“Application of the marketing mix to the world export of animal products”

AUTHORS	Natalia Vasylieva http://orcid.org/0000-0003-4100-0659 https://publons.com/researcher/1728128/natalia-vasylieva/ Harvey James, Jr. https://orcid.org/0000-0003-0189-271X

ARTICLE INFO	Natalia Vasylieva, Harvey James and Jr. (2020). Application of the marketing mix to the world export of animal products. *Innovative Marketing* , *16*(1), 79-88. doi:10.21511/im.16(1).2020.08
DOI	http://dx.doi.org/10.21511/im.16(1).2020.08
RELEASED ON	Wednesday, 04 March 2020
RECEIVED ON	Monday, 10 February 2020
ACCEPTED ON	Monday, 02 March 2020

JOURNAL	"Innovative Marketing "
ISSN PRINT	1814-2427
ISSN ONLINE	1816-6326
PUBLISHER	LLC “Consulting Publishing Company “Business Perspectives”
FOUNDER	LLC “Consulting Publishing Company “Business Perspectives”

NUMBER OF REFERENCES	NUMBER OF FIGURES	NUMBER OF TABLES
36	0	5

BUSINESS PERSPECTIVES

LLC "CPC "Business Perspectives"
Hryhorii Skovoroda lane, 10,
Sumy, 40022, Ukraine

www.businessperspectives.org

Natalia Vasylieva (Ukraine), **Harvey James, Jr.** (USA)

APPLICATION OF THE MARKETING MIX TO THE WORLD EXPORT OF ANIMAL PRODUCTS

Abstract

Agricultural trade is complicated owing to perishable goods and high requirements for safety and quality, especially by animal products. Intensifying their exports is a major priority in the context of augmenting competitive negotiations and providing global food security to cover a shortage of an animal protein intake. To address such challenges, this study aimed at improving marketing performance necessary for developing the world exports of animal products. The methodological research framework was the Marketing Mix model, which included Product, Price, Place, and Promotion, and was amplified by Innovation. The model components were presented by the average export prices and indicators for Infrastructure, ICT adoption, and Innovation capability evaluated for each exporting country. For testing hypotheses about homo- and heterogeneity of top exporters, this research utilized the single factor Analysis of Variance (ANOVA) technique. The offered approach was applied to the most valuable export segments of poultry, livestock, and dairy world markets. They engaged from 75 to 140 countries and had total export values between USD 3.2 billion and USD 33.2 billion. The study outcomes captured similarities and differences of Price, Place, Promotion, and Innovation components among the First 10, Second 10, and Third 10 ranked exporters. Given the found indicators of the top world exporters, the study clarifies prospects and attainable goals on developing exports of animal products at a country level.

Keywords 4P marketing model, innovation component, top world exporters, poultry, livestock, dairy products, Analysis of Variance (ANOVA)

JEL Classification C12, C14, Q13

Received on: 10th of February, 2020
Accepted on: 2nd of March, 2020
Published on: 4th of March, 2020

Natalia Vasylieva, Doctor of Economics, Professor, Head of the Department of Information Systems and Technologies, Dnipro State Agrarian and Economic University, Ukraine. (Corresponding author)

Harvey James, Jr., Ph.D., Professor, Associate Division Director and Director of Graduate Studies of Applied Social Sciences/Agricultural and Applied Economics Department, University of Missouri, USA.

Conflict of interest statement:
Author(s) reported no conflict of interest

INTRODUCTION

An important challenge facing international agriculture is the pressing issue of covering a shortage of food products across countries. It is a complicated task and one of the major focuses of the World Trade Organization (WTO) since its foundation in 1995. Following the WTO Agriculture Agreement, member states have been negotiating the establishment of a fairer and more competitive and predictable trading system, especially concerning market access, domestic support, and export subsidies that can distort agricultural trade and hinder providing food security (The WTO Agriculture Agreement, 2020). Indeed, feeding over 9 billion people by 2050 is a prime challenge for the pairing of agricultural practice and science (Vasylieva, 2018). Future global kilocalories demand implies an additional supply of approximately 60% of agricultural products (Grafton, Daugbjerg, & Qureshi, 2015; Flies, Brook, Blomqvist, & Buettel, 2018). Besides, protein deficiency and nutritional imbalances result in severe human health complications (A. Khan, S. Khan, Jan, & M. Khan, 2017).

Continuing globalization and rising incomes trigger a tangible diversification of food consumption in favor of animal products (Kearney,

2010; Vasylieva, 2019). Specifically, by 2050, consumption of poultry, pork, and cheese is expected to increase by over 35%, 15%, and 25%, respectively, which corresponds to 146, 133, and 65 g daily per capita in the industrial countries. Similar trends are expected to occur in developing countries, where the demand for beef, poultry, pork, eggs, and whole milk would rise by 14%, 52%, 37%, 44%, and 21%, which corresponds to 28, 36, 59, 34, and 141 g daily per capita.

Most of wealthier consumers can and are ready to pay for animal products placed and promoted, according to the quality standards established by the top world exporters. Given the accelerated demand for animal products, the world exporters beyond top 10 must also contribute to expanding market niches and capture their potential economic benefits through the advanced marketing techniques. Therefore, the purpose of this study is to clarify options for improving the marketing performance of globally exported animal products. Specifically, this paper outlines a general "roadmap" for expanding the world exports of animal products by considering which components (Product, Price, Place, and Promotion) and innovations should be developed by countries to keep pace with the top world exporters.

1. LITERATURE REVIEW

According to the WTO estimations, the world agricultural trade hit the record of USD 1,820 billion in 2018, which was 5% more than the previous year. Nevertheless, trading agricultural goods has its inherent pitfalls, such as its perishable nature, long supply chain, strong requirements to transportation conditions, storage facilities, safety, and quality (Xu, 2015). So far, farming became an initial phase of agriculture, which also encompasses provisioning, processing, marketing, and consuming agricultural goods. A focus on liberating agricultural trade is a shared consensus between the World Trade Organization and the Food and Agriculture Organization of the United Nations committed to providing food security on a global scale (Farsund, Daugbjerg, & Langhelle, 2015). To eliminate misconceptions and alleviate discrepancies on the issue, Anderson (2016) explored the evolution of food trade patterns, interface between agricultural prices and food security, navigated trends in policy reforms and prospects for agricultural marketing.

Another obstacle inhibiting the development of agricultural trade was identified by Eum, Sheldon, and Thompson (2017) who examined reasons and implications of asymmetry in agricultural exports across countries. The trade balance is quite sensitive to an external impact. The most remarkable current examples are the trade tariff disputes between the USA and China. Consequently, the US agricultural export to China dropped from USD 19.5 billion in 2017 to USD 9.1 billion in 2018. It concerned soybeans, pork, beef, vegetables, and sorghum. During 2008–2017, China was the prevalent importer of US agricultural goods. In 2018, it ranked the fifth in contrast, Canada, Mexico, and the European Union became the largest foreign markets for the US farmers (The Economic Research Service, 2020).

That is why all economic tools fostering agricultural trade are invaluable. To a large extent, it refers to agricultural marketing. Consistent with Murugesan and Rajarajan (2016, p. 46), "marketing is the performance of all business activities involved in the flow of goods and services from the point of initial agricultural production until they are in the hands of the ultimate consumer." Stated differently, marketing consolidates with "all the operations that will be used to accelerate the transmission stream of goods from production to consumption to show the ease and speed in sale and distribution work" (Rasouliazar, Perani, & Rashiedpour, 2015, p. 211). Among key benefits of marketing development, they emphasized increasing timely sales for higher prices, as well as augmenting market knowledge and better competition with foreign rivals.

According to Kohls, Uhl, and Hurt (2014), Morgan, Feng, and Whitler (2018), establishing international agricultural trade is more than simply exporting and blending strategic marketing capabilities. Constantinides (2006), Powers and Loyka (2010) identified the Marketing Mix to be the dominant theoretical paradigm and the most applicable practical concept, which successfully underpinned

http://dx.doi.org/10.21511/im.16(1).2020.08

all economic fields and industries, including international trade and agricultural sector. Previously, Leonidou, Katsikeas, and Samiee (2002) synthesized the general model of export performance linking managerial characteristics, organizational factors, environmental forces, export targeting, and the core elements of marketing strategy such as product, pricing, distribution, and promotion. Farris, Bendle, Pfeifer, and Reibstein (2010) featured measuring marketing performance like an undeniable advantage of translating numbers into managerial decisions. Similarly, Katsikeas, Morgan, Leonidou, and Hult (2016) encouraged quantified assessments of outcomes in marketing typed by customer-level, product-market, accounting, and financial performance at historical, present, and future time horizons. However, these recommendations need an accurate specification by industries and areas.

Thus, this review suggests that more work is needed to obtain a better understanding of international agricultural marketing, especially in animal products. The literature also supposes that a quantitative approach to a tailored Marketing Mix model might be an effective means of obtaining more accurate details of marketing opportunities for different countries for developing export of animal products. Given the study aim, this paper contributes to an important gap in the literature.

2. RESEARCH METHODS AND HYPOTHESES

Dobor (2015) defined the Marketing Mix as a combination of strategies and activities for building an effective agribusiness at the stage of selling goods and services. The classic 4Ps mix merges Product, Price, Place, and Promotion. To achieve this research goal and quantify the Marketing Mix for the agricultural exports, these elements were measured as follows.

The data source for the Product and Price components was FAOStat (2020), which provides a focus on animal products with the most valuable world export markets. The selected indicators for the Price were the average export prices by countries, which mirror the standing of fair and competitive international trade (Ferris, 2005; Norwood & Lusk, 2007).

Other data were from the Global Competitiveness Indices (GCI) computed annually by country by the World Economic Forum (Schwab, 2019). Firstly, Christopher and Peck (2015), O. Velychko and L. Velychko (2017) concluded that the paramount benefits from the Place component could be derived from effective marketing logistics. Since exports of agricultural products strongly depend on the quality of transportation and utility, the 2nd pillar of GCI: Infrastructure was chosen for their evaluation. Secondly, Lin (2015) showed a strong positive effect of the Internet and e-marketing on international trade. They reduce information uncertainty and cost, leverage market knowledge and common standards, expand communication with customers and clients (Skudiene, Auruskeviciene, & Sukeviciute, 2015; Mathews, Bianchi, Perks, Healy, & Wickramasekera, 2016). In the context of market globalization, Babenko, Kulczyk, Perevozova, Syniavska, and Davydova (2019), Babenko, Perevozova, Mandych, Kvyatko, Maliy, and Mykolenko (2019) placed high emphasis on the key factors for developing e-commerce embedding trust, quality, government intervention, and the Internet accessibility. Summarizing the abovementioned, it was chosen to evaluate the Promotion component to exporting agricultural products via the 3rd pillar of GCI: ICT (information and communication technology) adoption. Thirdly, Ferrara (2018), Morgan, Feng, and Whitler (2018), Tomich, Lidder, Coley, Gollin, et al. (2019) gave unquestionable evidence that innovativeness is the most beneficial way to operate in the competitive and dynamic export market. It provided convincing reasons to elaborate on the Marketing Mix with the Innovation component and assess it using the 12th pillar of GCI: Innovation capability.

The single factor Analysis of Variance – ANOVA (Turner & Thayer, 2001) was the appropriate methodological framework for applying the offered Innovative Marketing Mix to exports of animal products. The ANOVA technique enabled to test an influence of the model components over First, Second, and Third 10 world exporters of selected animal products using Null and Alternative Hypotheses:

H0: There are relatively equal averages among the considered groups.

Hα: There are essentially different averages among the compared groups.

In more detail:

- $X_i^{10}, i = 1...10$, $X_i^{20}, i = 1...10$, $X_i^{30}, i = 1...10$ denoted the sample values of some indicator concerning First, Second, and Third top 10 world exporters of the given product;
- $\overline{X^{10}}$, $\overline{X^{20}}$, $\overline{X^{30}}$ designated the respective average values among the analyzed groups of exporters;
- $\overline{X}$ was the grand mean of the all three examined samples by the given product.

Then, the inter-group difference was calculated like

$$SSB = 10 \cdot (\overline{X^{10}} - \overline{X})^2 + \\ +10 \cdot (\overline{X^{20}} - \overline{X})^2 + 10 \cdot (\overline{X^{30}} - \overline{X})^2.$$

The intra-group difference was computed using the following formula:

$$SSW = \sum_{i=1...10} (\overline{X^{10}} - X_i^{10})^2 + \\ + \sum_{i=1...10} (\overline{X^{20}} - X_i^{20})^2 + \sum_{i=1...10} (\overline{X^{30}} - X_i^{30})^2.$$

Degrees of freedom in the research case were

$$dfB = 3 - 1 = 2 \text{ and } dfW = 30 - 3 = 27.$$

The investigated variability was measured as follows:

$$F - Ratio = (SSB / dfB) / (SSW / dfW).$$

An alpha level to reject the hypotheses amounted to typical 10%, i.e., a boundary p-value was 0.1 and $Fcritical \approx 2.51$. It meant that an inequality

$$F - Ratio \leq Fcritical$$

entailed by rejecting the Alternative Hypothesis in favor of homogeneity of the top world exporters by the explored indicator. An inequality

$$F - Ratio > Fcritical$$

confirmed rejecting the Null Hypothesis caused by revealed heterogeneity of the top world exporters by the considered model component applied to the given animal product.

3. RESULTS

This research considered 12 animal products with the most valuable world export markets as of 2018. Namely, the poultry segment consisted of chicken meat, fresh and frozen; chicken meat, canned; and hen eggs, in shell, with export values of USD 21.5 billion, USD 8.7 billion, and USD 3.5 billion, respectively. The livestock segment comprised cattle meat, carcass; beef and veal, boneless; bacon and ham; pig meat, sausages; and pork with export values of USD 8.1 billion, USD 33.2 billion, USD 3.2 billion, USD 4.5 billion, and USD 15.7 billion, respective-

Table 1. Characteristics to input data

Source: Composed by the authors.

Indicator	Sample size	Population size
Price per ton in USD Export volume in tons	Top 30 states	138 countries by chicken meat, fresh and frozen
		119 countries by chicken meat, canned
		108 countries by hen eggs, in shell
		99 countries by cattle meat, carcass
		114 countries by beef and veal, boneless
		85 countries by bacon and ham
		117 countries by pig meat, sausages
		75 countries by pork
		140 countries by cheese, whole cow milk
		138 countries by butter, cow milk
		137 countries by milk, whole dried
		129 countries by milk, whole fresh cow
Pillar 2 – Infrastructure	12 samples of 30 states	141 countries, scored on a 0 to 100 scale
Pillar 3 – ICT adoption		
Pillar 12 – Innovation capability		

http://dx.doi.org/10.21511/im.16(1).2020.08

Table 2. ANOVA output over poultry export markets

Source: Computed by the authors.

Product/ model component	Average among ten exporters			F-ratio	P-value	Conclusion
	First	Second	Third			
Chicken meat, fresh and frozen						
Price	1,748	1,785	1,843	0.07	0.93	Relatively equal
Place	83	80	77	1.17	0.32	Relatively equal
Promotion	69	68	72	0.52	0.60	Relatively equal
Innovation	65	59	55	1.14	0.33	Relatively equal
Chicken meat, canned						
Price	3,710	4,135	3,585	0.63	0.54	Relatively equal
Place	83	82	78	1.25	0.30	Relatively equal
Promotion	71	70	70	0.05	0.96	Relatively equal
Innovation	68	62	54	2.51	0.10	Essentially different
Hen eggs in shell						
Price	1,737	2,474	2,150	1.06	0.36	Relatively equal
Place	85	76	76	5.02	0.01	Essentially different
Promotion	71	65	67	0.93	0.41	Relatively equal
Innovation	67	52	51	5.27	0.01	Essentially different

ly. The analyzed dairy segment included cheese, whole cow milk; butter, cow milk; milk, whole dried; milk, whole fresh cow with export values of USD 28.0 billion, USD 8.7 billion, USD 9.4 billion, and USD 5.5 billion, respectively. Table 1 featured the study information maintenance retrieved from FAO Statistics Base (FAOStat, 2020) and the Global Competitiveness Report (Schwab, 2019).

Table 1 showed various engagements of countries in exporting the considered products, which varied between 75 states by pork to 140 states by cheese,

Table 3. ANOVA output over livestock export markets

Source: Computed by the authors.

Product/ model component	Average among ten exporters			F-ratio	P-value	Conclusion
	First	Second	Third			
Cattle meat, carcass						
Price	4,904	3,579	3,053	11.74	0.00	Essentially different
Place	85	77	75	2.97	0.07	Essentially different
Promotion	70	64	68	0.58	0.57	Relatively equal
Innovation	70	58	48	5.66	0.01	Essentially different
Beef and veal, boneless						
Price	5,602	5,482	4,405	4.61	0.02	Essentially different
Place	76	83	73	2.51	0.10	Essentially different
Promotion	68	65	63	0.40	0.67	Relatively equal
Innovation	58	64	47	2.52	0.10	Essentially different
Bacon and ham						
Price	5,145	6,174	6,022	0.50	0.61	Relatively equal
Place	87	81	74	7.13	0.00	Essentially different
Promotion	72	68	68	0.43	0.66	Relatively equal
Innovation	73	56	53	6.64	0.00	Essentially different
Pig meat, sausages						
Price	4,647	3,019	3,043	4.66	0.02	Essentially different
Place	88	76	75	10.50	0.00	Essentially different
Promotion	73	67	65	1.60	0.22	Relatively equal
Innovation	74	51	53	11.48	0.00	Essentially different
Pork						
Price	2,982	3,145	2,967	0.23	0.80	Relatively equal
Place	84	83	77	3.51	0.04	Essentially different
Promotion	69	71	75	1.57	0.23	Relatively equal
Innovation	68	66	52	4.47	0.02	Essentially different

Table 4. ANOVA output over dairy export markets

Source: Computed by the authors.

Product/ model component	Average among ten exporters			F-ratio	P-value	Conclusion
	First	Second	Third			
Cheese, whole cow milk						
Price	4,577	5,205	4,222	1.36	0.27	Relatively equal
Place	86	82	72	11.73	0.00	Essentially different
Promotion	73	71	61	3.41	0.05	Essentially different
Innovation	74	60	44	28.38	0.00	Essentially different
Butter, cow milk						
Price	5,443	5,072	4,607	2.89	0.07	Essentially different
Place	86	80	80	1.39	0.27	Relatively equal
Promotion	74	72	72	0.08	0.92	Relatively equal
Innovation	72	56	59	3.27	0.05	Essentially different
Milk, whole dried						
Price	527	481	428	1.59	0.22	Relatively equal
Place	82	85	74	3.65	0.04	Essentially different
Promotion	72	76	60	5.16	0.01	Essentially different
Innovation	62	66	49	3.77	0.04	Essentially different
Milk, whole fresh cow						
Price	570	602	890	4.44	0.02	Essentially different
Place	86	82	71	8.29	0.00	Essentially different
Promotion	71	74	60	4.13	0.03	Essentially different
Innovation	70	59	45	11.06	0.00	Essentially different

whole cow milk. A comparison of the examined export markets also depicted a different magnitude of oligopoly. As can be seen from Table A1 in Appendix, the market shares of top 10 exporters ranged between 64% concerning milk, whole fresh cow and 94% concerning bacon and ham.

Unlike the qualitative results on the Marketing Mix in agriculture by Dobor (2015), the quantitative research findings of testing the set Hypothesis in terms of products and indicators were presented in Tables 2-4 and discussed in the next section.

4. DISCUSSION

The analytical research findings based on the fulfilled calculations and summarized results by Powers and Loyka (2010) were as follows. According to Tables 2-4, rejections of the Alternative Hypothesis by the model components detected that Prices and Promotions were mostly homogeneous for exports of 7 and 9 products. On the contrary, rejections of the Null Hypothesis determined the Place and Innovation components to be mostly heterogeneous for exports of 9 and 11 products. According to Christopher and Peck (2015), the Infrastructure level appeared to be the most demanding among the observed pillar indicators and ranged between 71 and 88 across the groups of top exporters. Consistent with Babenko, Perevozova, Mandych, Kvyatko, Maliy, and Mykolenko (2019b), the ICT adoption level demonstrated an average fluctuation from 60 to 76. As distinct from expectations of Tomich, Lidder, Coley, Gollin, et al. (2019), the Innovation capability occurred to be the least demanding among the observed pillar indicators and ranged between 44 and 74.

Overall, poultry export markets appeared to be mostly homogenous, especially by chicken meat, fresh and frozen. Indeed, there were 4 out of 4 conclusions about relatively equal indicators across the exporters' groups. In contrast, livestock and dairy export markets were largely heterogeneous, especially concerning milk, whole fresh cow, so that there were four conclusions about essentially different groups of top exporters.

The next stage of this study explored components' dynamic by the animal products to specify marketing metrics for the agricultural sphere (Farris, Bendle, Pfeifer, & Reibstein, 2010). According to Morgan, Feng, and Whitler (2018), the relevant research finding was that Top exporters of chick-

http://dx.doi.org/10.21511/im.16(1).2020.08

en meat, fresh and frozen, had uniform strong requirements in their market environment. On average, the First 10 poultry exporters relied on the lowest prices, better-developed Infrastructure, and higher Innovation capability. Meanwhile, the Third 10 group endeavored to benefit from advanced Promotion via ICT adoption. The First 10 exporters of chicken meat, canned, and hen eggs, had essential advantages through Innovation capability. The latter ones also gained from the advanced Infrastructure compared to the Second and Third top 10 exporters (see Table 2).

The First 10 exporters of cattle meat, carcass had significant priorities in the Place and Innovation components, offsetting their high prices. At the same time, the Third 10 group strived to compete through low average prices explained by Ferris (2005). The Second 10 exporters of beef and veal, boneless, focused their marketing efforts on the Infrastructure and Innovation capability. The corresponding Third 10 group, as before, shrank the prices. The First 10 exporters of bacon and ham had a holistic leadership. In light of it, any expectations on foreseeable shifts here seem to be unrealistic. Despite high prices, the First 10 exporters of pig meat, sausages had unconditional advantages over rivals in the Place, Promotion, and Innovation components. The Second and Third 10 groups kept the marketing status quo since their indicators were hardly distinguishable. The Third 10 exporters of pork moved to promote cheap products. However, the standing of the First 10 exporters looked to be quiet robust owing to the advanced Infrastructure and vast Innovation capability (see Table 3).

The screening provided evidence that the poor indicators of the marketing performance did not allow the Third 10 exporters of cheese, whole cow milk, to compete with the stronger groups. Besides, the respective First 10 group had practically maximum average scores by the Infrastructure, ICT adoption, and Innovation capability compared to the rest 11 analyzed agricultural markets. Like in the case of pig meat, sausages, the First 10 exporters of butter, cow milk compensated their high prices through the best market accomplishments concerning the Place, Promotion, and Innovation capability agreed with the recommended performance outcomes in marketing by Katsikeas, Morgan, Leonidou, and Hult (2016). In contrast, the Second 10 exporters of milk, whole dried entirely overtook the current leaders and were eager to shift positions. The First 10 exporters of milk, whole fresh cow, had a justified leadership. Nevertheless, as proof of unorthodox patterns by Norwood and Lusk (2007), even poor pillar indicators of the Third 10 exporters, especially Uganda, South Africa, Thailand, Iran, Costa Rica, and Pakistan, did not deteriorate their high export prices because of favorable geographical location for delivering perishable fresh milk (see Table 4).

The goal indicators of the top world exporters enable to illuminate the plausible export improvements by country. For example, in Ukraine, the most pessimistic scenario happened to be in exporting pig meat, sausages, as well as bacon and ham. Ukrainian ranks were only 57 and 60 that were caused by flaws in processing and brand marketing. However, at ranks 12 (twice) and 13, Ukrainian exporters achieved the most optimistic results for chicken meat, fresh and frozen; hen eggs in shell; and butter, cow milk. To continue this status quo and prevent foregone opportunities, it is mandatory to enhance the marketing Infrastructure, ICT adoption, and Innovation capability from the current scores of 70, 52, and 40 up to the average levels in the corresponding Second 10 export groups. The ways to tackle this issue are extremely advisable given a sharp imbalance between Ukrainian exports of crop and animal products.

CONCLUSION

The main research outcome was an Innovative Marketing Mix model proposed for the international trade of animal products in order to quantify its ongoing performance by the Price, Place, Promotion, and Innovation components and to set goals on further export development. The single factor ANOVA technique was appropriate for evaluating and comparing marketing performance by animal products. The study revealed that the First, Second, and Third top 10 exporters demonstrated different priorities in

reaching competitive advantages in the global markets of poultry, livestock, and dairy products. However, the elaborated uniform approach provided their objective numerical measures based on the average export prices by countries and the Global Competitiveness Indices such as the Pillars of Infrastructure, ICT adoption, and Innovation capability. Milk, whole fresh cow, and the Innovation component were identified to be the most heterogeneous. In contrast, chicken meat, fresh and frozen, as well as the Promotion, appeared to be the most homogeneous among the analyzed animal products and model components.

To face challenges of market fluctuations, the obtained conclusions need regular updating. On the one hand, given the inputs accessible from the official data sources, it is not a sticking point. On the other hand, consistent recalculations maintain a proper insight on the dynamics of marketing performance and progress in increasing the world export of the most demanded animal products.

AUTHOR CONTRIBUTIONS:

Conceptualization: Natalia Vasylieva.
Data curation: Natalia Vasylieva.
Formal analysis: Natalia Vasylieva, Harvey James, Jr.
Funding acquisition: Natalia Vasylieva.
Investigation: Natalia Vasylieva, Harvey James, Jr.
Methodology: Natalia Vasylieva, Harvey James, Jr.
Project administration: Harvey James, Jr.
Resources: Natalia Vasylieva, Harvey James, Jr.
Software: Harvey James, Jr.
Supervision: Harvey James, Jr.
Validation: Natalia Vasylieva.
Visualization: Natalia Vasylieva.
Writing – original draft: Natalia Vasylieva.
Writing – review & editing: Harvey James, Jr.

REFERENCES

1. Anderson, K. (2016). *Agricultural Trade, Policy Reforms, and Global Food Security*: *Palgrave Studies in Agricultural Economics and Food Policy* (369 p.). London: Palgrave Macmillan. Retrieved from https://www.palgrave.com/gp/book/9781137471680
2. Babenko, V., Kulczyk, Z., Perevozova, I., Syniavska, O., & Davydova, O. (2019a). Factors of Development of International e-Commerce in the Context of Globalization. *CEUR Workshop Proceedings, 2422,* 345-356. Retrieved from http://ceur-ws.org/Vol-2422/paper28.pdf
3. Babenko, V., Perevozova, I., Mandych, O., Kvyatko, T., Maliy, O., & Mykolenko, I. (2019b). World informatization in conditions of international globalization: factors of influence. *Global Journal of Environmental Science and Management, 5*(SI), 172-179. https://doi.org/10.22034/GJESM.2019.05.SI.19
4. Christopher, M., & Peck, H. (2015). *Marketing logistics* (172 p.). London: Routledge.
5. Constantinides, E. (2006). The Marketing Mix Revisited: Towards the 21st Century Marketing. *Journal of Marketing Management, 22*(3-4), 407-438. https://doi.org/10.1362/026725706776861190
6. Dobor, A. (2015). Exploring Marketing Mix for Building a Viable Agro Business. *British Journal of Education, Society & Behavioural Science, 6*(2), 78-86. https://doi.org/10.9734/BJESBS/2015/14877
7. Eum, J., Sheldon, I., & Thompson, S. (2017). Asymmetric Trade Costs: Agricultural Trade among Developing and Developed Countries. *Journal of Agricultural & Food Industrial Organization, 15*(2), 20170035. https://doi.org/10.1515/jafio-2017-0035
8. FAOStat. (2020). *Statistics Data: the Food and Agriculture Organization of the United Nations.* Official website. Retrieved from http://www.fao.org/faostat/en/#data
9. Farris, P. W., Bendle, N. T., Pfeifer, P. E., & Reibstein, D. J. (2010). *Marketing Metrics: The Definitive Guide to Measuring Marketing Performance* (432 p.). London: Pearson FT Press.
10. Farsund, A. A., Daugbjerg, C., & Langhelle, O. (2015). Food security and trade: reconciling discourses in the Food and

http://dx.doi.org/10.21511/im.16(1).2020.08

Agriculture Organization and the World Trade Organization. *Food Security, 7*(2), 383-391. https://doi.org/10.1007/s12571-015-0428-y

11. Ferrara, G. (2018). Innovation in Agro-Food: A Geographical Perspective. *Journal of Food Products Marketing, 24*(1), 117-124. https://doi.org/10.1080/10454446.2017.1266554
12. Ferris, J. N. (2005). *Agricultural Prices and Commodity Market Analysis* (361 p.). East Lansing, MI: Michigan State University Press.
13. Flies, E. J., Brook, B. W., Blomqvist, L., & Buettel, J .C. (2018). Forecasting future global food demand: A systematic review and meta-analysis of model complexity. *Environment International, 120,* 93-103. https://doi.org/10.1016/j.envint.2018.07.019
14. Grafton, R. Q., Daugbjerg, C., & Qureshi, M. E. (2015). Towards food security by 2050. *Food Security, 7*(2), 179-183. https://doi.org/10.1007/s12571-015-0445-x
15. Katsikeas, C. S., Morgan, N. A., Leonidou, L. C., & Hult, G. T. M. (2016). Assessing Performance Outcomes in Marketing. *Journal of Marketing, 80*(2), 1-20. http://dx.doi.org/10.1509/jm.15.0287
16. Kearney, J. (2010). Food consumption trends and drivers. *Philosophical Transactions of the Royal Society: Biological Sciences, 365,* 2793-2807. http://dx.doi.org/10.1098/rstb.2010.0149
17. Khan, A., Khan, S., Jan, A. A., & Khan, M. (2017). Health complication caused by protein deficiency. *Journal of Food Science and Nutrition, 1*(1), 1-2. Retrieved from https://www.alliedacademies.org/articles/health-complication-caused-by-protein-deficiency.pdf
18. Kohls, R., Uhl, J., & Hurt, C. (2014). *Marketing of Agricultural Products* (848 p.). Upper Saddle River, NJ: Prentice Hall.
19. Leonidou, L. C., Katsikeas, C. S., & Samiee, S. (2002). Marketing strategy determinants of export performance: a meta-analysis. *Journal of Business Research, 55*(1), 51-67. https://doi.org/10.1016/S0148-2963(00)00133-8
20. Lin, F. (2015). Estimating the effect of the Internet on international trade. *Journal of International Trade and Economic Development, 24*(3), 409-428. https://doi.org/10.1080/09638199.2014.881906
21. Mathews, S., Bianchi, C., Perks, K. J., Healy, M., & Wickramasekera, R. (2016). Internet marketing capabilities and international market growth. *International Business Review, 25*(4), 820-830. https://doi.org/10.1016/j.ibusrev.2015.10.007
22. Morgan, N. A., Feng, H., & Whitler, K. A. (2018). Marketing Capabilities in International Marketing. *Journal of International Marketing, 26*(1), 61-95. https://doi.org/10.1509/jim.17.0056
23. Murugesan, S. V., & Rajarajan, M. (2016). Problems and Prospects of Agricultural Marketing. *International Journal of World Research, 1*(29), 45-50. Retrieved from http://apjor.com/ijrp/downloads/230720168.pdf
24. Norwood, B., & Lusk, J. (2007). *Agricultural marketing and price analysis* (464 p.). London: Pearson.
25. Powers, T. L., & Loyka, J. J. (2010). Adaptation of Marketing Mix Elements in International Markets. *Journal of Global Marketing, 23*(1), 65-79. https://doi.org/10.1080/08911760903442176
26. Rasouliazar, S., Perani, M., & Rashiedpour, L. (2015). Effective Strategies in Marketing Development of Agricultural Products. *International Journal of Agricultural Science Research and Technology in Extension and Education Systems, 5*(4), 211-220. Retrieved from http://ijasrt.iau-shoushtar.ac.ir/article_525391.html
27. Schwab, K. (Ed.) (2019). *The Global Competitiveness Report* 2019 (648 p.). Geneva: World Economic Forum. Official website. Retrieved from http://www3.weforum.org/docs/WEF_TheGlobalCompetitivenessReport2019.pdf
28. Skudiene, V., Auruskeviciene, V., & Sukeviciute, L. (2015). Internationalization model revisited: E-marketing approach. *Procedia – Social and Behavioral Sciences, 213,* 918-924. https://doi.org/10.1016/j.sbspro.2015.11.505
29. The Economic Research Service. (2020). *Agricultural Trade. The United States Department of Agriculture.* Official website. Retrieved from https://www.ers.usda.gov/
30. The WTO Agriculture Agreement. (2020). *Trade topics: the World Trade Organization.* Official website. Retrieved from https://www.wto.org/index.htm
31. Tomich, T. P., Lidder, P., Coley, M., Gollin, D., Meinzen-Dick, R., Webb, P., & Carberry, P. (2019). Food and agricultural innovation pathways for prosperity. *Agricultural Systems, 172,* 1-15. https://doi.org/10.1016/j.agsy.2018.01.002
32. Turner, R. J., & Thayer, J. F. (2001). *Introduction to Analysis of Variance: Design, Analysis & Interpretation* (192 p.). Thousand Oaks, CA: SAGE Publications, Inc.
33. Vasylieva, N. (2018). Ukrainian Agricultural Contribution to the World Food Security: Economic Problems and Prospects. *Montenegrin Journal of Economics, 14*(4), 215-224. https://doi.org/10.14254/1800-5845/2018.14-4.15
34. Vasylieva, N. (2019). Problems and Prospects of Food Security in Ukraine. *Bulgarian Journal of Agricultural Science, 25*(4), 668-676. Retrieved from http://www.agrojournal.org/25/04-08.pdf
35. Velychko, O., & Velychko, L. (2017). Logistical modelling of managerial decisions in social and marketing business systems. *Journal of International Studies, 10*(3), 206-219. https://doi.org/10.14254/2071-8330.2017/10-3/15
36. Xu, K. (2015). Why Are Agricultural Goods Not Traded More Intensively: High Trade Costs or Low Productivity Variations? *The World Economy, 38*(11), 1722-1743. https://doi.org/10.1111/twec.12232

APPENDIX A

Table A1. Market shares of top 10 exporters by animal products

Source: Composed by the authors.

Animal product	Countries in the descending order of export	Combined market share, %
Bacon and ham	Italy, Spain, Germany, the Netherlands, the USA, Denmark, Canada, Poland, Belgium, the United Kingdom	94
Pork	the USA, Germany, Canada, Spain, Brazil, Denmark, the Netherlands, Mexico, Poland, Austria	90
Butter, cow milk	New Zealand, the Netherlands, Ireland, Germany, Belgium, France, Poland, the United Kingdom, Denmark, Finland	84
Chicken meat, canned	Thailand, China, Germany, the Netherlands, Brazil, the USA, Belgium, Poland, France, Denmark	82
Beef and veal, boneless	Australia, the USA, Brazil, the Netherlands, Ireland, New Zealand, Canada, Uruguay, Argentina, Paraguay	82
Milk, whole dried	New Zealand, the Netherlands, Hong Kong, Uruguay, France, Germany, Australia, Oman, Argentina, Ireland	81
Chicken meat, fresh and frozen	Brazil, the USA, the Netherlands, Poland, Belgium, Hong Kong, Germany, Thailand, France, Turkey	80
Hen eggs in shell	The Netherlands, the USA, Turkey, Poland, Germany, Belgium, Spain, China, Malaysia, France	78
Pig meat, sausages	Germany, the USA, Italy, Spain, Austria, France, China, the Netherlands, Denmark, Belgium	75
Cheese, whole cow milk	Germany, the Netherlands, France, Italy, Denmark, the USA, New Zealand, Ireland, Belgium, the United Kingdom	74
Cattle meat, carcass	the USA, Poland, France, the Netherlands, Germany, Spain, Belgium, Mexico, Australia, Canada	73
Milk, whole fresh cow	Germany, France, Belgium, the Netherlands, the Czech Republic, the United Kingdom, Austria, Poland, Australia, New Zealand	64

http://dx.doi.org/10.21511/im.16(1).2020.08