

# CHARACTERISTICS OF DAIRY SUPPLY CHAINS: THE CASE OF THE BALTIC STATES

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## Abstract

There are significant differences in retail food markets in the Baltic States in terms of consumer habits, economic conditions and market participants; however, it is not possible to analyse trade in packaging for dairy products only within one country, as the largest retailers and producers of dairy products operate in all the three countries, implementing single supply operations and other supply chain operations. In the present research, the authors examine further development opportunities for the logistics of and packaging for dairy products in the three Baltic States – Estonia, Latvia and Lithuania – in the dairy supply chain. There are several reasons for such a research study, which are related to the composition of the dairy retail supply chain and the specifics of primary packaging for dairy products. The research aim is to examine the dairy supply chain in the Baltic States in order to identify opportunities for the development of packaging. To achieve the aim, the following research tasks were set: 1) to describe the dairy supply chains in the Baltic States from the aspect of retail trade; 2) to examine the characteristics of the dairy supply chain that affect logistics and the development of packaging in logistics. The research found that a situation has emerged in the Baltic States that a fragmented diversity of returnable packaging is specific to the dairy supply chain, which makes the logistics of packaging for dairy products inefficient. The diversity of returnable packaging hinders reverse logistics, the key hindering operations of which are: sorting, storage and washing of containers ready for transport and other related operations.

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**Keywords:** Supply chain, logistic, returnable packaging

## Introduction

For the last 20 years, the production of dairy products has traditionally been the most significant industry in the agro-food sector in the

Baltic States. The accession of Estonia, Latvia and Lithuania to the European Union in 2004 accelerated the growth of their dairy industries, which allowed fully meeting their domestic demand as well as exporting dairy products to other EU and third countries.

After regaining independence in 1990, the Baltic States' dairy processing industries were characterised by the fragmentation of the large milk processing enterprises inherited from the Soviet Union into a large number of small and individually privatised enterprises. For example, in Estonia 11 large milk processors were fragmented into 36 small ones. For this reason, 60% of the production capacity was controlled by milk producers or their cooperatives, while 40% was bought by local private investors. Similar processes took place in Lithuania and Latvia as well. In 1998, a lot of the small enterprises bankrupted owing to the financial crisis in the Baltics. At the same time, during this period, the dairy processing industry was characterised by a fast concentration process in the result of mergers and acquisitions (Jansik, 2009).

Along with the economic processes, the logistics management of dairy supply chains and packaging have developed. It is considered that efficient food logistics has to ensure the delivery of the right product in the right quantity and quality at the right time and place and for the right price, and it has a positive effect on all partners involved in the food supply chain (Bosona, Gebresenbet, 2012). However, practice shows that cooperation among the logistics systems of the organisations involved in the food supply chain is quite weak and fragmented (Bosona, Gebresenbet, 2012). Even within individual companies, the vertical and internal integration of transport and logistics is at a low level, which makes them economically inefficient and unsustainable from the environmental perspective. The necessity for cooperative logistics as one of the most important trends in the development of food logistics in order to meet retail standards in the next decade was also emphasised by the participants of the 12<sup>th</sup> logistics management conference that took place in Bonn in 2007 (Trends in food logistics, 2007). So, in order to assure the quality of food, an increasing role is played by the right packaging and logistics management. S.Krautwurst-Leister, the head of the food logistics department of one of the leading companies of logistics services in Europe, DACHSER, stressed in his presentation the necessity to reduce the time of delivery, which can be achieved by maximum standardisation of logistics solutions, while at the same time making no compromises in the quality of products (Trends in food logistics, 2007).

Retail enterprises, the market share of which (at present, in the majority of European countries, 40% of the market is controlled by 3-5 retail companies (Geloso-Grosso et al., 2008) allows controlling and influencing food supply chains, have admitted that the most effective is the centralised

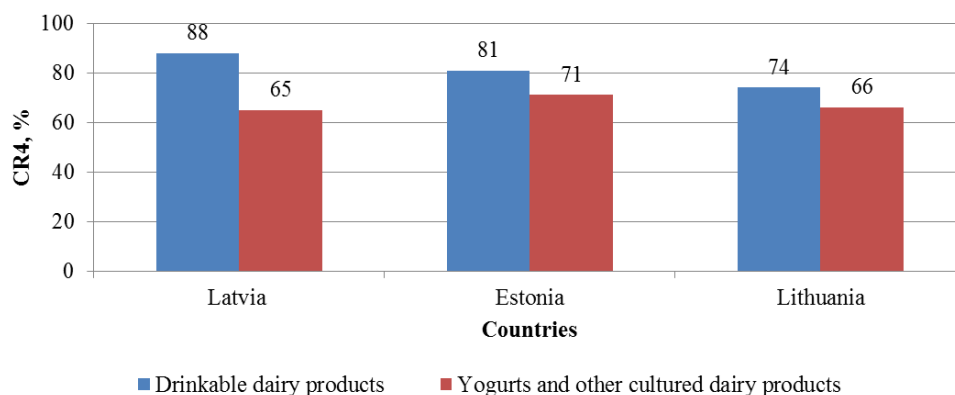
delivery strategy; to implement it, as high standardisation and unification of all logistics-related operations as possible have to be achieved. At the same time, the mergers of companies and the absorption of domestic brands play an essential role also on the part of producers and suppliers of the food supply chain. They too become increasingly rational in creating new products and in managing their deliveries.

The mentioned preconditions and problems determine the research aim: to examine the dairy supply chain in the Baltic States in order to identify opportunities for the development of packaging. To achieve the aim, the following research tasks were set: 1) to describe the dairy supply chains in the Baltic States from the aspect of retail trade; 2) to examine the characteristics of the dairy supply chain that affect logistics and the development of packaging in logistics.

Research methods: the logical and constructive methods, data grouping, the monographic method, analysis and synthesis. The research employed scientific literature, research papers in journals, statistical data and unpublished information provided by enterprises.

### Characteristics of the trends in dairy retail sales in the Baltic States

With the concentration and specialisation of milk production and processing in the Baltic States beginning in 1994, a dynamic increase in CR4 (the concentration ratio of 4, which is the percentage market share of four largest enterprises in the industry's total turnover) was observed. In the period 1994-2011, on average, this concentration ratio in milk processing in the Baltic States increased from 29% to 75% (Jansik, 2009).

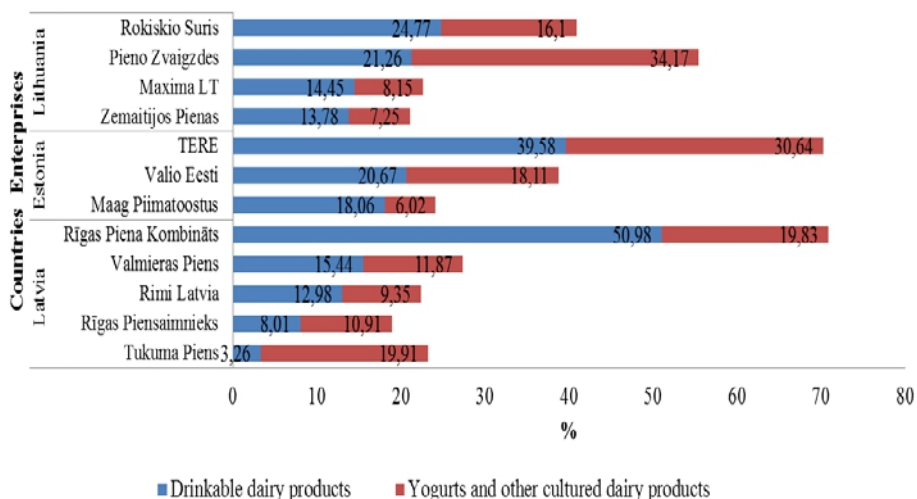


Source: authors' construction based on Euromonitor International data  
Figure 1. Concentration ratio for the dairy processing industry (CR4) in the Baltic States in 2011 (%)

As shown in Figure 1, in 2011 in the Baltic States the market share of four strongest enterprises in the group of drinkable dairy products, on

average, was 74-88%, while in the group of yogurts and other cultured dairy products it was 65-71%. In the result of these processes, market structures, in which 3-4 strong enterprises dominate in each country, emerged in the dairy industries in the Baltic States. The rest of milk processors are medium or small specialised enterprises that focus on small market segments.

However, a detailed analysis of each country's leading milk processing enterprises leads to a finding that in comparison with Estonia and Lithuania, Latvia's milk processing sector is more fragmented.



Source: authors' construction based on Euromonitor International data

Figure 2. Market share of milk processing enterprises in the Baltic States in 2011 (%)

The information on the market shares of milk processors in the Baltic States summarised in Figure 2 shows that the convincingly dominant place in the Baltic market is taken by the JSC "Rīgas Piena kombināts", which sells more than 50% of drinkable dairy products in Latvia. After the merger of the JSC "Rīgas Piena kombināts" and the JSC „Valmieras Piens” in 2012, their total market share of drinkable dairy products reached 66.42%. The leading position of the JSC „Tukuma Piens” in sales of yogurts and other cultured dairy products (19.91%) may be explained by the broad assortment of its products and its explicit specialisation.

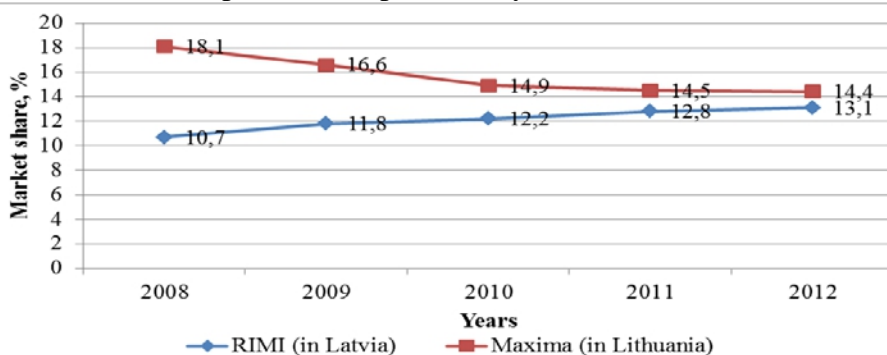
In Estonia, a convincing leader in sales of both drinkable dairy products and yogurts is the JSC "TERE", with the market shares of 39.58% and 30.64%, respectively. At the same time, one has to emphasise that the highest degree of concentration in the market of dairy products was specific to Estonia, as CR4 for the segment of drinkable dairy products was the highest in 2011. Besides, in both segments, the market share of the fourth largest producer was five times smaller than that of the market leader, the JSC "TERE".

In comparison with Latvia and Estonia, there is no obvious leader in the segment of drinkable dairy products in Lithuania, as the market shares of the JSC „Rokiskio Sūris” and the JSC „Pieno Zvaigzdes” are quite similar, 24.77% and 21.26%, respectively. Yet, the dominant position in the segment of yogurts and other cultured dairy products was taken by the JSC „Pieno Zvaigzdes” with a market share of 34.17% in 2011, which may be explained by the large diversity of its products and its large production capacity. Among the Baltic States, the lowest degree of concentration in the segment of drinkable dairy products was observed in Lithuania.

It has to be noted that in the segment of yogurts and other cultured dairy products in Latvia and Estonia, the influence of products of the group “Danone” (brands such as Actimel, Activia, etc.), the market shares of which are 16.36% and 15.61%, respectively, can be observed, which, in the opinion of the authors, can be explained by this company’s experience and opportunities in advertising its products (Packed Goods in Latvia, 2013; Packed Goods in Estonia, 2013).

All the enterprises shown in Figure 2 also distribute their products outside their home country, for example, in 2012 the Estonian producer JSC “Valio” had a market share of 0.31% for drinkable dairy products in Lithuania and a market share of 5.43% in the yogurt market in Lithuania. The Lithuanian enterprise JSC „Pieno Zvaigzdes” supplies 0.11% of drinkable dairy products sold in Latvia, while the Estonian JSC “Valio” – 0.86% of the quantity of yogurts sold in Latvia (Packaged Goods in Lithuania, 2013; Packaged Goods in Latvia, 2013).

Another important specific is the role of private brands in the assortment of products, particularly in Lithuania and Latvia.



Source: authors’ construction based on Euromonitor International data

Figure 3. Changes in the market share of private brands for dairy products in the period 2008-2012 (%)

A specific of the Baltic market is the stable increase in the market share of the private brand “RIMI Baltic” for drinkable dairy products in Latvia from 10.7% in 2008 up to 13% in 2012 (Figure 3). The market shares

of the private brands of “Maxima Grupa” – Optima Linija and Favorit – slightly decreased from 18.1% to 14.4% in the period 2008-2012; yet, these market shares were higher than that of the private brand RIMI in Latvia. Such a different trend may be mostly explained by the positioning of both enterprises’ different private brands in the market – RIMI advertises its brand as being of similar quality but more available. In contrast, the private brand MAXIMA Favorit was initially promoted in the market as that for very cheap products. As the market situation changed and consumers’ quality requirements rose, the attractiveness of absolutely lowest prices declined. In contrast, in Estonia private brands are outdid by domestic producer products, which, in the opinion of the authors, is associated with Estonian patriotism as well as the reluctance of producers to produce private brand products, thereby increasing the competitiveness of products of their own brand.

In general in the Baltic States, an analysis of the dairy supply chain leads to a conclusion that this chain involves the following common characteristics being specific to a single market:

- ✓ each country has 3-4 large milk processors that determine market trends;
- ✓ influence from foreign producers can be simultaneously sensed, particularly in the segment of yogurts;
- ✓ all the large enterprises distribute their products also outside their home country;
- ✓ in the assortment of products, an important role is played by the private brands of retail store chains (RIMI, Maxima);
- ✓ in the dairy industry in the Baltic States, the consolidation of enterprises continues, as well as foreign investors are interested in it;
- ✓ increase in the influence of foreign investors contributes to the entry of foreign supply chain management experience in the Baltic market, which, in its turn, affects the structure of packaging logistics and sale techniques;
- ✓ in all the three Baltic States, dairy products, but particularly drinkable dairy products, are very price elastic;
- ✓ for products with higher value-added, for example, yogurt or sour cream, their taste, convenient packaging, expiry dates, origin of ingredients and chemical composition are important;
- ✓ profit margins of the milk processors in the Baltic States have been within a range of 2-4% of their total turnover.

### **Logistics of the dairy supply chains in the Baltic States and the development of packaging in logistics**

Since 1990, the assortment of products supplied by the dairy processing industry has sharply changed, which is characterised by high differentiation and value-added. The most significant way of distribution of

dairy products is retail store chains of various formats, the price policies of which greatly affect the sale prices of basic necessities.

Some dairy products have historically played a special role in daily diets in the Baltic States. The consumption of dairy products per capita in the Baltic States is different: 183 kg in Latvia, 272 kg in Estonia and 354 in Lithuania (FAO data, 2014). It is also observed that no considerable increase in the consumption of dairy products can be expected. For this reason, to attract consumers under conditions of high market concentration and price competition, the producers increase their product assortments, mainly through creating special product lines and diversifying the packaging of their products. For instance, in 2012 the Estonian dairy producer JSC “TERE” introduced a new, flexible milk packaging, while at the same time modernising also the primary packaging of other dairy products (kefir, sour cream and yogurt). In the segment of drinkable yogurts, the JSC “TERE” introduced packaging for a 12-piece pack. In February 2012, another Estonian dairy producer, the JSC „MAAG Piimatööstus”, started selling 3.5% fat milk in plastic bottles. In Latvia, the JSC „Rīgas Piena kombināts” familiarised the market with a product line “My Family” for which milk, kefir and yogurt are packed in an unusual for the Baltic market 1-litre packaging (Figure 4), which combines flexibility and the opportunity of being placed vertically.



Source: Who is My Family [s.a.]

Figure 4. Primary packaging for the product line “My Family” introduced by the JSC „Rīgas Piena Kombināts”

To make the price of a package more attractive, a number of enterprises reduce the volume of the package, for example, from 1 l to 900 ml. Besides, there are relatively popular kinds of primary packaging for dairy products in each Baltic State: in Latvia consumers prefer 1-litre tetra packs as packaging for milk, whereas in Estonia they want milk in 1-litre polyethylene packaging (unpublished study by Schoeller Allibert Ltd).

So particularly the primary packaging of dairy products mainly affects the choice of transport packaging in the food supply chain because in order to maximally efficiently exploit the capacity of transport and warehouses, dairy producers seek to choose the most appropriate transport

packaging for every kind of primary packaging. Furthermore, the primary packaging of dairy products historically does not meet the standard sizes of logistics packaging – 1200x800mm or 1200x1000mm – accepted in the world (Belcikovs, Praude, 2003); therefore, dairy producers choose three approaches:

- 1) to reduce the unused space in transport packaging and to increase the stability of primary packaging, returnable packaging, which is partially fit for the logistics of dairy products, is used; its external size – 432x342mm – differs from that for other food categories; in the result, the use of the surface of wooden pallets or batching is not efficient;
- 2) to ensure the batching of transport packaging on EUR-standard pallets maximally efficiently, returnable packaging, fitting the standard size of 1200x800mm, with the size of 400x300mm or 400x600mm is used; consequently, there is unused space inside the transport packaging, leading to the instability of primary packaging, which, in its turn, increases the loss of products;
- 3) for every kind of primary packaging, cardboard transport packaging of another size, fitting the primary packaging, is used; as a result, the cost of transport packaging increases, as well as the batching of products on EUR-standard wooden pallets is not maximally safe and efficient (unpublished study by Schoeller Allibert Ltd).

Owing to the mentioned factors, a situation has emerged in the Baltic States that at least 30 different kinds of returnable packaging – plastic boxes –, as well as approximately 300 kinds of cardboard packaging are simultaneously used in the dairy supply chain (unpublished study by Schoeller Allibert Ltd). For comparison, the logistics of bread products employs only eight such kinds, which makes the logistics of dairy products inefficient as:

- ✓ the cost of transport packaging increases (owing to disposable cardboard or the high production cost of returnable packaging due to its great diversity);
- ✓ owing to mutual incompatibility, the risk of damage of products increases and the availability of products on store shelves decreases;
- ✓ the great diversity of returnable packaging hinders the sorting, storage and washing of containers ready for transport and other related operations, increases the proportion of manual work in processing packaging and raises the risks of loss and theft of packaging;
- ✓ disposable cardboard increases the cost of recycling waste as well as raises environmental risks;
- ✓ the diversity of transport packaging increases the costs of transport and storage, as it is not possible to fully use the maximum stacking height;



- ✓ the greatest deal of available transport packaging is not appropriate for placing products on store shelves; therefore, in retail trade, dairy products have to be restacked on shelves or into other boxes, which increases the cost of handling the products;
- ✓ the diversity of transport packaging cannot be equipped with standardised and modern identification systems in order to accelerate and enhance the traceability and identification of goods at any stage of the dairy supply chain as well as to ensure precise recording of inventories.

### **Conclusion**

Each country has 3-4 large milk processors that determine market trends in the segments of dairy products, yogurts and cultured dairy products. The Baltic States' milk processing enterprises have a single sales market, in which an important role is played by retail chains and their brands. An increase in the influence of foreign investors contributes to the entry of foreign supply chain management experience in the Baltic market, which, in its turn, affects the structure of packaging logistics and sale techniques. Profit margins of the milk processors in the Baltic States have been within a range of 2-4% of their total turnover.

The great diversity of returnable packaging hinders the sorting, storage and washing of containers ready for transport and other related operations, increases the proportion of manual work in processing packaging and raises the risks of loss and theft of packaging. The greatest deal of available transport packaging is not appropriate for placing products on store shelves; therefore, in retail trade, dairy products have to be restacked on shelves or into other boxes, which increases the cost of handling the products. The diversity of transport packaging cannot be equipped with standardised and modern identification systems in order to accelerate and enhance the traceability and identification of goods at any stage of the dairy supply chain as well as to ensure precise recording of inventories. Therefore, one of the solutions to it is to simultaneously introduce standardised and unified returnable packaging for dairy products in all the Baltic States by making an agreement among all the largest participants of the dairy processing industry.

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