

The effect of business models in the financial viability and competitiveness as advisory tools in the Greek dairy cow sector.

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ABSTRACT

Dairy cow farming is one of Greece's most important livestock industries, as it contributes to the gross value of livestock production at approximately 18%. Cow milk production in our country is 600,000 tons, but approximately 170,000 tons are imported each year. In Greece, 63% of the trade deficit is due to livestock products, which shows that the domestic livestock industry has very low competitiveness. In recent years, the number of dairy farms in Greece has decreased. The decrease in farms was observed mainly in small-sized farms, while the number of medium and large farms increased, while there was an increase in milk production. Compared to previous years, dairy cow rearing conditions have improved significantly in the last decade. Stables that were traditionally used were replaced by new facilities, and the development of intensive feeding systems for dairy cows resulted in a significant improvement in the quality of the products and in their health, always in connection with the improvement of animal management conditions. The dairy cow farming business model is the path of the future for today's milk producers.

The purpose of this study was to examine the effect of the business model on the economic and productive viability of dairy farms in Central Macedonia, Greece. The data used in the case study was obtained from 186 dairy cow farms in the area, that participate in a program of genetic improvement of the Holstein breed. The statistical analysis of the survey was performed using the SPSS 24 statistical package. Results showed that there is a strong correlation between the form of the business model and the gross margin as well as basic financial indicators of the dairy farms.

Keywords: financial viability, competitiveness, advisory, business models, dairy cow sector

INTRODUCTION

The dairy cow sector in Europe has long been a significant contributor to the region's economy and food security. Europe is one of the world's leading producers of milk and dairy products. In 2020, the region produced over 162 million tons of milk, accounting for 28% of global production [1]. The dairy sector is particularly important in countries such as France, Germany, and the Netherlands, which are among the largest milk producers in the region.

For Greece, dairy cow farming is one of the most important livestock industries, as it contributes to the gross value of livestock production at approximately 18% [2]. Cow milk production in our country is 600,000 tons, but approximately 170,000 tons are imported each year. In Greece, 63% of the trade deficit is due to livestock products, which shows that the domestic livestock industry has very low competitiveness. The Greek dairy cow farmers are now young entrepreneurs who rely on no direct support from the European Union to continue their business, they have made significant investments compared to other livestock sectors and aim to pass on livestock traditions to the next generation [3]. Last years, the number of large farms in Greece has increased. The cycle of dairy farms' annual financial operations also increased, which resulted in a significant change to the sector, which became more entrepreneurial. In addition to the establishment of incentives for modernization and construction of new building facilities and the purchase of high-yielding animals, the implemented policy made an important contribution to the development and transformation of the

sector into a business activity. Dairy industries played an equally important role in organizing the market, handling, and marketing cow's milk. Both technical and financial support has been provided to cow farms by the dairy industries. Besides raw milk, cow's milk distribution channels contributed to the development of other processed livestock products such as yogurt and cheese, which contribute to exports.

Business ranking Greek dairy cow farming is mainly practiced in Macedonia and Thrace, where 108,384 cows are bred, representing 75.2% of all dairy cows in the country. In terms of the number of animals, Thessaly has 19,832 (13.8%), and the rest of Greece has 22,5% of the animals, mostly in Western Greece (5.7%) and Epirus (5.2%). Compared with previous years, dairy cow rearing conditions have significantly improved over the past decade.

According to the literature, the legal form of business is a key aspect that can influence the profitability and productivity of dairy farms. Gross revenue, profitability, and productivity are critical indicators that determine the success of any agricultural enterprise. A study by Gómez et al. [4] found that farms operating as corporations had higher profitability and productivity compared to farms operating as sole proprietorships. Another study by Mishra et al. [5] found that limited liability companies (LLCs) had higher net farm income than sole proprietorships and partnerships.

Furthermore, a study by Key et al. [6] found that farms that had a higher proportion of ownership in the form of equity had higher gross margins and profitability. Similarly, a study by Katchova et al. [7] found that farms that had a higher proportion of ownership in the form of equity had higher productivity. A study by Barkema et al. [8] examined the financial performance of 306 Canadian dairy farms between 2010 and 2012. The study found that farms that were incorporated had a significantly higher gross margin per cow compared to farms that were not incorporated. The study also found that farms that were incorporated had a higher net income per cow, although the difference was not statistically significant. The authors suggest that the higher gross margin may be due to the tax advantages of incorporating a business.

Another study by Van den Berg et al. [9] looked at the effect of different legal forms on the performance of Dutch dairy farms. The study found that farms that were organized as cooperatives had a higher gross margin per cow compared to other legal forms. The authors suggest that this may be due to the greater bargaining power that cooperatives have in the market.

Another study by Dill and Ellis [10] explored the relationship between the legal form of dairy farms and their productivity. The study found that farms that were incorporated had a higher milk yield per cow compared to farms that were not incorporated. The authors suggest that the higher productivity may be due to the ability of incorporated farms to invest in better technology and equipment. Wang et al. [11] examined the impact of the legal form of Chinese dairy farms on their profitability. The study found that farms that were organized as cooperatives had a higher return on assets compared to other legal forms. The authors suggest that this may be due to the lower transaction costs and greater access to resources that cooperatives have.

The above-mentioned leads to the conclusion, that the legal form of business can significantly impact the gross margin, profitability, and productivity of cow farms. Farms that operate as corporations or have a higher proportion of ownership in the form of equity tend to have higher profitability and productivity.

This study examined the structure and business model of Greek dairy cow farms, as well as, the correlation between the gross margin, productivity, and the legal forms of dairy business farming.

2. METHODOLOGY

Technical and economic analyses were conducted using a method developed for the production of economic livestock [12]. Data collection was performed through the official Greek Holstein Breed Association. Data recorded during the investigation included information about the size of the holdings, the number of cows and the number of cows in milk production, the average annual milk production, the total annual milk production per farm, the selling price of 100 kg of milk, and the business form of each holding. For each holding, the above data were recorded in a Microsoft Excel spreadsheet according to its characteristics, which was used as a matrix to extract different groups of businesses for their individual averages. The statistical analysis of the survey was performed using the SPSS 24 statistical package. The

sample consisted of 186 farms, from the entire country, which belongs to the Greek Holstein Breed Association. Simple random sampling was employed as a sampling method.

3. RESULTS

Table 1: The legal forms of dairy farms

The legal form of dairy farms	N	Percentage (%)
Sole proprietorship	147	79.03
General partnership	14	7.52
Société Anonyme	10	5.37
Private company	9	4.83
Public limited company	4	2.15
Education institution	2	1.07
Total	186	100

According to table 1, most enterprises belong to the legal form of Sole proprietorship (79.03%). Second, comes the General partnership enterprises with 7.52%. Société Anonyme (S.A.), Private companies, Public limited companies, and Education institutions hold approximately 5.37%, 4.83%, 2.15%, and 1.07%.

Table 2: The number of dairy cows and the size of the average farm by legal form of the farm.

The legal form of dairy farms	Number of cows	Number of cows in the average farm
Sole proprietorship	14.810	100,74
General partnership	3.845	274,64
Société Anonyme	1.987	198,70
Private company	893	99,22
Public limited company	354	88,50
Education institution	230	115,00
Total	22.119	876,80

According to the data in Table 2, General partnerships show the greatest potential in terms of the size of the holdings followed by Sole proprietorship and Société Anonyme enterprises. The educational institutions hold 115 cows per farm, while the smallest average holding of approximately 88.5 and 99.22 cows is presented by Private companies and Public limited companies respectively.

Table 3: Milk production according to the legal form of farm

The legal form of dairy farms	Milk production per cow (kg/day)	Total milk production per average farm (kg)
Sole proprietorship	26	1.032.282,78
General partnership	27	2.803.284,80
Sosiete Anonyme	26.5	2.190.667,50
Private company	27.3	877.402,46
Public limited company	27	771.012,00
Education institution	28	1.279.605,00

According to table 3, the milk production per cow is higher for Education institutions (28 kg/cow), and for General partnership and Public limited companies, the milk production per cow is the same (27 kg). The cows that belong to the Private companies produce 27.3 kg of milk per day. In the Société Anonyme companies, the milk production per cow is 26.5 kg/ day and finally, in the Sole proprietorship companies, the milk production per cow is 26.5 kg/ day.

Table 4: Gross revenue according to the legal form of farm

The legal form of dairy farms	Gross revenue per cow (€)	Total gross revenue per average farm (€)
Sole proprietorship	14.40	578.078,357
General partnership	15.12	1541.806,64
Sosiete Anonyme	14.31	1.226.773,80
Private company	15.28	5.213,16
Public limited company	15.58	4.226,88
Education institution	15.68	6.963,69

According to table 4, the biggest gross revenue have the educational institutions (15.68 €/ cow). Follow the Public limited companies with 5.58 €/ cow, the Private companies with 15.28 €/ cow, the General partnership companies with 15.12 €/ cow, the Sole proprietorship companies with 14.40 €/ cow, and finally the Société Anonyme companies with 14.31 €/ cow.

4. DISCUSSION AND CONCLUSION

The legal form of business can significantly impact the gross revenue, profitability, and productivity of cow farms. According to the results, Sole proprietorship enterprises constitute the majority in Greece. The mean number of cows that they hold is 100, the mean milk production per cow and per day is 26 kg and the mean gross revenue is 14.40 €/ cow. The General partnership enterprises amount to about 7.5%. The mean number of cows that they hold is 275, the mean milk production per cow and per day is 27 kg and the mean gross revenue is 15.12 €/ cow. The Société Anonyme enterprises amount to about 7.5%. The mean number of cows that they hold is 275, the mean milk production per cow and per day is 26.5 kg and the mean gross revenue is 15.12 €/ cow. The Private companies amount to about 4.8%. The mean number of cows that they hold is 99, the mean milk production per cow and per day is 27.3 kg and the mean gross revenue is 15.28 €/ cow. The Public limited companies amount to about 2%. The mean number of cows that they hold is 88, the mean milk production per cow and per day is 27 kg and the mean gross revenue is 15.58 €/ cow. Finally, the education institutions amount to about 1%. The mean number of cows that they hold is 115, the mean milk production per cow and per day is 28 kg and the mean gross revenue is 15.68 €/ cow. So, it seems that farms whose business structure has helped to adopt the application of intensified nutrition systems and the use of modern trends in milking such as robotic milking parlors have led to an increase in productivity and by extension profitability. The above is in absolute agreement with the results of Tse et al. [13], Siewert et al. [14], and Mattachini et al. [15] who found in their comparative studies that the utilization of automatic feeding systems and milking has led to a strong increase in farm productivity.

Cow farms that belong to sole proprietorship may have lower revenues than other legal forms, but they may also have lower expenses and greater flexibility in decision-making [16]. Generally, sole proprietorships in the dairy industry had lower gross revenues than other legal forms, but also had lower expenses and higher net incomes. This suggests that while sole proprietorships may not have the highest gross revenues, they can still be profitable and successful through careful management practices [17].

General partnership enterprises may offer benefits such as shared decision-making and lower organizational costs. They may also be a good fit for medium size farms. Furthermore, general partnerships can provide certain advantages for cow farms, such as shared decision-making, shared risk, and access to more capital. According to a study by Safley et al.[18], general partnerships in the agriculture industry were found to have higher average farm incomes compared to sole proprietorships or corporations. Cow farms that belong to Société Anonyme (SA) can have varying levels of gross

revenue and milk production depending on a number of factors. However, the SA legal form can also have an impact on revenue and milk production. According to a study, SAs had higher levels of debt, which could impact their overall profitability [19]. Private companies in the agriculture sector, including cow farms, tend to have quite high levels of gross revenue and milk production than other legal forms due to the fact that they have access to resources and especially Private companies have greater access to capital, technology, and management expertise, which can help them increase production and profitability [20]. In terms of milk production, Public limited companies have an advantage due to their ability to invest in modern technologies and equipment. A study by Tauer and Mishra [21] found that larger farms, which are often owned by corporations, had higher milk yields per cow than smaller farms. Finally, Educational institutions that own and operate cow farms have better economic and productive results, due to the fact that the owners have extensive knowledge and know how to manage the farms in order to achieve maximum results. Besides being familiar with rationally prepared rations, they also know the factors that influence the total production cost.

In conclusion, it is worth mentioning that there are many factors that can impact a cow farm's revenue, including location, herd size, and management practices. Additionally, the legal form of a farm is just one of many factors to consider when evaluating its overall financial performance. By taking into account the unique characteristics and needs of their farm, farmers can choose the legal form that is best suited for their business.

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