DEVELOPMENT OF EGG MARKET IN UKRAINE: EVALUATION, FORECASTING AND MARKETING SOLUTIONS

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Abstract

The purpose of the present paper is to identify the features of the egg market in Ukraine, to assess the key trends and prospects for its development, which are significantly influenced by both natural and economic factors. In this aspect, the main objectives of the study are the following: to deepen market segmentation, identify new factors of the consumption culture and develop the mechanisms for interaction of market participants in conditions of intense competition.

The research was conducted on the materials of large agro-industrial enterprises of Ukraine (annual reports from official sites “Avangardco IPL” and “Ovostar Union”), and data of State Statistics Service of Ukraine. Methods of statistical modeling (logistic regression) and economic-mathematical forecasting were used during the research for the analysis of dynamics of production volume of agro-industrial production and sales volume of agro-industrial products. The method of synthesis and comparison allowed the authors to identify the key trends of Ukrainian egg market development. Moreover, the authors used the methods of systematization and generalization - in the process of substantiation the conceptual approach for the development of strategy of agro-industrial enterprises in the egg market, the methods of complex evaluation (assessment of the level of monopolization and concentration) for define type and competitive structure of the market.

Conjuncture is defined as a certain situation that has developed in the market in a specific period of time and characterizes the real ratio of supply and demand. Market conditions are characterized by demand, supply and their interaction, price dynamics and their level, volumes and dynamics of stocks, and the formation of market conditions is influenced by historical, national, climatic, territorial, political, socio-economic situation which are completely pouring into the development of the egg market, as there are factors as: number of chickens; productivity of chickens; economic situation; epizootic situation in the region; seasonality. The dynamics of the poultry population in general, as well as of laying hens in the context of agricultural enterprises and households, is also considered. Great attention to the organic and natural food, as well as the interest to the conditions of the production, increases the demand for the products of the companies, which adhere to the standards and treat animals humanely. In addition, in Ukraine, besides the segments of chicken eggs and egg products, the segment of free range eggs is developing.

The tendencies in the field of marketing of table eggs are revealed and the directions of their adaptation in the Ukrainian market are offered.

Key words: Egg market, Market conjuncture, Market capacity, Market share, Segment.

1. Introduction

Currently, the market of eggs in Ukraine is one of the important submarkets of agro-food products, providing consumers with relatively cheap and biologically complete food. It is a market in which the interests of producers, intermediaries and end consumers are combined. The market is developing rapidly, changing its competitive structure and deepening differentiation.
However, the production of various egg products has not yet developed sufficiently in egg poultry farming in Ukraine.

The strategic priority of social and economic development of Ukraine’s economy in the context of globalization and increasing global competition is to increase food security by increasing food production, improving their quality and safety, as well as ensuring the protection of domestic producers. Egg poultry relates to the branches of agriculture, the development of which allows to adequately ensure the growing demand of the population for high-quality food products of animal origin. Egg poultry industry supplies energy-nutritious and essential foods to the market, have significant potential for development, but do not make full use of it.

Strategic vector of poultry enterprises development is aimed on finding a compromise between increasing production volumes, quality, affordability and environmental friendliness, based on diagnostic of the elements of micro- and macrosystems of marketing environment for providing, enhancement and expansion of the production of qualitative competitive products. In this context, optimal target is the balance between the resource potential of the poultry enterprises and market requirements in terms of environmental component.

Problems of development of the world and domestic egg markets, their current state, are reflected in the scientific works of such Ukrainian scientists as Gomenjuk and Krulikovska, [5], Stav ska, [12], Varchenko et al., [15], and Yaroshenko [18]. Sumner et al., [13], investigated economic and market aspects of egg production in the United States. Widyantara and Sukaatmadja [16] devoted their research to the development of chicken egg marketing strategy. Windhorst, [17], reveals the question of the development of organic egg production and marketing in the EU. Varchenko et al., [15], considered marketing approaches to the functioning of poultry enterprises in Ukraine in general. But global and domestic egg markets need new in-depth research in the context of changing consumer tastes and preferences and deepening product differentiation processes. Issues of worldwide importance regarding the choice of directions and methods of agrarian market research had quite a few of domestic and foreign scientists engaged in, such as Shpychak, [10], and Yer ankin, [19].

The importance of the issue of egg market development through the defining the substance, structure, organization, methods and forms of competition and forecasting are provided with strategic information to a whole mutually agreed process of functioning and development. However, despite the large number of scientific papers on the specified issues, lately the question of identification of trends of egg market conditions, and evaluation of the market development still remains not resolved completely. In addition, an important issue is to determine the future prospects for the development of this market and the formation of its competitive structure which define the optimal decision making and degree of coordinated action to ensure the competitiveness of poultry enterprises in the long run.

Objectivation of methodological approaches and practical recommendations for defining strategic directions of poultry enterprises development in the conditions of deepening differentiation and high intensity of competition, will promote the effective development of Ukrainian egg market in the long run.

The purpose of the research is to identify trends and prospects for the development of the domestic egg market, and to develop proposals for the use of marketing tools by the subjects of this market. The task of the research is to form a general and complete picture of the main trends of the Ukrainian egg market in order to further understand the competitive actions of market leaders and their successors.

2. Materials and Methods

Materials for this research were annual reports from official sites “Avangardco IPL” and “Ovostar Union”, and data of State Statistics Service of Ukraine.

Methods of statistical modeling (logistic regression) and economic-mathematical forecasting were used during the research for the analysis of dynamics of production volume of agro-industrial production and sales volume of agro-industrial products.

The methods of analyses, synthesis and comparison were used during the research, which allowed the authors to identify the main trends of development of Ukrainian poultry enterprises of egg specialization. Moreover, the methods of systematization and generalization - in the process of substantiation the conceptual approach for the development of schemes of forming the strategically oriented personnel potential of agro-industrial enterprises. Also, there were used the methods of complex evaluation in order to define the competitive structure of the market - for developing the coordinated mechanism of realizing marketing strategies of agro-industrial enterprises’ activity.

Cyclicity in this study was considered as a specific category, namely it was about the cycles of fluctuations in agricultural production (eggs), so the theoretical provisions should provide a comprehensive description of macroeconomic and general economic cycles, which set the pace for all other types of cycles at the mesolevel. Thus, these theoretical patterns will be applied to the object of study - the egg market of Ukraine.
3. Results and Discussion

Conjunctre (from the Latin *conjungo* - connect, associate) is the state of the market at the moment; a certain situation that has developed in the market in a particular period of time and characterizes the real ratio of supply and demand. Therefore, market conditions are characterized by demand, supply and their interaction, price dynamics and their level, volume and dynamics of stocks; the formation of market conditions is influenced by: historical, national, climatic, territorial, political, socio-economic conditions. For in-depth analysis, it is necessary to study the dynamics of poultry in general, with the selection of laying hens in terms of agricultural enterprises and households.

The poultry industry of Ukraine is traditional for the country and has a fairly high level of development. Since 2017, a gradual increase in the number of poultry has begun, which indicates a gradual recovery of the poultry industry after the crisis. According to the results of 2018, an increase in the number of poultry was recorded both in the industrial production sector and in households (Figure 1).

![Figure 1. Dynamics of poultry in Ukraine, million heads](Calculated by authors on the basis of [11])

The development of the egg market is influenced by factors such as the total number of chickens; productivity of chickens; economic situation; epizootic situation in the region; seasonality.

Systematic approach to the research of the Ukrainian market of eggs and egg products involves the allocation of certain segments in the structure of this market: 1) the segment of eggs of industrial production; 2) egg products; 3) segment of organic eggs (formed). One of the current trends in the food industry is the production of organic products, including eggs. Despite the fact that the price of organic eggs is higher than usual, the demand for such products is developing, affecting the average price of all products.

Regarding egg production in Ukraine, during the period from 1998 to 2013 there was a steady increase in its volume - 1.73 times. During this period there was a reduction in the share of households and an increase in this share for agricultural enterprises. The exceptions to the increase in egg production were 2015 and 2016, when there were negative increases. In 2018, Ukraine produced 4.1% more eggs than in 2017 (16.14 billion pieces compared to 15.5 billion pieces, respectively). It is worth noting that the increase in production was due to both industrial enterprises and households. Egg production in agricultural enterprises amounted to 8.9 billion units (+ 6.4% compared to 2017), in households - 7.2 billion units (+ 1.4% compared to 2017). Ivanov-Frankivsk (19.9%), Donetsk (18.4%), Kyiv (14.6%), Ternopil (10.7%), Kherson (9.9%), Kharkiv (8.9%) and Transcarpathian (8.8%) regions became the leaders in terms of egg production growth rates.

Effective selection work carried out in poultry farming has provided a high increase in productivity of laying hens. From 2013 to 2018, the average annual productivity was over 290 eggs per hen. High indicators as such led to the high export potential of the egg industry and Ukraine’s entry into the international market. The main reason for the growth of exports is the promotion of Ukrainian producers on world markets due to the competitive price with high quality. Imports of eggs from Ukraine are much lower than exports, eggs are imported mainly to replenish livestock (hatching eggs).

Consideration of the egg consumption dynamics in Ukraine showed that from 2014 there were 268 - 280 eggs per person per year, which is less than the consumption rate of 290, and increase over the study period was more than 40%.

The segment of egg products (EP) has been actively developing in Ukraine since 2005, demonstrating high growth rates. The market volume (in tons) increased almost 15 times, the reduction took place only in the crisis of 2009. In the structure of EP there are dry and liquid products. Dry production grew at a faster pace until 2016: growth was 21.1 times. In 2017, for the first time in 10 years, the production of liquid EP exceeded the production of dry ones. In 2018, the production of dried EP decreased by 1.9%, to 9,865 tons. The most significant export deliveries of egg products in 2014 - 2018, Ukraine made to Jordan, Korea, Taiwan, Indonesia and Turkey.

It is expected that the growth of egg production in the short term will remain stable due to high demand both in Ukraine and in world markets. Egg production will continue to grow rapidly. According to Varchenko *et al.* [15], segments of the egg market have much greater opportunities for development, with increasing competition, the role of branding will increase, but most producers are inert in shaping the new needs of consumers through the production of innovative products.

In addition to those described above, another promising segment may soon appear in Ukraine, namely - free-range eggs. In recent years, more and more...
people around the world are concerned about the ecology, the environment protection and the humane treatment of animals. In some countries, care for the environment is not only enshrined in law, but is also supported by means of budget subsidies. A noticeable example is the European Union, which allocates more than 400 million euros annually on the environment development. For example, the 2020 budget provides for expenditures of 405.9 million euros. Apart from that, another 57.7 billion euros are allocated for the development of rural areas and agricultural enterprises. In 2018, the development of natural resources and sustainable development in general under the EU’s Common Agricultural Policy accounted for 43% of all expenditures from the European Union budget [9].

Increased consumer attention to organic and natural products, as well as interest to the conditions of production contributes to the growth of demand for goods produced by companies that adhere to standards and humanely treat livestock. According to surveys, more than 94% of Europeans believe that the issue of protecting farm animals is important. The highest share remains in the most developed countries, such as Sweden, Finland and Portugal, where about 99% of respondents said that they consider farm welfare important for animal life, while in less developed countries, such as Hungary, Croatia, Poland, Slovakia and Bulgaria, the percentage of such respondents was 86 - 88% [9].

The growing popularity of natural products also has an impact on the egg industry. In many developed countries, more and more, free range eggs are appearing on supermarket shelves. The difference from ordinary eggs is in technology. Free-range assumes that egg-laying hens are kept not in cages, but in special enclosures. This affects the use of free-range eggs in production, retail, restaurants and food transnational corporations (TNCs) before using abbreviation for the first time, please use full name. In the EU, the development of the free-range egg market is not only based on growing demand, but is also stimulated at the legislative level. Thus, Switzerland has completely abandoned the production of eggs "from cages". In Austria and Belgium, the keeping of birds in cages will soon be prohibited by law. A similar restriction will be applied in Germany and the United Kingdom from 2025 [9]. The contribution of organic egg production differs considerably among EU member states. Denmark has the highest share, followed by Austria and the United Kingdom; on the other hand, in southern European countries, organic egg production only plays a minor role. In spite of the increasing production volume, trade with organic eggs is still relatively unimportant in the EU [11]. The contribution of organic egg production differs considerably among EU member states. Denmark has the highest share, followed by Austria and the United Kingdom; on the other hand, in southern European countries, organic egg production only plays a minor role. In spite of the increasing production volume, trade with organic eggs is still relatively unimportant in the EU [11]. In addition to European countries, this trend is actively developing in the United States and Australia.

In Ukraine, the market for free-range eggs is still poorly developed. Today, only a few manufacturers are engaged in the free-range technology. However, market experts suppose that in future the share of companies which are loyal to animals will increase. This will be facilitated by integration with the EU, increasing egg exports to European countries, and incentives from large retail chains. The purchasing power of the population in Ukraine can be a significant deterrent, as free-range eggs are more expensive than conventional ones.

Egg market research should also include the calculation and evaluation of market capacity and market shares of the largest competitors, the degree of market concentration. The capacity of the egg market in Ukraine depends mainly on the dynamics of production, as the share of foreign trade is small (Table 1).

Table 1. Indicators of the egg market capacity in Ukraine for 2011 - 2018

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<tbody>
<tr>
<td>Actual egg consumption, pcs/person per year</td>
<td>310</td>
<td>307</td>
<td>309</td>
<td>310</td>
<td>280</td>
<td>267</td>
<td>273</td>
<td>275</td>
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<tr>
<td>Population of Ukraine, million people</td>
<td>45.71</td>
<td>45.59</td>
<td>45.49</td>
<td>43</td>
<td>42.84</td>
<td>42.67</td>
<td>42.48</td>
<td>42.38</td>
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<tr>
<td>Capacity of the domestic egg market at a rational rate of consumption, billion pcs</td>
<td>13.25</td>
<td>13.22</td>
<td>13.19</td>
<td>12.47</td>
<td>12.43</td>
<td>12.38</td>
<td>12.32</td>
<td>12.29</td>
</tr>
<tr>
<td>Actual capacity of the domestic egg market, billion pcs</td>
<td>14.17</td>
<td>14.00</td>
<td>14.06</td>
<td>13.33</td>
<td>12</td>
<td>11.39</td>
<td>11.60</td>
<td>11.65</td>
</tr>
<tr>
<td>The average price of chicken eggs, UAH/thousand pcs</td>
<td>521.5</td>
<td>627</td>
<td>656.7</td>
<td>782.4</td>
<td>1335.2</td>
<td>1108.7</td>
<td>1145.9</td>
<td>1600.3</td>
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<tr>
<td>The average price of chicken eggs, Euro/thousand pcs</td>
<td>49.9</td>
<td>61.05</td>
<td>61.89</td>
<td>49.8</td>
<td>55.02</td>
<td>44.19</td>
<td>47.24</td>
<td>49.78</td>
</tr>
<tr>
<td>Capacity of the domestic egg market according to the rational consumption rate, billion Euro</td>
<td>0.623</td>
<td>0.807</td>
<td>0.816</td>
<td>0.621</td>
<td>0.684</td>
<td>0.485</td>
<td>0.471</td>
<td>0.612</td>
</tr>
<tr>
<td>Actual capacity of the domestic egg market, billion Euro</td>
<td>0.666</td>
<td>0.835</td>
<td>0.869</td>
<td>0.664</td>
<td>0.66</td>
<td>0.446</td>
<td>0.443</td>
<td>0.58</td>
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Source: calculated by the authors according to the State Statistics Service of Ukraine [3, 11].
According to the data shown in the Table 1, we can identify general trends for reduction of actual consumption, price growth in national currency and a corresponding increase in market capacity. These factors have an inverse relationship according to the law of demand, and clearly demonstrate the effect of economic patterns. When converting value indicators into euros, we can see that the average price level has changed significantly, although it decreased in 2014, 2016 and 2017. Capacity of the domestic egg market according to the rational consumption rate and actual capacity in Euro also declined sharply since 2014 due to exchange rate fluctuations.

Let us consider the market of chicken eggs in Ukraine regarding the ratio of market shares of major players. According to the website Latifundist, [7], the market share of the Avanguard Agroholding in 2015 was 56%. However, using data from the State Statistics Service of Ukraine, as well as examining the annual reports of two major competitors in the egg market for this period, namely Ovostar LLC and the Avanguard Agroholding, we concluded that the data on the Latifundist website were inaccurate. The Avanguard Agroholding was indeed the market leader, but with a market share of 21% (as of 2015) and 16% (as of 2018). Such inconsistencies in the data might be a result of agreements between the portal’s editorial staff and companies in order to comprise inaccurate data into the information space. The feasibility of such a step can be that it is quite a successful marketing step, because the market leaders usually have the opportunity to influence the consumer with their authority, to be a guarantor of customer’s choice in the decision on a certain purchase. Market share indicators somewhat changed during the period of 2013 - 2018, which indicates significant competition between producers and the impact of external factors on production and sales. The dynamics of changes in market shares is shown in Figure 2.

On Figure 2 we can observe a gradual leveling of competitive positions of the two companies, as well as a stable growth of market performance of the Ovostar Union company. As noted in the annual reports of the Avanguard agricultural holding, such a significant decline in market share and, consequently, production volumes, is caused by the closure of plants in the occupied territories of Crimea, Donetsk and Luhansk regions, as well as reduced production in adjacent regions.

On the basis of conducted studies it is possible to conclude that the egg market of Ukraine has characteristic features of an oligopoly. This conclusion is also confirmed by secondary information: “The structure of the chicken egg market in Ukraine is close to the oligopoly, but is competitive” as stated in the reports of the Antimonopoly Committee of Ukraine. The combined share of the three largest industrial groups participating in the market (Avangard, Ovostar Union, and Inter - Agrosystems) is 46.61%. In terms of understanding the essence of the oligopoly, we can conclude that the criterion of attribution to the oligopoly is met, namely, several large firms occupy a significant market share [1, 5].

The key producer of eggs in Ukraine is the Avanguard company, which since its establishment has used a growth strategy through mergers and acquisitions, in line with its strategic goal of increasing the company’s value. The process of implementing the growth strategy is based on both internal development (expansion of the range, production of new products - dried egg products (concentric diversification), and quality improvement strategies through the introduction of new technologies) and external development - mergers and acquisitions (poultry farms, feed factories) [1]. Avangardco IPL has achieved steady growth through the acquisition of companies (in 2003 - 2008) in the weakly concentrated egg industry, resulting in the merger of more than 25 business units in order to create a nationwide company. During this period, the market for eggs, egg products and demand for them began to grow rapidly.

To successfully implement the general strategy, the management of the holding identified areas of growth in the external market: 1) increasing exports of eggs in shell and egg products. Thanks to the high quality of products, as well as economies of scale due to the expansion of production through vertical integration, AVANGARDCO IPL can continue to increase exports of eggs and egg products to the Middle East, Asia and the Commonwealth of Independent States (CIS) countries; 2) acquisition of other companies of a similar direction in the countries of Eastern Europe, which will allow to conquer the European market faster [2, 4]. At this stage of the life cycle, the company uses a cost leadership strategy and actively implements the principles of quality management and environmental safety.
The next stage of the analysis is to consider the dynamics of consumer prices (Figure 3). From the chart we can observe certain features of price changes, which are largely caused by the specifics of production in the present market. The fact is that the studied market depends entirely on short cycles, as well as seasonality.

Laying hens are the production facilities of egg-producing companies, so enterprises and households must take into account their biological characteristics. Hens are very sensitive to changes in the environment, in the cold season their productivity reduces, so the supply decreases.

It is obvious to conclude that prices due to this external factor have a cyclical dynamics and increase with changes in the length of daylight, as well as with changes in temperature. Since the cyclicity in industrial enterprises is insignificant, and in households on the contrary, in warm periods the market is oversaturated with the supply of households, thus provoking producers to reduce prices in accordance with the law of equilibrium of supply and demand. Therefore, due to the change of seasons, production indicators also change, which should be taken into account when identifying the causes of these fluctuations. It is referred to seasonal fluctuations in supply. It is also necessary to note that industrial producers are able to compensate the seasonal cyclicity, but are already affected by other factors, namely market laws. Given that the conditions at enterprises are high-tech and take into account many components that cannot keep up with a typical household, we have the following pattern of production for 2017 - 2018 (Figures 4 and 5).

As we can see from the Figures 4 and 5, the difference in material and technical base significantly affects the seasonality of egg production. Therefore, households should pay more attention to the conditions of holding chickens, and industrial producers should pay attention to other factors of production, such as food and sanitation.

Indeed, in the periods of maximum values of production volumes, i.e. in the period between March and September, production in 2017, on the contrary, decreased relative to the cold periods of the same year. The reason for this is failure to take into account the above factors and, as a consequence, reduced productivity or morbidity of laying hens. Figure 6 visually demonstrates the cyclical nature of the studied market.

Such substantial fluctuations require manufacturers to raise prices and adapt their pricing strategy and marketing policy to cyclical market conditions. Although agricultural enterprises have the opportunity to balance production, they, under the influence of cyclical farms, are forced to adjust to the general trend and psychological perception of the value of eggs as a product in different seasons. However, currently there is a tendency to gradually displace competition by the oligopolistic market structure.

However, seasonal fluctuations in the chicken egg market are determined not only by natural factors. There are also a number of other factors, primarily economic...
- in particular: the level of consumer income, consumption structure, changing tastes and general culture of consumption, formation of effective demand through the impact of supply, competitive market structure, tools, and intensity of competition. The egg market is characterized by seasonality of consumption during the year, while in the long run the demand for eggs is relatively stable. In summer, egg production increases in households, and this increases the overall supply of this product on the market by 30 - 35%. The market is also affected by the seasonal change in the structure of food consumption. In summer, people traditionally consume more vegetables and fruits, reducing the consumption of eggs. The combined effect of these factors leads to a significant reduction in egg prices. The main problem is to forecast sales taking into account the high intensity of competition in the market.

The increase in prices for chicken eggs is caused by the specifics of the market. As prices rise, demand will decrease, which directly affects the market capacity. The effect of market laws forces producers to reduce volumes, although the specifics of production do not allow them to react promptly. Excess of eggs stimulate increase of exports [1]. Accordingly, when the price decreases, demand will increase, but the supply response will be less noticeable.

One more feature of the price situation in the egg market is the manifestation of oligopolistic pricing. The price of this product during the year rises to a maximum, and then falls again after declining consumer demand and declining exports. However, the price as of 2018, instead of the usual decrease, demonstrated stability and even growth. Analysis of data from 2016 - 2018 showed that in 2018 the price trend is different from the previous two years. In January 2016 and 2017, the price of chicken eggs after December growth decreased by 16% and 11%, respectively. In 2018 the price in Euro stayed at the same level - 0.89 Euro per ten eggs. But taking into account the change in the method of calculation, i.e. the transition from calculating the cost of eggs of 1 - 2 categories to the average price of 1, 2 and higher categories, we can talk about 18% growth, from 0.77 Euro per ten eggs up to 0.89 Euro. Market experts suggest a possible cartel agreement, as evidenced by the coincidence of the market situation and insider information [8]. It is also necessary to compare export prices and domestic market prices over a certain period of time. If it turns out that export prices are much lower than domestic, then there is every reason to talk about anti-competitive actions of large producers.

In addition to the abovementioned pricing factors, it is necessary to consider another price aspect, namely the average selling prices of eggs set by agricultural enterprises. Such prices differ from consumer prices because they do not take into account the VAT, subsidies, transport, forwarding and overhead costs and reflect the actual production and marketing expenses of producers.

In order to assess the prospects for the development of the egg market, it is necessary to forecast the main parameters of market conditions - supply (based on production volumes), demand, price levels. The role of forecasting in marketing research is exceptional. With a formed concept of the possibilities of development of a factor, it is possible to make informed, balanced and less risky marketing and management decisions [14].

Quantitative methods include, first of all, the method of trend extrapolation - a method by which assumptions are made on the basis of statistical data and their analysis, which calculates the value of economic indicators for future periods, based on the assumption that the trend is constant. The method of correlation-regression analysis is based on establishing relationships between factor and performance indicators. Demand prediction is possible if a statistical model is built that characterizes the relationship between sales and independent variables that affect its value. Normative method is based on the values of consumption norms of production or sales that are scientifically reasoned. Thus, the balance of microelements is a prerequisite for the establishment of physiological norms of consumption, and the norms of use of building materials are based on technological requirements [14].

Since the main factor of price changes since 2014 has been inflationary growth, it would be incorrect not to take this factor into account to confirm the following theses. Let us consider Figure 7. Given the fact that with a significant jump of Ukrainian hryvnia the calculations of the trend line would be unreliable, the data collection begins from 2013. If we compare the growth of the dollar against the hryvnia, we can see that in fact a sharp jump in prices in 2015 was caused by the largest value of the hryvnia against the US dollar (30 UAH per 1 dollar), which led to a significant change in selling price, which is quite a logical reaction of producers.

![Figure 7. Dynamics of price change per thousand units’ eggs for 2013 - 2018 and the forecast until 2021 with a fixed euro exchange rate](image)

Source: formed by the authors based on [11]

If we consider the prospects of price change with a probability of 73.7%, the price for the period from 2018
to 2021 will gradually increase to the mark of 55.47 Euro per thousand. All other options are included in the rest of 26.3%. Thus, although the economic system and the exchange rate have somehow stabilized, it is likely that the market will continue to raise prices, according to the calculations. Another prospect is the stabilization of the price at a new level and its corresponding seasonal fluctuations within certain typical limits.

Figure 8 illustrates the dynamics of prices change per thousand units’ eggs for 2013 - 2018 and the forecast until 2021, taking into account the average annual exchange rate of the euro in some periods. Here we can see the downward trend caused by the growth of the euro exchange rate.

The presented graph demonstrates that the volume of production since 2015 began to respond to changes in demand and decreased, but recently the figure increased slightly by 0.48 billion eggs, and therefore companies began to normalize and increase egg production.

Consequently, with a probability of 93.6%, the production situation will be more or less stable and will fluctuate slightly. In such a situation, there is an expectancy for a gradual reduction in sales prices in order to stimulate demand for products, which will thus improve and increase the consumer basket. Although there is a possibility of declining production in a cyclical economy, namely, this is in reference to medium cycles.

Thus, the calculated forecast indicates that the price of eggs will not increase, and this is confirmed by the high probability of egg production stabilization of and even its increase, which will gradually improve the price situation.

The next step is to build Figure 10, which shows the corresponding changes in demand and production volumes (the submitted calculations do not take into account such factors as the share of exports and imports) for the period from 2010 to 2017. The presented graph is a form of visualization of changes in the ratio of supply and demand in real market conditions.

Since we have already considered the trend of production development, it is worthwhile to focus on the indicator of market capacity, which determines the level of demand in the presented calculations. From Figure 10 it is noticed that with a probability of 68.3% the capacity of the egg market will fall to the level of 10 billion pieces, but given the pace of dynamics, in the future this figure will not change significantly. The possible impact on it can only have an increase in sup-
ply, and as a consequence of lower prices that will lead to increased market capacity. It should be noted that production also tends to increase with a probability of 87.8% and will reach a significant level of 20 billion pieces by 2020.

Based on the above forecast data, we can assume that the egg market will have a general upward trend and a probable intensification of price and non-price competition. Under such conditions, the marketing decisions of the main participants become extremely relevant. Market actions of all competitors (challengers, followers and nichers) must take into account the marketing strategies of market leaders, especially in terms of product and pricing policy. Marketing decisions relate primarily to strategies for the development and formation of marketing complexes that require improvement and application of innovative elements.

Marketing improvement programs may range in their objectives from relatively simple changes in handling and packaging methods to a reorganization of the marketing channels. Frequently, important marketing improvements can be effected simply by correcting specific handling, transport, packaging, grading, and storing methods. Efficient marketing must satisfy consumers’ demands and preferences [6].

Since a significant amount of the produced eggs is exported, it is advisable to take into account global marketing trends in the market of eggs and egg products in the process of their sale and promotion. As a result of globalization, changes in consumer values, these trends are likely to develop in the domestic market. Particularly, these trends include the following:

   According to the Innova database, the number of egg and egg product launches increased from 663 in 2014 to 1,049 in 2018 [4]. Partly, this was due to the consumer demand for new taste experiences. But most of the new products were about making eggs more convenient to eat, with pre-prepared meals and snacks based on eggs.

2. Move towards packaging made from recycled materials.
   Of the new eggs and egg products launched between 2014 and 2018, there was a clear shift towards packaging made from recycled materials, particularly moulded fiber. Thanks to shoppers’ concerns about plastic pollution, the number of new products with cardboard or paper packaging rose significantly.

3. Hinged trays for greater convenience.
   The trend for greater convenience also showed up in a clear preference for egg trays with hinges. Hinged trays are easier to stack, more stable during transport and consumers appreciate the ability to open and close the tray’s lid.

4. Plastic out, paper in.
   Since 2014, moulded fiber packaging has grown in popularity. Not only does it meet the demand for a renewable, recyclable, biodegradable material, but its natural appearance appeals to consumers looking for organic products. It’s also a great solution for retailers who have set targets to reduce plastic packaging.

5. Greater transparency: “Connected to the plate”.
   With so many people sharing pictures of their meals on Instagram and Facebook, there is a greater interest in how the food they photograph was produced, packaged and transported. Consumers want their food photos to reflect the values they stand for. So food companies who are transparent about their operations, especially if they have eco-friendly values, have a better chance of growing in popularity.

Based on the analysis and forecasting, poultry companies should use a marketing growth strategy based on the concept of holistic marketing, which includes internal marketing, relationship marketing with partners, customers and intermediaries, integrated marketing, and socially responsible marketing. An important component of holistic marketing is environmental marketing. Its essence is in the orientation of egg production and sales to meet the environmentally oriented needs of consumers, stimulating demand for organic products, cost-effective and environmentally friendly products. According to the concept of ecological marketing, all aspects of economic activity of poultry enterprise should be planned and realized taking into account needs and requirements of consumers (ecological, quality and wide range, saving of time of consumers, digitalization).

Marketing activities of egg poultry enterprises should include the following elements: systematic marketing research, including qualitative research; innovative solutions in marketing product policy; increase in demand and production of organic products; focus on paper packaging instead of plastic; pricing taking into account the seasonality factor; transparency, active interaction with consumers and informing them about the whole production process and product distribution.

4. Conclusions
   - The poultry industry of Ukraine is characterized with a fairly high level of development. Since 2017, there has been a gradual increase in the number of poultry in both the industrial sector and households, which is illustrative of a gradual recovery of the industry after
the crisis. The development of the egg market is influenced by various factors, such as the total number of chickens; productivity of chickens; economic situation; epizootic situation in the region; seasonality.

- Consideration of the dynamics of egg consumption in Ukraine revealed that in 2014 - 2018 there were 268 - 280 eggs consumed per person, which is less than the rational norm - 290, the growth of consumption for the period 2010 - 2014 was 47%, and in subsequent years (2015 - 2018) a decrease in the consumption of table eggs was evidenced.

- The segment of egg products has been actively developing in Ukraine since 2005, demonstrating high growth rates, especially dry products until 2016, and liquid egg products since 2017. There is a tendency detected of increasing demand for organic products in this market (free-range eggs), despite the higher price. In the EU, development of this segment is based not only on the growth of demand, but it is stimulated at the legislative level.

- The market shares of the main egg producers in Ukraine decreased slightly, and this indicates significant competition between producers and the impact of external factors on production and sales. There was a gradual leveling of competitive positions of two companies - Avangard and Ovostar Union. Based on the research, we can conclude that the Ukrainian egg market has the characteristics of an oligopoly, as the combined share of the three largest industrial groups participating in the market (Avangard, Ovostar Union and Inter-Agrosystems) is over 46%, and in some periods there are present manifestations of the cartel conspiracy.

- Under the conditions of intensified competition, marketing decisions of the main participants become more important, because the market actions of all other competitors (challengers, followers and nichers) must take into account the marketing strategies of the market leaders, especially in terms of product and pricing policy. The main marketing trends include: steady growth in new egg product launches; move towards packaging made from recycled materials; hinged trays for greater convenience; transition to paper packaging; transparency of companies, environmental orientation and reflection of consumer values.

- Trends in the development of modern agri-food markets dictate their rules, which operate effectively within the rapid changes in management technologies, in changing the structure of consumer needs, reorientation of marketing tools. The egg poultry industry needs strategic changes, as the rate of variability of the market environment has a direct and indirect impact on the functioning of enterprises in this industry, resulting in an urgent need to meet new requirements of the information society and changes in consumer values.

- The optimal choice of marketing strategies of poultry enterprises will significantly expand the range of management through diversification of target markets, clearer choice of segment and optimal positioning, taking into account trends in egg markets of leading countries. Recommendations on the applied aspects of the choice of marketing tools to influence consumers can be used in the practice of domestic enterprises, including when entering world markets.

5. References


