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Analysis and evaluation of indicators of the development of the food industry of Kazakhstan

Abstract

Object: For any state, the development of the food and processing industry is a strategically important task, since this industry is responsible for ensuring food security. The study of the development of the food industry is relevant today due to the fact that there is an uneven development of the territory due to the geographical location of the regions, the level of technological development and innovation potential. The results of the functioning of food industry enterprises in conditions of fierce competition are largely determined by the pace of introduction of scientific and technological progress into production, which makes it possible to produce products in demand, reduce their cost, increase profits and profitability. For the normal functioning of food industry enterprises and ensuring food security, it is necessary to increase the level of use of innovative technologies and more productive equipment.

Methods: A historical, statistical, systematic and comparative, regression analyses, graphical methods of displaying the study results.

Results: This paper analyzes the main indicators of the food industry, the use of fixed assets and investments. In the industry, due to the fact that some of the fixed assets used in the industry are worn out, an analysis of the impact of investments on the production volumes of the food industry is considered.

Conclusions: The paper analyzes the influence of factors on the volume of production. According to the study results when investing in the next three years, the option of an increase in manufacturing output by 16.5% is possible.

Keywords: food industry, agri-food policy, agriculture, food production, drinks production, investments, forecast, indicators.

Introduction

The development of the food industry in any country is one of the strategically important sectors of the economy and the largest consumer of agricultural products. Therefore, today, the Government aims to increase the competitiveness of the agriculture and food industry to ensure their development. For this purpose, state programs are being developed and implemented aimed at supporting producers through subsidies, assistance in the acquisition of fixed assets, etc. The pandemic coronavirus infection has shown how important the development of the food industry is, providing the population with food. The study of the development of the food industry is relevant, and the purpose of this work is to identify the impact of investments on the development of the industry. Accordingly, the following tasks are set: a literary review and study of theoretical aspects of the development of the food industry; analysis of the main indicators of the industry; identification of the impact of investments on the indicators of the development of the food industry using regression analysis. The hypothesis of the study is that there is a relationship between investment and the development of the food industry.

Literature Review

Today, in a period of rapidly changing economic conditions, it is necessary to pay special attention to the development of investment and improvement of the material and technical base of the food industry as a priority industry. Improving the mechanism for managing fixed assets and investing in fixed

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assets is an urgent scientific problem. Effective use of fixed assets creates prerequisites for the growth of almost all economic indicators of the industry. The food industry is closely connected with agriculture, respectively, the contribution of investments in the food industry will lead to the improvement of agriculture. Industrially developed and socially oriented states see the basis for a cardinal improvement in the quality of life of the population in improving the efficiency of the food industry and the agro-industrial complex as a whole.

Being a part of the agro-industrial complex, the food industry is one of the industries that most urgently needs to attract the optimal amount of investment resources (Nagovitsyna, 2014).

The food industry has been used to transform agricultural products into edible, safe, healthy, and nutritious foods, as well as to preserve food. Food processing is not only an important tool in providing nutrition to the population, but also, affects the global problem of food security and sustainability (Knorr & Augustin, 2021).

Considering the process of development of the food industry, it can be seen that initially, during the transition to market relations, for a number of reasons, there was a decline in investment activity, which led to the difficulty of adapting enterprises to these conditions.

A simplified idea was made that market mechanisms are able to independently cope with the organization of the functioning of the socio-economic complex. It must be admitted that the absence of the apparatus and mechanisms of state regulation at that time gave rise to uncertainty about the economic situation in the country, had a negative impact on the development of all spheres of the economy, including investment activity. The redistribution of property has not formed a layer of effective private owners. This is one of the reasons for the sharp decline in investments in fixed assets, both private and public.

The volume of investments attracted in the process of privatization was insufficient for industrial, technological, and social development. The sharp decline in production undermined the financial stability of enterprises, limited the possibilities of investment financing at the expense of their main own sources – profit and depreciation. Revaluation of fixed assets lagged behind the rate of inflation. Most enterprises did not have their own funds to invest in not only expanded but also simple reproduction (Kaishev, 2005).

In his work, A.M. Kopylov identifies the following problems of food producers (Gurkov, 2007): the possibilities of updating fixed assets at the expense of external sources have narrowed, gaps in legislation in practice have led to numerous raider seizures of agricultural land, investment programs at all stages of food production have been curtailed (stopping the opening of new production facilities, the inability to expand retail space, braking innovation processes, etc.).

Marco V. Sánchez, Martín Cicowiez, Araceli Ortega note the need to allocate public investment in production infrastructure. They believe that “not only investments should be a priority in these sectors, but the government should also finance them through external borrowing in order to accelerate recovery and prevent short-term macroeconomic compromises with domestic financing” (Sánchez, Cicowiez, & Ortega, 2022).

In the study conducted by Wawrzyniec Czubak, Krzysztof Piotr Pawłowski, Arkadiusz Sadowski, two analytical measurements were used “to determine groups of farms in accordance with the use of public funds for co-financing investment expenditures in agriculture and the scale (complexity) of investments made” (Czubak, Pawłowski, & Sadowski, 2021). According to the research results, it was revealed that in those farms where complex investment was carried out, they were able to increase their technical efficiency during the study period.

Earlier in the literature, it was said that investments do not affect the state of technology in the economy in any way (Solow, 1957; Salter, 1960), but most scientists study the impact of investment in fixed assets, on productivity and, accordingly, on the economic performance of an enterprise or industry. At the same time, the authors take into account feedback, that is, an increase in labor productivity can lead to a decrease in investment in fixed assets. However, the condition of equipment in the food industry is assessed by a high degree of deterioration, so it is necessary to pay great attention to this since the efficiency of enterprises depends directly on the state of fixed assets.

Some authors note that the fragmented nature of agricultural production systems and supply chains, the lack of a reliable database of scientific data and well-developed tools for using knowledge in investment decision-making processes constrain the inflow of investments into the food and agricultural sector (Negra et al., 2020).

Within the framework of improving the efficiency of the functioning of the food industry, it will be useful to apply the approaches proposed by Brouwer et al., showing in practice anti-crisis measures for managing food systems (Brouwer, McDermott, & Ruben, 2020). The development of the food industry should take

place in a close relationship with agriculture, reflect the priorities of agri-food policy, while it is possible to apply comprehensive actions and measurements related to food safety and nutrition offered by (Nordhagen et al., 2022).

Methods

During the study, the following research methods were used: historical, statistical, comparative, regression analysis, and graphical methods of displaying the results were also used.

When discussing the results of the functioning of the food industry, the following methods were used: analysis, synthesis, clarification, generalization.

The experimental basis of the study was the main indicators of the development of the food industry, as well as data from enterprises operating in the industry. An assessment of the impact of investments in fixed assets on production volumes was carried out and a forecast for 3 years was calculated. The results of the study were summarized and systematized, prospects for the development of the food industry were outlined.

Results

To consider the production volumes of food industry products we examine three productions of the food industry provided in the general classifier of economic activities of the Republic of Kazakhstan. Table 1 demonstrates the dynamics over 5 years for the production of food, beverages, and tobacco products.

Table 1. Dynamics of production volumes of the food industry, million tenge.

Name of indicators	2016	2017	2018	2019	2020	growth	
						+/-	%
Manufacturing industry	8046845	9400848	10403854	11573350	13232696	5185851,00	64,45
Food industry	1808616	1943736	1995101	2218996	2612259	803643,00	44,43
Food production	1448386	1525814	1527687	1708013	1957241	508855,00	35,13
Production of drinks	254294	311675	343794	398492	443428	189134,00	74,38
Production of tobacco products	105936	106247	123620	112491	211590	105654,00	99,73
Note – Compiled by the authors on the basis of data from the National Bureau of Statistics							

It can be seen from Table 1 that the volume of production of food industry products is increasing annually; the increase in production compared to the baseline indicator amounted to 5185,851 million tenge or 64.45%. Basically, the increase is observed in the production of food and this is natural since there is an increase in the population and an increase in demand for products of domestic producers. For a more complete picture and development of recommendations, consider the main indicators of the food industry.

The number of food production enterprises over the past year decreased by 6 enterprises compared to the previous year, 17 enterprises for the production of beverages increased, and tobacco production enterprises remain at the same level as before. Compared with the indicators of 2016, the number of food production enterprises decreased by 63. A sharp decline in enterprises was observed in 2017 and this is due to the fact that many enterprises were unable to withstand competition, as well as due to a lack of experience in farming.

Let us look at the number of enterprises in the context of economic activity for 2020 in Figure 1. According to the figure, it can be seen that the largest number of enterprises are engaged in the production of bakery, pasta and confectionery products – 420 units. 395 enterprises are engaged in the processing and preservation of meat and the production of meat products.

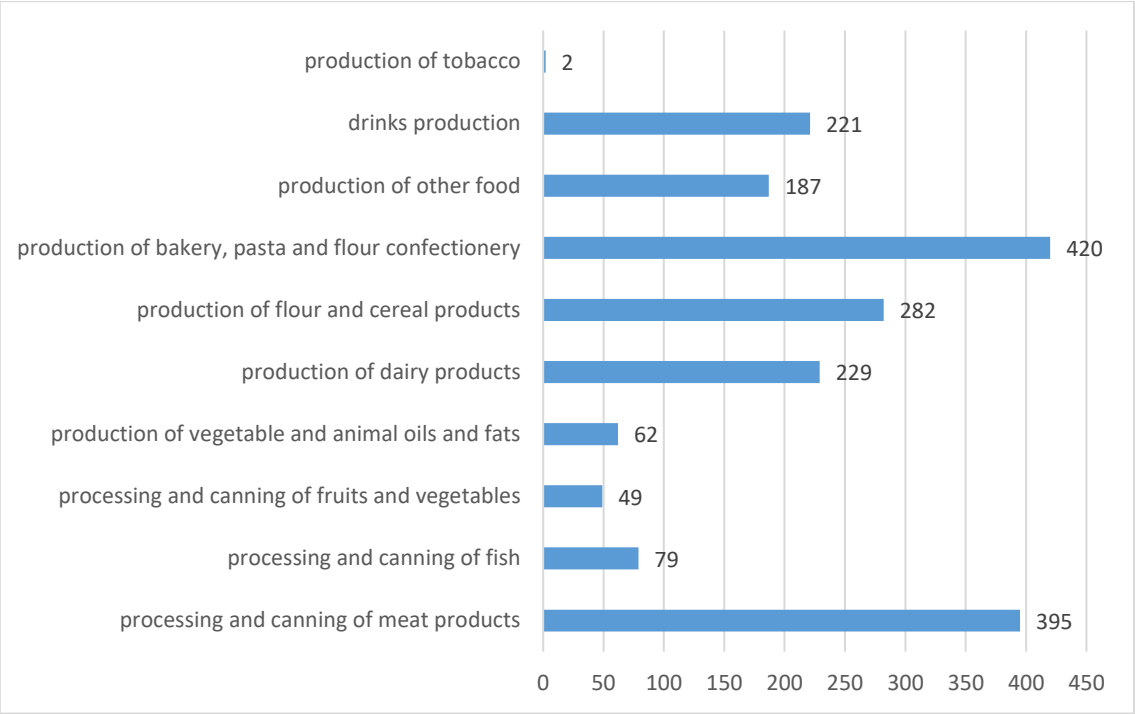

Figure 1. Number of enterprises and industries by type of economic activity for 2020

Note – Compiled by the authors on the basis of data from the Bureau of National statistics

The structure also shows that the largest volume of production is occupied by food production – 75%, beverage production – 17%, and tobacco production – 8%.

Let us now consider food production in the context of types of products according to Figure 2.

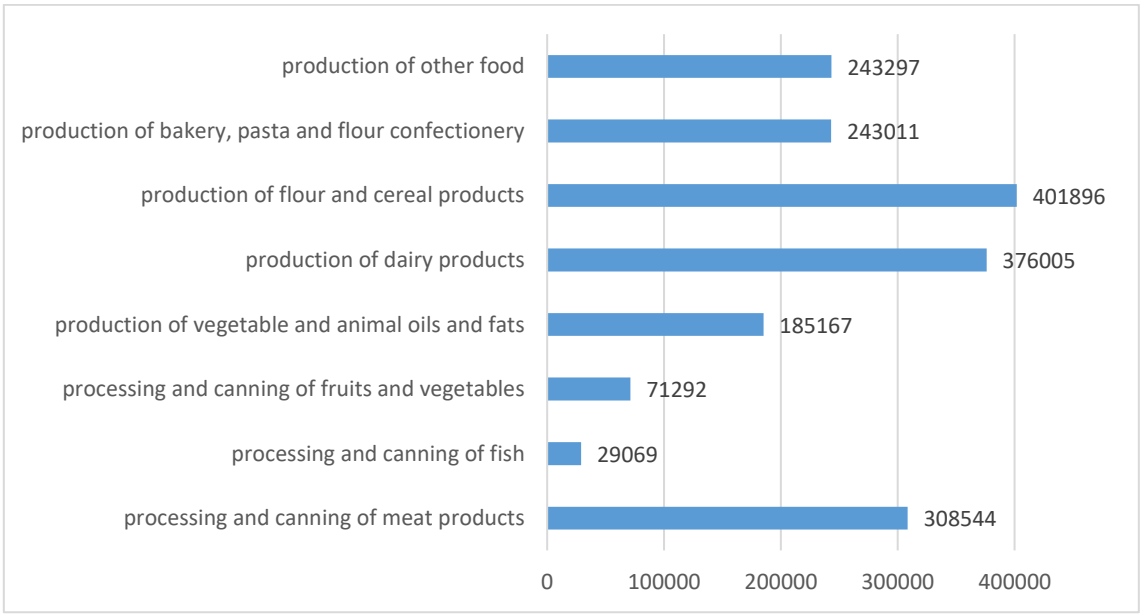

Figure 2. Food production for 2020, million tenge

Note – Compiled by the authors on the basis of data from the Bureau of National statistics

Thus, Figure 2 shows that the largest volume of food production falls on the production of flour and cereals, starches and starch products and amounted to 401,896 million tenge. The smallest amount falls on the processing and preservation of fish, crustaceans, shellfish.

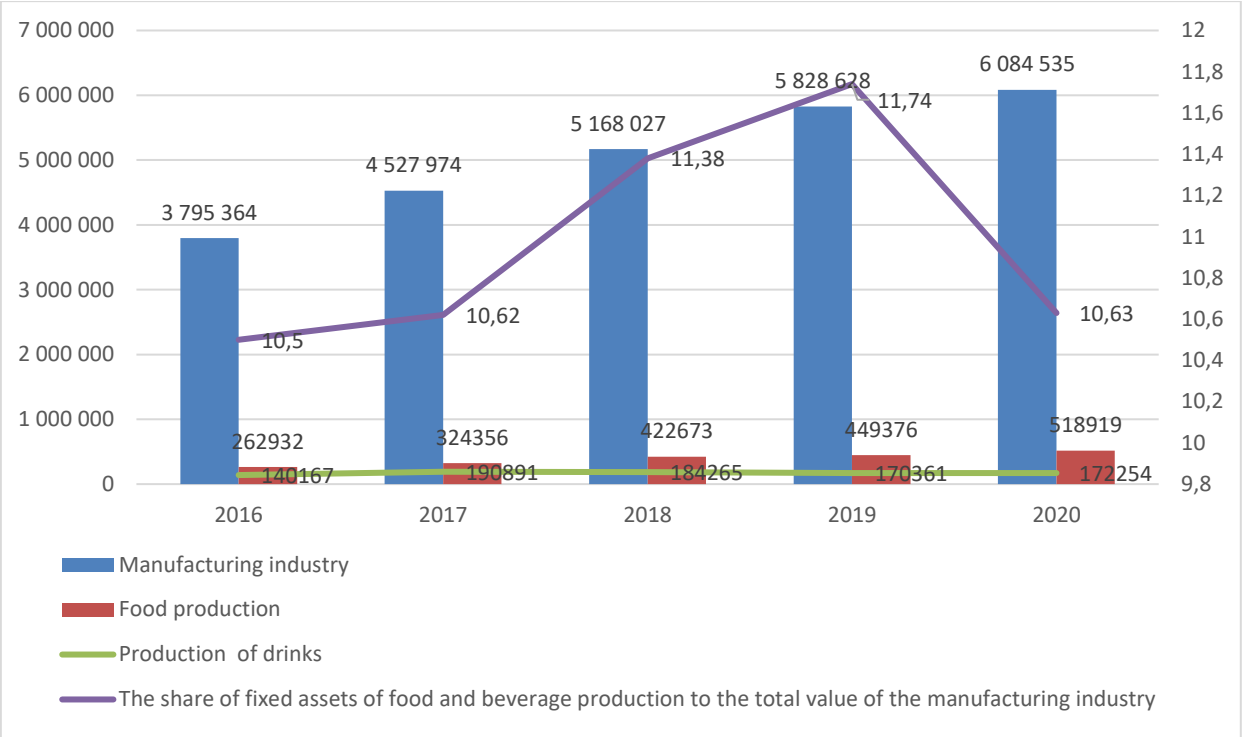

Figure 3. Dynamics of the availability of fixed assets on the balance sheet (net of depreciation) cost, million tenge

Note – Compiled by the authors on the basis of data from the Bureau of National statistics

Figure 3 illustrates the dynamics of fixed assets by book value and their share in the value of fixed assets of the manufacturing industry. According to these data, it can be seen that the share of fixed assets is 11%. The cost of fixed assets for food production increases annually, and for the production of beverages, the cost has increased over the past year by more than 2000 million tenge.

The following figure shows the indicators of the use of fixed assets for food production, since this direction occupies a large share in the food industry.

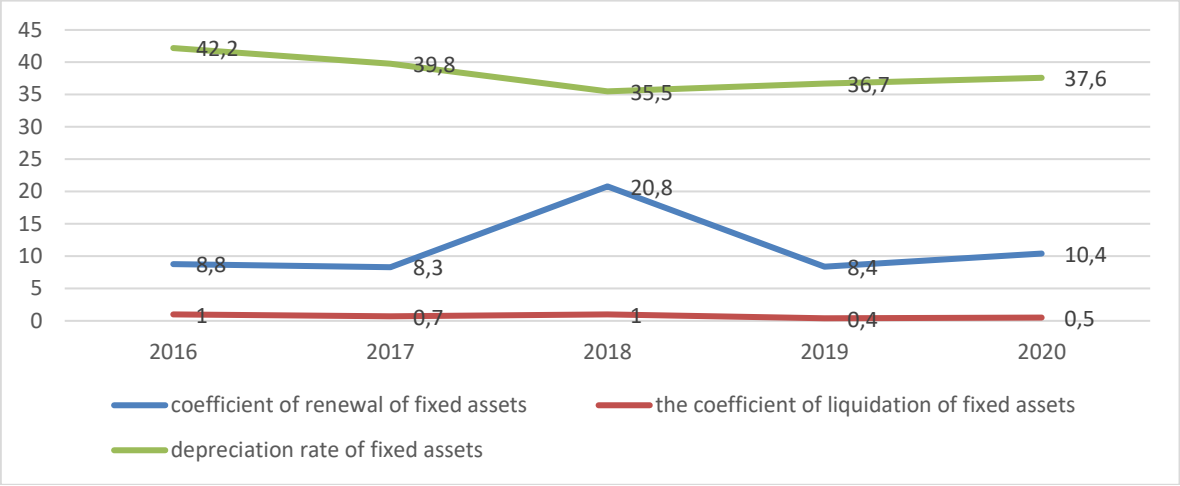

Figure 4. Dynamics of indicators of the use of fixed assets of food production

Note – Compiled by the authors on the basis of data from the Bureau of National statistics

As can be seen from Figure 4, more than 37% of fixed assets are worn out, and over the past year this indicator has increased by 0.9% compared to the previous year. During the period under review, the maximum renewal of fixed assets was observed in 2018 and amounted to 20.8%, and in 2020 the percentage of renewal was 10.4.

To consider the main indicators of the financial performance of food industry enterprises, we designate the dynamics of profit and profitability in Figure 5.

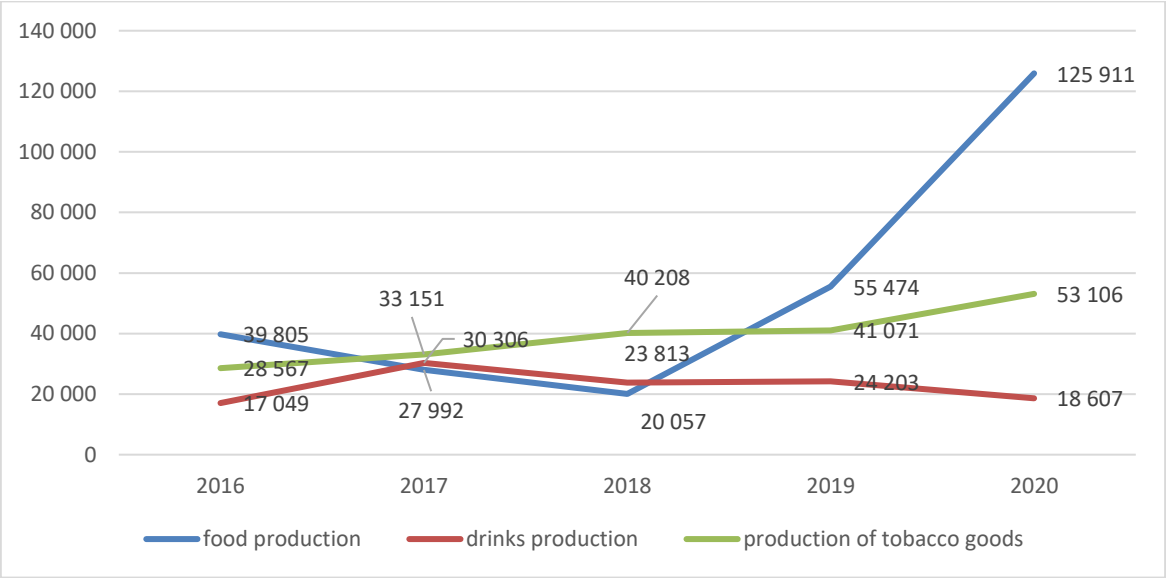

Figure 5. Profit (loss) before taxation, million tenge

Note – Compiled by the authors on the basis of data from the Bureau of National statistics

Profit on food production in 2020 compared to the indicator of 2019 increased by 70437 million tenge or 2.26 times. The profit on the production of tobacco products increased by 12035 million tenge. While the profit from the production of beverages decreased by 5596 million tenge due to quarantine measures during the pandemic and the suspension of the activities of public catering facilities.

The profitability of the production of products in recent years has been heterogeneous. We see an increase in profitability in 2019 and 2020, which is due both to an increase in production volumes and also to an increase in productivity in the industry.

Further, one of the indicators that affect the efficiency of any industry is investment in fixed assets. Figure 6 shows the dynamics of investments by types of food industry production.

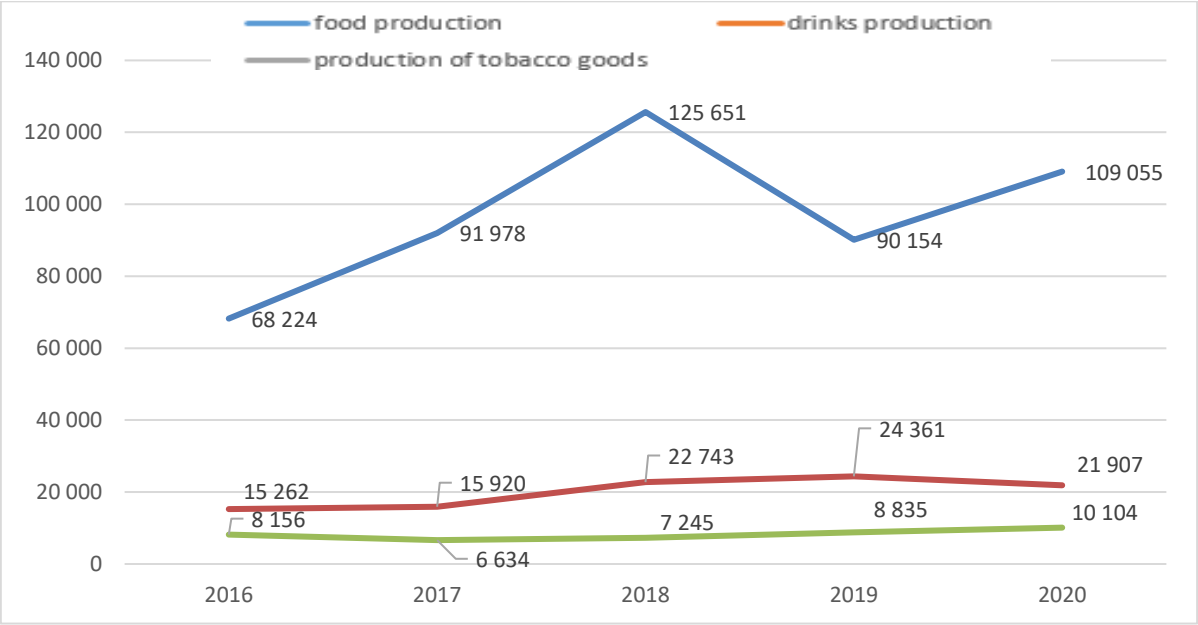

Figure 6. Dynamics of investments in fixed assets, million tenge

Note – Compiled by the authors on the basis of data from the Bureau of National statistics

In 2020, the volume of investments in the production of food and tobacco products increased and amounted to 18901 and 1269 million tenge, respectively. Investments in the production of beverages decreased by 2454 million tenge. In general, according to the results of the year, the geographically developed regions in terms of investment activity in food production enterprises are the Almaty and Akmola regions, while for these years, investments directed to food production enterprises occupy the largest share in the structure of investments in fixed assets.

Summing up the results of the analysis of indicators of the food industry, the following conclusions can be drawn: the number of operating enterprises operating in the food industry has increased, the production of food, beverages and tobacco products has increased, investments in fixed assets of food industry enterprises have increased, loans sent by second-tier banks to the food industry have increased.

Discussions

Regression analysis is a set of statistical methods for evaluating relationships between variables. It can be used to assess the degree of relationship between variables and to model future dependence. Linear regression is a simple but powerful tool that can significantly facilitate the work of an analyst when studying factors affecting certain indicators. In our example, we took the volume of production of the food industry as a dependent variable, and investments in fixed assets, the number of food industry enterprises and the book value of fixed assets of food industry enterprises as independent variables (Mylnikov & Kulikova, 2013). The initial data for the calculation of the regression analysis is given in Table 5.

Table 5. Initial data for regression analysis

Years	Production of food industry products, million tenge	Investments in fixed assets, million tenge	Number of food industry enterprises, units	Book value of fixed assets, million tenge
2016	1808616	91642	2041	403099
2017	1943736	114532	2101	515247
2018	1995101	155639	1951	606938
2019	2218996	123350	1990	619737
2020	2612259	141066	2001	691173

Tables 6–9 show the results of the calculation carried out using MS Excel.

Table 6. Output of results

Regression statistics	
Multiple R	0,947018
R-square	0,896843
Normalized R-square	0,58737
Standard error	202027,2

Table 7. Monitoring

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	3,55E+11	1,18E+11	2,897973	0,401797
Remains	1	4,08E+10	4,08E+10		
Total	4	3,96E+11			

Table 8. Analysis of variance

	Coeffi-cients	Standard error	*t*- statistics	*P*- Value	Lower *95%*	Upper *95%*	Upper *95,0%*	Lower *95,0%*
Y- intersection	995119	5525294	0,180102	0,886559	-6,9E+07	71200636,	-6,9E+07	71200637
Variable X_1	-8,80949	8,629858	-1,02082	0,493443	-118,462	100,843	-118,462	100,8433
Variable X_2	-45,3735	2480,755	-0,01829	0,988357	-31566,4	31475,610	-31566,4	31475,61
Variable X_3	4,082026	1,660335	2,458555	0,24593	-17,0145	25,178582	-17,0145	25,17858

Table 9. Output of the remainder

Monitoring	*Predicted Y*	*Remains*	*Standard balances*
1	1740653	67963,03	0,672811
2	1994072	-50336,4	-0,49831
3	2013032	-17930,8	-0,17751
4	2347958	-128962	-1,27668
5	2482993	129265,8	1,279687

According to the analysis results, it can be seen that the multiple correlation coefficient and the R-square are equal to 0.94 and 0.89, which confirms the quality of the constructed model.

The coefficient of -8.81 shows that investments within this model affect the production volumes of the food industry with a weight of -8.81. The "-" sign indicates a negative impact: the less investment, the smaller the production volumes of the food industry.

The coefficients 45.37 show that the smaller the number of food industry enterprises, the smaller the production volumes. Finally, if we increase the cost of fixed capital, that is, upgrade fixed assets, then the volume of production of the food industry will increase by 4.08 million tenge.

This model can be used to detect trends and make forecasts. Figure 7 presents a forecast for the next three years.

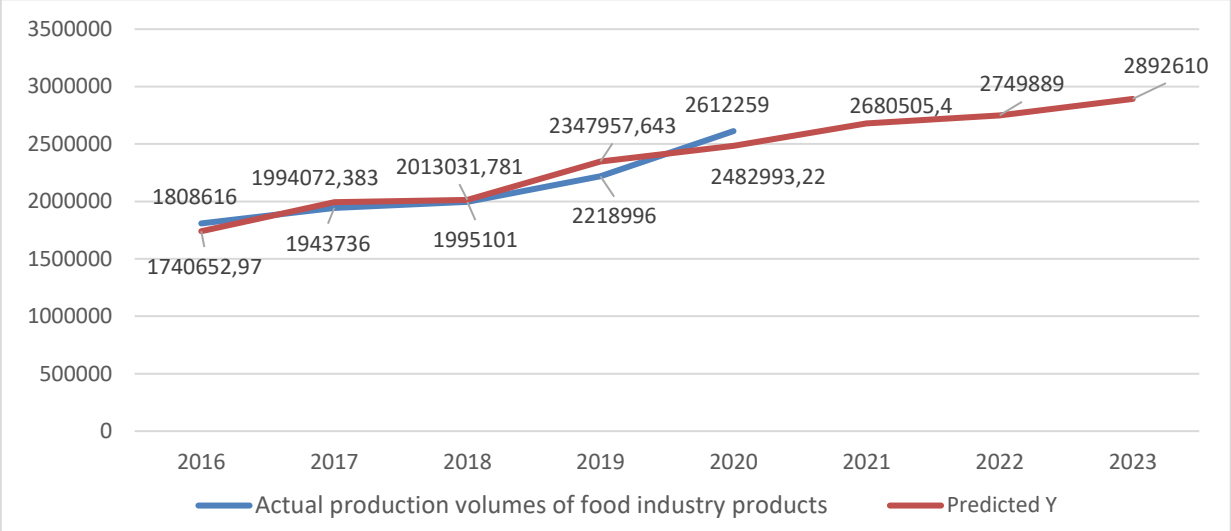

Figure 7. Calculation of forecast values of the volume of production of food industry products

Note – Compiled by the author

Conclusions

Analysis results show that the volume of production of food products is growing annually, the largest share (75%) in it is occupied by food production. For fixed assets, although we see that the cost is growing, however, there is also a large deterioration of equipment. According to statistics, investment in fixed assets is growing annually, but there is still 43.7% deterioration in equipment and machines. Financial indicators in recent years show positive dynamics, only a decrease is observed in the production of beverages, this is due to a decrease in the number of enterprises. Based on the calculation data, it can be seen that investments and the use of fixed assets directly affect the production of food products. Thus, it is necessary to pay attention to the issues of increasing the indicators of the use of fixed assets, namely the shelf life. The improvement of these indicators will lead to an increase in the number of products produced by the food industry.

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Қазақстанның тамақ өнеркәсібінің даму көрсеткіштерін талдау және бағалау

Аңдатпа

Мақсаты. Кез келген мемлекет үшін азық-түлік және қайта өңдеу өнеркәсібін дамыту стратегиялық маңызды міндет болып табылады, өйткені бұл сала азық-түлік қауіпсіздігін қамтамасыз етуге жауап береді. Тамақ өнеркәсібінің дамуын зерттеу бүгінгі таңда өңірлердің географиялық орналасуына, технологиялық даму деңгейіне және инновациялық әлеуетке сәйкес аумақтың біркелкі дамымауына байланысты өзекті. Қатаң бәсекелестік жағдайында тамақ өнеркәсібі кәсіпорындарының жұмыс істеу нәтижелері көбінесе сұранысқа ие өнімдер шығаруға, оның өзіндік құнын төмендетуге, пайда мен рентабельділікті арттыруға мүмкіндік беретін өндіріске ғылыми-техникалық прогресті енгізу қарқынымен анықталады. Тамақ өнеркәсібі кәсіпорындарының қалыпты жұмыс істеуі және азық-түлік қауіпсіздігін қамтамасыз ету үшін инновациялық технологиялар мен анағұрлым өнімді техниканы пайдалану деңгейін арттыру қажет.

Әдістері. Мақалада зерттеудің мына әдістері қолданылған: тарихи, статистикалық, жүйелік және салыстырмалы талдау.

Нәтижелері. Жалпы, техникалық әлеует негізгі қорлармен тікелей байланысты, сондықтан осы мақалада тамақ өнеркәсібінің негізгі көрсеткіштеріне, негізгі қорлар мен инвестицияларды пайдалануға талдау жасалған. Салада пайдаланылатын негізгі қорлардың бір бөлігі тозғандықтан, инвестициялардың тамақ өнеркәсібі өндірісінің көлеміне әсерін талдау қаралды.

Тұжырымдар: Жұмыста өнім өндірісінің көлеміне факторлардың әсерін талдау жүргізілді және есептік деректер бойынша алдағы үш жылға инвестициялау кезінде өңдеу өнеркәсібі өнімінің 16,5% -ға өсу мүмкіндігі болуы мүмкін.

Кілт сөздер: тамақ өнеркәсібі, аграрлық азық-түлік саясаты, ауыл шаруашылығы, тамақ өндірісі, сусындар өндірісі, инвестициялар, болжам, көрсеткіштер.

Р. Байжолова, Г. Шмарловская, Д. Саржанов, Ж. Амангельдиева

Анализ и оценка показателей развития пищевой промышленности Казахстана

Аннотация

Цель. Для любого государства развитие пищевой и перерабатывающей промышленности является стратегически важной задачей, так как данная отрасль отвечает за обеспечение продовольственной безопасности. Изучение развития пищевой промышленности на сегодня актуально в связи с тем, что наблюдается неравномерное развитие территории из-за географического расположения регионов, уровня технологического развития и инновационного потенциала. Результаты функционирования предприятий пищевой промышленности в условиях жесткой конкуренции в значительной степени определяются темпами внедрения в производство научно-технического прогресса, позволяющего выпускать продукцию, пользующуюся спросом, снижать ее себестоимость, повышать прибыль и рентабельность. Для нормального функционирования предприятий пищевой промышленности и обеспечения продовольственной безопасности необходимо повышение уровня использования инновационных технологий и более производительной техники.

Методы исследования. В работе использованы следующие методы исследования: исторический, статистический, системный и сравнительного анализа.

Результаты. В целом, технический потенциал непосредственно связан с основными фондами, поэтому в статье проведен анализ основных показателей пищевой промышленности, использования основных фондов и инвестиций. В отрасли, в силу того, что часть основных фондов, используемых в отрасли, изношена, рассмотрен анализ влияния инвестиций на объемы производства пищевой промышленности.

Выводы: В работе проведен анализ влияния факторов на объемы производства продукции и по расчетным данным при инвестировании в последующие три года возможен вариант прироста продукции обрабатывающей промышленности на 16,5 %.

Ключевые слова: пищевая промышленность, агропродовольственная политика, сельское хозяйство, производство продуктов питания, производство напитков, инвестиции, прогноз, показатели.

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