QUALITY MANAGEMENT IN THE LITHUANIAN DAIRY INDUSTRY:
THE BEGINNING AND THE EXPERIENCE

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The early practice of quality management in the Lithuanian dairy industry from 1918 to 1940 is examined. This practice utilized the effective collaboration between the governmental and administrative institutions and the dairy companies, in order to assure the development of dairy products, their export, and quality. The practice for achieving quality objectives, such as stimulating the milk farmers, the dairy companies and their specialists, their education and training, study and use of best international practice is discussed. Product quality improvement activity, problem solving practice, markets and consumers’ requirements, research, and assessment in the Lithuanian dairy industry are presented. Significant product quality improvement was directly correlated with the export increase.

Keywords: Milk Economy, Product Quality, Export Development, 1918 - 1940.
JEL Classification System: M11 – Production Management, Q10 – General Agriculture.

Introduction

After the declaration of Lithuania’s independence in 1918, the development of stockbreeding and dairy processing, and the establishment of cooperative dairy companies were successfully started. The progress was driven by the market economy and collaboration between milk producers and administrative and governmental institutions. The objective of this collaborative effort was to increase the production and the processing of milk products, and to improve the quality of milk and butter. The improved quality of butter and other products determined their market value internationally, which directly influenced the amount of their export. As a result, in 1937, the combined export of butter and eggs comprised more than 20% of Lithuanian total national export. This significantly supported the nation’s growing economy.

The utilization of the effective quality improvement methods allowed the young Lithuanian dairy industry to successfully achieve their objectives and to acquire quality management experience. The general Lithuanian dairy industry development has been researched by Šalčius (1989), Manelis (1939), Visackas (1990), and others. However, the early evolution of the industry (before 1940) has not been explored from the quality management perspective. This information may be useful in the present time, since Lithuania has moved from a planned economy to a market economy.

Goal: to examine the quality objectives achievement practice in the Lithuanian dairy industry during its early development period and to disclose its results because quality management in the Lithuanian interwar period has not been examined.

Object: the activities of the Lithuanian dairy industry and its management.

Research Methods: empirical analysis of the quality achievement practice, logical analysis.

Lithuanian milk economy before 1918

Stockbreeding had long traditions in Lithuania, but its development was gradual. Before the First World War, middle and small farmers raised many primitive breeds of cattle with low milk production. Farmers used their products mostly for family needs. Farmers began considering the improvement of the livestock. As a result, beginning in 1907, cattle control groups were organized (Šalčius, 1989).

The progress of stockbreeding influenced the growth of industrial milk processing.

At the end of the 19th century, the majority of the estates had well-equipped dairies and creameries where sour cream, butter, and cheese were produced. These products were sold in Lithuania, in big cities of czarist Russia such as St. Petersburg and Moscow, and other neighbouring capitals like Riga, Warsaw, etc. To expand their business, big landowners united into unions and corporations, and developed more technologically advanced dairies and creameries. Before the First World War, there were 10 dairies registered in the Kaunas district (“gubernija”) (Šalčius, 1989).
Starting in 1891, dairy schools and courses were founded in order to meet the growing need of dairy specialists. Bubiai Dairy School, established in 1910, had a substantial influence on the dairies activity, because dairies and creameries hired specialists trained at this school.

**Lithuanian milk economy after 1918**

After the declaration of Lithuania’s independence in 1918, the provisional government initiated the agricultural reform and management of the land works and the production. The government gave priority and support to the stockbreeding and its product processing, provided subsidies to the farmers, stockbreeders and dairy manufacturers. The subsidies were used by the farmers, agricultural cooperatives, dairies, municipalities, and young farmers’ circles from poor districts. The government also supported education.

In 1921, the Ministry of Agriculture (MA) researched the suitability of different cattle breeds for agricultural conditions in Lithuania. It was decided to improve cattle herds by introducing juodmargių (black-speckled) and žalųjų (rufous-speckled) breeders from Denmark, Sweden, and Germany. The newly established Palace of Agriculture (PA) created a specialized stockbreeding department, which took over some of the responsibilities from the MA and took care of practical livestock breeding issues (Brazaitytė, 1990).

Starting in 1922, livestock breeding groups were founded to improve the breeding and the care of livestock. In 1939, there were 211 livestock breeding groups, which took care of 6.8% of the total number of milking cows in Lithuania (Manelis, 1939). Although the livestock breeding groups’ activities were limited, they demonstrated that the improvement of livestock breeding and care was effective. Compared to Lithuania’s average, milk production and the percentage of milk fat were higher in the cows cared by the livestock breeding groups. In 1937 - 1938, the annual milk production from one of the livestock breeding groups’ cows was 2913 kg with 3.75% milk fat (The Lithuanian Stockbreeding and Control Circles’ Alliance information, 1938).

The MA understood the necessity to have a new generation of agricultural specialists to foster the successful development of the economy. Therefore, in 1923, the MA formed a network of agricultural specialists for the administrative districts and provided it with specialists. The MA established primary and secondary agricultural schools, the Academy of Agriculture, and the Veterinarian Institute. In 1924 teaching of the first group of control assistants (livestock specialists) began in the village of Gruzdžiai, the Šiauliai district. A year later, the Gruzdžiai Secondary Stockbreeding and Dairy School was established. Later, the education of dairy specialists was separated from Gruzdžiai School and Belvederis Secondary Dairy School was established.

In 1923, the first cooperative milk processing companies (dairies) were established in “Lietūkis”, which was in association with agricultural cooperatives. The Lithuanian Farmers’ Union gave their attention to the establishment of these companies, too. The government supported these initiatives by providing subsidies to construct the buildings and to buy equipment for the dairies. From 1925 to 1926, there was a boom in an establishment of the cooperative milk processing companies. At the end of the year, there were 211 dairies that used steam engines or manual control.

The founders of the cooperative milk processing companies helped farmers to process and sell milk more efficiently and profitably. The companies’ regulations required that members of these companies raised cattle and sold well-filtered, not falsified or spoiled milk, which was additionally left from the daily needs of their families. Members who did not obey these regulations were charged with a monetary fine. In this way, companies motivated their members to maintain high quality of milk and therefore improve milk sales.

**Objectives of cooperative milk processing companies**

The Central Lithuanian Union of Milk Processing Companies, “Pienocentras,” was established in 1928 to centralize the administration of the cooperative dairy companies. “Pienocentras” started the new period in Lithuanian milk processing industry. It aimed “…to stimulate the milk production, to develop and improve the milk processing, and to create a high mark of Lithuanian butter” (Šalčius, 1989). The export of Lithuanian butter, which was started in 1923, was small (Visackas, 1990). “Pienocentras” had an objective to increase the export of butter, which was an important economical initiative for the country and its residents. The “Pienocentras” initiative was supported by the Lithuanian government.

“Pienocentras” was vigorous in pursuing their objectives. “Pienocentras” established milk-separating dairies and distributed them in the country to provide easier access to the farmers. As a result, the farmers had improved conditions for the milk delivering to the dairies.

In the auxiliary dairies milk separating and cream processing were rational from the quality standpoint because it helped to preserve the cream quality during the transportation to dairies. Using horse transportation, it was easier and more economical to move smaller amounts of cream, which better maintained the quality characteristics and was more stable than milk.

From 1927, the number of milk separating dairies was rapidly growing but “Pienocentras” continued to explore new practices and methods of milk purchase and delivery. The milk delivery system improvement ensured a significant increase in the number of milk suppliers and amount of purchased milk by the dairy companies. In 1938, the 101,000 farmers delivered milk to Lithuanian cooperative milk processing companies, which was more than 1/3 of all Lithuanian farmers (Visackas, 1990).
For the milk primary processing improvement, the administrative institutions, together with “Pienocentras,” defined new, specific requirements to the processing conditions and technology. To improve the process of butter production, in 1929, the Lithuanian MA issued General Veterinary Sanitary Rules to be maintained in the dairies (Manelis, 1939). “Pienocentras” also examined other aspects of the dairy industry, such as improvement of milk production and its delivery in specific regions, and decrease of the seasonal impact on the output of milk production.

In 1927, the Lithuanian government newly instituted the National Butter Export Control Office, which was subordinated to the Lithuanian MA. The office had a task to control the exported butter quality, as well as to assess its stability using the Exported Butter Assessment Guidelines. These guidelines recommended the use of specific instrumental methods for the assessment of the moisture and the quantity of dry materials in the butter, and sensory methods for the assessment of other features of this product. Butter was categorized into 3 categories, using a 15-point system. It was required to collect 10.1-15 points to obtain the first category, 7.1-10 points - for the second category, and less than 7 points for the third category (Manelis, 1939). The butter that was categorized to the third category of quality was returned to the producer. “Pienocentras” analysed the data of butter assessment and used it for stimulation of dairy specialists and companies.

The marking system of exportable butter provided the consumer with important information, such as the recognition of butter producers and quality category. Dairy companies had to document the “Pienocentras” trademark, the inscription “Lithuanian Butter”, as well as its origin, “Product of Lithuania”. Wooden barrels that stored the first category butter had a red inscription, “Controlled Klaipėda Choiset Quality,” and the second category of butter had a green inscription, “Controlled Klaipėda First Quality.” The third category butter was credited as the household butter (Manelis, 1939). Before transportation, butter was held in new, contemporary freezers, which allowed for good conditions in order to preserve its quality.

More than 1,000 regular employees, such as milk technologists, accountants, and other specialists of “Pienocentras” worked responsibly, competently, which allowed them to achieve their goals.

**Butter quality improving**

There were some practical issues concerning the quality of exportable butter. Occasionally, butter was too moist, with taste or flavour defects. Compared with other countries, Lithuanian butter was less stable. Wooden barrels often were marked incorrectly. The quality of the cream every so often was questionable: “Even the best dairy technologist with the best technology will not be able to make high quality butter out of bad cream,” – wrote “Talka” (The Lithuanian Cooperative Society information, 1932). These and other shortcomings were caused by the problems in milk production and processing. The defects and stability of butter were determined by the milk production, such as the feeding of the cows, the conditions of their care and milking, and the milk primary processing such as filtration, cooling, packing, and its storage conditions. Milk separating dairies did not have appropriate premises, technological equipment, and qualified specialists. “Pienocentras” and PA focused their efforts to solving of the problems mentioned above.

Some defects of butter were caused by the difficulties in the production processes. “Pienocentras” implemented the improvements in the technical equipment and the materials, such as butter culture, water, etc. The control of the production processes in dairies was supervised by the regional dairy instructors from “Pienocentras”. Three to four times a year, they visited dairies, evaluated the situation, assessed the problems, and prepared recommendations to address these problems. Instructors also assessed the dairy specialists (technologists) and wrote their comments for the company’s annual report. These assessments were available not only for the company’s board of directors but also to “Pienocentras”, which analysed the assessments. “Pienocentras” also recommended companies to hire controllers to control the processes at the milk separating diaries (The Lithuanian Cooperative Society information, 1932).

To encourage milk processing companies and dairy technologists to produce high quality products, “Pienocentras” determined that the payment to the company for the exported butter was based on its category. The salary of the dairy technologists depended on the amount of processed milk and on the category of produced butter. To further increase of motivation, “Pienocentras” periodically organized professional competitions of the butter quality. Dairy technologists would receive awards for first category butter and fines for every kilogram of third category butter produced (The Lithuanian Central Record Office information). Although the award process eventually changed, it was an effective way to improve the quality of butter.

Although exportable butter was carefully examined, some defects and outside bodies were found at the final place of sale and use. “Pienocentras” carefully assessed every reported case because the marking system allowed identification of the producing company and the responsible specialist. To prevent repeated instances of defected butter, “Pienocentras” required the companies to investigate the causes of these defects, to take measures to eliminate them, and that the responsible specialists presented a written explanation.

To continue the products’ quality improving, “Pienocentras” understood the importance of professional competence and started to organize professional training of the specialists and other employees. “Pienocentras” and Lithuanian PA understood the impact of professional competence of the milkmaids and specialists in agriculture.
The PA advertised the appropriate methods of cowkeeping, feeding, and milking, as well as primary milk processing, milk storage, and its cleanliness assurance. They taught farmers how to prepare ice from the rivers and lakes during the winter season and how to save it until the summer in order to chill the milk during the warm seasons.

Lithuanian PA, teaching institutions, various societies, “Pienocentras”, “Maistas,” and other organizations provided professional literature on stockbreeding and dairy issues. In 1928, the PA announced a competition for the new literature about agricultural issues. As a result, several publications, including a textbook for the managers of the milk separating diaries, were published by “Pienocentras” in 1934.

Since 1927, “Pienocentras” and the PA constantly organized professional education courses for the dairy technologists (Brazaitytė, 1990). In Radviškis, these courses lasted three weeks. The lectures were given by the specialists trained abroad. The training of milk separating dairy managers was especially important because these managers had little understanding of the milk processing technology. This training was started in 1932-1933 and it was carried on by the specialists from dairy companies, Lithuanian PA, and “Pienocentras”.

They also introduced broad educational and teaching programs. In 1936, the PA organized 39 three-day courses of appropriate animal care and feeding, 47 courses of appropriate cow milking, all of which were completed by thousands of people (Farmer’s Adviser, 1937). The PA organized a milking competition with 280 participants. This was the method that the PA, as a national organization reaching all of the territories, used to educate farmers. In 1936-1937, the PA organized education courses for control-assistants in order to improve the qualifications of stock-breeding specialists (Brazaitytė, 1990).

“Pienocentras” started to propagate the best experience of foreign and Lithuanian dairy companies.

**Best practice propagation**

At that time, Denmark, Germany, and other European countries already had substantial experience and expertise in the control and assessment of milk and its products quality. “Pienocentras” and the Lithuanian PA evaluated the theoretical and practical experiences of the dairy industry in these countries, published professional literature and their findings in magazines, and applied it in Lithuania.

The book by the Danish veterinary doctor H. M. Hoyberg (1930) “Public Milk Control” was translated into the Lithuanian language and published by the PA in 1930. The well-known fact that adults and children can contract infectious diseases by using milk of ill cows was the reason why H.M. Hoyberg wrote the book. The author stated that the control of milk production for safety assurance consisted of medical health checks of the milkmaids and other personnel, as well as animal veterinary control in order to prevent diseases in their primary stages. The author provided data about the composition of milk, its physical and biological characteristics, the impact of bacteria on the souring and decomposition of milk, and methods of identification of falsified milk.

While discussing public dairy control, the author demonstrated the mechanism of quality control and its administration. In Denmark, the quality control of dairy products was carried out by the veterinarian doctors. Public health police were assisting veterinary doctors by supervising dairies, milk selling places, and buying milk samples necessary for analysis. Milk analysis was carried out using sensory, physical, chemical, and biological methods.

This book had a significant influence on the development of milk quality improvement and control systems and its products in Lithuania. Danish experience in the dairy industry had international importance. The mentioned book was widely used by experts in Germany, France, Belgium, Czechoslovakia, and Spain (Hoyberg, 1930).

In Lithuania, J. Grušas wrote Pieno mokslo vadovėlis (The Textbook of Milk Science), which was based on summarizing professional literature about Danish experience in the dairy industry. Lithuanian magazines and journals, such as “Pieno ir gyvulininkų patarėja,” “Ūkininko patarėja,” “Žemės ūkis,” and “Talka,” presented successful achievements of the country dairy industry and discussed its problems. They published regulating documents issued by the government and administrative institutions, and highlighted modern foreign experience. Milk processing companies then distributed this literature to the farmers.

Lithuanian farmers and dairy specialists were provided with the opportunities of visiting these countries and receiving practical training there. “Pienocentras” also invited several experts from Denmark to work as dairy instructors in Lithuania (Visackas, 1990).

For best practice propagation and quality improvement motivation, “Pienocentras” and the Lithuanian PA announced the competitions. The competition winners received diplomas and monetary awards. The results of the competitions were announced publicly.

The first Lithuanian butter quality and stability competition was announced in 1935. The competition guidelines required judging on annual results given by the participants such as total amount of exported butter, the produced butter categories, its stability, and other quality parameters (Dairy and Animals Economy, 1936). Butter quality competitions continued later and it was an effective mean to improve the quality of butter production.

To encourage farmers to improve milk production and selling to the dairy companies, “Pienocentras” initiated competitions for the milk suppliers in 1936. The guidelines of this competition required to judge the milkman by the amount of milk fat sold per year, based on one hectare of agricultural land resources. It depended on the amount of sold milk as well as the amount of milk fat. This indicator would be low in falsified milk. The competition could be won by
the milkman who had productive livestock, effective milk production, and supply for sale practice. After the competition was completed, there were 21 milkmen awarded.

Lithuanian dairy processing companies participated in the shows organized by the PA. “Pienocentras” also presented Lithuanian butter internationally at the shows in Tel Aviv (1934), and in Berlin (1937), where it was judged very well (Farmer’s Adviser, 1937).

The applied means resulted in substantial improvement in the quality of butter. In 1938, 88.7% of all butter produced by the cooperative milk processing companies was of first category.

Eggs quality problems solving

In addition to stockbreeding, egg farming was also an old Lithuanian agricultural tradition.

The statistical data about the selling and exportation of eggs before the First World War does not exist. The export of eggs during the first years of Lithuanian independence was low because the eggs’ quality did not meet the requirements of the foreign markets. There were twenty exporters who bought eggs for export from the agents. Farmers used the best eggs themselves and sold the worst quality eggs to the agents. This was not a rational process of purchasing eggs. Eggs were bought by the dozen without taking into consideration their size, freshness, and cleanliness. Therefore, the price was identical for all eggs without dividing by their quality.

In the foreign markets there was an increase in the sale of eggs, so Lithuanian egg exporters had to adjust to the market demands, change the practice of purchasing eggs from the farmers, and finally, to expand the export (The Lithuanian Cooperative Society information, 1935). „Gamintojas“, the Agricultural Cooperative Association, was the first company to start this process. They purchased eggs directly from the cooperative corporations without the middleman and appraised the eggs using British market standards.

In 1929, the Lithuanian government issued rules for egg export. “Pienocentras” started application of these rules. The consumer cooperatives and dairy processing companies started purchasing eggs. Buyers were in close contact with the sellers. Eggs were categorized and marked. In 1935, the government commissioned “Pienocentras” to be the only institution to export eggs. “Pienocentras” changed the egg purchasing practice. They initiated egg purchase by weight, which prompted the process of purchasing and selling. Therefore, the egg export began to increase starting in 1935. In 1936, there were 40 million but in 1937, there were 60 million eggs exported (Farmer’s Adviser No. 17, 1938).

Focusing on market and export growth

“Pienocentras” continued to support the development of export because they analysed and assessed foreign markets and consumer needs. Specific market requirements helped “Pienocentras” to plan and implement changes in the production of dairy products and adjust to the market and consumer requirements.

The president of the board visited the consumers in England and in other countries. The representatives of “Pienocentras” also communicated with foreign buyers in England, which characterized Lithuanian butter well, though it was not as stable or flavourful as Danish butter. “Pienocentras” concluded that the British were satisfied with Lithuanian eggs, but would prefer to have fresher and cleaner eggs.

In 1936, a company from Washington, “Alexander Rosenberg,” wrote to “Pienocentras” that Tilsit cheese did not qualify for the American markets as its colour was too dark. Bakstein cheese had good taste, acceptable colour and shape but the name had to be changed because it was unknown to the consumers. Holland cheese was good quality but the taste was too spicy. This company expressed their interest in creating a stable market for Lithuanian cheese in the USA (The Lithuanian Central Record Office information).

To further develop relationships with the different foreign markets, “Pienocentras” appointed regular business representatives in London, Manchester, Brussels, Berlin, and Paris. This provided an opportunity to timely detect and respond to changes in the markets (Farmer’ Adviser No. 24, 1938).

The improvement of butter quality assured its competitiveness in the foreign markets. The improvement in quality as well as the increase in production of butter and purchase of eggs resulted in the growth of their export.

In 1930, Lithuanian annual export of butter was 100,000 barrels, in 1935 - 200,000 barrels, and in 1938 - 300,000 barrels (15,240 tons). In 1937, Lithuania ranked ninth among 23 other butter-exporting countries in the world (Farmer’ Adviser No. 12, 1938). In 1939, “Pienocentras” exported 17,308 tons of butter compared to the 1,375 tons in 1928 (Visackas, 1990).

“Pienocentras” exported butter to more than 20 countries, mostly to England (70%), Germany (16%), the Middle East, as well as to the USA and Japan. Eggs were exported to England, Germany, Spain, and other countries. In 1938, “Pienocentras” started exporting new dairy products such as cheese, condensed milk, dried milk, and casein.

In 1937, “Pienocentras”, together with “Maistas” and “Lietūkis,” established a shipping stock company, in order to optimise the export of dairy products in terms of conditions of transportation and time (Farmer’ Adviser No. 24, 1938).

“Pienocentras” took care of not only the export, but also the expansion of sales of products in the local markets. “Pienocentras” had its stores in various cities. The most developed market was in Kaunas and Klaipėda. Lithuanian sales market had potential to grow. “Pienocentras” wanted to establish closer relationships with the local consumers. In 1938, “Pienocentras” organized in Kaunas “Pieno savaitė” (Milk Week), where program included visiting dairies,
dairy product exposition, and other events. In this exposition, the achievements of Lithuanian dairy industry were shown and the results of the milk processing companies’ activities were demonstrated.

The achievements of Lithuanian milk economy were determined by cooperative efforts of all administrative and manufacturing branches of the milk economy in increasing the production and processing of milk and improving the product quality. These achievements had significant impact on the growth of Lithuanian economy. This study demonstrates that “Pienocentras”, by using directions from foreign countries, was attempting to increase the competitiveness of their products and developed ways to satisfy the consumer needs. To achieve their objectives the administrative institutions and the milk processing companies practised continuous improvement of processes, motivated employees, stimulated their professional growth, and disseminated their successful experience. Therefore, their activities are compatible with the contemporary general theory and principles of quality management.

Conclusions

1. The objectives and strategies of the Lithuanian milk economy development from 1919 to 1940 were closely associated with quality. The administrative institutions of agricultural economy and dairy industry applied a systematic approach for achieving their objectives. The administrations’ governing documents, organizational activities and quality improvement methods were consistent, coordinated, and included all areas of the milk economy, such as milk production, its processing, and control services. They embraced egg suppliers and exporters, too. The administrations collaborated with the farmers, milk processing companies, and other subjects.

2. The administrative institutions of the agricultural economy and dairy industry supported and motivated the business partners to expand production and to improve product quality. They set the differential payment for quality of supplied milk and exported butter. The dairy technologists’ salary was determined by the amount of processed milk and the amount of produced butter.

The administrative institutions organized competitions for the milkmaids, the milk suppliers, the butter producers and stimulated their participation. Financial and professional incentives maintained the highest motivation and interest of the participants to produce high quality products.

3. “Pienocentras” monitored the improvement of conditions and processes of the manufacturer, implemented the production control, and evaluated the work of the specialists. For this reason, the instructors regularly visited dairies, analysed situations, and proposed methods to correct the problems. The issues of butter quality were assessed from technological and other aspects, methods to solve and prevent future problems were recommended.

4. “Pienocentras” and the FA understood the significance of professional competency in achieving quality improvement objectives. Therefore, these organizations provided educational and professional competency improvement programs for all employees in the industry, distributed professional literature, and advertised foreign and Lithuanian best experience. The stockbreeders were consulted by the control assistants and the milk processing industries’ technologists were consulted by the instructors from “Pienocentras”.

5. “Pienocentras” maintained strong relationships with foreign countries by appointing regular representatives, analysing foreign markets, maintaining relations with consumers, solving quality issues, and developing strategies to adjust to market and consumer requirements. “Pienocentras” supported the development of the local market and closer relations with the consumers.

6. Quality objectives and their implementation methods were very similar to the contemporary general theory of quality management and its principles. That helped to achieve important results, to assure the competitiveness of Lithuanian butter in the foreign markets, and to increase export. These achievements had a significant impact on the public wealth of Lithuania.

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