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STUDIES ON THE EVOLUTION OF PROCESSING CAPACITIES OF MEAT PROCESSORS WHO HAVE ACCESSED GRANT FUNDS IN THE OLTENIA REGION, ROMANIA

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Abstract

In recent years, the meat processing sector in Romania has experienced rapid development, at the level of all existing regions. This was possible thanks to access to non-reimbursable European funds. It can be said that following the investments made, this sector has developed, resulting in a modern meat processing industry, where there is a permanent concern for food safety and quality. The present study was carried out to highlight the evolution of the production capacities of meat processors who accessed non-reimbursable funds in the South-West Oltenia Development Region. Investment value, processing capacity and the profit from the project set up by meat processing companies operatinng in teh region swere used to determine the investment efficiency in terms of specific invetment, investment pay back and coefficient of economic investment. In this region, between 2016 and 2020, 4 projects were financed, where the total increase in meat processing capacity, through the contribution of the National Rural Development Program, was 15,884 tons/year.

Key words**:** *meat, processing, funds, economic efficiency, modernization of processing capacity*

INTRODUCTION

Romania accessed European funds for agriculture and rural development in the period 2014-2020. During this funding period, Romania received more than 8.12 billion euros from the European Union budget, more precisely from the Agricultural Fund for Rural Development (FEADR), through the National Rural Development Program (PNDR) [19] [14]. Subsidies for investments in the field of meat processing increase the economic results of the supported companies and their competitiveness [5]. In order to develop a sustainable development strategy in the case of a meat processing enterprise, the following steps are followed: developing a methodology for economic evaluation of the company, processing and systematizing data, ensuring the collection, processing and transmission of information [7]. Investments in tangible and intangible assets made by meat processing enterprises in Romania are designed for the modernization and modernization of technological and manufacturing lines [15]. In order to improve the internal situation of a meat processing company, with regard to the economic and financial situation, it is recommended that each meat processing company has a review committee or audit representative within its staff [8] . The use of new technologies to achieve real improvement and increase productivity in a business can be effective in the long term only by correctly analyzing the current state of the company [10]. Following an analysis of companies in the meat processing industry, it turns out that these companies in this field perform much better than meat producers, respectively raw material producers. Both in the EU and Romania, livestock is declining, but meat production is increasing [9, 10]. In the context in which the pig market in the European Union is decreasing in terms of pig herds, and exports are increasing, in order to recover the pig market in Romania, both breeders and processors must comply with the strategy and measures imposed by authorities regarding

pig breeding, transport and slaughter. Regarding unprocessed sheep meat, Romania has an efficient external trade, reflecting that it is a net exporting country [1, 2].

As the demand for automation increases, Romania and other countries in the European Union have adopted new technologies in the meat industry. However, due to the diversity of animals and anatomical peculiarities, meat processing requires advanced equipment to meet the challenges [17]. According to Smedescu, Romania has made significant progress, especially in large companies, highlighting the complexity of work dynamics in the meat processing industry in the European Union, influenced by market demand, technological advances and economic policies [16]. Likewise, Romania's progress in meat processing is notable, and the development of this sector in the European Union is marked by market demand and significant regional differences. Inefficiencies are related to managerial practices rather than local conditions [3], [13]. According to Lautenschlaeger, investments in meat processing are driven by the rigorous requirements and exacting standards of the industry, thus stimulating the adoption of advanced technologies and helping to improve processing efficiency [4]. Another approach is Popescu's, where he gives special importance to large cooperatives for the processing of meats that have a significant impact on the global food industry, demonstrating the ability to operate on an international scale. They comply with high quality and safety standards at all stages of processing. Through innovative practices, cooperatives offer products appreciated on international markets, contributing to increasing competitiveness and satisfying consumer demands [11].

MATERIALS AND METHODS

A first step in conducting this study was to conduct a bibliometric analysis of key word connections such as between meat processing, meat processing skills development and other associated terms.

The bibliometric analysis represents an alternative method for the statistical analysis of the public of different fields of study.

This instrument provides an organized and transparent process that broadly analyzes an area of research.

Carrying out the bibliometric analysis, with the help of a program, involves performing several phases such as: identifying the analyzed topic, selecting the database, exporting and entering the database into the software, and finally, analyzing the results.

The present study was carried out to highlight the evolution of the production capacities of meat processors who accessed non-reimbursable funds in the South-West Oltenia Development Region.

In this region, in the period 2016 – 2021, 4 projects were financed (P1, P2 and P3Vl and P3Gj), which were accessed by 3 companies, which were noted as follows: SC MATRA SRL - P1, SC TELDOTRANS SRL - P2, SC AVICARVIL SRL - P3 (P3Vl, P3Gj). Following the request to the Regional Center for the Financing of Rural Investments (CRFIR) 4 South – West Craiova [13], but also to the beneficiaries of the projects, we obtained information on the processing capacities from the end of the implementation period of the projects, which were subsequently processed.

These data together with the investment value of the projects (data taken from the AFIR database), the initial processing capacity and the profit (data taken from the accounting balance of these companies) from the year in which the projects of these processors were submitted, were processed by evaluating investment efficiency.

Investment efficiency indicators:

1. *The specific investment (IS)* which is the ratio between the value of the investment (I) and the production - tons (P) and shows the size of the investment expenses for the creation of the processing capacity.

(a)for newly established processing capabilities:

$I_S = \frac{I}{P}$, ...(1)

(b) for the development of production capacity:

$I_S = \frac{I}{P_1 - P_0}$, ...(2)

2. *The investment payback period (D)* shows the length of time the investment (I) recovers from the profit (p).

$D = \frac{I}{p}$. .....(3)

3. *The coefficient of economic investment (E)* expresses the profit obtained for each euro invested and is the ratio between profit (p) and the value of the investment (I).

$E = \frac{p}{I}$. .....(4)

The situations regarding the herds of cattle, sheep and goats, pigs and poultry were processed and transformed into Livestock Unit) according to the conversion coefficient for each analyzed species as follows.

Table 1. Conversion coefficient from species into Livestick unit, LU

Species (Number of animals)	Livestock Unit conversion factor
Cattle	1.00
Swine	0.30
Sheep and Goats	0.15
Poultry	0.03

An analysis was made regarding the necessity of the investments made in the respective areas, taking into account the production of matter and the need for its processing.

RESULTS AND DISCUSSIONS

The subject "meat processing" is debated in over 1,000 papers written between 2002 and 2023, and they were included in the fields of Economy, Food Industry and Agriculture. With the help of the Web Of Science database, the document is exported in editable format with all specialist papers written on the subject of "meat processing" [14].
With the help of the VosWiewer program, maps are generated that contain the keywords mentioned at least 3 times, in a publication and countries that give special importance to the subject.
Fig.1 reflects the connection between ”meat processing” and other related terms.
Fig. 2 shows the relationship between ”meat processing” and other related terms by years.
Fig. 3 regards the keywords density in the field of meat processing.
Fig. 4 shows the connections between the authors of the countries that researched about "meat processing”.

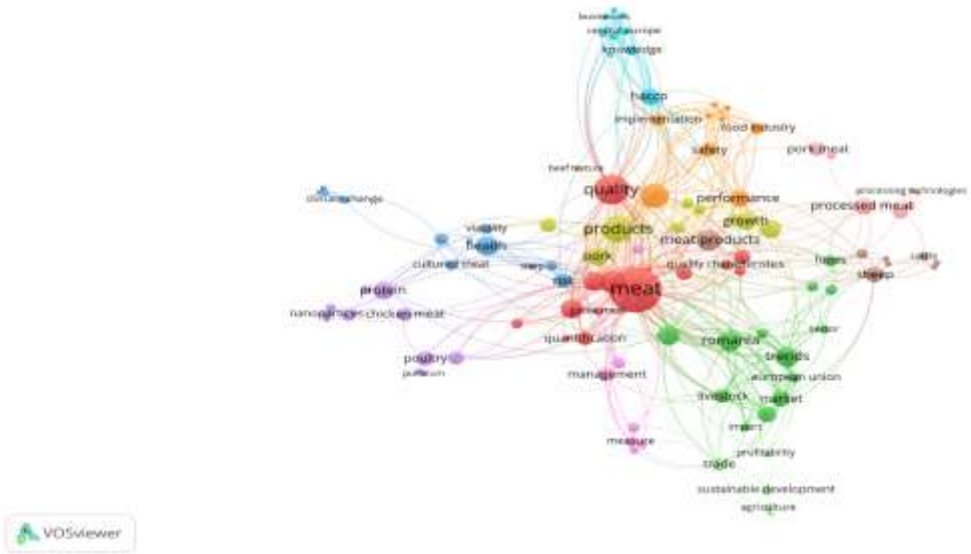

Fig. 1. The connection between ”meat processing” and other related terms
Source: Web of Science data processing with **VOSviewer software [20].**

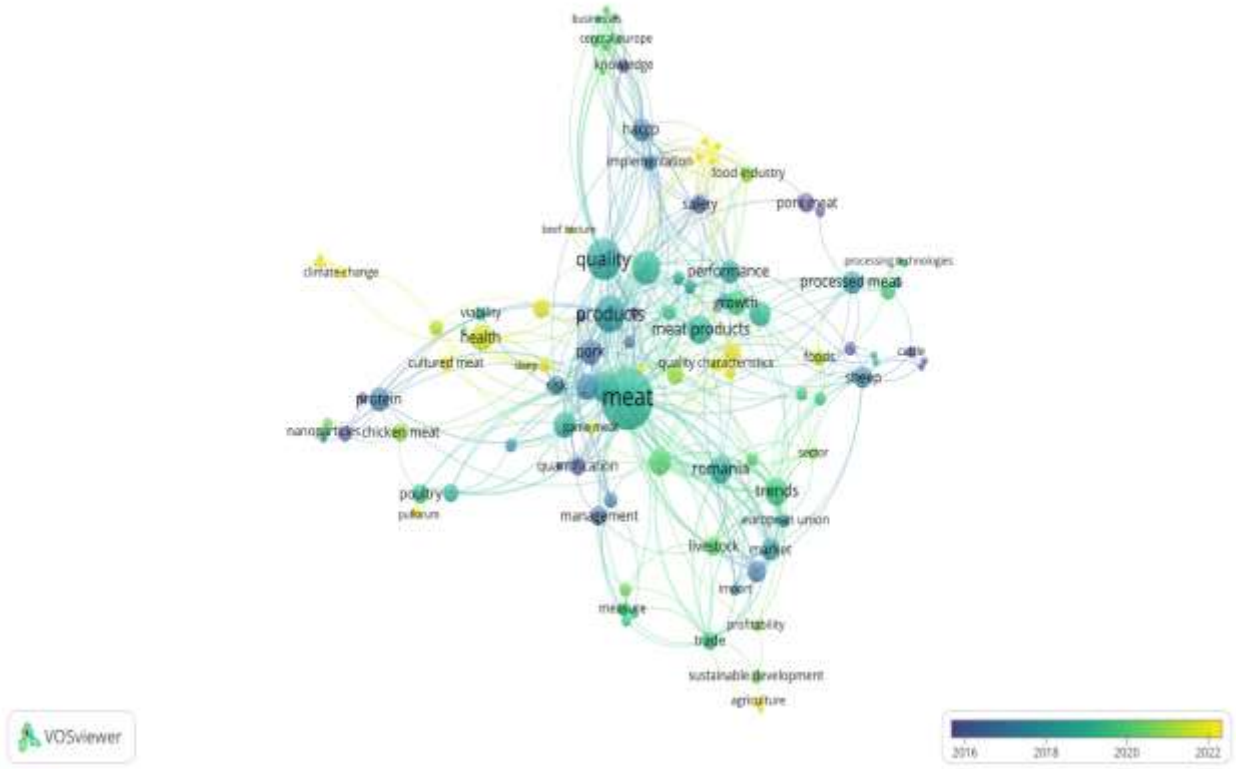

Fig. 2. The relationship between ”meat processing” and other related terms by years
Source: Web of Science data processing with VOSviewer software [20].

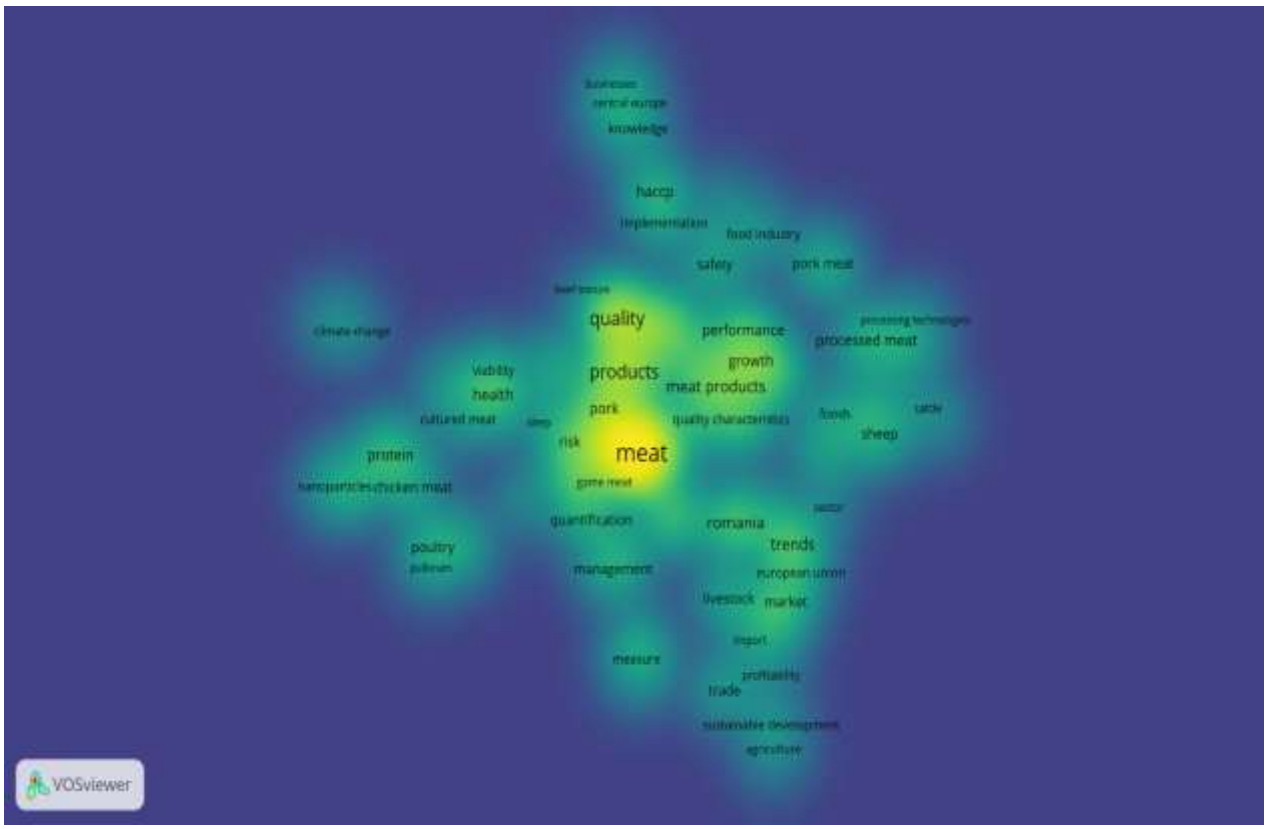

Fig. 3. Keyword density from the field of meat processing
Source: Web of Science data processing with VOSviewer software [20].

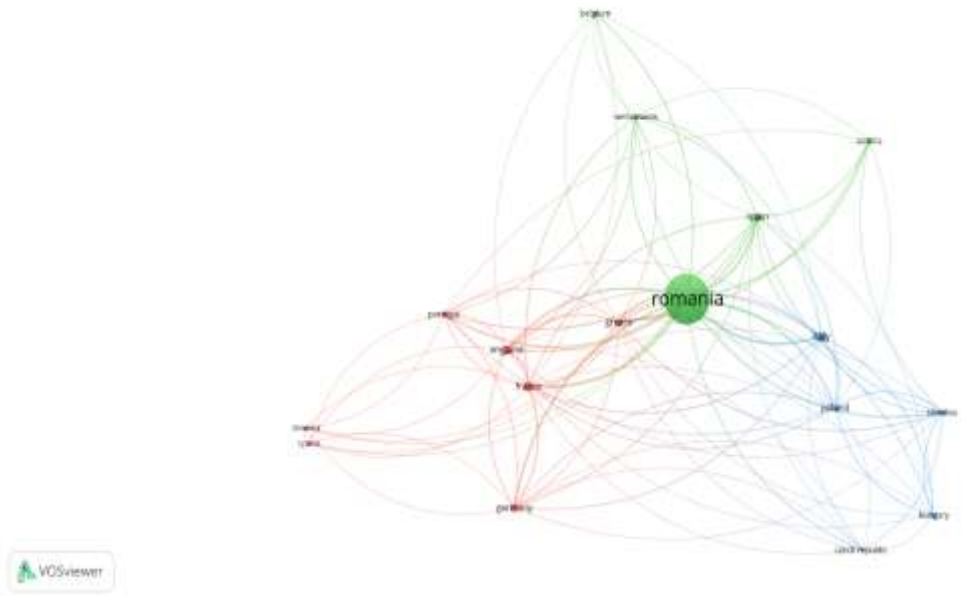

Fig. 4. The connections between the authors of the countries that researched about "meat processing"
Source: Web of Science data processing with VOSviewer software [20].

The size and color features provided by the VOSViewer software help identify groups. Thus they identified several clusters, as follows (Figure 1):

-*The red cluster*, highlighted by the term "meat", shows us in words the main ideas about meat such as "quality", "meat products", "quantification";

-*The green box*, highlighted by "Romania" and "European Union", shows us the main key ideas, such as: "sustainable development", "agriculture", "trade", "livestock", "market", "import", "foods";

-*The brown box*, represented by the term "processed meat", shows us the links between "processing technologies", "sheep", "cattle", "pork meat", "meat products".

-*The orange circle*, which we can call "food industry", includes the keywords "implantation", "performance", "safety";

-*The blue circle*, which we can call "HACCP", includes links between the terms "central Europe", "businesses", "knowledge", "climate change".

As for the keywords used in scientific works by year, Figure 2 shows the interest in certain topics, in the interval 2016 – 2022, i.e. over a period of 6 years. So, between 2016 and 2018, the researchers were concerned with meat, processed meat, meat products, quality, management, implementation, HACCP, Romania. In the following years, 2018 – 2020, the research focused on food industry, processing technologies, businesses, Central Europe, measure, growth, livestock. In the last interval, 2020 – 2022, the attention was on the terms climate change, quality characteristics, foods, health, cultured meat, agriculture (Figure 2).

Figure 3 suggests the density of the keyword, based on the concentration of the central node from which they originate, namely, the color of the node is influenced by the number of nearby elements. So, in our case, the density of the created map is about the keyword "meat", the research focusing on quality, processed meat, meat products, sustainable development, management.

The link between countries is important to highlight the countries of interest in this study. The intensity of the nodes on the map represent the partnerships between institutions, and the colors show us the multitude of research directions. The countries that show particular importance to the analyzed topic are a good part of the European Union countries (Spain, Holland, Poland, Italy, Greece, France, Hungary), also England, and Romania is the strongest node (Figure 4).

Table 1 shows that the value of the 4 projects is 14,071,539 euros, where the non-refundable value of the investments is 5,893,046 euros.

Table 2. The value of investments and the situation of the production capacities of the processors at the end of the implementation of the projects

Project	Investment value (euro)	The non-refundable value of the investment (euro)	Rate of public support (%)	Initial capacity (tons/year)	Final Capacity* (tons/year)	Final Capacity* (tons/year)
P_1 (2017)	986,126	493,063	50	0	1,200	1,200
P_2 (2018)	1,658,183	829,091	50	1,148	1,148	0
P_3 Vl (2016)	5,731,230	2,292,492	40	0	774	774
P_3 Gj (2019)	5,696,000	2,278,400	40	18,250	32,120	13,870
Total	**14,071,539**	**5,893,046**	-	**19,398**	**35,242**	**15,844**

Source: Own calculation based on data Regional Center for the Financing of Rural Investments 4 SV Craiova [12].

Table 2 shows that the value of the 4 projects is 14,071,539 euros, where the non-refundable value of the investments is 5,893,046 euros. The initial total processing capacity is 19,250 tons/year and the final total processing capacity is 35,242 tons/year, resulting in an increase in processing capacity of 15,844 tons/year. Although the potential of this region is much greater, out of the 5 counties, only 3 counties managed to access non-reimbursable funds, these being Olt, Vâlcea and Gorj, and the counties in Dolj and Mehedinți had no funded projects.

The total increase in meat processing capacity in this region, through the contribution of the National Rural Development Program, is 15,884 tons/year. The P1 project, financed in 2017, establishes a new processing capacity with a total investment of 986,126 euros, half of which—493,063 euros—is provided as non-reimbursable support (50%). The project aims for a final processing capacity of 1,200 tons per year (Table 1). The P2 project, funded in 2018, focuses on modernizing an existing processing facility with an investment of 1,658,183 euros, of which 829,091 euros (50%) is covered by non-reimbursable support. This upgrade does not increase the processing capacity, which remains at 1,148 tons of processed meat per year (Table 2).

The P3 Vl project, financed in 2016 in Vâlcea County, establishes a new processing capacity with an investment of 5,731,230 euros, including 2,292,492 euros in non-refundable support, covering 40% of the total. The target processing capacity for this project is 774 tons per year. The P3 Gj project, financed in 2019 in Gorj County, focuses on expanding poultry slaughter capacity with an investment of 5,696,000 euros, of which 2,278,000 euros (40%) is non-refundable support. The initial slaughter capacity is 18,250 tons per year, with the project aiming to reach a final capacity of 32,120 tons per year, reflecting an increase of 13,870 tons annually (Table 2). Table 3 presents the indicators for investment efficiency.

Table 3. Investment efficiency indicators

Project	Specific investment (euro/tonne)		Recovery time (years)	Economic efficiency
	Newly established processing capacity	Development / Modernization of processing capacity		
P_1	821.77	-	4.24	0.24
P_2	-	1,444.41	7.32	0.14
P_3 Vl	7,404.69	-	5.61	0.18
P_3 Gj	-	410.67	7.18	0.14

Source: Own calculation based on data Regional Center for the Financing of Rural Investments 4 SV Craiova [12].

The specific investment P1 is 821.77 euros, for a newly established meat processing capacity, the investment recovery period is approximately 4 years, and the economic efficiency is 0.24. In the case of P2, the specific investment for the modernization of the meat processing capacity is 1,444.41 euros for each processed ton, the investment recovery period is approximately 7 years, and the economic efficiency is 0.14, which shows that it has approximately the same indicators as in the case of P3 Gj. The specific investment for the establishment of a poultry meat processing capacity, at P3 Vl is 7,404.69 euros for each ton of processed meat, the investment recovery period is approximately 5 and a half years. The economic efficiency is 0.18, from which it follows that for each euro

invested the profit is 0.18 euro. In 2019, P3 Gj develops its poultry meat slaughtering capacity, the specific investment is worth 410.67 euros for each ton of slaughtered meat, the investment recovery period is approximately 7 years. The economic efficiency is 0.14, from which it follows that for each euro invested the profit is 0.14 euro (Table 3).

The type of investment is a very important factor in the performance differences of investments between projects, projects to establish new capacities, as in the case of P1 and P3VL projects, require much higher initial costs, because they involve the construction of new factories, compared to modernizations as in the case of the P2 project, or in the case of the expansion of already existing capacities as in the case of the P3GJ project. Consequently, the specific investment SI is much higher in the case of projects that establish new capacities, as in our case with the P3VL project, which has a much higher SI than the other projects, with a value of 7,403.66 euros/ton. The differences in the quality and complexity of the equipment purchased for modernization or establishment can vary significantly between projects. In the case of P3VL with a specific investment of 7,403.66 euros/ton, it reflects a much more advanced technology and high infrastructure costs, compared to P3GJ with a specific investment of 410.77 euros/ton, where the expansion of the slaughterhouse can be achieved with relatively less equipment expensive. Own contribution and non-reimbursable support varies between projects, P3Vl and P3Gj projects have a 40% support, while P1 and P2 benefit from a 50% support, these differences directly influence the financial pressure on each company and affect the way they have managed investments. Managerial skills and experience in implementing similar projects can influence the efficiency of the investment. A company with more experience in grant management and meat processing can optimize costs and reduce implementation risks, which could explain differences in performance between projects (Table 2 and Table 3).

Table 4. Herds of cattle, pigs, sheep and goats, birds in 2019, in the South - West Oltenia Region

	Dolj County		Gorj County		Mehedinți County		Olt County		Vâlcea County		South - West Oltenia Region	
Animal category	Number of Animals	Livestock Unit	Number of Animals	Livestock Unit	Number of Animals	Livestock Unit	Number of Animals	Livestock Unit	Number of Animals	Livestock Unit	Number of Animals	Livestock Unit
Cattle	30,339	30,339	32,732	32,732	29,142	29,142	31,985	31,985	41,091	41,091	165,289	165,289
Swine	127,301	38,190	81,971	24,591	69,880	20,964	150,106	45,032	69,823	20,947	499,081	149,724
Sheep and goats	314,858	47,229	144,498	21,675	182,936	27,440	215,467	32,320	137,555	20,633	995,314	149,297
Poultry	2,042,159	61,265	1,092,285	32,769	878,243	26,347	1,703,521	51,106	2,133,934	64,018	7,850,142	235,504
Total Livestock Unit	-	**177,023**	-	**111,767**	-	**103,894**	-	**160,442**	-	**146,689**	-	**699,815**

Source: Own calculation based on data www.statistice.insse.ro [16].

Table 5. Livestock Unit, Number of funded projects, Number of Business Consulting and Management companies*

County	Livestock Unit	Number of funded projects	Number of Business Consulting and Management companies*
Dolj	177,023	0	344
Gorj	111,767	1	90
Mehedinți	103,894	0	60
Olt	160,442	2	107
Vâlcea	146,689	1	130
South - West Oltenia Region	**699,815**	**4**	**731**

Source: Own calculation based on data www.topfirme.com [18].

Location and local infrastructure total costs, such as raw material transport costs, access to utilities (energy, water), labor availability and proximity to markets vary. As shown in Table 5, the raw material production in the 5 counties was: in Dolj county 177,023 livestock unit were produced, in Gorj county 111,767 livestock unit were produced, in Mehedinti county 103,894 livestock unit were produced, in Olt county there were produced

160,444 livestock unit, and in Valcea county 146,689 livestock unit were produced. Raw material production, expressed in Livestock Units, reflects the agricultural and zootechnical potential of each county, which is essential for the development of the meat processing sector. In counties where raw material production is higher, meat industry companies are more motivated to access funds to develop or modernize their processing capacities. This may partly explain why certain counties have been more active in accessing funds.

Dolj county had the highest production of raw material (177,023 livestock unit), which indicates a high potential for the livestock sector and implicitly for meat processing. However, the fact that Dolj has not accessed funds may be an indication that there are other inhibiting factors such as consultancy or infrastructure. Dolj County has the largest number of consulting firms (344), which suggests a high capacity to access funds, the absence of access may indicate an inefficient distribution of consulting resources, or other obstacles have prevented local firms from submitting viable projects (Table 4 and Table 5).

Olt County (160,444 livestock unit) and Vâlcea (146,689 livestock unit) have accessed funds, and their high raw material production is a factor that has supported the development of processing capacities. These counties have greater potential for farmers and processors to work together effectively. The counties of Olt (107 firms) and Vâlcea (130 firms) accessed funds, which suggests that a sufficient number of consulting firms active in these counties contributed to the success of accessing funds. These companies provided support for the preparation and management of financing projects (Table 4 and Table 5).

Gorj (111,767 livestock unit) and Mehedinți (103,894 livestock unit) have lower production, which could limit the motivation for massive investment in processing. However, Gorj has accessed funds to expand its slaughtering capacity, suggesting that a certain production threshold is required to justify such investment. Gorj County (90 firms) accessed funds, even if the number of consulting firms is relatively small compared to other counties. This indicates that while the number of consulting firms may be an important factor, it is not necessarily decisive whether the existing ones are well trained and efficient. Mehedinți County (60 firms) did not access funds, and the small number of consulting firms may be one of the main reasons. The lack of a sufficient number of consultants can limit the ability of local companies to prepare competitive projects for accessing funds (Table 4 and Table 5).

CONCLUSIONS

The P1 project, launched in 2017, establishes a new processing capacity with a total investment of 986,126 euros, including 493,063 euros in non-refundable support, covering 50% of the cost. The target processing capacity for this project is 1,200 tons per year.

Project P2, funded in 2018, focuses on modernizing the processing capacity, with an investment of 1,658,183 euros, half of which—829,091 euros—comes from non-refundable support. This modernization does not increase the processing capacity, which remains at 1,148 tons of processed meat per year.

The P3 Vl project, initiated in 2016, establishes a new processing capacity with an investment of 5,731,230 euros, including 2,292,492 euros (40%) in non-reimbursable support. The intended processing capacity for this project is 774 tons per year.

The P3 Gj project, funded in 2019, aims to expand slaughter capacity with an investment of 5,696,000 euros, 40% of which—2,278,000 euros—is covered by non-refundable support. The initial slaughter capacity was 18,250 tons per year, and the project aims to reach 32,120 tons per year, marking an increase of 13,870 tons annually.

Raw material production has a direct influence on the development potential of the meat processing sector in each county. Counties with a higher production (such as Olt and Vâlcea) are more likely to justify significant investments and, implicitly, to access non-reimbursable funds. In order to

boost access to funds in unsuccessful counties (such as Dolj and Mehedinți), it is necessary to improve the collaboration between the agricultural sector, the business environment and consultants, as well as to support the development of a larger number of local consulting firms.

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