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Analysis of the Impact of the COVID-19 Pandemic on the Industrial Production Level in Kazakhstan

Abstract

Object: to analyze the impact of the COVID-19 pandemic on the industrial production level in Kazakhstan.

Methods: to pursue this objective, we've used *statistical data analysis methods*, including comparison of output indicators and industrial production indices for the period from 2017 to 2021.

Findings: the results of the research have showed that overall industrial production in Kazakhstan decreased during the pandemic. However, the effects of the pandemic on individual sectors varied. Mining and quarrying as well as crude oil and natural gas production experienced significant declines in production due to the shutdown of production capacity for lack of demand in the global energy market. At the same time, other industries, such as food production and agriculture, increased their production capacity amidst increased demand for food.

Conclusions: the results of the research have confirmed the hypothesis that the COVID-19 pandemic had a negative impact on the industrial production level in Kazakhstan, causing reduced output and deteriorated financial performance of enterprises. However, we've also confirmed the hypothesis that the pandemic spurred development of certain industries in Kazakhstan. Thus, this research allows us to better understand the impact of the COVID-19 pandemic on the economy of Kazakhstan and develop recommendations for its improvement in the future.

Keywords: COVID-19, industrial production, Kazakhstan, mining industry, manufacturing industry, pandemic, economic after-effects, financial performance, output, demand for goods and services, adaptation of enterprises.

Introduction

Industrial production is an important sector of Kazakhstan's economy, which contributes significantly to the country's GDP and employment. Due to restrictive measures and supply disruptions caused by the COVID-19 pandemic, many businesses in Kazakhstan faced production problems and output cuts.

The analysis of the impact of the COVID-19 pandemic on industrial production in Kazakhstan can facilitate understanding the scale and nature of these problems, identifying the most vulnerable industries, and providing recommendations for supporting industry in the post-pandemic period. Thus, this research can be useful for making decisions at the state and business levels aimed at supporting the economy and restoring industrial production in Kazakhstan.

The objective of this research is to study how the COVID-19 pandemic affected the industrial production level in Kazakhstan, identify the main problems faced by enterprises, and provide recommendations for supporting industry in the post-pandemic period. Hypothesis 1: The COVID-19 pandemic has negatively affected the industrial production level in Kazakhstan, causing output cuts and deteriorated financial performance of enterprises.

This hypothesis suggests that most industries in Kazakhstan have been affected by the pandemic, as many businesses faced supply disruptions and shortages of raw and consumable materials.

Hypothesis 2: The COVID-19 pandemic has spurred the development of certain industries in Kazakhstan. Some enterprises were able to adapt to the new conditions and even increase their production capacity during the pandemic. This hypothesis suggests that the pandemic has resulted in shifts in demand for certain goods, services and products, that fueled increased production in some industries in Kazakhstan.

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Literature Review

The COVID-19 pandemic has materially affected industrial production levels in many countries (Baldwin & Weder, 2020). Due to the restrictive measures and supply disruptions caused by the pandemic, many enterprises faced production problems and output cuts (Zhu & Sun, 2021). Different industries were affected in different ways in different countries. For example, in Italy, which was one of the first countries severely affected by the pandemic, production suspended for several months resulted in decreased output in all sectors, including the motor, textile and footwear industries (Sharma, 2020).

In the first quarter of 2020, Italian GDP fell by 5.3% and industrial production fell by 8.4%. The transport and motor sectors were the hardest affected by the pandemic. Italian car production fell by 29.3% in 2020 and new car sales fell by 27.9% as against 2019 (ANFIA, 2020). The fashion and textile sectors also experienced a noticeable decline in output. Textile exports decreased by 24% in 2020 (Cimoli, 2020). The food sector was able to withstand the pandemic as it was recognized as an essential sector necessary to support vital functions. However, there were disruptions in supplies and difficulties in an adequate workforce due to mobility restrictions (Confederazione Italiana Agricoltori) (Pereira, 2020).

In the United States and other countries that rely on international supplies and exports, problems with supplies and logistics have resulted in electronics, aviation and other production cutbacks. Restrictive measures imposed to prevent the spread of the virus caused that many businesses closed, and production suspended. As a result of production stoppages and problems with supplies and logistics in many industries, significant cuts were noticeable in the United States (Bayraktar, 2021). For example, the motor industry, electronics and engineering, and other industries dependent on international supplies and exports were affected significantly (Pereira, 2020). However, there were shifts in demand for goods and services in some industries, allowing companies to increase outputs. For example, the increased demand for medical masks and personal safety apparels resulted in the increased textile and sewing production. Moreover, the US government adopted a range of support measures for pandemic affected companies, including financial assistance programs and tax incentives, which enabled some businesses to retain production capacities and employees (Nohria, 2020).

However, as Kazakhstan, some industries experienced shifts in the demand for goods and services, which made it possible for enterprises to increase their outputs. For instance, the demand for medical masks, personal safety apparels, and other medical products caused that medical and pharmaceutical industries increased their production.

The impact of the COVID-19 pandemic on the industrial production level can be explained by several theoretical approaches:

1. "Money demand" model. This model explains that the pandemic causes a decreased money demand for goods and services (Gupta, 2020). Due to restrictive measures and supply disruptions, many people remain unemployed, lose income, and save on expenses, including on consumption of goods and services. These results in a decreased demand for enterprise products, including industrial production, and ultimately, drops in output.

2. "Production restriction" model. Amidst the COVID-19 pandemic, many enterprises were forced to stop or reduce production due to supply, logistics, and personnel problems (Huang, 2021). This causes a limited producibility and reduced outputs in many industrial sectors.

3. "Adaptation to new conditions" model. Some enterprises can adapt to the new conditions caused by the pandemic and even increase their production capacities. For example, manufacturers of medical goods and personal safety apparels can increase outputs in response to the growing demand for these goods. Many enterprises have also switched over to remote work and reorganized their production processes to adapt to the new conditions (Javorcik, 2020).

The "adaptation to new conditions" model suggests that some enterprises can successfully adapt to the new conditions caused by the COVID-19 pandemic and even gain competitive advantages (Kharatyan, 2020). Adaptation may include changes in production processes, the use of new technologies and digital solutions, a switch to new markets and products, and improved consumer services.

Some businesses in Italy have been able to adapt successfully to the new conditions caused by the COVID-19 pandemic and even increase their production capacity. For example, reduced international supply and logistical problems resulted in a situation where some Italian producers were able to increase their domestic market share and fill in the gaps left by other suppliers (Kostova, 2021). Moreover, many Italian enterprises are actively adopting new technologies and digital solutions, so that they may increase production efficiency and reduce costs (Lee, 2020).

However, not all businesses in Italy were able to adapt successfully to the new conditions. Many companies, especially small and medium-sized enterprises, faced severe financial and operational challenges caused by the pandemic. Some of them had to reduce their operations or stop them altogether (Manolis, 2021).

Thus, the impact of the COVID-19 pandemic on the industrial production level can be attributed both to reduced money demand and restricted production, and to the ability to adapt to the new conditions and the changing demand for certain goods and services. The COVID-19 pandemic has had a wide and diverse impact on the industrial production level worldwide, having caused problems in most sectors, but also having spurred production growth in some sectors of the economy.

Methods

The following methods have been used for the research. Analysis of statistical data – we've analyzed official statistics on the industrial output in Kazakhstan for the period of 2017—2021 in various industries. These data have been obtained from official sources such as the Republic of Kazakhstan National Bank and the Statistics Committee of the Republic of Kazakhstan Ministry of National Economy.

Collection and analysis of public information — reports, publications, and news from various experts, analysts, researchers, and media have been studied to obtain supplemental information on the impact of the COVID-19 pandemic on industrial production in Kazakhstan.

Statistical analysis — we've carried out statistical data analysis, including the calculation of industrial production indices and the industry trend data in Kazakhstan. For this purpose, mathematical statistics methods, including variation analysis, correlation analysis and regression analysis have been used.

The studies have showed that the COVID-19 pandemic has had a significant impact on the industrial production level in Kazakhstan.

Results

The COVID-19 pandemic has substantially affected the industrial production level in many countries, including Kazakhstan. Due to the restrictive measures and supply disruptions caused by the pandemic, many industries experienced production problems and reduced output.

In Kazakhstan, industries related to oil and gas, metal mining and chemistry were hardly affected. Amid the pandemic, demand for oil and gas declined, causing prices to fall and output to decline. There were also problems with the supply of raw and consumable materials, which resulted in reduced output in metals and chemicals plants.

However, some industries in Kazakhstan experienced shifts in demand for goods and services that allowed them to increase output. For example, increased demand for medical masks and personal safety apparatus resulted in increased production of textile and clothing companies in the country.

Thus, the COVID-19 pandemic had a significant impact on the industrial production level in Kazakhstan, having caused problems in most industries, while having initiated production growth in some economy sectors.

Kazakhstan's key industrial performance indicators are presented in Table 1.

Table 1. Kazakhstan's key industrial performance indicators in 2017—2021

Indicator	2017	2018	2019	2020	2021
Share of industrial GVA in the republic's GDP, %	26,8	28,2	27,5	27,1	29,6
Number of businesses and industries, units	12385	12486	13237	13362	14065
Industrial output, mln tenge	22790209	27218063	29380342	27028506	37606243
Industrial production indices, % against the previous year	107,3	104,4	104,1	99,5	103,6

Note – compiled by the author based on the source (QazStat, 2022)

The data on the industry performance in Kazakhstan from 2017 to 2021 has allowed drawing the following conclusions. The industrial GVA share in the country's GDP gradually increased from 26.8% in 2017 to 29.6% in 2021, as suggested by the growing importance of industry in the country's economy.

The number of businesses and industries had increased every year, from 12,385 in 2017 to 14,065 in 2021, as suggested by increased competition and development of small and medium enterprises in this industry. Industrial output had been steadily increasing from 2017 to 2019 but had declined in 2020 due to the COVID-19 pandemic. However, outputs substantially increased in 2021, which amounted to more than 39%

as against the previous year. The industrial production indices, which reflect the production growth rate, have showed fluctuations, but generally have remained high. In 2020, the industrial production index decreased by 0.5% as against the previous year, but in 2021 the index rose again by 3.6%.

Thus, we can conclude that industry in Kazakhstan shows stable growth and holds high promise for further development. However, despite positive trends, the COVID-19 pandemic affected the economic situation in the country in 2020.

The industrial output in Kazakhstan is presented in Table 2.

Table 2. Industrial output in Kazakhstan in 2017—2021, million tenge

Industrial sector	2017	2018	2019	2020	2021
Mining and quarrying	11568785	14877068	15978061	11785557	17976976
Manufacturing	9400848	10403854	11573350	13232696	17121392
Supply of electricity, steam, hot water and conditioned air	1582299	1693343	1561366	1740718	2150972
Waterworks, waste control, pollution abatement	238277	243797	267565	269535	356902

Note – compiled by the author based on the source (QazStat, 2022)

The following conclusions can be drawn from the data on industrial production in Kazakhstan for the period 2017-2021. Altogether, there is an upward trend in outputs in all industries in Kazakhstan for the period from 2017 to 2021. The largest increase in outputs is observed in mining and quarrying, where the output had increased by more than 50% over the period from 2017 to 2021. The manufacturing industry also shows a steady growth in output, with the largest increase in 2021, when output had increased by more than 29% as against 2020.

Supply of electricity, steam, hot water and conditioned air, waterworks, waste control, pollution abatement also demonstrate stable growth in outputs during the period from 2017 to 2021. However, 2020 showed a 26% decline in mining and quarrying output as against the previous year. This can be attributable to the restrictive measures caused by the COVID-19 pandemic that affected the raw material supply and logistics in the industry. 2021 showed an increased output in all industries, which can be attributed to the gradual recovery of the post-pandemic economy and increased government support for enterprises. Thus, the data provided facilitate drawing a conclusion that overall industrial production in Kazakhstan shows stable growth in outputs; however, the COVID-19 pandemic affected some industries in 2020.

The following conclusions can be drawn from the presented data on the indices of mining and quarrying production in Kazakhstan for the period from 2017 to 2021. All things considered, the mining and quarrying production indices in Kazakhstan during the period from 2017 to 2021 show unstable changes. The highest growth in the mining and quarrying production index was recorded in 2017 (109.3%), then the index began to decline, and in 2020 it reached lowest value (96.3%), but in 2021 the index rose again to the level of 101.9% (Fig. 1).

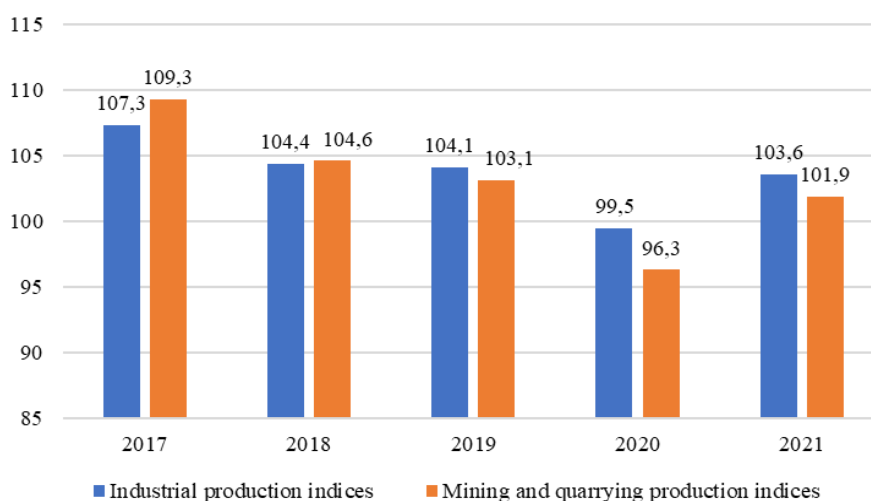


Figure 1. Mining and quarrying production indices, % as against the previous year.

Note – compiled by the author based on the source (QazStat, 2022)

The fluctuations in the mining and quarrying production indices may be explained also by the influence of global prices on raw material, as well as shifts in demand for certain types of products. 2020 recorded a significant decline in mining and quarrying output by 3,7 million tenge (-26%) as against the previous year. This can be explained by COVID-19 pandemic restrictive measures, which affected the raw materials supply and logistics in the industry. However, in 2021, there was a significant increase in mining and quarrying output, which might be due to the improved global economic situation and increased demand for raw materials.

Thus, it can be concluded that the mining and quarrying production indices in Kazakhstan show unstable changes, which may be due to global raw material prices and shifts in demand for products. However, despite fluctuations, the industry shows a stable growth trend.

The following conclusions can be drawn from the presented data on the crude oil production indices in Kazakhstan for the period from 2017 to 2021. The crude oil production indices in Kazakhstan for the period from 2017 to 2021 show unstable changes. The largest increase in the crude oil production index was recorded in 2017 (110.5%), then the index began to decline and reached its lowest value (94.6%) in 2020, but in 2021 the index rose again to the level of 100.3% (Fig. 2).

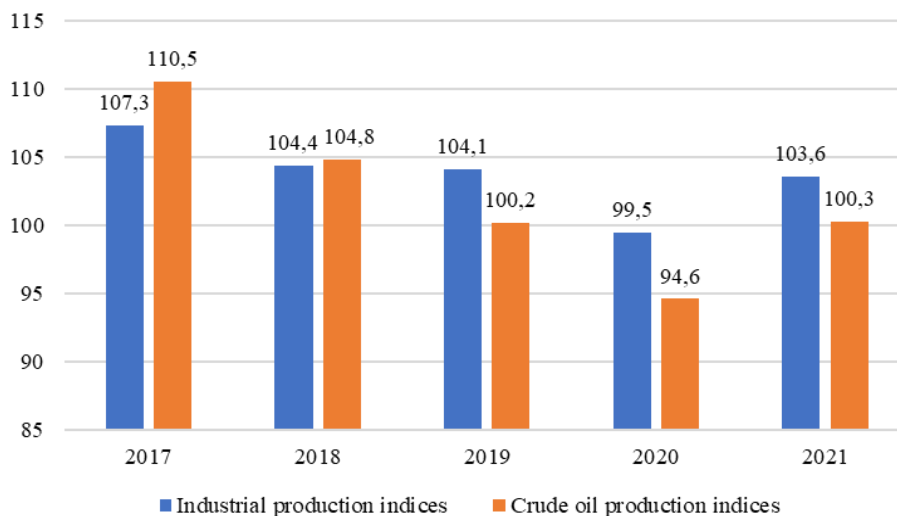


Figure 2. Crude oil production indices, in % as against previous year

Note – compiled by the author based on the source (QazStat, 2022)

One of the possible reasons for changes in the crude oil production indices could be changes in global oil prices and reduced output due to reduced oil demand caused by the COVID-19 pandemic. The crude oil output in 2020 substantially declined by 3,3 mln tenge (-5%) as against the previous year. This can be explained by reduced production outputs due to restrictive measures caused by the COVID-19 pandemic, as well as lower global oil prices. However, the crude oil output in 2021 slightly increased, which can be attributed to some improvement in the global economic situation and an increase in oil demand.

The table below presents the economic performance trends of iron ore production in Kazakhstan.

Table 3. Economic performance trends of iron ore production in Kazakhstan in 2017—2021

Indicator	2017	2018	2019	2020	2021
Industrial product output, million tenge	244,024	291,173	415,898	476,793	976,927
Industrial production index, in % against the previous year	107	106,5	109,3	99,8	102,5
Share of industry products in total industrial output, in %	1,1	1,1	1,4	1,8	2,6

Note – compiled by the author based on the source (QazStat, 2022)

The iron ore production output in Kazakhstan amounted to 244,024 million tenge in 2017 and kept growing until 2021, reaching 976,927 billion tenge. The iron ore production index in Kazakhstan also showed positive trends as a whole, except for 2020 when the index fell to 99.8%. However, in 2021, the index began to rise again, reaching 102.5%. The share of industry products in total industrial output also increased substantially from 1.1% in 2017 to 2.6% in 2021.

One of the reasons for the increased iron ore outputs in Kazakhstan may be the growing demand for iron ore on the global market. Moreover, the production ramp-up may be attributable to expanding investments and modernizing production facilities in the industry. Thus, we can conclude that the iron ore mining industry in Kazakhstan has shown stable growth over the past five years, suggesting its significance for the country's economy. The growth in outputs may be due to the increasing demand for iron ore on the global market and expanding investments in the industry.

Table 4 presents the economic performance of food production in Kazakhstan.

Table 4. Economic performance of food production in Kazakhstan in 2017—2021

Indicator	2017	2018	2019	2020	2021
Industrial product output, million tenge	1525814	1527687	1708013	1957241	2287783
Industrial production index, in % against the previous year	105,1	100,9	103	103,2	101,9
Share of industry products in total industrial output, in %	67	5,6	5,8	7,2	6,1
Number of businesses and industries, units	1898	1748	1784	1778	1828

Note - compiled by the author based on the source (QazStat, 2022)

The food production output in Kazakhstan in 2017 amounted to 1525,814 million tenge and kept growing until 2021, reaching 2287783 million tenge. The food production index in Kazakhstan also showed positive trends for the period from 2017 to 2020. However, in 2021 the index decreased slightly to 101.9%. The industry's product share in total industrial output fluctuated substantially over the period from 2017 to 2021, from 67% in 2017 to 5.6% in 2018, and then began to grow again to 6.1% in 2021.

The number of businesses and industries in the industry also fell slightly in 2018, but then kept growing to 1,828 in 2021.

Thus, we can conclude that the food production industry in Kazakhstan has shown stable growth over the last five years, although the share of its products in total industrial output has fluctuated. Increased production outputs may be due to the growing consumer demand for food products in the country, as well as the improved quality of the produced goods and the expanded production capacity in the industry.

Discussions

The COVID-19 pandemic has affected substantially the industrial production level in Kazakhstan. The reporting period recorded decreased industrial output in the country, as well as decreased industrial production index. The pandemic has had the greatest impact on the mining industry and quarrying, as well as on food production. Both industries experienced a significant decline in industrial production in 2020, but in subsequent years, some industries, including food production, began to recover.

Kazakhstan's industrial production faced various challenges due to the pandemic, such as reduced demand for certain types of products, problems in the supply of raw and consumable materials, as well as problems in organizing work and complying with safety measures. Despite the negative impact of the pandemic on the industrial production level in Kazakhstan, the country's government has taken several actions aimed at supporting and developing industries. These actions include state support programs, tax and fee cuts, as well as the granting of loans and subsidies.

Thus, the COVID-19 pandemic has affected substantially the industrial production level in Kazakhstan; however, the country's government has taken a few measures aimed at supporting and developing industries. A few years after the pandemic, Kazakhstan's industrial sectors began to recover and demonstrated some growth.

Conclusions

We've accomplished the objective of the research, to analyze the impact of the COVID-19 pandemic on the industrial production level in Kazakhstan. The findings of the research can be useful to various concerned parties, including government agencies, industrial enterprises, economists and researchers. Based on the results of the research, it is possible to identify sectors that have been most affected by the pandemic and need support from the government. It is also possible to identify sectors that have been able to successfully adapt to the new conditions and even increase production capacity, which could serve as an example for other enterprises. The results of the research may also be useful for making decisions about investing in sectors which hold promise to develop amid the pandemic. In general, the results of the research can provide a

framework for developing and implementing measures to support industry in Kazakhstan amid the pandemic and in the long run.

The research has been conducted to analyze the impact of the COVID-19 pandemic on the industrial production level in Kazakhstan. For this purpose, we've examined data on outputs in various industries for the period from 2017 to 2021. The following conclusions regarding the hypotheses can be drawn from the results of the research:

Hypothesis 1: The COVID-19 pandemic has negatively affected the industrial production level in Kazakhstan, causing reduced outputs and deteriorated financial performance of enterprises. This hypothesis is evidenced by a decline in output in 2020 in the mining and manufacturing sectors, which are key sectors of Kazakhstan's economy. It is also worth noting that the industrial production index in 2020 was 99.5%, suggesting the degradation of the situation in the industry. Some enterprises faced supply disruptions and shortages of raw materials and supplies, which also negatively affected production. Thus, hypothesis 1 is confirmed.

Hypothesis 2: The COVID-19 pandemic has stimulated certain industries in Kazakhstan to develop. However, this hypothesis is not supported by the research data. Although some companies were able to adapt to the new conditions, increase their production capacities, and even grow during the pandemic period, the overall economy of Kazakhstan experienced a reduction in production, which negatively affected most industries. Therefore, hypothesis 2 is not confirmed.

Thus, the research has showed that the COVID-19 pandemic negatively affected the industrial production level in Kazakhstan, causing reduced outputs and deteriorated financial performance.

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Д.Г. Мамраева, О.В. Калинина, Л.В. Ташенова, А.Л. Муканов

COVID-19 пандемиясының Қазақстандағы өнеркәсіптік өндірістің деңгейіне тигізген әсерін талдау

Аңдатпа

Ұсынылған зерттеудің мақсаты — COVID-19 пандемиясының Қазақстандағы өнеркәсіптік өндіріс деңгейіне тигізген әсеріне талдау жасау.

Әдісі: Жоғарыда аталған мақсатқа жету үшін, 2017 мен 2021 жылдар аралығындағы өндіріс көлемі мен өнеркәсіптік өндіріс индекстерінің көрсеткіштерінің салыстырмалары келтірілген, статистикалық деректерді талдау әдістемесі қолданылған.

Қорытынды: Жалпы Қазақстанда пандемия кезінде өнеркәсіптік өндірістің деңгейінің төмендегенін көрсетеді. Бірақ, пандемияның әр салаға тигізген салдары әртүрлі болды. Өлемдік энергетика нарығындағы сұраныстың жетіспеушілігі салдарынан өндірістік қуаттардың тоқтатылуына байланысты, тау-кен өндірісі, карьерлер қазу, шикі мұнай мен табиғи газ өндіру салалары өндіріс деңгейінің төмендеуінің елеулі әсерін сезді. Сонымен қатар, азық-түлікке арта түскен сұраныс салдарынан, азық-түлік пен ауылшаруашылық өндірістері сияқты салалар өздерінің өндірістік қуаттарын арттыра түсті.

Тұжырымдама: Зерттеу нәтижелері COVID-19 пандемиясы өндіріс көлемін азайтуға ұшырату мен өнеркәсіптердің қаржылық көрсеткіштерін төмендету салдарынан Қазақстандағы өнеркәсіптік өндіріс деңгейіне кері әсерін тигізгені туралы гипотезаны дәлелдеді. Сонымен қатар, Қазақстандағы өнеркәсіптің жеке бір салдарының дамуына тиімді жағдай жасалғаны да расталынды. Осылайша, берілген зерттеу COVID-19 пандемиясының Қазақстан экономикасына тигізген әсерін жақсырақ түсінуге және болашақта оның қалпын жақсартуға ұсыныстар тұжырымдауға мүмкіндік береді.

Кілт сөздер: COVID-19, өнеркәсіптік өндіріс, Қазақстан, тау-кен өндіру өнеркәсібі, өңдеуші өнеркәсіп, пандемия, экономикалық салдар, қаржылық көрсеткіштер, өндірістік мөлшер, тауар мен қызметтерге сұраныс, кәсіпорынның бейімделуі.

Д.Г. Мамраева, О.В. Калинина, Л.В. Ташенова, А.Л. Муканов

Анализ влияния пандемии COVID–19 на уровень промышленного производства в Казахстане

Аннотация

Цель: Проанализировать влияние пандемии COVID–19 на уровень промышленного производства в Казахстане.

Методы: Для достижения данной цели были использованы методы анализа статистических данных, включающие сравнение показателей объема производства и индексов промышленного производства за период с 2017 по 2021 годы.

Результаты: Исследование показало, что в целом промышленное производство в Казахстане снизилось в период пандемии. Однако эффекты пандемии на отдельные отрасли были различными. Горнодобывающая промышленность и разработка карьеров, а также добыча сырой нефти и природного газа испытали существенное снижение производства, связанное с остановкой производственных мощностей из-за недостатка спроса на рынке мировой энергетике. В то же время другие отрасли промышленности, такие как производство продуктов питания и сельское хозяйство увеличили свои производственные мощности в условиях повышенного спроса на продукты питания.

Выводы: Результаты исследования подтвердили гипотезу о том, что пандемия COVID–19 оказала негативное влияние на уровень промышленного производства в Казахстане, приводя к сокращению объемов производства и ухудшению финансовых показателей предприятий. Однако гипотеза о том, что пандемия стимулировала развитие определенных отраслей промышленности в Казахстане также подтвердилась. Таким образом, данное исследование позволяет лучше понять влияние пандемии COVID–19 на экономику Казахстана и выработать рекомендации для улучшения ее состояния в будущем.

Ключевые слова: COVID–19, промышленное производство, Казахстан, горнодобывающая промышленность, обрабатывающая промышленность, пандемия, экономические последствия, финансовые показатели, объем производства, спрос на товары и услуги, адаптация предприятий.