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DEVELOPMENT OF ORGANIC DAIRY PRODUCTION IN UKRAINE: CURRENT TRENDS AND PROSPECTS

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Abstract. *The subject* of the study is the current state of development of organic dairy production in Ukraine in the context of global and European trends. *Methodology.* In the preparation of the article, the following scientific research methods were employed: monographic method, scientific abstraction and generalisation, abstract and logical method, and methods of analysis and synthesis. The study's information base comprised economic indicators from the Eurostat database, the State Statistics Service of Ukraine, the FAO, data from industry associations representing dairy producers in Ukraine, and data from the authors' own scientific observations. *The purpose* of the study is to assess the current state and prospects for further development of organic dairy production in Ukraine, taking into account EU market trends. *Research findings.* Milk and dairy products are consumed by 80% of the world's population. In recent years, there has been a significant increase in demand for organic products produced using sustainable farming methods. The transition towards sustainability, which excludes the utilisation of chemical and synthetic substances, genetically modified organisms (GMOs) and inhumane practices in the rearing of farm animals, is a pressing necessity within the contemporary agricultural context. The countries currently leading the production of organic dairy products are the USA, Germany, Japan and Australia. The principal consumers of organic dairy products are the USA, China and the countries that comprise the European Union. Dairy products represent a substantial proportion of the organic food market in Ukraine, accounting for over 46% of the total. This sector shows considerable potential for further growth. Concurrently, the actual proportion of organic milk in the domestic market does not exceed 19%. Furthermore, the low proportion of organic farms and the low milk yield from cows on organic farms also constitute a significant challenge. The most rapid expansion of organic milk production occurred in the country's western regions. The most promising potential markets for organic dairy products in Ukraine are the domestic market, the markets of Eastern Europe and North Africa. The domestic market is of pivotal importance to the growth of organic dairy production. In order to evaluate the potential of Ukrainian companies entering the global market for organic dairy products, an organisational model has been proposed. In order to reach these markets, manufacturers must focus on stimulating demand, strengthening value chains and increasing the level of sustainability of production.

Keywords: milk, dairy companies, sustainable development, market, livestock productivity, agriculture, food.

JEL Classification: Q1

1. Introduction

Milk and dairy products are among the most valuable and irreplaceable food products, exerting a significant impact on human health. The issue of healthy human nutrition based on the consumption of high-quality and safe dairy products has become especially pertinent during and in the aftermath of the global pandemic caused by the COVID-19 virus (Zuba-Ciszewska et al., 2023).

As observed by Fusco et al. (2020), over 80% of the global population consumes dairy products. The substantial global demand for dairy products is currently fulfilled primarily through conventional production methods that employ the use of genetically

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modified organisms (GMOs), chemicals, and synthetic substances, in addition to inhumane practices in the keeping of farm animals (Lin et al., 2021). In the context of global trends in sustainable development and the prioritisation of environmentally-friendly production methods, the organic production of milk and dairy products represents a promising alternative to traditional dairy cattle breeding.

The global market for organic dairy products is one of the most dynamic and promising food markets in the world. According to Future Market Insights, the volume of the organic dairy market is expected to increase at an average rate of 3.5% per year from 2022 to 2032, reaching approximately 32.8 billion USD by the end of this period (compared to 23.2 billion USD in 2022) (Organic Milk Market Outlook, 2022).

The findings of Kumar et al. (2023) indicate that organic dairy products are the most consumed organic food item globally, with vegetable products and fruits ranking second.

2. Literature Review

The global trends of increasing demand for high-quality and safe food products, coupled with the growing awareness of the values of sustainable development among both society and business, are collectively driving the popularisation of organic food and production methods. The potential for capacity and economic attractiveness is a defining factor in the markets for safe organic products. Verburg et al. (2022) identify several key trends in the development of the global market for organic dairy products. These include the growing popularity of a healthy lifestyle and nutrition among the population of most developed countries in the world. This is leading to an increase in the level of social responsibility associated with consumption, as well as a deep perception of global problems associated with the need to switch to sustainable methods and methods of agricultural production. There are also trends in the more active protection of animal welfare and rights in the world, as well as an increase in the volume of state support for organic and safe ecological agricultural production. Further active development of innovations in agriculture is also occurring.

Organic dairy products have a higher nutritional value for a healthy human diet due to a lower ratio of omega-6 to omega-3, which is a result of the different ways dairy cows are housed and fed. Organic dairy production is based on maximising milk production in an environmentally sustainable way, with the health and welfare of the animals as a primary concern (Linehan et al., 2024).

As demonstrated by Grodkowski et al. (2023), the organic dairy sector exhibits considerable potential for growth and is distinguished by the most rapid expansion rates and the greatest economic benefits. Conversely, the findings of scientific studies suggest that traditional milk production techniques will prevail in the majority of developing countries worldwide in the near future (Adesogan & Dahl, 2020). As evidenced by the findings of the Kononets et al. (2023) analysis, one of the primary obstacles impeding farmers' transition to organic milk production is the intricate nature of production organisation processes and the substantial financial costs involved. Zuba-Ciszewska et al. (2024) identify the necessity for a substantial concentration of industrial processing of raw milk as a significant obstacle to the advancement of organic dairy production, particularly given the additional challenges this presents for raw material production.

The pricing of organic dairy products, which is higher than that of conventional products, remains a topic of contention and debate among scientists (Dinçer et al., 2024). Furthermore, Schwendel et al. (2015) highlight the duration of the production cycle in organic cattle breeding as a further problematic aspect, given that it is associated with a longer period of grazing cows utilising organic production methods.

Brito & Silva (2020) and Hirsch & Koppenberg (2023) reached a consensus that there is a productivity deficit among dairy cows under conditions of organic milk production, with an average reduction of 15-28% relative to traditional methods of dairy cattle breeding. In the context of this problem, Tommasoni et al. (2023) also emphasise another issue: an increase in the risk of mastitis in cows. This is a consequence of a decrease in their productivity, which in turn leads to a deterioration in the health and welfare of animals.

In Ukraine, there has been a notable increase in the popularity of healthy nutrition and organic production in recent years, with a growing number of individuals, consumers, and agricultural producers embracing these trends. In the strategic development plan for Ukraine's agricultural sector, it is stipulated that by 2030, a minimum of 3% of the country's total agricultural land area, amounting to 1.26 million hectares, should be designated as organic production zones. The formulation of strategic guidelines is a fundamental prerequisite for the development of Ukraine as Europe's principal partner in the export of organic food products (Nehoda & Huz, 2023). In addition, the current challenges facing the development of organic production and the organic dairy market in Ukraine have been identified by scientists as follows: imbalances in the structure of dairy production and a considerable proportion of households, the necessity for substantial investments and innovations, the decline in farm animal biodiversity, a high level of risk associated with the rejection of synthetic and chemical substances in the implementation of organic dairy cattle breeding methods, and the actual decline of the domestic feed industry (Vdovychenko et al., 2021). This final inconsistency of practical principles and the uncertainty of further development prospects make it expedient to conduct further research to assess the state and trends of organic dairy production in Ukraine.

3. Methods

The following economic research methods were used in the study: monographic (when processing scientific sources and reviewing thematic literature, studying certain aspects of the current state of organic milk production in the world and EU countries); scientific abstraction and generalisation (when assessing the prospects and threats to the participation of Ukrainian dairy companies in the segments of the global milk and dairy products market); abstract and logical method (in substantiating the model for assessing the potential for Ukrainian producers to enter the world markets of milk and dairy products, formulating conclusions based on the results of the study); methods of analysis and synthesis (in analysing the volume of organic milk production in Ukraine, determining the main economic characteristics of the state of development of organic dairy farming). The study was based on economic indicators from the Eurostat database, the State Statistics Service of Ukraine, the FAO, information from industry associations of dairy producers of Ukraine and data from the authors' own scientific observations.

4. Results

The the Food and Agriculture Organisation (FAO) interprets organic farming as "... a system that focuses primarily on ecosystem management rather than on agricultural inputs" (Vinci, 2024). Organic products are those produced without synthetic mineral fertilisers and chemical pesticides. In EU countries, organic milk is defined as a product containing at least 95% organic ingredients.

In Ukraine, agricultural products, including organically produced food and feed, are considered to be organic (The Law of Ukraine "On Basic Principles and Requirements for Organic Production, Circulation and Labelling of Organic Products", 2018).

According to EU Directive 834/2007, organic dairy farming operators must meet the following requirements: 1) breeding cattle exclusively under organic conditions and preserving biodiversity; 2) standards of animal husbandry, in particular, the prohibition of tethered housing and high concentration of livestock, standards for the size of production facilities where cows are kept; 3) maximum use of own-produced feed, rational feeding rations depending on the age group and composition of animals, and the rejection of the use of synthetic and chemical substances and active animal growth stimulants; 4) prohibition of the use of chemical veterinary drugs, limitation of veterinary measures (vaccinations) to no more than two per year; 5) support for animal welfare (Council Regulation (EC) No 834/2007 of 28 June 2007 on organic production and labelling of organic products and repealing Regulation (EEC) No 2092/91, 2007).

According to FAO, in 2022, global milk production is estimated at 929.9 million tonnes. According to forecast estimates, the US, Germany, Japan and Australia will remain the leading participants in the organic milk market (Organic Milk Market Outlook, 2022). Approximately 28% of global organic dairy consumption is attributable to the United States, with China accounting for over 24%. Among European countries, Germany and France represent the largest consumers of organic dairy products (Health is Wealth: The Growth of Organic Dairy, 2023).

According to the results of the analytical assessment of the world agency Research & Markets, in 2022, the leading participants in the global market of organic dairy products were Arla Foods (Denmark and Sweden), The Kroger Co. (USA), General Mills, Inc. (USA), China Shengmu Organic Milk Ltd. (China), Saputo, Inc. (Canada), Unilever PLC (UK), Nestle (Switzerland), and SunOpta Inc. (USA) (Global Organic Dairy Products Market, Size, Forecast 2022-2027, Industry Trends, Share, Growth, Insight, Impact of COVID-19, Company Analysis).

Among the EU countries, the leaders in organic milk production are Germany (with a share of 3.9% of total organic production), France (5.2%), Italy (about 3.8%), Austria (17.3%) and Sweden (about 17.1%) (Organic farming in the EU, 2023).

Ukraine boasts a robust agricultural sector, which plays an integral role in the global and European agricultural markets. Concurrently, Ukraine's economic structure is currently oriented towards the export of raw materials, with the majority of its agricultural exports consisting of food products derived from crops. Nevertheless, Ukrainian agriculture is undergoing a process of transition towards the adoption of sustainable practices for the production of high-quality, safe, and organic food. The proprietors of Ukrainian agribusinesses are aware that organic production offers a strategic opportunity to gain competitive advantages in EU and global markets. Traditionally, dairy farming has been of exceptional importance for the agricultural sector of Ukraine. Over the past decades, the development of dairy farming in the country has been accompanied by significant difficulties and challenges that have led to a decline in livestock production and biodiversity. The total volume of milk produced in the period 1990-2022 decreased by 68.3% and amounted to 7768 thousand tonnes in all categories of farms (Agriculture of Ukraine. Statistical collection, 2022). Concurrently, in the context of the objectives of sustainable agricultural and rural development, the resurgence of the dairy industry has acquired novel long-term priorities and prospects associated with the dissemination of organic dairy production.

In 2023, dairy products constituted 46.4% of the domestic market for organic products in Ukraine, representing a decline from 55.4% in 2019. The total volume of organic dairy products was 3,157 tons, with a total value of 438 million UAH. Concurrently, empirical evidence indicates that Ukrainian producers are experiencing a decline in their market share within the domestic market, with producers of vegetables and fruits gradually assuming a dominant position.

According to the Ukrainian Association of Milk. UA, in 2023 three dairy companies were included in the ranking of the three leading producers of organic dairy products in Ukraine: "Organic Milk" (Zhytomyr region), organic farm "Staryi Porytsk" (Volyn region), agricultural enterprise "EthnoProduct" (Chernihiv region) (Top 3 Producers of Organic Dairy Products Identified, 2023).

Despite the emergence of certain trends in the resurgence of the Ukrainian market for organic dairy products, their proportion remains negligible. In 2023, the proportion of organic milk certified in Ukraine was 18.9% (Figure 1).

Organic livestock farming in the region is developing most intensively in Zhytomyr, Ternopil and Volyn oblasts. Concurrently, the economic and statistical analysis data indicate that the proportion of producers of organic dairy products is less than 6% of the total number of visas. Furthermore, the annual productivity of cows on organic farms is 34.9% lower than that of traditional farms (Table 1).

A comprehensive examination of the dairy and dairy products market enabled the identification of potential avenues for Ukrainian producers to penetrate specific global market segments. The findings of this evaluation are presented in Table 2.

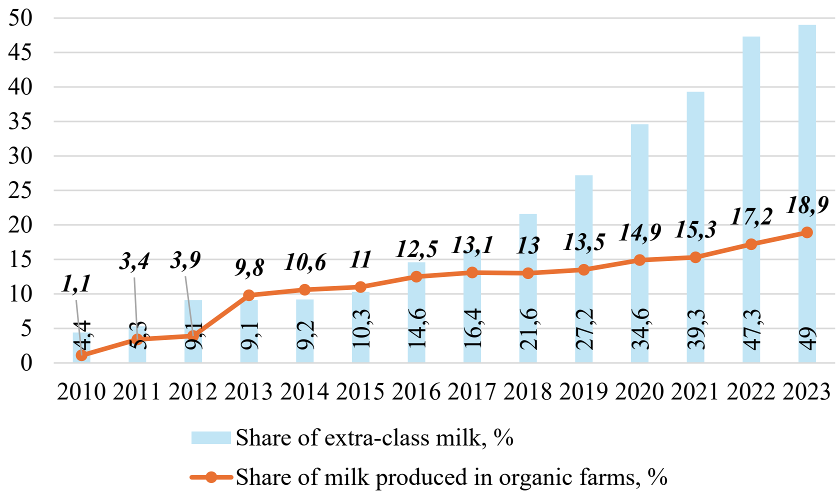

Figure 1. Dynamics of the share of organic milk production in Ukraine, %
Source: compiled by the authors based on data from (Domestic market for organic products in Ukraine, 2023)

Table 1
The main economic characteristics of organic dairy cattle breeding in Ukraine, 2023

Indicators	Actual Value
Number of cows in certified organic farms, thousand heads	2,8
Share of cows in certified organic farms of total number, %	0,2
Number of milk production enterprises (from 5 heads of cows) – total, units	1309
Number of organic milk producing enterprises, units	6
Share of organic cattle farms, %	0,45
Average annual milk yield per 1 cow in organic farms, kg	4783
Average annual milk yield per 1 cow in conventional farms, kg	7345
Volume of consumption of milk and dairy products by the population of the country, kg per person per year	201,5

Source: calculated by the authors based on data from (Domestic market for organic products in Ukraine, 2023, Balances and consumption of basic food products by the population of Ukraine, 2021)

Table 2

Prospects and threats to the participation of Ukrainian dairy companies in segments of the global milk and dairy products market

Global market Segment	Prospects	Threats
European market	Developed market infrastructure and logistics value chains; High solvent consumer demand; Dominance of healthy eating trends and steady growth in demand for organic and eco-dairy products; Impact of the Association Agreement with the EU.	Risks of restoring trade quotas for Ukraine; High competition in the market; Increased cost and complexity of supply chains from Ukraine; Final inconsistency between Ukrainian and European quality standards and labeling of organic products.
Central Asian Countries	Traditional presence of Ukrainian manufacturers in the market and brand awareness; Growing demand for dairy products; Well-established logistics value chains.	Increased competition from neighboring countries; Increasing cost and complexity of supply chains from Ukraine, which reduces competitiveness potential.
Middle East & North Africa	Growth of wholesale and retail trade in regional markets; Rapid increase in the rate of consumption of dairy products by the population; High capacity potential of regional markets.	Risks of macroeconomic instability and rising inflation; Risks of a decline in the effective demand of the regional population; Exacerbation of geopolitical regional risks.
North Asia and Southeast Asia	High capacities and their future expansion in Chinese dairy markets; Steadily growing demand for dairy products; Active promotion of healthy eating trends.	Cost and complexity of supply chains; Political risks associated with the further trade orientation of China's foreign economy; Increased competition from other countries with more convenient and cheaper supply logistics.

Source: compiled by the authors based on data from (Dairy market review, 2023)

In light of the existing potential risks and threats, it can be posited that the most promising markets for Ukrainian dairy producers are the European market (in particular, the markets of Poland, Hungary, Slovenia, Slovakia, Bulgaria, the Czech Republic, Bosnia and Herzegovina, Lithuania, Latvia, Estonia) and the market of North African countries.

Studies show that organic food production is a strategic trend and a guiding principle for the further development of the EU agri-food sector. Despite the current insignificant share of organic milk production in the EU, which is around 3.7% of total production, countries such as Germany, France, Denmark, Austria and Italy are leading the way with high growth rates and a significant share of total production (Vinci, 2024).

In recent years, Ukraine has emerged as a prominent exporter of organic food products to the European Union. In a recent report by the European Commission, Ecuador, China, the Dominican Republic, and Peru were identified as the leading exporters of organic food in Europe. Notwithstanding the repercussions of the military conflict and the decline in sales volumes, Ukraine ranks fifth in terms of organic product exports, with a total volume of 2.48 million tons (EU imports of organic agri-food products, 2024).

The process of entering and consolidating organic dairy products in the European markets represents a significant and challenging undertaking for producers in Ukraine. In light of the current state of development of the Ukrainian market for organic dairy products, it is evident that in order to gain a foothold in the global market, Ukrainian organic farms must increase production volumes, establish sustainable logistics chains, and actively develop organic agricultural branding. It is imperative to conduct a comprehensive economic assessment of market opportunities and develop an algorithm to gain competitive advantages for the Ukrainian dairy industry in order to address this issue. The authors propose the presentation of the sequence of actions in the format of an organisational model for the assessment of the potential for the entry of milk and dairy products into the global markets (Figure 2).

Among the critical areas for further intensification of the development of organic dairy production in Ukraine in the context of entering and expanding its presence in the European and global markets, three main vectors should be distinguished:

1) Stimulation of demand for ecological and organic products and increase of consumer confidence in organic brands (popularization of eco-brands and healthy eating among the population, increase of public procurement of organic milk, increase of state subsidies for the production of organic dairy products);

2) strengthening value chains and creating closed-loop business models for organic dairy production (support for sectoral value chains, improving conditions for keeping and feeding farm animals, restoring biodiversity, increasing the volume of industrial processing of organic raw materials, state compensation for the cost of organic certification services);

3) increase the contribution of organic production to the achievement of the goals of environmental,

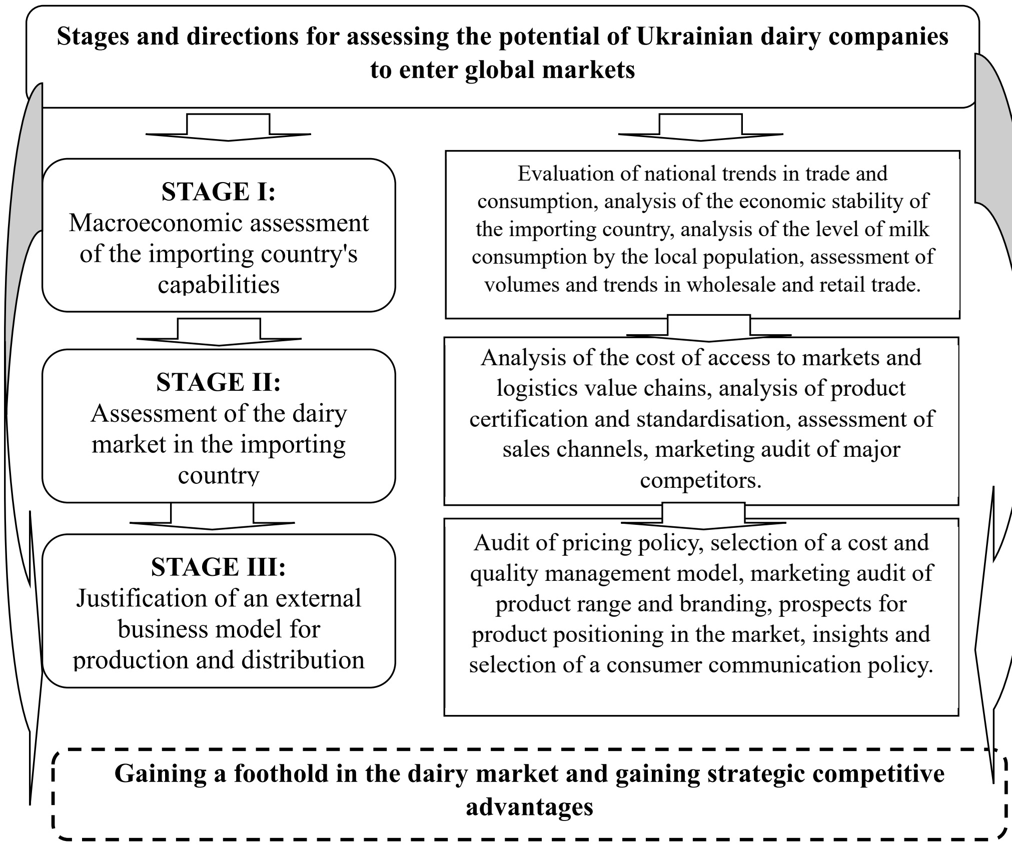

Figure 2. Model for assessing the potential for companies to enter the global markets of organic milk and dairy products
Source: authors' development

economic and social sustainability of the domestic agricultural sector (reduction of negative environmental impact, increase of genetic biodiversity, improvement of animal welfare, resource saving, development of circular business models for dairy production).

5. Conclusions

The findings of the research indicated that the global production of organic dairy products is influenced by the rapid expansion of market capacity and projections of a substantial increase in scale over the next decade. In terms of global market share, the leading producers of organic dairy products are the USA, Germany, Japan, and Australia. The main consumers of these products are the USA, China, and the EU countries. Ukraine has considerable potential for the production of organic dairy products. In 2023, the proportion of dairy products in Ukraine's domestic market of organic agricultural products was 46.4%. The largest concentration of organic dairy production is in Zhytomyr, Ternopil and Volyn oblasts. The foremost producers of organic dairy products are the companies Organic Milk, Staryi Porytsk, and the agricultural enterprise EthnoProduct. The proportion of organic milk among all raw milk products available on the domestic market is approximately 19%. However, it is evident that a consistent upward trajectory is being observed. The current state of organic dairy production in Ukraine is characterised by a limited number of certified animals, a comparatively lower level of productivity among cows on organic farms relative to conventional ones, and a relatively small proportion of organic dairy farms.

An evaluation of the potential for Ukrainian dairy producers to penetrate global markets revealed that Eastern European and North African markets are the most promising in the near term. In order to facilitate the expansion of Ukrainian producers' geographical sales area, a model for the assessment of companies' potential for entering the global markets of organic milk and dairy products was proposed. This model takes into account the existing definitions of priorities and prospects. The following were identified as three critical areas for intensification of organic dairy production and Ukraine's entry into the world markets:

1. Stimulation of demand for organic dairy products.
2. Strengthening value chains and creating closed-loop business models for organic production.
3. Increasing the sustainability of the domestic dairy sector.

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