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Management Theory and Studies for Rural Business and Infrastructure Development
eISSN 2345-0355. 2023. Vol. 45. No. 3: 267-275
Article DOI: https://doi.org/10.15544/mts.2023.27

MANAGEMENT OF THE DEVELOPMENT OF THE REGIONAL MARKETS FOR POULTRY PRODUCTS IN UKRAINE

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Received 11 06 2023; Accepted 30 07 2023

Abstract
The article assesses the development of the regional market for poultry products using the indicator of the development of the regional market. The purpose of the study is to determine the level of efficiency in managing the development of Ukrainian regional markets for poultry products based on the formation of a system of indicators of the level of development and assessment of their interdependence. The market development indicator is calculated as the sum of a weighted normalized assessment of each of the three components: the regional demand indicator, the regional supply indicator, and the trade development indicator in the region. The methodology for assessing the level of development of regional markets for poultry products includes: establishing indicators characterizing the level of development of regional markets for poultry products; assessment of the significance of characteristics in shaping the level of development of regional markets for poultry products; building a mathematical model for assessing the level of development of regional markets for poultry products. The calculations carried out using the proposed methodological approach make it possible to determine that the highest level of development of regional markets belongs to the central region.

Keywords: *level of market development, regional market for poultry products, assessment methodology, market development indicators, consumption, production, trade, administration.*
JEL Codes: *R 11, R 58, O 13, Q 13.*

Introduction

The goals of the state policy to ensure Ukraine's state sovereignty are: liberation of the regions temporarily occupied by the Russian Federation and restoration of the constitutional order in these territories, as well as protection of the rights, freedoms and legitimate interests of individuals and legal entities, including restoration of property rights of Ukrainian citizens, etc. One of the next steps after achieving these goals should be the restoration of the regional economy and logistics, the functioning, development and integration of regional product markets, including in the poultry industry.

Indeed, the efficiency of the market functioning is influenced by many environmental factors. But the main driving forces that are in a certain conflict of interest are supply and demand. These are two forces that change and adapt to each other's interests,

on the one hand, influencing the assortment, pricing, distribution and communication policies of manufacturing companies, and on the other hand, changing the characteristics of demand and consumer loyalty to certain brands. With the active development of forms and methods of trade, we are getting another influential force in the market - trade intermediaries, where it is especially possible to single out retailers, which, thanks to the breadth of their assortment and flexible pricing policy, have attracted and received a high degree of loyalty from consumers. Most producers are highly dependent on supermarkets as resellers, since it is working with supermarkets that allows enterprises to regularly sell products in large volumes on a regular basis. However, today there is a growing demand for franchised reseller services. As a rule, these are small stores that offer 3-4 product lines, for example, in the following combination: meat and meat products, cooking, dairy products, and bakery products. Within these product lines, the stores use all the attributes of marketing policy: price discounts, assortment expansion, promotional activities, while cooperating with only one manufacturer on a franchise basis for each product line. Thanks to their responsible attitude to product quality, storage conditions, and the friendly attitude of their sales consultants, it is highly likely that these retailers will compete with supermarkets in the future for certain product lines.

Therefore, today, when assessing the level of development of regional markets, it is necessary to talk about the representation of all three interacting components on the market: demand (consumers of products), supply (producers of products) and intermediaries (trading companies). Speaking of regional markets of poultry products, it is necessary to note the active dynamics of growth in the popularity of these products among consumers, given the relative cheapness of poultry meat, and, accordingly, the growth of supply from producers who respond to the increase in demand for products.

The purpose of the article is to determine the level of efficiency of management of the development of Ukrainian regional poultry markets based on the formation of a system of indicators of the level of development and assessment of their interdependence.

The main objectives of the study are to determine the indicators of development of regional markets for poultry products, to establish the degree of dependence between them based on the results of correlation and regression analysis, to form a mathematical model of dependence of the integral indicator of development of regional markets for poultry products, and to assess the level of development of regional markets in Ukraine.

The definition of the concept of market has evolved from a specific (territorial) place of purchase and sale of goods; economic relations entered into by market participants in the process of exchange; form (method) of organization and functioning of economic relations; self-regulating mechanism that coordinates exchange processes on a competitive basis; mechanism of interaction between buyers and sellers, which is regulated by state institutions.

As for the concept of "regional market", in this conceptual apparatus, the opinions of scholars do not coincide, on the one hand, the official division of Ukraine into regions is based on the allocation of administrative-territorial units by region, which lists 24 regions, the Autonomous Republic of Crimea, Kyiv and Sevastopol, and on the other hand, based on the research covered by scholars (Pavlova, 2019; Constitution of Ukraine, 1996), the following regional distribution of the boundaries of Ukraine is proposed: Western region (Volyn, Rivne, Lviv, Ternopil, Khmelnytskyi, Zakarpattia, Ivano-Frankivsk, Chernivtsi regions); Northern region (Chernihiv, Sumy, Poltava, Kharkiv regions); Central region (Kyiv, Zhytomyr, Vinnitsa, Cherkasy, Kirovohrad regions, Kyiv city); Southern region (Odesa, Mykolaiv, Kherson regions, the Autonomous Republic of Crimea, Sevastopol city); Eastern region (Dnipro, Zaporizhzhia, Donetsk, Luhansk regions).

When it comes to assessing the level of development of regional markets, it is necessary to weigh the ratio in which the three driving forces of the market are located: $\Rightarrow$ production $\Rightarrow$ trade $\Rightarrow$ consumption.

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The general description of regional markets details the state of the poultry products market, revealing the specifics of the influence of macro- and micro-environmental factors at the regional level. When analyzing a particular regional market, its geographical location and the degree of logistics development are considered, and the supply and demand ratio in the market is assessed.

Methods used in analyzing regional market conditions (Ammons et. al., 2020; Carelo et. al., 2020; Rehor, 2013):

– method of comparisons (actual indicators are compared with what is forecasted, average data);

– index method (study of the dynamic characteristics of poultry products sales on the market);

– method of groupings (combining indicators according to certain characteristics into homogeneous groups);

– graphical method (visual representation of the research results);

– analysis of dynamic series (analysis of patterns, trends and functioning of the regional market in dynamics);

– correlation method (determination of the degree of interdependence of individual elements by calculating the indicators of closeness of connection of correlation coefficients);

– regression method (determining the dependence of certain indicators on others);

– expert method (assessment of the results of market functioning based on a certain set of opinions and assumptions of experts, which are checked for the degree of homogeneity);

– method of economic and mathematical modeling (information processing system, which is a set of economic and mathematical methods);

– balance method (used to display two groups of interrelated and balanced elements of indicators).

Therefore, the problematic aspects in the choice of a methodological approach to assessing the level of development of regional markets remain important for the country's economy, especially in the current unstable political situation in the country.

Proposed methodology

The research methodology of the article is to conduct a correlation and regression analysis to establish the relationship between the indicators of regional market development and to build a mathematical model of dependence based on the method of partial correlation coefficients to further determine the level of development of Ukrainian regional markets for poultry products.

The efficiency of the functioning of regional poultry markets is evidenced by the achieved level of market development. The objectivity of assessing the level of functioning of regional markets is influenced by the system of indicators that underlies the calculation of the integrated regional development indicator.

Accordingly, the formed system of indicators for assessing development must meet certain requirements:

– provide a quantitative reflection of phenomena and processes;

– display of information should be comprehensive;

– use the same measurement systems, with adaptation if necessary;

– ensure quantitative and substantive reliability of indicators based on primary information.

To determine the mathematical relationship between regional market development indicators, we will use the calculation of correlation coefficients (Boyko, 2010; Michalkova et. al., 2023). To begin with, let us determine the relationship between the development indicators using correlation and regression analysis formula (1):

$$r = \frac{\sum_{i=1}^{n}(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^{n}(x_i - \bar{x})^2}\sqrt{\sum_{i=1}^{n}(y_i - \bar{y})^2}} \quad (1)$$

Thus, the correlation coefficient can have the following value $-1 \le r \le +1$, and the strength of correlations can characterize the following impact: $r = 1{,}0$ - full; $0{,}90 \le r \le 0{,}99$ - very strong; $0{,}70 \le r \le 0{,}90$ - close (strong); $0{,}50 \le r \le 0{,}70$ - medium; $0{,}30 \le r \le 0{,}50$ - moderate; $0{,}20 \le r \le 0{,}30$ - weak; $0{,}01 \le r \le 0{,}19$ - very weak; $r = 0{,}0$ - no connection (Vasylieva et. al., 2017).

If the results show a close correlation between the indicators, we determine the weight of the indicators of regional poultry markets development using formula (2):

$$\nu_i = \frac{r_i}{\sum r_1 + r_2 + ...r_n} \quad (2)$$

where, ν_i - the weight of the i-th indicator of the development of regional poultry markets;

r_i - correlation of the i-th indicator of the development of regional poultry markets;

$r_1 + r_2 + ...r_n$ - the sum of possible correlation relations.

The proposed system of indicators for assessing the development of regional markets for poultry products includes three indicators that characterize the factors and conditions of cooperation of the main participants in the regional market for poultry products:

−regional Demand Indicator (I_{demand}) - characterizes the level of satisfaction of consumer needs for products, determines the level of unsatisfied demand and the factors that caused this situation;

−regional Supply Indicator (I_{offer}) - characterizes the production capabilities and the degree of saturation of the market with products, the competitive situation in the market, and the nearest prospects for the sale of products in the regional market;

−indicator of the development of trade in the region ($I_{region\ trade}$) - identifies opportunities for selling poultry products through retail chains, provides conditions for producers to reduce sales costs by increasing the volume of product batches.

As a result, an integral indicator of the efficiency of the functioning and development of regional markets is calculated, and a conclusion is formed based on the results of the assessment.

When forming a mathematical dependence, we take into account that the mathematical equation for finding the integral indicator of the development of regional poultry markets (I_{RMD}) will have the following form formula (3):

$$I_{RMD} = \nu_i \cdot I_i + \nu_i \cdot I_i + ...\nu_n \cdot I_n$$
$$or \quad I_{RMD} = WNa_i + WNa_i + ...WNa_n \quad (3)$$

where, $\nu_i ....\nu_n$ - weight of each i-th indicator of the development of regional markets for poultry products;

I_1, I_2, I_3 - indicators of development of regional markets for poultry products.

$WNa_1 + WNa_2 + ...WNa_n$ - weighted normalized assessment of each individual i-th indicator of the development of regional markets for poultry products

Whereas, WNa_n is calculated by the formula (4):

$$WNa_n = Na_i \cdot \nu_i \quad (4)$$

where, Na_i - the normalized score per person of the i-th indicator of the development of regional poultry markets.

In this case, Na_i is calculated by formula (5):

$$Na_i = \frac{I_i \cdot 10}{I_i \max} \quad (5)$$

where, I_i - the indicator per person of the i-th indicator of the development of regional markets for poultry products;

$I_i \max$ - the maximum indicator per person of the i-th indicator of the development of regional markets for poultry products, which is identified empirically by comparing all regional indicators of the i-th indicator.

In order to calculate the integral indicator of regional market development, the method of "modeling an ideal regional market" is recommended to bring all indicators to a single measurement system (points). For this purpose, regional markets are compared with each other for each indicator characterizing the state of the market. The indicator of the regional market whose result was the best is taken as the benchmark, which is estimated at

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10 points. As a result, we will have a model of an "ideal regional market" that is possible in modern conditions, and all indicators will be transferred to a single measurement system.

Thus, the most effective management of the development of the regional level of poultry products can be assessed at 10 points, and the decision on the compliance of the results obtained with the expected ones is based on a comparison with the maximum possible score, taking into account the conditions in which the market functioned.

The following scale is used to determine the level of development of regional markets for poultry products:

– from 0.0 to 3.0 points - market development is at a low level;

– from 3.01 to 5.0 points - market development is at an average level;

– from 5.01 to 8.0 points - market development is at an above average level;

– from 8.01 to 10.0 points - market development is at a height level.

As a result, a system of measures aimed at improving the level of market development is proposed, and after the forecast of possible changes as a result of the implementation of these measures is made, the final decision on the stages and order of their implementation is made.

Result analysis and discussion

The methodology for assessing the level of development of regional markets for poultry products is based on a certain system of indicators, which is represented by quantitative indicators. The system of indicators is formed under the influence of external and internal environmental factors and should meet modern requirements and take into account the directions of development and interests of the national economy.

When forming a system of indicators for the development of Ukrainian regional markets, it was found that the following indicators can be used as indicators (taking into account the impossibility of simultaneous calculation of the two main types of poultry products - poultry meat and eggs, poultry meat was chosen as the main indicator for calculation):

– as an indicator of regional demand - the volume of poultry meat consumption in the region, thousand tons (I_{demand});

– as an indicator of regional supply - the volume of poultry production in the region, thousand tons (I_{offer});

– as an indicator of trade development of trade in the region - the volume of retail trade turnover of poultry meat in the region, million UAH ($I_{regiontrade}$).

Since all regions have different areas and populations, for the sake of research integrity, the above indicators will be used in the calculations, but per person (indicators for each region will be divided by the population in the respective region).

The calculation of the correlation coefficient was carried out using the data of development indicators throughout Ukraine (formula (1) showed the following results (Table 1):

Table 1. Calculation of the correlation coefficient of indicators of development of regional poultry meat markets

	$I_{regiontrade}$	I_{demand}	I_{offer}
$I_{regiontrade}$	1		
I_{demand}	0,448932902	1	
I_{offer}	0,814991862	0,655408295	1

**Source: calculated by authors.*

The calculation of possible combinations of correlation coefficients showed the following relationships between the presented indicators of regional market development, which will be used to calculate the weight of individual indicators of regional poultry meat market development and characterize the following types of correlations:

– r_1=0.448932902≈0.45, the correlation between the indicators of retail trade turnover in the region and the volume of poultry meat consumption in the region is moderate;

– r_2=0.655408295≈0.66, the correlation between the volume of poultry meat consumption in the region and the volume of poultry meat production in the region is medium;

– r_3=0.814991862≈0.81, the correlation between the volume of retail trade turnover in the region and the volume of poultry meat production in the region is close.

Then the weight of each of the indicators of the development of regional poultry meat markets (v_i) will be as follows:

$$v_{regiontrade} = 0\frac{0.45}{1.92} = 0.23,\quad v_{demand} = \frac{0.66}{1.92} = 0.34,\quad v_{offer} = \frac{0.81}{1.92} = 0.43$$

When, $\sum r = 0.45 + 0.66 + 0.81 = 1.92$

Accordingly, the calculations (Table 2) of each individual indicator of the development of regional poultry markets per capita make it possible to determine the benchmark for each indicator, namely:

$I_{demand}\max = 29.26кг$ - Dnipropetrovsk (Eastern region) ≈10 points;

$I_{offer}\max = 287.45кг$ - Vinnitsa (Central region) ≈ 10 points;

$I_{regiontrade}\max = 588928.97тис.грн$ - Kyiv and Kyiv city (Central region) 10 points.

In this case, the mathematical expression for calculating the normalized score of each of the three indicators of the development of regional poultry markets for the i-th region will be calculated as follows:

$$Na^i_{demand} = \frac{I^i_{demand}\cdot 10}{29.26}$$

$$Na^i_{offer} = \frac{I^i_{offer}\cdot 10}{287.45}$$

$$Na^i_{regiontrade} = \frac{I^i_{regiontrade}\cdot 10}{588928.97}$$

Then the calculation of the weighted normalized score for each of the three indicators of the development of regional poultry meat markets for the i-th region will be as follows:

$$WNa^i_{demand} = Na^i_{demand}\cdot 0.34$$

$$WNa^i_{offer} = Na^i_{offer}\cdot 0{,}43$$

$$WNa^i_{regiontrade} = \frac{I^i_{regiontrade}\cdot 10}{588928.97}$$

Taking into account the previous calculations, we will form a mathematical model for calculating the indicator of development of regional poultry markets (6):

$$I^i_{RMD} = \sum WNa^i_{demand} + WNa^i_{offer} + WNa^i_{regiontrade} \quad (6)$$

where, i – the separate i-th region of the poultry meat market is represented by the regions of Ukraine.

The calculation of the integral indicator of the level of development of Ukrainian regional poultry meat markets is presented in Table 2.

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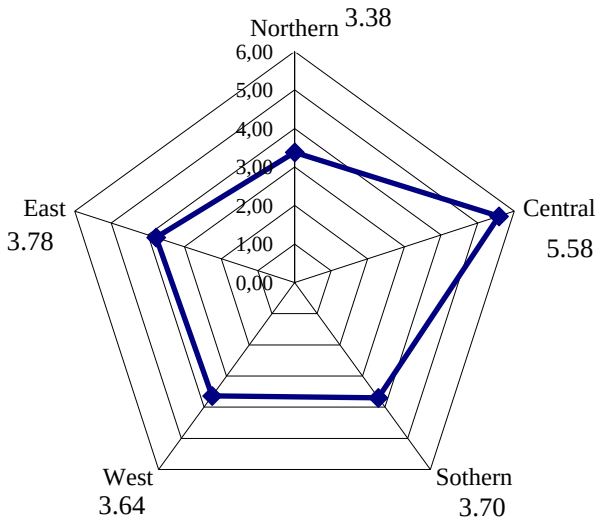
eISSN 2345-0355. 2023. Vol. 45. No. 3: 267-275
Article DOI: https://doi.org/10.15544/mts.2023.27

Table 2. Calculation of the integral indicator of the level of development of regional poultry meat markets in Ukraine

Regions	I_{offer}	I_{demand}	$I_{region\ trade}$	Na_{offer}	Na_{demand}	$Na_{region\ trade}$	WNa_{offer}	WNa_{demand}	$WNa_{region\ trade}$	I_{RMD}
West	$v_{regiontrade} = 0.23,\ v_{demand} = 0.34,\ v_{offer} = 0.43$									3.64
Volyn	75.88	26.24	65762.46	2.64	8.97	1.39	1.14	3.05	0.32	4.50
Rivne	24.61	22.77	84820.03	0.86	7.78	1.44	0.37	2.65	0.33	3.35
Lviv	30.79	24.37	186142.62	1.07	8.33	3.16	0.46	2.83	0.73	4.02
Ternopil	11.75	23.00	76684.03	0.41	7.86	1.29	0.18	2.67	0.30	3.14
Khmelnytskiy	11.80	25.47	51535.17	0.41	8.71	0.88	0.18	2.96	0.20	3.34
Ivano-Frankivsk	20.94	24.12	101630.21	0.73	8.24	1.73	0.31	2.80	0.40	3.51
Zakarpattya	4.58	25.15	257334.46	0.16	8.60	4.37	0.07	2.92	1.00	4.00
Chernivtsi	14.94	22.12	116703.08	0.52	7.56	1.98	0.22	2.57	0.46	3.25
Northern	$v_{regiontrade} = 0.23,\ v_{demand} = 0.34,\ v_{offer} = 0.43$									3.38
Chernihiv	3.44	25.54	163769.31	0.12	8.73	2.78	0.05	2.97	0.64	3.66
Poltava	3.55	23.07	82788.89	0.12	7.89	1.41	0.05	2.68	0.32	3.06
Sumy	13.81	22.30	103309.13	0.48	7.62	1.75	0.21	2.59	0.40	3.20
Kharkiv	10.85	24.59	146423.01	0.38	8.40	2.49	0.16	2.86	0.57	3.59
Central	$v_{regiontrade} = 0.23,\ v_{demand} = 0.34,\ v_{offer} = 0.43$									5.58
Vinnytsya	287.45	27.76	65762.46	10.0	9.49	1.12	4.30	3.23	0.26	7.78
Zhutomyr	9.25	24.68	94223.06	0.32	8.44	1.60	0.14	2.87	0.37	3.37
Kyiv/ Kyiv city	8.87	28.75	588928.97	0.31	9.83	10.0	0.13	3.34	2.30	5.77
Kirovohrad	11.84	26.78	148528.35	0.41	9.15	2.52	0.18	3.11	0.58	3.87
Cherkasy	253.55	26.28	72541.46	8.82	8.98	1.23	3.79	3.05	0.28	7.13
East	$v_{regiontrade} = 0.23,\ v_{demand} = 0.34,\ v_{offer} = 0.43$									3.78
Dnipropetrovsk	77.33	29.26	258962.77	2.70	10.00	4.40	1.16	3.40	1.01	5.57
Zaporizhzya	4.52	26.30	237747.20	0.16	8.99	4.04	0.07	3.06	0.93	4.05
Donetsk	2.73	21.92	82381.02	0.10	7.49	1.40	0.04	2.55	0.32	2.91
Luhansk	0.71	20.12	63692.36	0.02	6.87	1.08	0.01	2.34	0.25	2.60
Sothern	$v_{regiontrade} = 0.23,\ v_{demand} = 0.34,\ v_{offer} = 0.43$									3.70
Odessa	0.94	22.92	295931.98	0.03	7.83	5.02	0.01	2.66	1.66	3.83
Mikolayiv	4.76	25.92	162792.89	0.17	8.86	2.76	0.07	3.01	0.64	3.72
Kherson	7.29	26/06	107926.71	0.25	8.91	1.83	0.11	3.03	0.42	3.56

**Source: calculated by authors (Balances and consumption of basic food products by the population of Ukraine, 2021), (Statistical collection "Regions of Ukraine 2021", 2021).*

The analyzed regions of Ukraine were ranked according to the degree of development of the regional poultry meat market in 2021 in the following order (Fig. 1).



	Northern	Central	Sothern	West	East
Place in the rating	5	1	3	4	2
Development level	average	an above average	average	average	average

Figure 1. The level of development of Ukrainian regional poultry meat markets

This distribution of places was formed under the influence of several factors, including which regions have the highest production and consumption of poultry meat, how well the trade is developed in the region, and what its volume is, i.e., how much the population of the region is able to spend their income on food, including poultry meat. Regions with the highest consumption of poultry meat are the most attractive for poultry producers, while regions with high levels of poultry production, on the contrary, face the greatest competition. But at the same time, the regions with the highest production, especially in regions where poultry production exceeds consumption, have the lowest prices for products, which in turn also stimulates the consumption of poultry meat and preference for this type of meat among others. The Central region of Ukraine is the first in the ranking, as it includes two leading regions, one of which is the leader in terms of production (Vinnitsa) and the other in terms of retail trade (Kyiv).

Global experience confirms that businesses that focus solely on current problems and survival have no prospects of achieving commercial success in the future. Only organizations that are already laying the groundwork for such development, even in times of crisis, can grow and develop fully (Sokirnyk, 2009).

If we consider the most successful specific solutions that have been implemented by poultry producers and trading companies, it is necessary to note:

– expanding the range of poultry meat products through smaller processing (shank meat, small fillets, etc.)

– updating the forms of trade through the active opening of franchised retailers in all regions of the country, which compares favorably with the usual self-service retailers in terms of consultation and communication with sellers, a wide range of products and regular product promotions.

Conclusion

1. The study of modern approaches to determining the level of development of the regional market allowed us to propose a methodology for assessing the level of development of the regional market and to determine that the individual indicators of market development are the indicator of regional demand for poultry products in the region, the indicator of regional supply of poultry products in the region and the indicator

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of trade development in the region. The following indicators were used as indicators: as an indicator of regional demand - the volume of poultry meat consumption in the region; as an indicator of regional supply - the volume of poultry meat production in the region; as an indicator of trade development in the region - retail trade turnover in the region.

2. The conducted correlation and regression analysis showed a close relationship between the indicators of poultry meat consumption in the region, the volume of poultry meat production in the region and retail trade turnover in the region. On the basis of the correlation, a mathematical dependence was built to determine the weight of the indicators in the calculation of the integral indicator of the development of the regional poultry market.

3. The results of the calculations showed that the Central region of Ukraine has an above-average level of development of the poultry products market, while Vinnitsa and Cherkasy regions showed a high level of market development.

Comprehensive implementation of the methodology for assessing the level of development of regional markets for poultry products will increase the efficiency of management processes both by enterprises producing these products and by the socio-economic policy of development of Ukrainian regions and their food security.

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