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COMPARATIVE ANALYSIS OF SUGAR INDUSTRY DEVELOPMENT IN KAZAKHSTAN AND GERMANY

Germany has an effective experience in the development of the sugar industry, which allows the country to be fully self-sufficient with this type of product. The authors consider that this experience could be applied in Kazakhstan. To do this, a comparative analysis of the development of the sugar industry in Germany and Kazakhstan was conducted in the article in the following areas: production dynamics and its structure; sugar refineries revenue; cost of production; profitability of production; sugar price dynamics; production capacity use. After the comparative analysis preparation, the authors calculated differential indicators of the product competitiveness at a price and sales volumes in the local market, RXA (relative export advantage), RMA (relative import advantage) and RTA (relative trade advantage). The results obtained during the study revealed the main barriers that hinder the development of the sugar industry and increase its competitiveness in Kazakhstan. In order to address identified problems, relevant recommendations were made by the authors concerning to Germany's feasible experience of sugar industry development for Kazakhstan. The article may be useful for relevant national and government agencies of Kazakhstan in addressing the Concept of implementing the sectoral program for the development of sugar production for 2018-2027, as well as for the Eurasian Economic Commission in developing recommendations to support sugar production as a sensitive agricultural commodity.

Keywords: agroindustry, food industry, sugar industry, product competitiveness, enterprise profitability, relative export advantage, relative import advantage, relative trade advantage, Kazakhstan, Germany.

Кілт сөздер: агроөнеркәсіптік кешен, тамақ өнеркәсібі, қант өнеркәсібі, өнімнің бәсекеге қабілеттілігі, кәсіпорынның табыстылығы, экспорттың салыстырмалы артықшылығы, импорттың салыстырмалы артықшылығы, сауданың салыстырмалы артықшылығы, Қазақстан, Германия.

Ключевые слова: агропромышленный комплекс, пищевая промышленность, сахарная промышленность, конкурентоспособность продукции, прибыльность предприятия, относительное преимущество экспорта, относительное преимущество импорта, относительное торговое преимущество, Казахстан, Германия.

JEL classification: Q 13, Q 18, L 66

Introduction. The relevance of the research topic is due to the fact that sugar is one of the strategic food products and increasing the level of self-sufficiency and competitiveness of this product affects the country's food security and the stabilization of the food market. The main purpose of the research paper is to make recommendations on the acceptance of Germany experience by Kazakhstan regarding the sugar industry development and increasing its competitiveness. In order to achieve the mentioned goal of the research paper development trends of the sugar industries in Kazakhstan and Germany between 2015-2021 years were identified on the basis of secondary data comparison sourced from statistics committee database.

In the research paper the authors chose the differential method of Svetunkov and Litvinov

(2000) in order to assess product competitiveness:

$$Di_p = \frac{P_{b(r)}}{P_p}, \quad (1)$$

where Di_p – differential indicator of product competitiveness at a price;

P_p – product price;

$P_{b(r)}$ – base, reference price.

$$Di_v = \frac{V_m}{V_p}, \quad (2)$$

where Di_v – differential indicator of product competitiveness in terms of sales volume in the market;

V_m – manufacture volume;

V_p – total volume of products offered in the market.

* Compiled by the author according to the source [1].

It is important to use the minimum price in investigated market as the base (reference) price while calculating the differential indicator of product competitiveness concerning to the price.

Furthermore, for the purpose of determine the competitive advantages of sugar product in Kazakhstan and Germany, the export and import dates were collected from national committee of statistics. In this study the relative export advantage (RXA), relative import advantage (RMA), relative trade advantage (RTA) of refined sugar product were calculated using the following formulas:

$$RXA_{ij} = (X_{ij} / X_{it}) / (X_{nj} / X_{nt}), \quad (3)$$

$$RMA_{ij} = (M_{ij} / M_{it}) / (M_{nj} / M_{nt}), \quad (4)$$

$$RTA_{ij} = RXA_{ij} - RMA_{ij}, \quad (5)$$

where, X – exports; M – imports;

i – sugar product;

n – other products;

j – Kazakhstan/Germany;

t – other countries.

* Compiled by the author according to the source [2].

Overall, the product will have competitive advantage if a value of RXA is greater than one, and conversely a value of RMA is lower than one. Thus, higher RTA resulted higher competitiveness level of researched product in the market [2].

Literature review. Within the framework of the theoretical part of the competitiveness of agricultural sector, a significant number of scientific works were held by foreign and domestic scholars, such as Kokenova, et al. (2020), Tireuov, et al (2020), Tsaurkubule, et al. (2020), Zhussupov et al. (2020), OECD (2019) [3-7]. However, the applied aspects and specific features of the competitive environment in the sugar industry of Kazakhstan has not been explored to great extent and comparative analysis of sugar industry with foreign country has not been conducted, that increase the significance of this study.

Wimmer and Sauer (2020) evaluated sugar beet

farming’s productivity and profitability in Germany in the period 2004-2013 using a Lowe quantity index for this purpose. The results showed that sugar beet trade losses partly compensated by growth in total factor productivity. In addition, production reallocation contributed to the increase in sugar sector productivity varying across the regions. These findings are important for industry policy as sugar market becoming more liberalized [8].

On average, for any economy, the optimal level of self-sufficiency in strategic food products should be at least 75%. The level of self-sufficiency of the economy of Kazakhstan with sugar is characterized by a relatively low indicator, which was equal to 52% in 2021 [9]. This indicator is significantly lower than the same indicator in Germany, which was 153% [10]. Therefore, the main purpose of the work is to conduct a qualitative comprehensive analysis of the competitiveness level of the sugar industry product in Kazakhstan and Germany, through the quantitative and qualitative research methods, to identify the complex of economic problems that hinder the competitiveness and to determine the factors that influence this process.

Main body. The trend in refined sugar production is cyclical with a dynamic downward tendency in Kazakhstan, as shown in table 1. The maximum volume of white refined sugar production was in 2016 and amounted to almost 412 thous.t. Despite the negative dynamics of refined sugar production, as of 2020, the overall growth rate of its production was 277% in 2021.

Concerning Germany, the total volume of refined sugar production reached the highest rate in 2017 at the level of almost 5200 thous.t., which in turn exceeds the same indicator in Kazakhstan approximately 12 times. In the period from 2015 to 2017 the volume of production had an increasing trend, then in the period from 2017 to 2018 it decreased by around 1 mln t. In general, if we look at the long-term perspective, from 2015 to 2021, the volume of sugar production in Germany showed a positive trend.

Table 1

Dynamics of refined sugar (white sugar) production* (thous. tonnes)

Indicators	Years						
	2015	2016	2017	2018	2019	2020	2021
1	2	3	4	5	6	7	8
Kazakhstan							
Cane sugar	225,34	370,93	264,53	161,17	146,84	96,86	181,84
Beet sugar	17,65	40,90	57,60	75,46	62,09	50,66	95,10

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1	2	3	4	5	6	7	8
Total	242,99	411,83	322,13	236,63	208,93	147,52	276,94
Production growth rates, in %	-	169,50	78,20	73,50	88,30	70,60	187,70
Germany							
Cane sugar	20,92	23,96	32,74	26,67	27,28	26,35	28,82
Beet sugar	3299,17	3780,00	5164,49	4195,00	4302,90	4156,40	4545,60
Total	3320,09	3803,96	5197,23	4221,67	4330,18	4182,75	4574,42
Production growth rates, in %	-	114,57	136,63	81,23	102,57	96,60	109,36

* Own processing according to the source [11, 12]

It should be noted that in the structure of sugar production in Kazakhstan, the main share is occupied by the production of cane sugar, which is imported from foreign countries, mainly from Brazil. Despite the fact that more than 70% of refined sugar in Kazakhstan is produced from sugar cane, its production decreased by 43,5 thous.t. in the last seven years, whereas at the same time the production of refined sugar from sugar beet gradually increased by more than 77 thous.t. Research shows that in Germany, sugar is produced almost entirely from sugar beet of domestic production. The share of beet and cane sugar in the total volume of refined sugar production did not change much in the period under review.

Investigation of the cost price of sugar industry enterprises in Kazakhstan shows that despite the decline in production volumes, from 2017 to 2020,

there is an increase in specific production costs. The current situation fully corresponds to the economic law «economies of scale», as applied to the average industrial enterprise. The average unit cost of sugar production between 2015 and 2021 in Kazakhstan was 0,43 USD per kg or 431,85 USD per ton. In Germany the average unit cost of sugar production accumulated 0,51 USD per kg or 507,14 USD per ton. The cost of sugar production decreases in direct proportion to the increase in its production volume in Germany [10, 13].

In the study period, the production and economic activities of sugar industry enterprises is characterized by a relatively low profit, the maximum amount of which took place in 2016 in Kazakhstan (11,09 mln USD) and in 2017 in Germany (184,73 mln USD), table 2.

Table 2

Assessment of the dynamics of sugar refineries profits* (mln. USD)

Indicators	Years						
	2015	2016	2017	2018	2019	2020	2021
Kazakhstan							
Enterprise's revenue	177,81	234,66	150,55	110,72	94,28	62,55	134,78
Cost price	150,07	198,05	127,06	93,45	79,26	52,54	113,22
Value added tax	19,05	25,14	16,13	11,86	10,10	6,70	14,44
Profit	8,69	11,47	7,36	5,41	4,92	3,31	7,12
Germany							
Enterprise's revenue	2690,69	2791,60	3172,77	2913,98	2488,59	2469,63	3057,36
Cost price	2042,25	2022,43	2331,15	2271,09	1943,58	1924,66	2322,53
Value added tax	530,72	600,09	656,72	576,92	503,00	502,95	623,17
Profit	117,72	169,43	184,73	65,70	41,84	42,02	111,66

* Own processing according to the source [9, 10, 13]

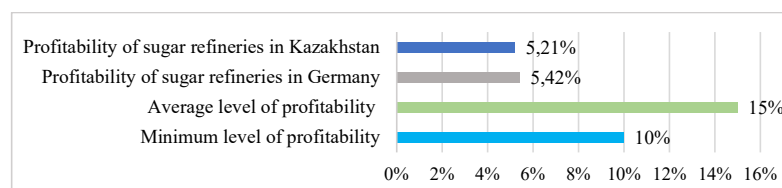


Figure 1. Comparison of the average profitability of sugar refineries with the theoretical and normative indicators of profitability of food industry enterprises

* Own processing according to the source [10, 12, 13].

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Comparing the profit and cost price of sugar refineries allows us to assess the profitability of their production. Studies show that, the average profitability level in the study period in Kazakhstan and Germany accumulated only 5,21 and 5,42 % respectively, which, in accordance with figure 1, does not correspond to the average standard and minimum threshold profitability for food industry enterprises.

The study of the dynamics of refined sugar prices in Kazakhstan shows that the maximum price in national currency was in 2021 (207 672 KZT per t.), while the highest price in foreign currency was in 2015 (732 USD per t.). Refined sugar prices in Kazakhstan have a positive growth trend in the national currency and a declining trend in USD, which is due to the high volatility of the exchange rate of the national currency. Concerning Germany, refined sugar prices have declining tendency in both currencies, with highest price in 2015 and the lowest in 2020. The average price of refined sugar in national currency amounts to 458,50 EUR per t. and in foreign currency 521,09 USD per t. [10, 13].

The decrease in the volume of sugar production caused a decrease in the level of utilization of the production capacity. The average production capacity in Kazakhstan is 61,4%. As of 2020, the production capacity utilization rate is 36,3%. The failure of industrial enterprises to reach full production

capacity causes their system downtime, including seasonal downtime. Regarding Germany the average sugar production capacity utilization is 86,9% in the study period. Sugar producers in Germany tended to maximize the use of production capacity thereby saving on the scale effect of production [10, 12].

Results. The reference price as of 2021 is 414,31 USD per t. Manufacturer selling price for white refined sugar in Kazakhstan is 486,69 USD per t. Differential indicator of competitiveness of white refined sugar produced in Kazakhstan at a price is 85,13% [13].

Concerning Germany, the reference price as of 2021 is 476,72 USD per t., whereas manufacturer selling price for white refined sugar is 479,36 USD per t. Differential indicator of competitiveness of white refined sugar produced in Germany at a price is 99,45% [10].

It can be seen, through the calculations of the product competitiveness at a price, that sugar products produced in Kazakhstan and Germany have a relatively good competitiveness (higher 85%). Meanwhile, in terms of sales volumes, the competitiveness levels of sugar produced in Kazakhstan and Germany are different. According to table 3, there is a low competitiveness of refined sugar in Kazakhstan at the level 52,0% and a high competitiveness in Germany at the level of 90,8%.

Table 3

Calculation of the differential indicators of sugar competitiveness in terms of sales in the market in 2021*

Indicators	Kazakhstan	Germany
Refined sugar production volume, thous.t.	276,94	4574,42
The total volume of sugar product offered in the local market, thous.t.	532,91	5036,89
Competitiveness of white refined sugar in terms of sales volumes, %	52,00	90,80

* Own processing according to the table 1 and source [10]

Table 4

Calculation of the RXA, RMA, RTA for 2020*

Country	Total all commodities export (mln USD)	Total all commodities import (mln USD)	Sugar export (mln USD)	Sugar import (mln USD)	RXA	RMA	RTA
Kazakhstan	46949,20	38081,41	12,93	180,77	0,20	3,98	-3,78
Germany	1385852,26	1173167,33	633,86	359,62	0,34	0,26	0,08
World	16983483,58	17126530,36	23133,58	20432,95	-	-	-

* Own processing according to the source [14]

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As it was previously noted in the theoretical part of the research paper, RXA value greater than zero indicates that the country has a comparative advantage in the export of a certain type of product. In the case under consideration, both countries Germany and Kazakhstan have indicators below zero for RXA of white refined sugar, however, this indicator is higher in Germany than in Kazakhstan. This suggests that Germany has a higher volume of sugar production and a higher level of self-sufficiency with this type of product, thus supplying rest of the sugar product for the export to third countries. Concerning import volumes, the lower RMA indicates higher relative advantage of the country in the import of a particular product. Due to the lack of raw materials for sugar production, the total volume of sugar in Kazakhstan does not allow the country to meet local demand, and this leads to a high volume of sugar imports. Current situation reflects the final RTA, in Germany at the level of 0,08 and in Kazakhstan at the level of - 3,78. In turn, the RTA value less than zero is interpreted as a «comparative disadvantage» in the trade of studied product. Germany where sugar industries have been facing a strong public support from the government shows higher RTA, whereas Kazakhstan presents great comparative disadvantage in the trade of refined sugar in 2020.

Conclusion. The assessment of the sugar refineries activities in Kazakhstan resulted in a range of economic problems inheriting in their production and business processes: a significant decline in sugar production, the absence of sugar refineries at full capacity, the relatively low level of profitability of production, the dynamic growth of prices for finished goods. To solve these problems, as well as to increase the competitiveness of sugar industry product, Kazakhstan should draw attention to the beneficial experience of Germany sugar industry development. Thus, the main success factors of the German sugar industry are:

- adaptation of the product assortment to market conditions. By offering healthier products certified according to the principle of fair trade, sugar producers can adapt their assortment to the increased awareness of health and environmental friendliness.

- optimal utilization of production capacities. Sugar refineries that use their production facilities to a large extent or completely can benefit from lower unit costs and thus increase their profits.

- proximity to the main markets. Geographical proximity to important consumer markets helps to minimize transportation costs and strengthen relationships with customers.

- proximity to important suppliers. Proximity to sugar beet and sugar cane suppliers is a crucial factor due to perishable raw materials and the costs associated with long transport routes.

- transfer of an increase in value. The ability to pass on the increased production costs that arise as a result of increased purchase prices for sugar beet or sugar cane to buyers through sales prices is crucial for the profitability of sugar producers [15].

In addition, the sugar market regime in Germany that consists of a set of rules, such as quotas, tariffs and subsidies to protect domestic sugar production and the cultivation of sugar beet. As a result, Germany, which had previously been a net importer, turned into a sugar exporter. Consequently, it is relevant for Kazakhstan to continue providing financial support to the industry and increase the acreage of sugar beet. However, the financial supports of the industry alone will not help until it gets back on track. Currently Kazakhstan needs to protect its sugar market through the state regulation measures by setting a minimum price and ensuring stable prices in this industry. Also, it is necessary to introduce protective customs duties and quotas for the import of white sugar from third countries and prohibit the purchase of sugar for state needs from non-local producers.

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**ҚАЗАҚСТАН МЕН ГЕРМАНИЯДАҒЫ ҚАНТ
ӨНЕРКӘСІБІНІҢ ДАМУЫН САЛЫСТЫРМАЛЫ ТАЛДАУ**

Аңдатпа

Германияның қант өнеркәсібін дамытуда тиімді тәжірибесі бар, бұл елге өнімнің осы түрімен өзін толық қамтамасыз етуге мүмкіндік береді. Авторлар бұл тәжірибені Қазақстанда қолдану қант өнімінің бәсекеге қабілеттілігін арттыруға өз септігін тигізеді деп пайымдайды. Бұл үшін мақалада келесі бағыттар бойынша Германия мен Қазақстанның қант өнеркәсібінің дамуына салыстырмалы талдау жүргізілді: өндіріс динамикасы және оның құрылымы; қант зауыттарының түсімі; өнімнің өзіндік құны; өндіріс рентабельділігі; қант бағасының динамикасы; өндірістік қуаттарды пайдалану деңгейі зерттелді. Салыстырмалы талдау жүргізгеннен кейін авторлар жергілікті нарықтағы сату бағасы мен көлемі бойынша өнімнің бәсекеге қабілеттілігінің дифференциалды көрсеткіштерін, ЭСА (экспорттың салыстырмалы артықшылығы), ИСА (импорттың салыстырмалы артықшылығы) және ССА (салыстырмалы сауда артықшылығы) есептеді. Зерттеу барысында алынған нәтижелер қант өнеркәсібінің дамуына және оның Қазақстанда бәсекеге қабілеттілігін арттыруға кедергі келтіретін негізгі мәселелерді анықтауға мүмкіндік берді. Анықталған мәселелерді шешу мақсатында авторлар Қазақстан үшін қант өнеркәсібін дамытуда Германияның тәжірибесін қолдануға қатысты тиісті ұсынымдар берді. Мақала Қазақстанның тиісті ұлттық және мемлекеттік органдарына 2018-2027 жылдарға арналған қант өндірісін дамытудың салалық бағдарламасын іске асыру тұжырымдамасын қарастыру кезінде, сондай-ақ Еуразиялық экономикалық комиссия үшін сезімтал ауыл шаруашылығы тауары ретінде қант өндірісін қолдау жөніндегі ұсынымдарды әзірлеу кезінде пайдалы болуы мүмкін.

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**СРАВНИТЕЛЬНЫЙ АНАЛИЗ РАЗВИТИЯ
САХАРНОЙ ПРОМЫШЛЕННОСТИ В КАЗАХСТАНЕ И ГЕРМАНИИ**

Аннотация

Германия имеет эффективный опыт в развитии сахарной промышленности, что позволяет стране полностью обеспечивать себя этим видом продукции. Авторы полагают, что применение данного опыта в Казахстане приведет к повышению конкурентоспособности сахарной продукции. Для этого в статье был проведен сравнительный анализ развития сахарной промышленности Германии и Казахстана по следующим направлениям: динамика производства и его структура; выручка сахарных заводов; себестоимость продукции; рентабельность производства; динамика цен на сахар; уровень использований производственных мощностей. После проведения сравнительного анализа авторы рассчитали дифференциальные показатели конкурентоспособности продукта по цене и объемам продаж на местном рынке, ОПЭ (относительное преимущество экспорта), ОПИ (относительное преимущество импорта) и ОТП (относительное торговое преимущество). Результаты, полученные в ходе исследования, позволили выявить основные барьеры, препятствующие развитию сахарной промышленности и повышению ее конкурентоспособности в Казахстане. В целях решения выявленных проблем авторами были даны соответствующие рекомендации относительно применения опыта Германии в развитии сахарной промышленности для Казахстана. Статья может быть полезна соответствующим национальным и государственным органам Казахстана при рассмотрении Концепции реализации отраслевой программы развития сахарного производства на 2018-2027 годы, а также для Евразийской экономической комиссии при разработке рекомендаций по поддержке производства сахара как чувствительного сельскохозяйственного товара..

