
Logistic Activities of Dairy Enterprises in Poland

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Abstract:

Purpose: The aim of the research was to identify activities in the field of logistics undertaken by dairy companies in Poland.

Design/Approach/Methodology: The research was carried out in 35 dairy enterprises operating in Poland. The research was conducted in 2021 using a guided interview questionnaire. In this study, descriptive, graphical and tabular methods were used, presented in further parts of the work. The research covered a diverse range of questions, corresponding to and falling within the scope of the subject matter of logistic activities undertaken by entities authorized to manufacture and distribute dairy industry products.

Findings: In the article, the authors focused mainly on presenting the main logistic activities of dairy companies operating in the country undertook to improve the condition of enterprises and the quality of products, including the issue of quality, the issue of delivery time of the raw material needed for production in the dairy industry, i.e. milk, as well as the subject of dairy industry products. The research shows that the main criteria for choosing a supplier are quality, price and brand.

Practical Implications: Thus, it can be concluded that decisions regarding supply are placed high in Polish dairy enterprises.

Originality/Value: Identification of the factors determining the functioning of logistics of dairy enterprises in Poland. The director, department manager, or sales manager are those who make the procurement decisions.

Keywords: Dairy enterprises, logistic activities, suppliers.

JEL classification: D3, D47.

Paper Type: Research study.

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1. Introduction

One of the most important areas of operation of dairy enterprises, determining their competitiveness, are logistic activities. Thanks to these activities, dairy companies can sell products and obtain raw materials, i.e., milk. Due to their specificity and short life, milk and dairy products must be stored and transported under specific conditions at a temperature of max 4°C (Bórawski, 2016). It is the physical and chemical properties of the raw material that determine the specificity of logistics (Domaradzki, 2012).

On the milk market, there are processes of concentration of production, reduction of the number of dairy cows and increase of milk yield of cows. These phenomena also affects the development and changes of logistics on the market (Jarzębowski, 2013).

The instability of the product which is milk means that its logistics must be carried out in a proper way, taking into account all biochemical factors necessary for the production and further distribution. The difficulty in milk production is its permanent nature, which prompts dairy cooperatives to collect milk and limits the ability to determine the amount of resources (Pietrzak *et al.*, 2010).

Errors made in the logistic activities of dairy enterprises are very likely the cause of dangerous changes leading to a reduction in the quality of the raw material, which may indicate a negative impact on the production and distribution processes of milk (Krajewski *et al.*, 2014).

It should also be mentioned that there has been a significant increase in the quality of milk in Poland in recent years, especially after Poland's accession to the European Union (Bórawski, 2016). Currently, the solution most conducive to both the continuous increase in the level of milk quality in Poland and the improvement of the logistic activities of dairy enterprises is the system based on individual collection of milk from dairy enterprises by authorized entities (Pietrzak *et al.*, 2010). Such solutions improve the situation of the dairy industry in Poland, which, in order to maintain the continuity of development, takes into account both the production stage and the distribution stage, improving the competitiveness of the Polish agri-food industry in relation to the agri-food industries of other European Union countries, as well as other international organizations of which Poland is a member.

Logistics and supply chains for dairy products determine the development of the milk market. They cover value chains from milk production and processing, through retail sales, and end with the consumer (Jarzębowski, 2012).

Logistics can be defined as all the activities that manage and enable the flow of products involved in the supply chain in order to offer the customer a competitive level of goods delivery. Therefore, the impact of competition in the Polish dairy industry can be considered in an ambiguous way, cost optimization and the

willingness to compete differently in order to gain the trust of its customers and better logistics service (Pietrzak *et al.*, 2010).

Logistics of dairy enterprises is characterized by the presence of a multitude of elements determining its organized and proper course, which are necessary for dairy enterprises to conduct and maintain appropriate logistic activities, which have an impact on their proper functioning. According to Pietrzak *et al.* (2010), such elements are inventory control, storage, packaging, transport and logistics information management.

These factors appropriately allocate various logistic activities, e.g., decisions on the quantity and value of ordered products, the location of product storage, the location of the infrastructure necessary for the proper management of the logistics process, the marking and protection of products as transaction objects, the method of delivering products to the ordering party, taking into account all factors communication, such as choosing the right route, quality and quantity of transport, rationalization of transport costs. At the same time, every effort should be made to maintain an appropriate flow of information in the logistics process (Skitsko, 2016). The information is necessary to respond to customers and management decisions (Kubasakova *et al.*, 2014).

The complexity of the agri-food industry and the specificity of the dairy industry bring the logistics to the level of advancement of the agri-food and dairy industry in Poland. The increase of competitiveness is observed what has an impact on trade of dairy products (Carraresita and Banterle, 2015). Such dependence forced the scientific community to reflect on the division of logistics with regard to the moment of the entrepreneur-consumer relationship. The scientific community has decided to introduce into the common circulation the division of logistics into the following categories: production logistics, supply logistics and distribution logistics (Pietrzak *et al.*, 2010).

2. Materials and Methods

The main source of data are studies carried out on a group of 35 dairy enterprises. The research was conducted in 2021 with the use of a questionnaire, which was addressed to the managerial staff of enterprises.

The selection of respondents for the research was deliberate. The basis for qualifying the enterprise for the research was the purchase and processing of milk and the consent of the management to participate in the research. The questionnaire to entrepreneurs of the dairy industry included, inter alia, questions related to logistics activities related to this industry. The research results were prepared in tabular, graphic and descriptive form. The authors of this article took into account, in their

opinion, the most important issues related to logistics in dairy enterprises in the country.

3. The Logistic Supply of Dairy Enterprises

It was important in the research to learn about the logistics activities in dairy enterprises in Poland. During the research, the respondents were asked to indicate the supplier selection criteria (Table 1). The respondents rated the criteria on a scale from 1 to 5, with 5 being the most important factor. The research shows that the most important factor in choosing a supplier is the quality and prices of milk. Subsequently, the respondents indicated the brand as an important factor in choosing a potential supplier of a given product.

According to the Central Statistical Office, the average milk price in May 2021 was PLN 151.39 / hl. This price was 0.6% lower than in the previous month. It is worth noting that the milk price in May 2021 was higher by 15.7% compared to the previous year. The increase in prices results from the greater demand of dairy raw materials by consumers and the improvement of the quality of the desired product. In addition, the increase in the prices of milk and dairy products was affected by the economic situation related to the COVID-19 pandemic (Polish Federation of Cattle Breeders and Milk Producers, 2021).

The quality of dairy products has improved significantly in recent years, which has translated into greater interest in purchasing dairy products from producers (Karoui, 2017). In recent years, and especially after Poland's accession to the EU, producers have increased the scope of investments also in terms of improving product quality, which was possible thanks to EU subsidies for the implementation of key tasks in this matter (Bórawski, 2016).

All surveyed dairy companies adhere to the ISO 9001 Quality Management System Standard and the ISO 22000 Food Safety Management System standard.

Table 1. Suppliers selection criteria (points on a scale of 1-5, where 5 is the most important factor)

Specification	Points
Quality	4,66
Price	4,04
Mark	3,34
Modernity	3,03
Ecological features	2,89
The width of assortment	2,83
Demand	2,73
Differentiation	2,63
Attractiveness of the packaging	2,46

Source: Studies based on own research.

Among the most important factors influencing the choice of the supplier, the respondents indicated the quality of the goods (94.3%). The price was second (82.9%). At the same time, the respondents recognized that the factor of selection of the assortment remains an important determinant influencing the choice of a potential supplier, which was noticed by every second respondent. The appearance and packaging of a given product are not the most important aspects in selecting a supplier. Support programs can enhance the investment in supply chain (Dries *et al.*, 2014).

Based on the example of the analyzed dairy enterprises, it can be stated that the main decision-maker in matters of dairy product orders is the director of a particular institution, which was started by every second respondent. This does not change the fact that entities involved in the production and distribution of dairy industry products have a diverse organizational specificity, which is shown by the presence of such responses as the head of the department, indicated by every fourth respondent.

This is mainly due to the complexity of the organization of individual dairy enterprises, as well as the financial capabilities of individual entities, to create the entire enterprise management system, including the management staff deciding on orders (Pietrzak *et al.*, 2010). Research conducted in this area also shows that owners are generally not interested in having the competence to regulate the issues of ordering products. This may be due to a number of other owner-owned obligations that prevent consistently deciding on the quantity and quality of orders for dairy products. Very often, such organizational decisions within the enterprise allow for better and more effective management of the entire enterprise, which allows for more efficient implementation of the tasks of such an entity in terms of both production and distribution of the product (Table 2).

Table 2. *The person deciding about the order (%)*

Specification	%
Director	49,0
Head of department	26,0
Sales manager	11,0
Warehouseman	6,0
Owner	3,0
President	3,0

Source: *Studies based on own research.*

Taking into account the analysis of logistic activities by the authors, it is necessary to mention a determinant significant from the point of view of the logistics of dairy enterprises, i.e., the waiting time for the implementation of the product order. Respondents, when answering the questions asked by the authors, had to indicate, among other things, what is the potential waiting time for the execution of the product order requested by the customer. The vast majority of respondents, over

62.9% stated that the time to complete a particular task is within a few days. In the vast minority of respondents, this time is approximately two to three weeks. An interesting fact is that every third respondent is able to complete the order within a maximum of one week from the date of order confirmation. Such research results prove the improving speed and quality of logistic activities undertaken by dairy enterprises in Poland and the increasing demand for dairy industry products by potential recipients.

The fact that the deadline for order fulfillment by dairy enterprises is accelerated is also influenced by systemic factors. Since Poland's accession to the European Union, there has been a visible increase in investment outlays, implemented with the help of European subsidies, by the dairy industry entities to improve the quality of transport, as well as increased government investments in infrastructure enabling faster delivery of products to the place specified in the order, through the construction of expressways, highways as well as repairs of local roads.

The authors assume that the potential duration of the contract with each subsequent research year will decrease, both due to the systematic increase in government and European funds for the construction of newer expressways and motorways, especially in strategically located places necessary for the proper flow of the nationwide supply chain, as well as and outlays of dairy enterprises on modernizing the quality of transport of the ordered products. Such changes in both the logistic activities of dairy enterprises and the continuous development of the nationwide infrastructure necessary to perform the basic function, i.e., maintaining the correct supply chain system and related economy, are a positive impulse to increase interest in the dairy industry in Poland, which will also have a positive effect on implications for the entire agri-food industry, of which the dairy industry is a part (Bórawski, 2016).

As part of the research, the authors paid special attention to the waiting time for the delivery of the raw material necessary for the proper implementation of the basic function of supplying the dairy industry products, i.e. milk. The respondents emphasized that milk is an easily available raw material, because in the vast majority of cases, more than 88.9% (Table 3), the waiting time for milk delivery is one day. In rare cases, this time is two days.

In the few cases of longer waiting for milk collection, it can be seen that it is generally caused by a large number of orders and recipients for milk, which, with increased demand, may result in a not particularly extended waiting period. At the same time, these results show that the human resources policy in the field of employing employees responsible for the distribution of the key raw material in the dairy industry is at a very high level, giving the possibility of better and more effective implementation of the goals of dairy enterprises in the production and distribution of both raw material and products.

Table 3. Time for milk delivery

Specification	%
One day	88,9
Two days	16,7

Source: Studies based on own research.

Logistic activities of dairy enterprises are also linked to the functioning of the Polish dairy industry as part of the existence of international economic relations (Jałowicki, 2018). Globalization, as one of the main determinants of economic development, means that Poland, as a country participating in international economic processes, cannot afford to lack interest from other countries in the field of joint investments, participation in the global supply chain and participation in economic development (Rynek Mleka, 2021). The authors of the research decided to include the European Union countries, including the neighboring countries of Poland, which are members of the European Union. This was due to the fact that with these countries Poland has the best developed economic contacts, especially in the field of the dairy industry, which translates into the number of contracts signed with individual milk suppliers.

The respondents stated that over 31.4% of foreign suppliers (Table 4) are milk suppliers from European Union Member States, and Lithuania is the largest supplier of milk among the European Union Member States, it is approximately 8.6%. Such a distribution of results shows that the countries of the old European Union, i.e., the Western countries, are condescending to protect the raw material of the dairy industry and are not interested in selling the key raw material on a mass scale. At the same time, it shows us that Lithuania, a country largely focused on the agri-food industry, including the dairy industry, in order to constantly increase the competitiveness of its own dairy industry in the European Union, must sell milk to richer countries, such as Poland.

At the same time, for Lithuania, such decisions are an opportunity to increase the number of trade partners, which is an added value both for their dairy industry and for the entire Lithuanian economy, given that globalist economic and trade trends strengthen the role of stronger, more affluent and countries with a higher level of development of the agri-food industry, including its branches, i.e., the dairy industry.

Tabela 4. Main foreign milk suppliers

Specification	%
European Union countries, including	31,4
Lithuania	8,6
Slovakia	5,7
Hungary	2,9
Czechia	2,9

Source: Studies based on own research.

4. Distribution Logistics of Dairy Enterprises in Poland

The specificity of the dairy industry, i.e., the presence of as many intermediaries as possible responsible mainly for the transport of products, forced the Polish dairy industry to adapt to the prevailing conditions abroad in order to increase the competitiveness of the domestic dairy industry in relation to the industry of neighboring countries (Jarzębowski, 2013).

The authors, analyzing the possible logistic activities, concluded that taking into account the number of intermediaries used by dairy enterprises is an indispensable element of this study. The authors, asking respondents about logistic activities, wanted to find out how many intermediaries are used by domestic dairy companies. Most of the respondents indicated that they use a very large number of intermediaries (Table 5).

However, it should be noted that every fourth respondent does not use intermediaries for the transport of products, and every tenth uses only one. Own distribution takes place in Poland in very small amounts, which concerns about 3% of the respondents. These results show some important information from the point of view of the Polish dairy industry. This primarily illustrates the very high interest in the products of the Polish dairy industry, both in the European Union and in the rest of the world, interested in the use of dairy industry products for internal use in the economies of countries importing products from Poland (Bórawski, 2016).

The increased interest in the products of Polish dairy companies around the world means that the logistic process and related activities must be undertaken decisively and quickly. At the same time, it should be noted that the geographic location of Poland determines the use of a large number of intermediaries so that the dairy industry products are delivered to Asian countries that are interested in continuous and lively trade contacts with European countries, including Poland, in a safe, fast and comfortable manner.

Having a large number of distribution intermediaries is in the vital interest of countries receiving products, which most often do not have such a well-developed agri-food industry as Poland, because increasing the number of intermediaries gives more opportunities to develop trade relations with various highly developed countries in the agri-food industry, which positively influences the economic development of a given country and positively influences the overall economic development of the whole world (Domaradzki, 2012).

In order to increase the competitiveness of domestic dairy enterprises in relation to both domestic and international dairy industry products, entrepreneurs dealing with the dairy industry must constantly undertake newer forms of distribution activities aimed at increasing the competitiveness of their enterprises (Domaradzki, 2012).

Tabela 5. *Number of intermediaries used by the enterprise (%)*

Specification	%
in bigger amount	45,7
It does not use intermediaries	25,7
One	11,4
Two	8,6
Three	5,7
Four	2,9
own distribution	2,9

Source: Studies based on own research.

The authors of this study attempted to obtain an answer to the issue of potential logistic activities undertaken by entrepreneurs in the distribution of dairy industry products. The results do not give an unambiguous, preferred form of action undertaken by entrepreneurs. However, it can be noticed that the best solution is to search for new ways of information about the enterprise, which was noticed by the majority of the respondents (Table 6). At the same time, half of the respondents considered that transport directly to the recipient is one of the most important factors allowing for better quality of product distribution. Also, every fifth respondent indicated that the improvement of points of sale should be an important element in the catalog of activities improving the distribution of products.

At the same time, the existence of solutions provided by respondents, such as reducing storage costs, or improving the management of supply chains, or warehousing goods, or distribution planning, as well as resignation from commercial intermediaries, clearly show that both the management and employees of enterprises have a catalog of actions to improve distribution, which can be implemented depending on the financial situation of a particular entity dealing with the dairy industry, as well as the general condition of the agri-food industry, including the dairy industry in Poland.

Such results show that the level of decisions made by the appropriate management in dairy enterprises, affecting both the functioning of dairy enterprises and the entire dairy industry, maintains an upward trend. This is a positive phenomenon, considering that the decisions relating to the nature and further future of the entity under the dairy industry are one of the most important, next to logistic activities, determinants of the development of the entire dairy industry in Poland.

Table 6. *Distribution activities (%)*

Specification	%
Searching for new ways and places to sell	65,7
Transport directly to the recipient	51,4
Lowering storage costs	48,6
Improving supply chain management	42,9
Storage of goods	34,3
Distribution planning	34,3

Resignation from commercial intermediaries	25,7
Improving your points of sale	20,0

Source: Studies based on own research.

5. Summary and Conclusions

Logistic activities of dairy enterprises in Poland are one of the most important factors in the development of the dairy industry and the entire agri-food industry in Poland. The presented research carried out by the authors of this study shows that the subject of logistics in dairy enterprises is a topic that requires dealing with specific issues in the field of economy and agriculture, such as international relations, employment structure in dairy enterprises or supplier selection criteria.

Logistics activities carried out by entities involved in the production and distribution of dairy industry products vary depending on the occurrence of various factors, such as the economic situation of the entire dairy industry, the number of orders carried out by a given entity, the presence of competition dealing with a similar scope of activities, as well as many other factors included by the authors.

Due to the complexity of the issues of logistic activities of dairy enterprises, this subject still arouses great interest both among future entrepreneurs or employees of entities dealing with the dairy industry, as well as among people interested in issues related to international trade or the share of the dairy industry in relation to the dairy industries of other countries, by examining the dependencies and the system of connections between the Polish and foreign dairy industries. To sum up, the issue raised by the authors is very important from the point of view of economy and agriculture and requires further in-depth analyzes and studies.

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