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**Rozwój zrównoważony – inkluzywna gospodarka
i społeczeństwo w wymiarach regionalnym, krajowym i globalnym**

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STATISTIC ANALYSES OF STRATEGIC DIRECTIONS OF UKRAINIAN DAIRY ENTERPRISES DEVELOPMENT

Abstract: The article stresses out that strategic direction of the Ukrainian dairy enterprises development is adjustment of their produce to international standards and improvement of material and technical base on innovative basis. It will assist to introduction of less power intensive and safe for consumption types of produce to the production. Work contains statistical analysis of volumes of dairy goods production on Ukrainian enterprises. The row of recommendations has been developed for expansion of organizationally-economic connections of enterprises and markets of their produce distribution. The figures of dairy enterprises investment attractiveness are studied by means of dairy products indexes and by the index of economic risk (sensitivity factor of systemic risk). Further development of industry must take place on investment-innovative basis. It is necessary to use experience of the EU countries to realize the state economic reforms in the future.

Keywords: dairy enterprises, innovative basis, innovations

Introduction

Problem statement. Main strategic directions of Ukrainian economy development are approximation to European standards. Efficiency of dairy enterprises functioning is influenced by terms of management, organizational structure, methods of management, material and technical base, financial provision, as well as by introduction of less power intensive, more eco-friendly, organic and safe for consumption types of products to production process.

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The topicality of the research is determined by necessity of economic pre-conditions for realization of strategy of dairy industry development on innovative basis. This is due to the urgent demand to accord vectors of domestic agrarian policy with the world developed countries' experience. Nowadays 37,3% of dairy enterprises work with losses because of difficult economic situation, high tax and tariff pressure, large depreciation of fixed assets and demand for investment. Many of them function with instability of milk raw supply that predetermines their frequent standby time.

Recent research and publications analysis. Many Ukrainian scientists dedicated their scientific works to the study of various questions of strategic aspects of domestic agrarian industry development. P. Sabluk and D. Cherevko prove the necessity of institutional transformations for the increase of domestic agrarian produce competitiveness². M. Ilchuk suggest using the experience of the EU countries for further development of dairy enterprises³. S. Shevelyova acquaints with the public policy of the world developed countries in relation to dairy industry⁴. D. Krysanov and T. Mostenska examine the economic and ecological problems of industry functioning and mechanisms of their solution on modern level of market transformations⁵.

Unresolved issues. The mentioned above suggestions expose approaches of dairy industry development according to general national scale. However, the study of this problem is topical in the conditions of deep economic crisis and in the context of changes at the outer market. This is due to the political conflict in separate regions of the state and changes in the structure of trade operations.

The purpose of this paper is realization of statistical analysis in relation to the problematic aspects of strategic development of dairy enterprises. The generalization of theoretical and methodological questions is resolved on the investment-innovative basis.

Key research findings. Ukrainian dairy industry includes butter and cheese production, canned milk produce and unprocessed milk production. Nowadays it is one of the leading and most profitable industries in the structure of the state food production. Apart from this, dairies are extraordinarily valuable and useful for

² P.T. Sabluk, O.H. Shpykulyak, L.I. Kurylo, M.Y. Malik, L.V. Bilozor, M.S. Vitko et al., *Innovative activities in agrarian sphere: institutional aspect: monograph*. State Science Centre "Institute of Agrarian Economics", Kyiv 2010, Ukraine, 704 (in Ukrainian); D.H. Cherevko, *An increase of competitiveness of dairy enterprises on conditions of membership in World Trade Organization. Extended abstract of candidate's thesis*. Lviv State Agrarian University, Lviv 2010, 7-9 (in Ukrainian).

³ M.M. Ilchuk, I.A. Konoval, *Innovative development of cattle breeding in Ukraine. Biological Recourses and Nature Management*, 2015, 5-6 (7), 59-65 (in Ukrainian).

⁴ S.O. Shevelyova, *Modern demands for safety and natural of dairy produce. Milk processing*, 1, 2009, 12-15 (in Ukrainian).

⁵ D.F. Krysanov, *Integration of Ukrainian agrarian food sector to European Union common normative area: monograph*, Institute of Economics and Forecasting, Kyiv 2016, Ukraine, 368 (in Ukrainian); T.L. Mostenska, O.I. Drahana, I.V. Sukha, *Systemic security of meat and dairy enterprises' competitiveness of Ukraine: monograph*, State University of Food Technology, Kyiv 2010, Ukraine, 98 (in Ukrainian).

nutrition. They have a high content of protein and lactobacillus. The increase of efficiency indexes of these enterprises presupposes adjustment of permanent processes to improve quality of produce, optimization of price policy and sustainable cooperation with raw milk suppliers. The necessity for this is the demand for keeping their positions at the food product market in difficult modern socio-economic terms.

It should be mentioned that sustainable work of dairy enterprises is closely connected with the effective indexes of milk production on farms and private rural households. Processed produce is used as a raw constituent for food industry (sauces, pastry, mayonnaise etc.). Changes in separate directions of basic types of Ukrainian dairy production are caused by political and socio-economic factors (table 1).

Table 1. Production of basic types of produce at Ukrainian dairy enterprises, thousand ton

Product	2010	2013	2014	2015	2015 to 2010	
					+/-	%
Milk	801,0	972,0	1117,0	970,0	169	121,1
Butter	79,5	94,3	114,0	102,0	22,5	128,3
Unfermented and low-fat cheese	78,5	83,7	74,7	67,8	-10,7	86,4
Fat cheese	207,0	165,0	130,0	124,0	-83,0	60,0
Yoghurt, fermented milk and cream	479,0	522,0	473,0	426,0	-53,0	98,7

Source: State Statistical Service of Ukraine [ukr.stat.gov.ua].

Milk production has increased from 801,0 in 2010 to 970,0 thousand ton in 2015, that is on 169,0 thousand ton (21,1%) more. The volumes of butter also have a tendency to increase – from 79,5 in 2010 to 102,0 thousand ton in 2015, that is on 22,5 thousand ton (28,3%) more. At the same time production of yoghurt and other fermented food during the last five years has remained almost unchangeable. In 2010 it was produced 479,0 thousand ton of this produce, but in 2015 that figure was 426,0 thousand ton, or on 53,0 thousand ton (1,3%) less. It should be underlined that all above-mentioned types of produce are mostly consumed at the internal market.

Because of the fact that relations with the Russian Federation are getting worse since 2014 export of Ukrainian cheese has completely stopped. Although, the considerable percentage of their consumption was at Russian market before that. In October 2014 RF sanitary service forbade all Ukrainian cheese products to be delivered to their country. The cause of this was „identification of a large number of irregularities in legislation requirements in the field of consumer rights protection”. As a result, the production of low-fat and fat cheese volumes in Ukraine diminished from 78,5 and 207,0 thousand ton in 2010 to 67,8 and 124,0 thousand ton in 2015, that is on 13,6 and 40% accordingly. So, there is a contradictory situation: the productive directions aimed at internal market are growing in volumes but produce which are oriented to export are undergoing a crisis situation. In our

opinion, this is due to the fact that many of enterprises are not ready to export domestic dairy production to the countries of EU and further abroad. Many of them have out-of-date technologies, high power expenses, content of large amount of admixtures and dyes in the processed produce which are forbidden in the world developed countries. This explains their subzero innovative activity.

In prof. D. Cherevko's opinion the basic factors which restrain development of export potential and entering of domestic dairy enterprises to the outer market are subzero quality of their raw materials and ready-made produce, as well as complete absence of state support⁶. Under conditions of geopolitical crisis and mentioned above changes at the outer market, domestic producers begin to organize association with the countries of EU and Asia. At present 12 of 140 dairy enterprises of Ukraine have got certificates of European Union and 18 companies compiled all documentation necessary to export of dairy produce in China – the largest partner among Asian countries. Such certification confirms accordance of Ukrainian dairy products with the international norms and standards, and thus, considerably strengthens country's export potential. This may be achieved by enhance of Ukrainian dairy produce competitiveness by increasing technological level of production processes, introduction of sufficient amount of scientific and technical development, as well as improvement of management system on dairy enterprises. The government of Ukraine approved the Strategy of State's innovative development for 2010-2020. It defines the main priority directions of agricultural production development which in their turn determine strategic vectors of dairy industry advancement:

- achievement of macroeconomic stability under favorable conditions for development of enterprising;
- modernization of economy and narrowing of differences in the levels of enterprises' updating;
- enhance of innovativeness of development providing the increase of research sphere financing and of technological processes of real production⁷.

However, because of financing shortage and lack of proper attention of administration to research and development, these suggestions were not brought into action. Unfortunately, now none of the above mentioned factors of improvement of innovative activity in dairy industry don't work. The volumes of the governmental expenditures on science and technology development is diminishing from year to year; the adopted legislative acts do not work as to enhance innovative policy in the industry; stimulant tax and credit levers do not function whereas they are widely used in the most world developed countries.

The experience of Poland is exemplary for Ukraine in relation to state support of innovative enterprises. Free economic zones have been created there since 90th

⁶ D.H. Cherevko, *An increase of competitiveness of dairy enterprises on conditions of membership in World Trade Organization. Extended abstract of candidate's thesis*, Lviv State Agrarian University, Lviv 2010, s. 7-9 (in Ukrainian).

⁷ *The strategy of innovative development of Ukraine on 2010-2020*. Retrieved from <http://refdb.ru/look/1610532.html>. pdf. (In Ukrainian).

of the past century, which amount already equals to 14. Enterprises working in these zones have privileges in the form of tax reduction. Besides, if a businessman creates new workplaces or puts into operation new types of produce and these introductions are concerned with preservation of environment, then they can apply for a number of tax deductions. When an enterprise extends its size, renews its equipment or conducts major conduction works, then it has the right to get direct long-term state subsidies.

Large attention is paid to the support of innovative productions. The state can return up to 50% of expenditures on purchase or use of goods of intellectual property, which are the results of scientific researches. It is important, that these innovative goods were used for the production of new types of produce. As a motive to development of small and medium-sized business enterprises were created business-incubators on the base of the 31 largest Universities and 1400 firms. They help young businessmen in legal, financial and accounting matters, and give advice on marketing. It is necessary to implement analogical measures to support small, medium business and enterprises which are developing on innovative direction in Ukraine using the experience of the EU countries.

Leading Ukrainian and foreign scientists accept common position as to the realization of strategy of dairy industry development on innovative basis. According to their recommendations we have developed the key directions of dairy industry innovative development. It involves an increase of production and produce competitiveness, strengthening of country's export potential, an increase of figures of financial result in all enterprises of productive line from milk production to its processing and realization of ready-made dairy produce to consumers (figure 1).

We consider that it is necessary to realize clear long-term innovative policy to provide steady development of dairy enterprises and development of special programme for the creation of favorable innovative-investment environment. Above mentioned presupposes:

- an increase of the state financing of research and development as well as of new technologies;
- a creation of tax and financial mechanisms for the stimulation of enterprises development, that are engaged in innovative activity;
- an assistance in gradual decommissioning of out-of-date equipment from the production processes and acceleration of renewal processes of production lines.

In 2012 the Resolution about innovative direction of enterprises' development was accepted by the Cabinet of Ministers of Ukraine which stresses out the necessity of the technological renovation of production of cattle breeding goods, as well as development and introduction of new technologies of children's, dietary and organic food production. The need of formation and practical introduction of new technologies of production, storage and processing of cattle breeding products is also noted out. Being based on the mentioned above priority directions of the Strategy of innovative development of dairy industry enterprises it is possible to distinguish such measures in relation to their functioning in perspective:

- introduction of modern hi-tech productive lines aimed at material renovation of enterprises' technical base on conditions of introduction of diversified forms of management;
- adjusting of domestic quality standards to international analogues, that will assist to advance Ukrainian produce at the outer market;

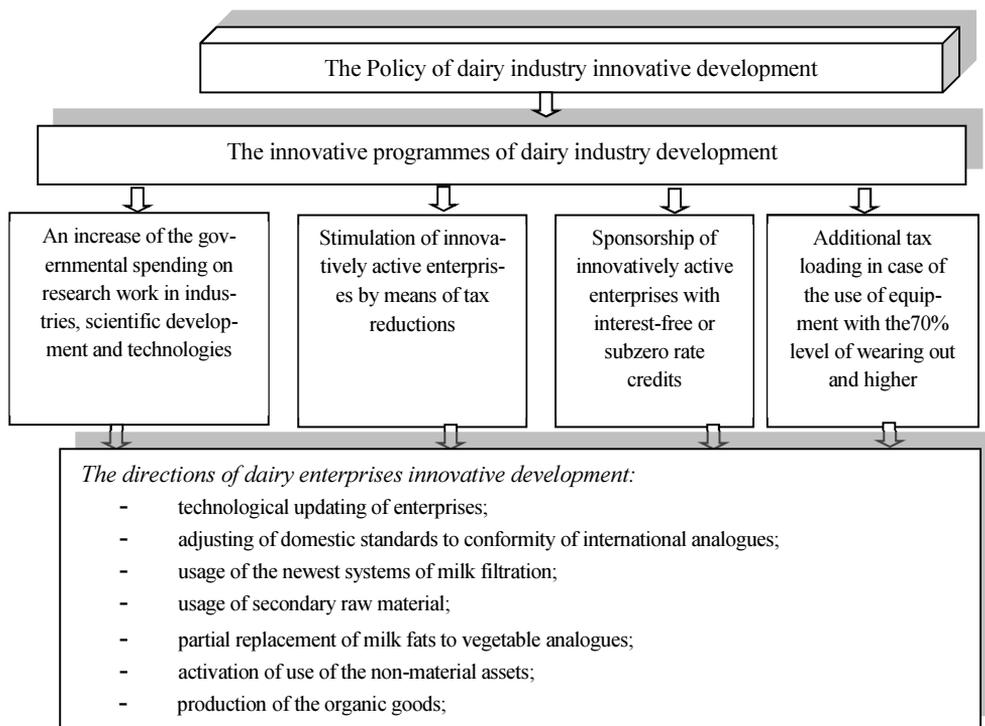


Figure 1. The key directions of dairy industry innovative development

Source: Kriukova I.O., Nepochatenko V.O., *The strategy of innovative development of agrarian processing of priority industries*. The economics: present realities, 4 (9) 2013, 133-141 (in Ukrainian), adapted and complemented.

- application of modern systems of raw milk material filtration during its provision in the points of reception for elimination of harmful bacteria and microorganisms, that will allow to increase an expiration date of raw materials and will also assist to increase its quality in accordance with international standards;
- usage of secondary raw materials for organization of deeper production with less by-products;
- reduction of part of adipose in the ready-made produce and their partial replacement by vegetable analogues, which is the main principle of dairy produce: its subzero fat and high protein content;

- an improvement of tax policy in relation to assistance of enterprises development, which purchased non-material assets (patents, licenses, constructions, trademarks and the like) in a current year and that are engaged in production of organic goods;
- gradual reduction of preservatives part and chemical dyes and their replacement by natural analogues aimed at implementation of safe and high-quality dairy produce in production especially of children's food and dietary types of produce;
- an introduction to the production of modern packaging equipment that gives an opportunity to increase an expiration date of ready-made produce and their taste;
- an assistance of public institutions to the further certification of dairy enterprises in the EU, that will extend distribution markets of domestic dairy production in perspective and thus strengthen export potential of the state.

Implementation support of the strategic directions of dairy complex innovative development also requires a clear mechanism of innovative development of the economy in general, and coordination of priority goals and objectives with all state policy. The result of such cooperation should be development of national programmes of innovation and investment support, creation of favorable investment climate in the country and formation of mechanism to stimulate innovation in the dairy industry. These programmes should be based on universally-known science and practice, on intensification of innovation activity in the industry: strengthening of the rate of governmental spending on the development of science and education, rational innovation policy of the state, stimulus tax credit and depreciation mechanisms of innovation and investment processes that will reduce risk and indefiniteness in production and, consequently, increase its investment attractiveness.

To determine the degree of indefiniteness and economic risks in the dairy industry we used sensitivity coefficient of systematic risk β , which is often called in the economic literature the index of investment attractiveness. The variation rate of increase in output in the dairy industry is connected with general situation in the processing industry of Ukraine and the deep economic crisis in the country. Indexes of industrial and domestic dairy production over the last three years and estimates are shown in the table 2.

Sensitivity factor of systemic risk in the field are defined by formula:

$$\beta = \frac{\text{cov}(x; y)}{D(x)}, \quad (1)$$

where: x – is random variable index of dairy products, %;

y – is the value of the industrial production index, %;

$D(x)$ – is dairy dispersion index, %;

$\text{cov}(x; y)$ – the degree of covariance between them, which is calculated in its turn by the formula:

$$\text{cov}(x; y) = \overline{xy} - \bar{x} \times \bar{y}; \quad (2)$$

\bar{x} and \bar{y} - are mean value of data index over the last 15 years;
 \overline{xy} - the mean of their product.

Above mentioned are average values calculated as the simple arithmetic mean value and included in the calculation of the table:

$$\bar{x} = \frac{\sum x_i}{n} = \frac{824,5}{8} = 103,1\%; \quad \bar{y} = \frac{\sum y_i}{n} = \frac{814,4}{8} = 101,8\%;$$

$$\overline{xy} = \frac{\sum x_i y_i}{n} = \frac{84319,7}{8} = 10540,0; \quad \overline{x^2} = \frac{\sum x_i^2}{n} = \frac{85749,6}{8} = 10718,7.$$

Table 2. Indexes of industrial and dairy produce of Ukraine, %

Index \ Year	2000	2005	2010	2011	2012	2013	2014	2015	On average
Processing industry (y)	116,6	103,0	116,3	109,7	98,0	92,7	90,7	87,4	101,8
including: manufacture of dairy products (x)	123,0	113,7	97,9	94,1	104,0	100,5	100,1	91,2	103,1
The calculated data									
xy	14341,8	11711,1	11385,8	10322,8	10192,0	9316,4	9079,1	7970,9	10540,0
x ²	15129,0	12927,7	9584,4	8854,8	10816,0	10100,3	10020,0	8317,4	10718,7

Source: State Statistical Service of Ukraine [ukr.stat.gov.ua].

The variance of the index of dairy produce is determined by statistical formula:

$$D(x) = \overline{x^2} - \bar{x}^2 = 10718,7 - 103,1^2 = 89,09 \quad (3)$$

Then the covariance between these indicators is:

$$\text{cov}(x; y) = 10540,0 - 103,1 \times 101,8 = 44,42$$

So, the value of systematic risk is:

$$\beta = \frac{44,42}{89,09} = 0,498 < 1$$

Therefore, fluctuations in the dairy produce index as to the general state of the processing industry in Ukraine is lower than the critical value, which is equal to one. This means that the value of economic risk for the dairy industry has a mean value and is acceptable in relation to general sectoral picture and kept within acceptable limits. Thus, dairy companies are attractive for investment and require further innovation and investment, taking into account urgent need for ecologically clean dairy products at the world markets.

Nowadays, Ukrainian producers have all necessary conditions to enhance their positions at the global market – a large amount of farmland, existence of high educated workers and increasing demand for milk at global dairy markets. According to experts, in the nearest future we will expect considerable increase of the demand for dairy products over volumes of their supply. World leaders of dairy industry – the US, New Zealand, Australia are no longer able to satisfy demand from other countries, allowing milk producers to increase activation of the second rank milk producers – Germany, Russia, France and Ukraine. Such a situation requires a clear focus of manufacturing processes on strategic adaptation of dairy industry enterprises to investment and innovative direction by attracting investors, introducing new products, improving tax, financial and institutional mechanisms to promote such processes.

Conclusions

The research of priority directions of dairy industry development has shown that the further market reforms should focus on innovative and investment basis. Due to changes at the outer market, it is important to use the experience of the EU for approximation of national standards to European analogues, significantly enhance the competitiveness of Ukrainian dairy produce and increase of food security of the nation in average perspective. For the further development of dairy processing industry it is necessary to develop methodological approaches to investment and innovation problems by discovering sources of investment to modernization and technical re-equipment of enterprises, especially focus on those industries which enhance the export potential of the state.

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Abstract

Analiza statystyczna strategicznych kierunków rozwoju przedsiębiorstw mleczarskich na Ukrainie

W artykule autorka podkreśla, że strategicznym kierunkiem rozwoju ukraińskich przedsiębiorstw mleczarskich jest przede wszystkim zgodność ich produkcji z międzynarodowymi standardami oraz poprawa logistyki oparta na innowacjach. Ułatwi to wprowadzenie do produkcji mniej energochłonnych oraz bezpiecznych dla konsumentów rodzajów produktów. W pracy znajduje się również analiza statystyczna wielkości produkcji przedsiębiorstw mleczarskich na Ukrainie. Prowadzone analizy pozwalają na dokonanie szeregu zaleceń dotyczących organizacyjnych i ekonomicznych powiązań między przedsiębiorstwami oraz rynkami, na których one funkcjonują. W pracy zbadano także atrakcyjność inwestycyjną firm mleczarskich przy pomocy indeksów produktów mleczarskich i tzw. współczynnika wrażliwości ryzyka gospodarczego (sensitivity factor of systemic risk). Konieczne jest też, aby nadal korzystać z doświadczeń krajów UE dotyczących reform gospodarczych.

Słowa kluczowe: przedsiębiorstwa mleczarskie, rozwój innowacyjności, innowacji