	Number of Family Members	%
18–29	21.2	1	10.1
30–39	16.7	2	19.0
40–49	17.2	3	24.1
50–59	17.7	4	25.1
60–69	14.6	≥ 5	21.7
>69	12.7		

A total of 67% had secondary school and high school qualifications, and 39% of the interviewees were graduates. The occupations of the interviewees were different; in particular, the highest percentages relating to employees (29%) were recorded. Family income is mainly low-medium (35.4%) and high-medium (32.8%); in 18.5% of cases, the interviewees report a low income, and in 4%, they did not answer the question (Table 5).

Table 5. Descriptive statistics of the sample: education, income, employment, purchase preferences, place of purchase of cheese.

Education	%	Income	%	Employment	%	Place of Cheese Purchase	%
Middle school	23.5	High	9.3	Employee	29.9	Retail	22.0
High school	43.4	Medium–high	32.8	Self employee	22.0	City market	27.5
Bachelor degree	23.8	Medium–low	35.4	Retired	22.0	Hypermarket	31.0
Master’s degree	7.1	Low	18.5	Unemployed	10.6	Company, fairs and festivals	14.2
No reply	2.1	No answer	4.0	Students, housewives, other	15.6	Not buy	6.6

Moreover, Table 5 shows that 56.3% of the consumers prefer to buy local pecorino cheese at Km0, while 37.0% buy cheeses from other production areas. Just under 7% of the interviewees said they never buy pecorino because they do not like it, the price is high or for other reasons. Consumers buy cheeses at the specialized shop/retail shop (22%); at the hypermarket (31%); at the city market (27.5%); or through the short chain (14.2%), for example, directly from producers on the farm, in dairies, in festivals and fairs. About 15% of the interviewees buy in several stores depending on the occasion (supermarket + city market and/or short chain). Many follow the seller’s advice “in part or a lot” (157).

3.2.2. Consumption Preferences: Correspondence Analysis (CA) e Multiple Correspondence Analysis (MCA)

Table 6 indicates dimensions and inertia. The maximum number of dimensions obtained is four. The first two dimensions explain 80% of the cumulative inertia. Correspondences Analysis sees the youngest (18–29 years old) orient themselves towards the purchase of cheeses on the city market (Table 6 and Figure 1); consumers over >69 years old buy at the hypermarket, and the 40–49 age group is in an intermediate situation between purchases at both the city market and the supermarket (See Appendix A Table A1).

Table 6. Correspondence analysis application summary.

Summary								
Dimension	Singular Value	Inertia	Chi Square	Sig.	Proportion of Inertia		Confidence Singular Value	
					Accounted for	Cumulative	Standard Deviation	Correlation 2
1	0.233	0.054			0.485	0.485	0.051	−0.039
2	0.188	0.035			0.316	0.801	0.049	
3	0.145	0.021			0.189	0.989		
4	0.035	0.001			0.011	1.000		
Total		0.112	42.348	0.002 ^a	1.000	1.000		

^a 20 degrees of freedom.

Those who are 60–69 years old go more specifically to retailers, while as you can see from the map of simple correspondences, those who are 50–59 years old buy in dairies, companies, or at fairs and festivals (Figure 1).

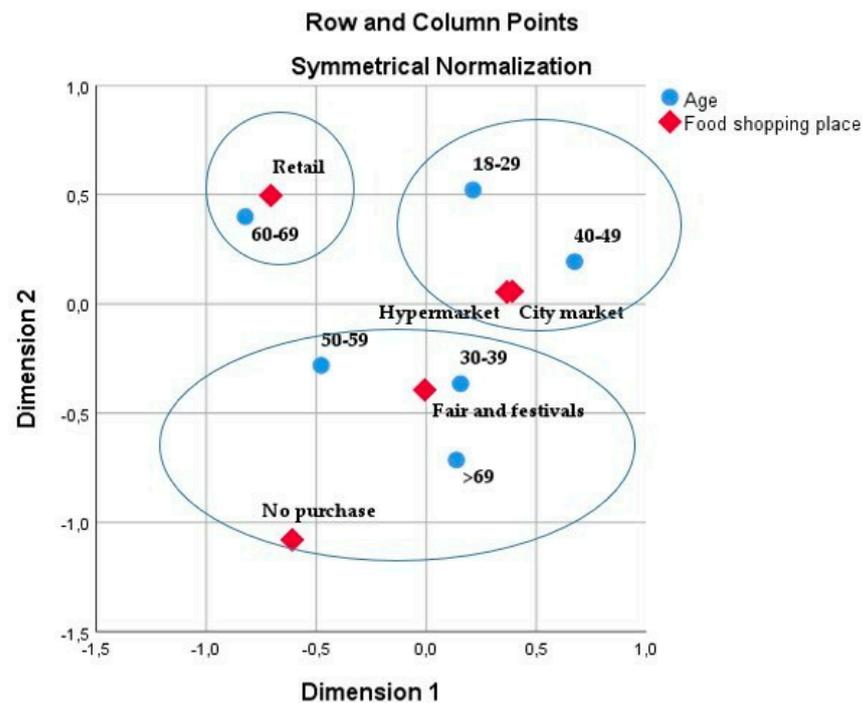


Figure 1. Correspondence analysis map: preferences for choosing places of purchase based on the age of consumers.

The results of the MCA conducted among the intercepted consumers show that the acceptance of all the variables considered are placed in the seminal axis for dimension 1; they represent the main discrimination measures for the consumers interviewed (see Figure 1 and Table 7). The results of the MCA conducted among intercepted consumers show that the acceptance of all the variables considered are placed in the semi-negative axis for dimension 1; they represent the main discrimination measures for the consumers interviewed.

Table 7. Model summary.

Dimension	Cronbach's Alpha	Variance Explained		
		Total (Eigenvalue)	Inertia	% of Variance
1	0.821	3.824	0.382	38.238
2	0.046	1.043	0.104	10.432
Total		4.867	0.487	
Media	0.655 ^a	2.433	0.243	24.335

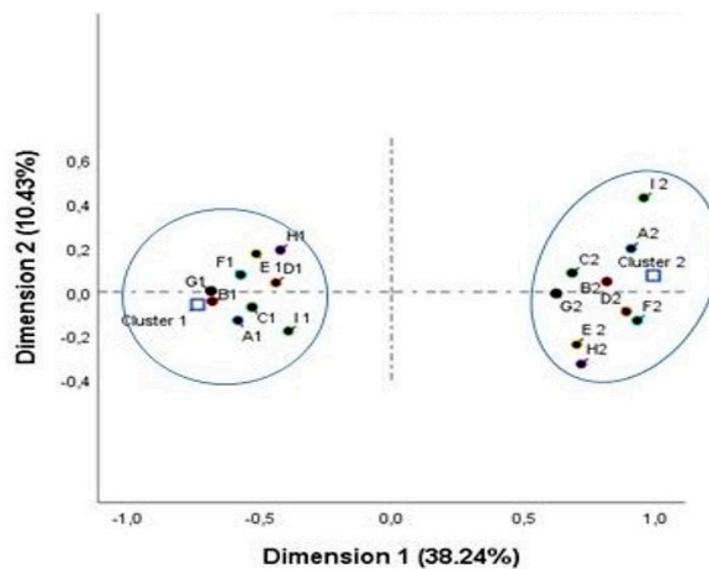
^a Cronbach's alpha mean is based on the mean of the eigenvalue. Source: The authors.

MCA was determined after identifying the motivational variables that together show the greatest percentage of variance explained. The description of the study carried out is entrusted to the two-dimensional solution as it is more effective. In the MCA, in the first dimension, the inertia is 0.38238 (38.24% of the explained variance); in the second dimension, the inertia is 0.10432 (10.4% of the explained variance). In total, this gives an eigenvalue of 4,867 and inertia of 0.487 (48.7% of the explained variance), as shown in the model summary (Table 7).

The results of the application of the cluster are highlighted in Figure 2. The latter shows the results of the MCA conducted among consumers show that in the negative axis for dimension 1 all the variables of Cluster 1 are grouped, with a profile that we can define as "loyal consumers" and which identifies all those who have expressed appreciation and

consent for all the variables considered (they declared “a lot”) for all variables (57.4% of the interviewees).

These are people who prefer pecorino cheeses and local cheeses near Km0 and choose them for their taste or their reputation, or they have a strong bond with the territory and want to help support the local economy. They also appreciate the advice of their trusted supplier and are generally attentive to brands and safety, declare themselves ethical consumers and are attentive to environmental sustainability. In this cluster, men are slightly prevalent (53%), and the most represented age group is that of 50–59 years. As for educational qualification, high school graduates represent 46.1%, followed by graduates at 24.4%, and the prevalent income is medium–high (37.8%). In Cluster 2, the profile traces the “indifferent consumers” who choose pecorino cheese without paying attention to the origin and who are not particularly linked to their own territory. In this group, the youngest age group (18–29 years) is predominant (they are 25.5%); the consistency of men and women is the same. As for the educational qualification, they are mainly high school graduates (39.1%); the prevailing income is medium–low (40.4%).



LEGEND - Reasons and conditions that influence the choice of purchase of Pecorino cheese	
Question posed to survey Respondents	
A	How important is the aspect relating to the environmental and agricultural sustainability of producers?
B	Do you define yourself as an ethical consumer?
C	How important is the craftsmanship of the production process?
D	Do you buy Pecorino cheese for its taste?
E	How much does the bond with the territory and its experience influence your purchase of cheeses?
F	How important is it in your food purchases to support the local economy?
G	Does the seller's advice affect your food purchases?
H	Does the reputation of the product and the producer influence your purchases of Pecorino cheese?
I	How much does the presence of a certification mark (POD / PGI, etc.) affect your food purchases?

Figure 2. Results of the MCA carried out on consumers: joint plot on perceptions and preferences of consumers who purchase pecorino cheese in the province of Reggio Calabria.

4. The Pecorino Producing Companies in the Survey Area

4.1. Material and Methods

4.1.1. The Types of Companies Examined

In order to maintain a vision that adheres to traditional local transformation, the study examined two types of companies that transform sheep's milk into pecorino cheese: these are dairies which, according to the ATECO classification, are divided into dairy industries "Dairy industries" (D.I.), in particular in our case for the production of cheese and curd, and "livestock farms" (L.F.).

The D.I are companies that fall within the economic activity of ATECO 10 (food industries), within the Economic Category 10.51.20 (production of cheese and curd); the L. F. are companies that fall within the scope of the economic activity of ATECO 01.45 (breeding of ovines and goats). The difference is substantial: the former are manufacturing activities, and the latter are agricultural activities, but both are authorized for the processing of raw sheep's milk and the production of pecorino. The following table shows the main distinctions (Table 8).

Table 8. The dairies examined distinguished on the basis of the NCE/ISIC/ATECO coding by main technical–economic characteristics.

Types of Dairies/ Businesses Examined	Economic Activity of Reference Codes	Labor Used	Quantities Processed (milk) Min and Max in the Case Studies Examined	Location of Farms	Local for Processing
Dairy Industries (DI)	NACE 10.51 ISIC 10.51.20 ATECO 10.51.20	They make use of external staff	From a minimum of 525 tons to a maximum of 1950 tons	They are located in urban areas	They own production facilities and ad hoc premises
Livestock Farms (LF)	NACE 0145 ISIC 02.14 ATECO 1.45	Only family members	From a minimum of 80 tons to a maximum of 0.880	Located Agroforestry in areas	They make use of exceptions with reference to processing and storage premises

In Italy, the ATECO classification is the classification that the National Institute of Statistics has introduced to respect the NACE classification, which represents the one adopted in Europe and which, in turn, derives from the international one (ISIC). NACE is a derived classification of ISIC: categories at all levels of NACE are defined to be identical to individual ISIC categories or to form subsets of them. All three classifications are in harmony with each other in order to make economic activities homogeneous.

In order to be able to homogeneously compare the investigated production realities, it was decided to collect information regarding the products obtained: fresh pecorino, seasoned pecorino and ricotta. These are products made with a curd obtained from whole raw sheep's milk. Fresh pecorino has a drying period of 3/4 weeks (and the product obtained is called primosale), while semi-matured pecorino requires at least two months of maturation. Both have the typical flavor of sheep's cheeses, less strong due to the freshness, and more incisive and spicy than the semi-aged pecorino. Ricotta, on the other hand, is a joint product that is obtained from the pecorino production process after adding a minimum percentage of milk to the whey of the pecorino production.

In the pecorino production process, the processing of the milk follows the following stages. The milk is measured, filtered, analyzed and subjected to a short heat treatment. The milk is then placed in the coagulation tanks, where a ferment composed of an association of thermophilic lactic acid bacteria is added. The milk coagulates by means of rennet. Once the optimal hardening of the curd is ascertained, the cheesemaker proceeds to break it until the curd clots reach small dimensions. Subsequently, the curd is divided into blocks and placed in molds for pressing in a warm and humid environment for an optimal time for

purging the whey. This is followed by the stage of cooking the curd. After cooling, salting takes place totally or partially dry according to an ancient and complex artisan technique. Finally, the wheels reach the maturing cells where required by the market.

4.1.2. Collection and Processing of Data from Production Companies

The methodology followed to identify the D. F. and L. F. to be analyzed used an exploratory, qualitative and instrumental case study approach.

Territorial analyses were carried out both preliminarily to collect the information necessary for subsequent interviews with business owners and, subsequently, to integrate and complete the information collected. For this purpose, various local operators in the sector were consulted, such as associations of breeders, local technicians and local public managers. Secondly, we turned to local farmers, some of whom deliver the milk to the D.I. In order to identify the dairies to be interviewed in the investigated area, we intercepted 10 companies using the “snowball” approach [37,38]. In choosing the specific non-probabilistic method, the existing study subjects recruit subjects to be interviewed from among their acquaintances. The sample group grows like a rolling snowball. The first interviewee reported other friendly producers, relatives who indicated the reference dairy, etc. This method is effective in difficult situations, where the subjects to be interviewed are available only through direct contact, a network of friends or relatives. The interviews with the owners of the companies were conducted anonymously on the basis of a semi-structured questionnaire prepared to collect all the technical and economic data necessary for the purpose of identifying the company’s economic results. Dairy industries (D.I.) and livestock farms (L. F.) were considered in the territory of the Province of Reggio Calabria, the southernmost province of the Italian peninsula. The companies considered, as a whole, intercept quantities of milk that are around 10% of the regional total.

The interviews were carried out only after having received informed consent for the processing of sensitive data. We used the collected data, organizing them and analyzing the transcripts of the interviews through thematic analysis [37]. Thematic analysis is one of the basic techniques in qualitative research and is particularly suitable when researchers conduct applied research.

The companies intercepted, available for the interview and to which to submit the questionnaire were 10 (6 D.I and 4 L.F). The interviewees were given the opportunity to choose the place and time of the interview. The data were collected between September and November 2021; the administration lasted between 60 and 90 min, was carried out on the basis of the objective of the study and was managed to take into account the experience already acquired by the researchers in this genre of studies. The data collection concerned the following: (1) the production process in its articulation; (2) the technical means used in this process; (3) costs relating to the means used and the raw materials used; (4) production performance; (5) the final selling prices of the produced productions.

4.1.3. Methodological Approach: Company Net Margins

The study of the companies was carried out in order to be able to determine the companies’ net margins. For this purpose, data were acquired to determine the following:

- The special cost or prime cost;
- The Industrial cost;
- The overall cost or economic–technical cost;

The production cost for the various types of production was obtained by reapplying the full cost or full costing methodology [39,40]. This methodology involves the debit of all cost elements found in the company, based on the contribution of the various factors used to obtain it, according to the “principle of full cost absorption”. Therefore, in the processing phase, the necessary adjustments are necessary so that each cost element charged to the calculation object expresses, as correctly as possible, the contribution that the single production factor has made according to the “causal principle” [41].

In order to comply with the aforementioned objectives, a classification of the elementary costs is carried out on the basis of the type of relationship that exists between the connected production factors and the products. Costs are thus distinguished in relation to their different functions. These are, therefore, divided into two categories of direct costs and indirect costs. The elementary costs that have a specific relationship with the product are direct; that is, they concern factors whose quantity it has been possible to determine in that product. These costs are, in fact, directly attributed to the product. On the other hand, costs that have a common relationship with several products and, therefore, must be shared between the same products are indirect. In order to be correctly classified, the elementary costs must be analyzed individually.

The prime cost is the aggregate obtained by adding all the direct costs. It is an aggregate commonly obtained by adding together the consumption of raw materials, ancillary materials, as well as the costs for direct labor. With the latter expression, we refer to the costs related to the person directly employed in obtaining the product in question. It is the most easily determined aggregate since, taking into account only direct costs, it is determined objectively and does not require any attribution of “parts of cost”.

The industrial cost, also known as production cost, is a cost configuration obtained by adding to the first cost a share of general production costs such as the costs of personnel assigned to production services, maintenance and repair costs, testing costs, expenses for internal movements of materials, expenses for production premises, industrial depreciation, expenses for studies and research, etc. The production costs are indirectly attributed to the object using various imputation criteria. It follows as it is easy to understand that it is an aggregate that is more difficult to determine and whose correct determination depends very much on the rigor with which it is defined. The economic–technical cost represents the most complete full-cost configuration of all. It is determined starting from the total cost and adding a portion of the notional charges. The latter are the managerial salary due to the entrepreneur who lends his work in the company, as well as the interest in calculating the capital invested in the company (see Figure 3).

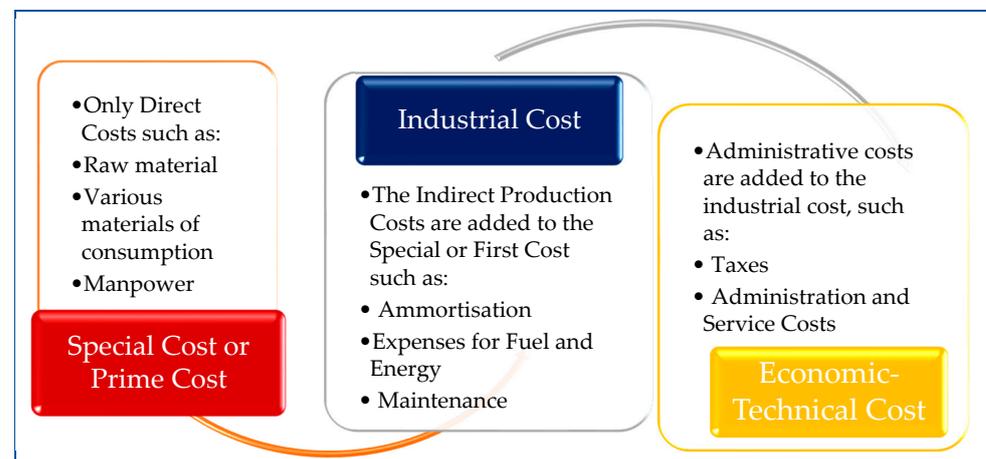


Figure 3. Configurations and cost items.

In the study, through the methodology used, the most complete possible synthetic cost determinations were reached. To this end, it is necessary to charge in the production cost all those elements that contributed to its achievement according to the so-called “principle of full cost absorption”. However, the need to consider all costs is not sufficient, as it is also necessary that each cost element charged to the calculation object reflects, as correctly as possible, the “service” that the connected production factor has given to the object itself (causal principle). The type of relationship that exists between the connected production factors and the products is therefore defined, and it will be this relationship that will influence the methods of charging the elementary cost to the product. As seen in the

previous paragraph, this leads to a distinction between costs in the two categories of direct costs and indirect costs in relation to the different functions performed by them. Specifically, the direct (or special) costs calculated for the production of the different types of cheeses are those referable to the purchase of the raw material (sheep's milk, rennet, lactic ferments and salt), to the use of strictly necessary for carrying out operations relating to all stages of milk processing, for spending on electricity and for packaging. It is, therefore, all the cost items directly attributable to the production of the cheese from the moment it reaches the dairy until it is packaged. As regards the direct cost of labor, relating to all the transformation operations, the annual cost, gross of contributions, is the sum of two components: fixed labor (annual salary + contributions) and temporary labor (working days for the gross daily wage). The costs of the electricity used were calculated directly. Therefore, the costs for packaging were added.

By calculating all the direct costs relating to the annual transformation of milk, the special (or first) cost was calculated. The second type of cost, indirect costs, can be attributed to specific criteria for the unbundling of quotas. These include depreciation and maintenance. In the specific study, these quotas were determined with reference to the equipment. The depreciation rate was calculated by calculating the new value of the assets less the residual value (once the useful life has been completed) divided by the years of probable use. With the exception of the boiler, for which a period of use of 20 years has been foreseen, a probable period of use of 8–10 years was considered for all other technical instruments. The maintenance quotas, on the other hand, were calculated according to their actual outlay. Interest was calculated on the fixed assets to the extent of 3% of their average value.

If we add the industrial overheads to the first cost, we obtain the industrial cost. Finally, if we add to this aggregate the set of general administrative, insurance, tax and commercial costs, we obtain an overall cost or technical, economic cost.

4.2. Companies' Economic Results

4.2.1. Milk Processed Results

The study examined the economic accounts of the dairies in order to determine, through the analysis of the costs relating to the transformation of milk into cheese, the economic items relating to this transformation. Regarding the D.I. (dairy industries) and the L.F. (agricultural/livestock enterprises), the former (D.I.) work from a minimum of 0.525 quintals of milk per year to a maximum of 1,950 quintals (Figure 3); the L.F. work from a minimum of 0.080 quintals in the L.F.3 company to a maximum of 0.880 quintals in the L.F.1 company per year (Figure 4).

Data relating to the production process of transforming milk into cheese were collected from all the companies. All the companies respect and guarantee the hygienic-sanitary norms foreseen. D.I. produce standardized cheeses, while L.F. firms produce less standardized and more artisanal cheeses.

At present, with modern knowledge in the field of hygiene and microbiology, the production of traditional cheese takes place with a high level of food safety.

Agri-food industries must guarantee the safety of the produced foods through the application of the existing regulations by correctly implementing quality control systems. It is extremely important to monitor the industrial treatments to which it is subjected to avoid the multiplication of spoilage and pathogenic microorganisms. Raw milk must undergo strict quality controls at the primary production level based on the knowledge of the main factors that influence their quality and microbiological safety: hygienic practices, the health status of cows, frequency and moment of collection, storage temperature and time of transportation [42].

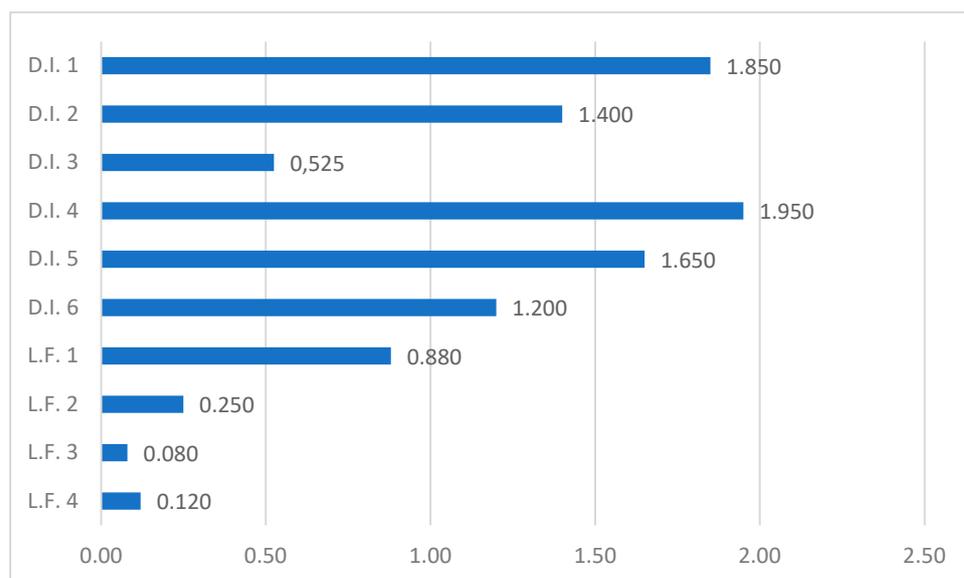


Figure 4. Milk per year processed from companies (D.I and L.F).

It is known that bacteria are not always dangerous: on the contrary, the lactic bacteria active in the cheese-making process help protect the cheese from dangerous bacteria [43].

The DI agri-food businesses where the survey was conducted develop on fairly small surfaces (between 100 and 400 square meters) and have masonry buildings and/or pre-fabricated sheds. There are basically three rooms: a milk storage and processing room, a production maturing room and a room for the direct sale of the product. The companies are run by sole proprietorships with one or two permanent workers whose function is occasionally supplemented by the use of casual labor. The equipment consists of boilers, refrigerating tanks, milk pasteurization machines, multi-purpose cheese-making tanks, double-bottomed ricotta tanks, stainless steel vats with wheels, steel stewing containers, stainless steel tables, various trolleys and vans for transport and deliveries.

The L.F companies have smaller rooms (between 30 and 100 square meters) and equipment: a room where the milk is processed, and one for the storage of the products made. They work exclusively with their own milk production from farm farms. The products made are sold to small local distribution within the province of Reggio Calabria and, to a lesser extent, directly in the company.

4.2.2. Cost Analysis

The following types of costs have been calculated for each company: special or prime cost, industrial overhead costs, industrial cost and economic–technical cost. The breakdowns for artisan dairies and for livestock farms are shown below (Figure 5).

Although there is substantial homogeneity in the purchase price of milk by the companies, there is a slight difference in the selling prices of the products obtained. These have therefore been detected by us and reported in Figure 6.

Furthermore, through the economic results obtained on the basis of the costs accounted for, it was possible to determine the gross salable production. The semi-gross margin and the net margin for each company were thus obtained (Figure 7). Finally, the net margin per quintal of milk processed for the ten companies was determined (Figure 8).

The economic results obtained from the company analyses show that the D.I. performed better. In fact, the net margins of these companies range from a minimum of EUR 113,52 to a maximum of EUR 127,15 per quintal of processed milk (Figure 9). The L.F., on the other hand, achieves significantly lower net margins. In fact, these range from a minimum of EUR 96,10 to a maximum of EUR 117,31 per quintal of processed milk (Figure 9). The reasons are to be traced back to a lower efficiency of the production factors due substantially

to the lower quantities of milk processed, as well as to the higher costs associated with the movement of personnel, as the companies are all outside the inhabited centers.

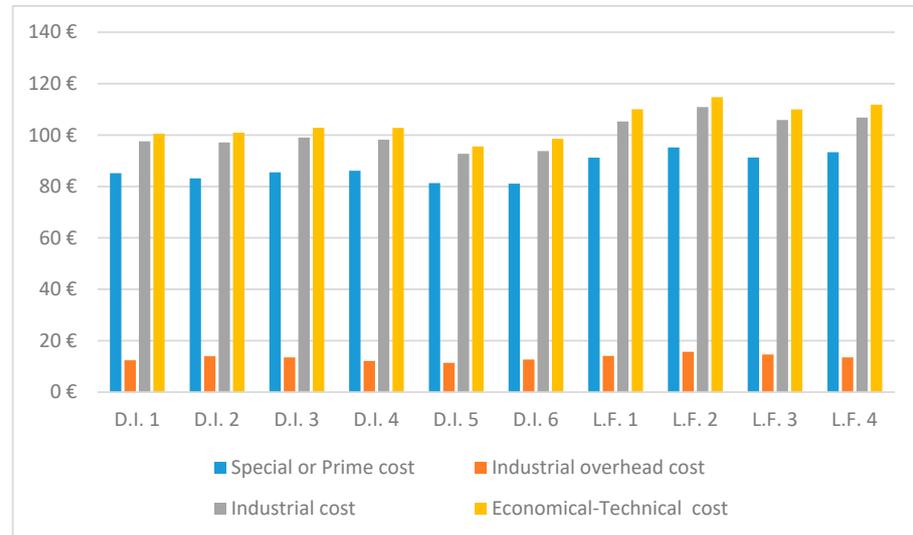


Figure 5. Types of costs in the companies interviewed D.I. and L.F. (EUR per quintal of processed sheep’s milk).

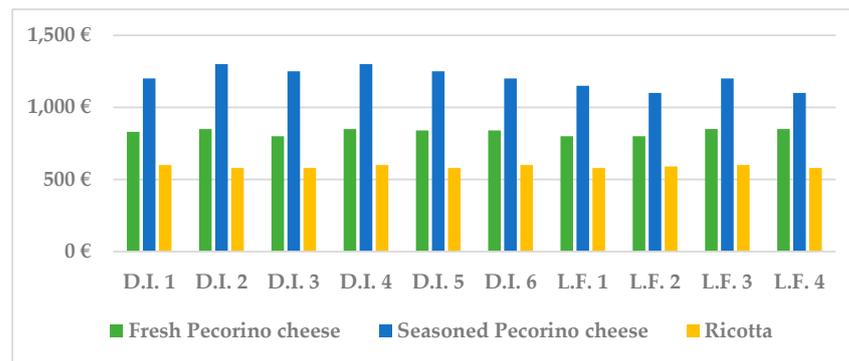


Figure 6. Prices obtained by type of product sold (EUR per quintal).

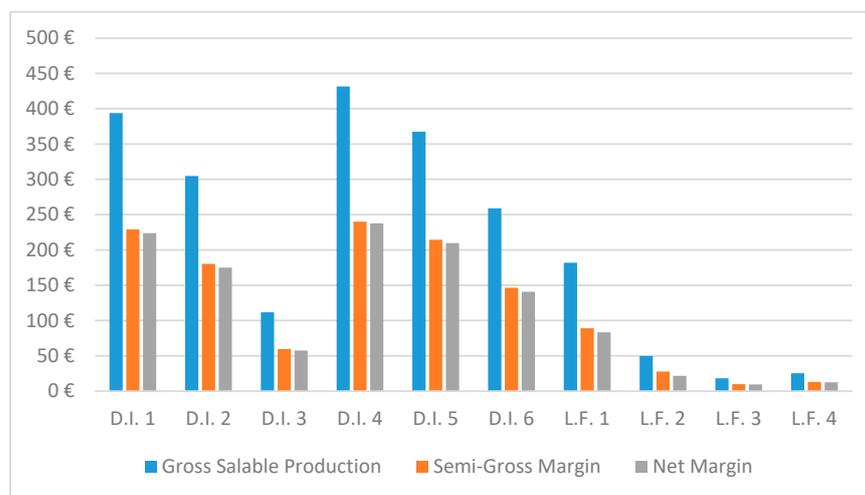


Figure 7. Gross salable production, the semi-gross margin and the net margin for D.I. and L.F. for types of products in euros.

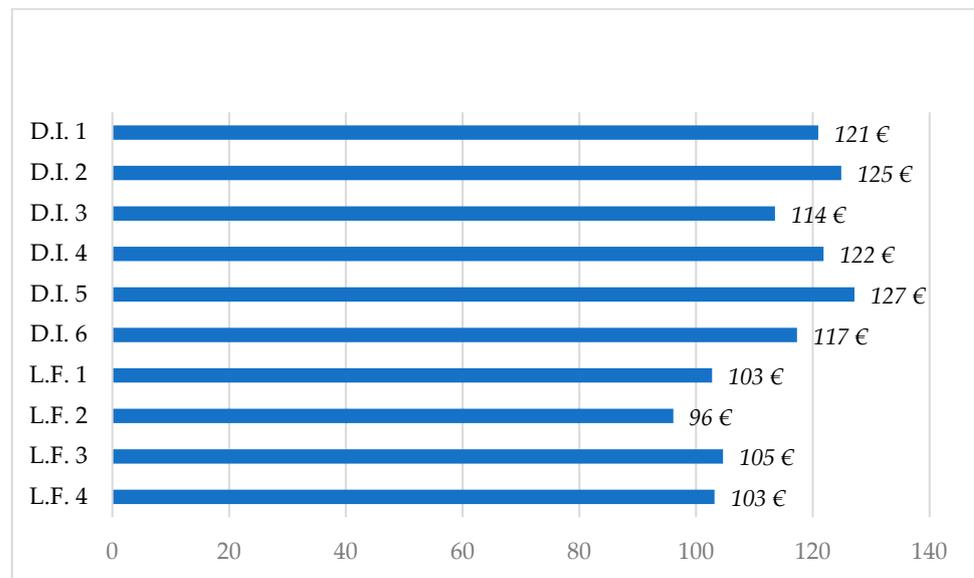


Figure 8. Net margin for companies D.I. and L.F. values in EUR per quintal of processed milk.

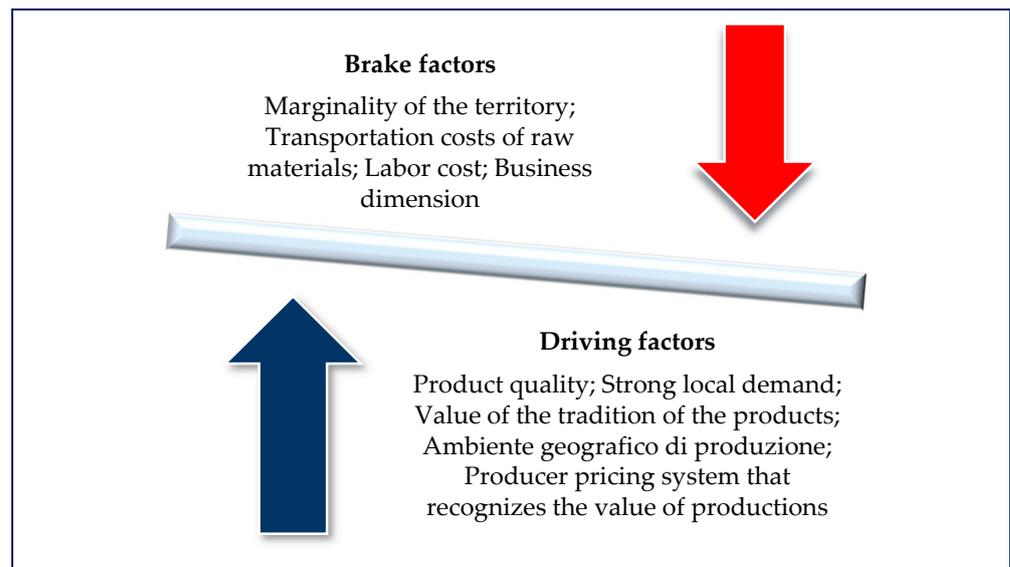


Figure 9. Driving and braking factors of the productions considered.

5. Discussion

The importance of pastoral farms in fragile areas (inland, mountain, marginal) [44] is known by virtue of their contribution to multiple aspects such as fire prevention, erosion of soil, maintenance of rural population in the territory, socio-economic contribution, etc. Less investigated is the role of dairy processing companies in maintaining the economic and social fabric in internal and marginal areas [29,45]. As Zamagni et al. [46] argued, the balanced development of local communities should create the conditions for common growth [43,44].

Sheep heads raised mainly on pasture play an important role in adding economic value to disadvantaged agricultural areas [18,19,34]. As has been pointed out in the case of agro-industrial systems in other countries [47], the agro-ecological and ecosystemic challenges that lie ahead are both opportunities and threats, and the fate of these productions is strongly linked to the ability of all the players in the local supply chain to collaborate to be able to improve the value chain.

The analysis carried out considered a group of companies that process sheep's milk for the production of fresh pecorino, aged pecorino and fresh ricotta. These are products widely consumed in the area that boasts an established tradition over time.

As for the costs that affect the profitability of the productions considered, according to the analysis of the company's financial statements, it emerges that sheep's milk (the main raw material), labor, expenses for electricity and fuel, expenses for depreciation of technical means, structures (warehouses and storage rooms, etc.) and finally expenses for administrative costs and commercial.

Overall the cost structure, the dynamics of the prices of sheep's milk destined for processing, is the one that most of all impacts the profitability of the productions carried out and which is strictly connected to the dynamics of the costs of milk production and to changes in feed prices for livestock [48]. Furthermore, sheep's milk, as well as bovine milk, is strongly conditioned by the price of production factors, primarily energy costs, but is also subject to cyclical fluctuations due to the relationship between demand and supply according to the theoretical instrument of web in which the market response is linked to the elasticity of supply and demand. This is, therefore, due to the lack of real market strategies [1], the fact that livestock farms have a rather limited number of animals, and, last but not least, the fact that they are located in quite a large territory.

In light of these considerations, some reflections are necessary. What are the driving forces and what are the braking forces for this sector in the area considered? What prospects are opening up? What and how could we intervene? Many are the criticalities of dairy production investigated. First is the company size; the transformation takes place in small-scale companies that do not allow suitable production and market strategies.

The main driving force is the quality of the production, strongly rooted in the agri-food heritage of the territory.

As pointed out by Pichierra et al. [49], one aspect to underline concerns the importance of the information on the label for food safety purposes. Clearer health claims are perceived as more useful and can increase product attractiveness and consumer intent to purchase.

The quality is mainly due to the particular geographical environment, biodiversity, human resources, craftsmanship, farms that have maintained the diversity of naturally selected breeds over time and a production system adapted to the territory (Figure 9).

In addition to being an important tool to combat abandonment, the survey on consumption shows that local production is also important in the eyes of consumers, especially the most demanding and attentive to food, who push demand for proximity products, which reflect the food traditions of the area and which are confirmed to be more sustainable, from an economic and social point of view, as demonstrated by lower costs of transport costs and lower environmental impact in terms of pollution.

6. Conclusions

The peculiarity of these productions lies in the maintenance of traditional production traditions and techniques and artisan dairy transformations that deviate from modern trends towards highly specialized and technically advanced production systems with commercial processing plants that mainly produce cheese and yogurt [1].

Even the internal demand for cheeses, considered solid, aware and increasing, represents a driving force, as well as the system of prices to the producer, which recognizes the value of the production.

It seems important to support traditional consumption models that respond to sustainability logic, strengthen the synergy of companies trying to optimize costs to improve relations between producers and dairy industries in compliance with the needs of both and stimulate the resilience of the territories [50]. It is also considered necessary to develop strategies that can avoid strong fluctuations in the price of milk, especially in a perspective that is a prelude to significant increases in the prices of raw materials, particularly due to the prices of energy products. The obvious risk is the inflationary processes that are taking place in this period with consequent repercussions on economies and which risk

compromising consumption. However, in our opinion, it is necessary to promote both individual and collective technical solutions compatible with the local production system, which increase the economic sustainability of the production and processing chain, also by resorting to forms of technical and professional advice for breeders and dairies.

As for the measures introduced by the European Union for companies located in internal and marginal areas, several authors underline how the transitions in dairy systems are influenced both by social, cultural, economic and environmental processes and by structural factors such as government subsidies and regulations [1,48]. For a long time now, the community policy rules have insisted on maintaining and/or increasing the quality of production, increasing the profitability of farms and improving the living conditions of farmers. Maintaining sheep farming in traditionally suited areas allows the population to remain at the same time and the maintenance of local productions and traditions, even if positive impulses for innovation must not be excluded at all. This is because if local production is important for the survival of agriculture and animal husbandry in the area, it is also important because the consumer has increased the demand for local products that are more sustainable (less transport and pollution) [51] and traditional.

Regarding the limitations of the research, three seem the most obvious: the first concerns the fact that the study is limited to a territory and consequently has a strongly localized value; the second concerns the fact that the analyses were carried out in a pre-COVID-19 period when companies and consumers were in a stable health and economic situation which was subsequently distorted: the third concerns the picture of costs and revenues of the productions considered. If, for a long time, the market conditions of both production factors and products have remained practically unchanged in the last year at a macroeconomic level, very marked price increases have been recorded in the costs of raw materials driven by energy price increases. The study photographs a valid situation in a precise moment and which is certainly subject to changes depending on the macroeconomic conditions.

Future research aims to consider other territorial realities and, with reference to the framework of costs and revenues, in a modified cost and revenue regime to study those elements of greater variability. Furthermore, the consumer analyses that we are carrying out aim to bring out the most innovative aspects linked to sensitivity relating to sustainability and proximity products. The research group expects to continue studies and research in which these aspects are considered.

Author Contributions: Conceptualization: all the authors.; methodology—Paragraph 3: A.N., Paragraph 4: D.D.G.; Results—Sub-Paragraph: 3.2: A.N. and V.R.L., Results—Sub-Paragraph 4.2: D.D.G.; validation: all the authors; formal analysis: all the authors; data curation: all the authors; writing—original draft preparation: all the authors; writing—review and editing: all the authors; funding acquisition: M.B. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by PSR Regione Calabria.

Institutional Review Board Statement: The study did not require ethical approval. There isn't no unethical aspect because all the interviews are totally anonymous.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study. In all questionnaires, researchers collected the information in anonymous form and requested for study reasons.

Data Availability Statement: <https://codiceateco.it/categoria?q=10.51.20> (accessed on 8 June 2022). <https://www.codiciateco.com/sezioni/a-agricoltura-silvicoltura-e-pesca/01-coltivazioni-agricole-e-produzione-di-prodotti-animale-caccia-e-servizi-connessi/01-4-allevamento-di-animale/01-45-allevamento-di-ovini-e-caprini/01-45-0-allevamento-di-ovini-e-caprini/> (accessed on 15 June 2022).

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Table A1. Correspondance analysis, overview column points and overviews row points.

Overview Row Points ^a									
Age	Mass	Score in Dimension		Inertia	Contribution				Total
		1	2		Of Point to Inertia of Dimension		Of Dimension to Inertia of Point		
					1	2	1	2	
18–29	0.212	0.212	0.521	0.017	0.041	0.305	0.129	0.627	0.755
30–39	0.167	0.156	−0.365	0.008	0.017	0.118	0.122	0.542	0.664
40–49	0.172	0.674	0.193	0.023	0.336	0.034	0.780	0.052	0.832
50–59	0.177	−0.478	−0.282	0.015	0.173	0.075	0.642	0.180	0.822
60–69	0.146	−0.822	0.399	0.027	0.422	0.123	0.839	0.159	0.998
>69	0.127	0.137	−0.715	0.022	0.010	0.344	0.026	0.562	0.588
Active Total	1.000			0.112	1.000	1.000			

^a. Symmetrical normalization

Overview Column Points ^a									
Food Shopping Place	Mass	Score in Dimension		Inertia	Contribution				Total
		1	2		Of Point to Inertia of Dimension		Of Dimension to Inertia of Point		
					1	2	1	2	
Retail	0.225	−0.706	0.495	0.037	0.482	0.293	0.716	0.284	1.000
City market	0.275	0.391	0.057	0.019	0.180	0.005	0.506	0.009	0.514
Hypermarket	0.310	0.366	0.054	0.021	0.178	0.005	0.470	0.008	0.478
No purchase	0.101	−0.609	−1.080	0.031	0.160	0.623	0.280	0.712	0.992
Fair and festivals	0.090	−0.007	−0.394	0.005	0.000	0.074	0.000	0.570	0.570
Active Total	1.000			0.112	1.000	1.000			

^a. Symmetrical normalization

References

- Pulina, G.; Milán, M.J.; Lavín, M.P.; Theodoridis, A.; Morin, E.; Capote, J.; Thomas, D.L.; Francesconi, A.H.D.; Caja, G. Invited review: Current production trends, farm structures, and economics of the dairy sheep and goat sectors. *J. Dairy Sci.* **2018**, *101*, 6715–6729. [[CrossRef](#)] [[PubMed](#)]
- Rokicki, T.; Ratajczak, M.; Golonko, M.; Rokicki, T.; Ratajczak, M.; Golonko, M. 2019: The production of sheep's milk in EU countries. In Proceedings of the 2019 International Conference "Economic Science for Rural Development", Jelgava, Latvia, 9–10 May 2019; pp. 375–381.
- ISMEA. 'Il Mercato Dei Formaggi Pecorini: Scenario Attuale e Potenzialità Di Sviluppo Tra Tradizione e Modernità Dei Consumi'. Istituto Di Servizi Per Il Mercato Agricolo Alimentare. 2019. Available online: <https://www.ismeamercati.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/10114> (accessed on 9 September 2022).
- Tolone, M.; Riggio, V.; Maizon, D.O.; Portolano, B. Economic values for production and functional traits in Valle del Belice dairy sheep using profit functions. *Small Rumin. Res.* **2011**, *97*, 41–47. [[CrossRef](#)]
- Sainju, U.M.; Lenssen, A.W.; Goosey, H.B.; Snyder, E.; Hatfield, P.G. Sheep grazing in a wheat-fallow system affects dryland soil properties and grain yield. *Soil Sci. Soc. Am. J.* **2011**, *75*, 1789–1798. [[CrossRef](#)]
- Toro-Mujica, P.; García, A.; Aguilar, C.; Vera, R.; Perea, J.; Angón, E. Economic Sustainability of Organic Dairy Sheep Systems in Central Spain. *Ital. J. Anim. Sci.* **2015**, *14*, 3625. [[CrossRef](#)]
- Schimmenti, E.; Viola, E.; Funsten, C.; Borsellino, V. The Contribution of Geographical Certification Programs to Farm Income and Rural Economies: The Case of Pecorino Siciliano PDO. *Sustainability* **2021**, *13*, 1977. [[CrossRef](#)]
- Istat.It | Indagine Annuale Sul Latte e Sui Prodotti Lattiero-Caseari. Available online: <https://www.istat.it/it/archivio/216775> (accessed on 11 December 2022).

9. ISMEA Supporto Alle Politiche—Imprese e Mercati—Documenti—La Competitività Della Filiera Ovina in Italia. Available online: <https://www.ismea.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/10572> (accessed on 22 December 2021).
10. Arfini, F.; Capelli, M.G. The resilient character of PDO/PGI products in dynamic food markets. In Proceedings of the European Association of Agricultural Economists, Crete, Greece, 3–6 September 2009.
11. Toma, P.; Manta, F.; Morrone, D.; Campobasso, F. Familiar worldwide: How PDO products reflect quality in consumers' appraisal and behaviour. *TQM J.* **2022**. *ahead of print*. [[CrossRef](#)]
12. Arfini, F.; Antonoli, F.; Cozzi, E.; Donati, M.; Guareschi, M.; Mancini, M.C.; Veneziani, M. Sustainability, Innovation and Rural Development: The Case of Parmigiano-Reggiano PDO. *Sustainability* **2019**, *11*, 4978. [[CrossRef](#)]
13. Atzori, A.S.; Bayer, L.; Molle, G.; Arca, P.; Franca, A.; Vannini, M.; Cocco, G.; Usai, D.; Duce, P.; Vagnoni, E. Sustainability in the Sardinian sheep sector: A systems perspective, from good practices to policy. *Integr. Environ. Assess. Manag.* **2022**, *18*, 1187–1198. [[CrossRef](#)] [[PubMed](#)]
14. Vargas-Bello-Pérez, E.; Tajonar, K.; Foggi, G.; Mele, M.; Simitzis, P.; Mavrommatis, A.; Tsiplakou, E.; Habib, M.R.; Gonzalez-Ronquillo, M.; Toro-Mujica, P. Consumer attitudes toward dairy products from sheep and goats: A cross-continental perspective. *J. Dairy Sci.* **2022**, *105*, 8718–8733. [[CrossRef](#)]
15. ISMEA. ISMEA, 'Tendenze Latte Ovino'. 2021. Available online: <https://www.ismeamercati.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/11627> (accessed on 16 September 2022).
16. Bizikova, L.; Tyler, S.; Moench, M.; Keller, M.; Echeverria, D. Climate resilience and food security in Central America: A practical framework. *Clim. Dev.* **2016**, *8*, 397–412. [[CrossRef](#)]
17. Paxson, H. Locating Value in Artisan Cheese: Reverse Engineering Terroir for New-World Landscapes. *Am. Anthropol.* **2010**, *112*, 444–457. [[CrossRef](#)]
18. Nicolosi, A.; Laganà, V.R.; Laven, D.; Marciànò, C.; Skoglund, W. Consumer habits of local food: Perspectives from northern Sweden. *Sustainability* **2019**, *11*, 6715. [[CrossRef](#)]
19. Brunori, G. Local food and alternative food networks: A communication perspective. *Anthropol. Food* **2007**, *S2*, 1–20. [[CrossRef](#)]
20. De Rancourt, M.; Fois, N.; Lavín, M.P.; Tchakerian, E.; Vallerand, F. Mediterranean sheep and goats production: An uncertain future. *Small Rumin. Res.* **2006**, *62*, 167–179. [[CrossRef](#)]
21. Rivas, J.; Perea, J.; Angón, E.; Barba Capote, C.; Morantes, M.; Dios-Palomares, R.; Garcia, A. Diversity in the dry land mixed system and viability of dairy sheep farming. *Ital. J. Anim. Sci.* **2014**, *14*, 179–186. [[CrossRef](#)]
22. Graziano, T.; Privitera, D. Cultural heritage, tourist attractiveness and augmented reality: Insights from Italy. *J. Herit. Tour.* **2020**, *15*, 666–679. [[CrossRef](#)]
23. Garmendia, E.; Aldezabal, A.; Galan, E.; Andonegi, A.; del Prado, A.; Gamboa, G.; Garcia, O.; Pardo, G.; Aldai, N.; Barron, L.J.R. Mountain sheep grazing systems provide multiple ecological, socio-economic, and food quality benefits. *Agron. Sustain. Dev.* **2022**, *42*, 47. [[CrossRef](#)]
24. Barron, L.J.R.; Andonegi, A.; Gamboa, G.; Garmendia, E.; García, O.; Aldai, N.; Aldezabal, A. Sustainability assessment of pasture-based dairy sheep systems: A multidisciplinary and multiscale approach. *Sustainability* **2021**, *13*, 3994. [[CrossRef](#)]
25. Rodríguez-Ortega, T.; Oteros-Rozas, E.; Ripoll-Bosch, R.; Tichit, M.; Martín-López, B.; Bernués, A. Applying the ecosystem services framework to pasture-based livestock farming systems in Europe. *Animal* **2014**, *8*, 1361–1372. [[CrossRef](#)]
26. Bernués, A.; Ruiz, R.; Olaizola, O.; Villalba, V.; Casasús, C. Sustainability of pasture-based livestock farming systems in the European Mediterranean context: Synergies and trade-offs. *Livest. Sci.* **2011**, *139*, 44–57. [[CrossRef](#)]
27. Scintu, M.F.; Piredda, G. Typicity and Biodiversity of Goat and Sheep Milk Products. *Small Rumin. Res.* **2007**, *68*, 221–231. [[CrossRef](#)]
28. Idda, L.; Furesi, R.; Pulina, P. *Economia Dell'Allevamento Ovino Da Latte. Produzione, Trasformazione, Mercato*; Franco Angeli: Milano, Italy, 2010.
29. Madau, F.A.; Arru, B.; Furesi, R.; Sau, P.; Pulina, P. Public perception of ecosystem and social services produced by Sardinia extensive dairy sheep farming systems. *Agric. Food Econ.* **2022**, *10*, 19. [[CrossRef](#)]
30. Caja, G.; de Rancourt, M. Situation actuelle Et Perspectives De La Production Des Ovins Laitiers En Espagne. Options Méditerranéennes. Serie B: Etudes Et Recherches (France). 2002. Available online: https://scholar.google.com/scholar_lookup?title=Situation+actuelle+et+perspectives+de+la+production+des+ovins+laitiers+en+Espagne&author=Caja%2C+G.&publication_year=2002 (accessed on 22 December 2021).
31. Ganiere, P.; Chern, W.S.; Hahn, D. A Continuum of Consumer Attitudes Toward Genetically Modified Foods in the United States. *J. Agric. Resour. Econ.* **2006**, *31*, 129–149.
32. Graça, J.; Oliveira, A.; Calheiros, M.M. Meat, beyond the plate. Data-driven hypotheses for understanding consumer willingness to adopt a more plant-based diet. *Appetite* **2015**, *90*, 80–90. [[CrossRef](#)]
33. Ruggeri, G.; Mazzocchi, C.; Corsi, S. Urban Gardeners' Motivations in a Metropolitan City: The Case of Milan. *Sustainability* **2016**, *8*, 1099. [[CrossRef](#)]
34. Nicolosi, A.; Cannavò, S.; Laganà, V.R. Quality Productions, Protection and Recovery of the Internal Areas of Aspromonte: The Role of Truffles, *ArcHistoR*, no. *ArcHistoR* (Extra n. 6/2019): La Mediterranea per Agenda 2030 Studi e ricerche sul patrimonio storico e sui paesaggi antropici, tra conservazione e rigenerazione. *ArcHistoR* **2019**, *6*, 274–285. [[CrossRef](#)]
35. Wenzig, J.; Gruchmann, T. Consumer Preferences for Local Food: Testing an Extended Norm Taxonomy. *Sustainability* **2018**, *10*, 1313. [[CrossRef](#)]

36. Guinot, C.; Latreille, J.; Malvy, D.; Preziosi, P.; Galan, P.; Hercberg, S.; Tenenhaus, M. Use of multiple correspondence analysis and cluster analysis to study dietary behaviour: Food consumption questionnaire in the SU.VI.MAX. cohort. *Eur. J. Epidemiol.* **2001**, *17*, 505–516. [[CrossRef](#)]
37. Nowell, L.S.; Norris, J.M.; White, D.E.; Moules, N.J. Thematic Analysis: Striving to Meet the Trustworthiness Criteria. *Int. J. Qual. Methods* **2017**, *16*, 160940691773384. [[CrossRef](#)]
38. Allen, M. Snowball subject recruitment. In *The SAGE Encyclopedia of Communication Research Methods*; Sage: Thousand Oaks, CA, USA, 2017; pp. 1614–1616.
39. Coda, V. *I Costi Di Produzione*; Giuffrè: Milan, Italy, 1968.
40. Bernetti, I.; Romano, S. *Economia Delle Risorse Forestali*; Liguori: Napoli, Italy, 2007.
41. Selleri, L. *Principi Di Contabilità Industriale e Per La Direzione*; Etas Libri: Milan, Italy, 1984.
42. Granados, L.V.R. Evaluación De Los Factores De Producción Primaria y Transformación Industrial Sobre La Calidad y Seguridad Microbiológica De La Leche. 2021. Available online: <https://dialnet.unirioja.es/servlet/tesis?codigo=299153> (accessed on 19 November 2022).
43. Panebianco, F.; Giarratana, F.; Caridi, A.; Sidari, R.; De Bruno, A.; Giuffrida, A. Lactic acid bacteria isolated from traditional Italian dairy products: Activity against *Listeria monocytogenes* and modelling of microbial competition in soft cheese. *LWT* **2021**, *137*, 110446. [[CrossRef](#)]
44. Cammarata, M.; Timpanaro, G.; Scuderi, A. Assessing Sustainability of Organic Livestock Farming in Sicily: A Case Study Using the FAO SAFA Framework. *Agriculture* **2021**, *11*, 274. [[CrossRef](#)]
45. Nori, M.; Scoones, I. Pastoralism, Uncertainty and Resilience: Global Lessons from the Margins. *Pastoralism* **2019**, *9*, 10. [[CrossRef](#)]
46. Zamagni, S. Conclusions: The way forward in achieving the SDGS—the urgency of transforming our agri-food systems. In *Achieving the Sustainable Development Goals Through Sustainable Food Systems*; Springer International Publishing: Cham, Switzerland, 2019; pp. 247–262. ISBN 978-3-030-23969-5.
47. Vallerand, F.; Dubeuf, J.-P.; Tsiboukas, K. The sheep and goat dairy sector in the Mediterranean area and the Balkans: Diversity of local realities and future changes in the sector. *Cah. Agric.* **2007**, *16*, 258–264. [[CrossRef](#)]
48. Casanovas-Oliva, V.L.; Aldanondo-Ochoa, A.M. Feed prices and production costs on Spanish dairy farms. *Span. J. Agric. Res.* **2014**, *12*, 291–304. [[CrossRef](#)]
49. Pichierri, M.; Peluso, A.M.; Pino, G.; Guido, G. Communicating the health value of extra-virgin olive oil: An investigation of consumers' responses to health claims. *Br. Food J.* **2020**, *123*, 492–508. [[CrossRef](#)]
50. Iotti, M.; Bonazzi, G. The application of life cycle cost (lcc) approach to quality food production: A comparative analysis in the parma pdo ham sector. *Am. J. Appl. Sci.* **2014**, *11*, 1492–1506. [[CrossRef](#)]
51. Sabia, E.; Gauly, M.; Napolitano, F.; Serrapica, F.; Cifuni, G.F.; Claps, S. Dairy sheep carbon footprint and ReCiPe end-point study. *Small Rumin. Res.* **2020**, *185*, 106085. [[CrossRef](#)]

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.