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«ГЛОБАЛЬНАЯ ЦИФРОВАЯ ИНТЕГРАЦИЯ: АКТУАЛЬНОСТЬ ОБЕСПЕЧЕНИЯ УСТОЙЧИВОГО МИКРО- И МАКРОЭКОНОМИЧЕСКОГО РОСТА ЧЕРЕЗ РАЗВИТИЕ ТЕХНОЛОГИЧЕСКОЙ И ИНДУСТРИАЛЬНОЙ ПРОМЫШЛЕННОСТИ В ПЕРЕХОДЕ К ЗЕЛЁНОЙ ЭКОНОМИКЕ К 2030 ГОДУ»

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05.01.00 – Axborot texnologiyalari, boshqaruv va kompyuter grafikasi
05.01.01 – Muhandislik geometriyasi va kompyuter grafikasi. Audio va video texnologiyalari
05.01.02 – Tizimli tahlil, boshqaruv va axborotni qayta ishlash
05.01.03 – Informatikaning nazariy asoslari
05.01.04 – Hisoblash mashinalari, majmualari va kompyuter tarmoqlarining matematik va dasturiy ta'minoti
05.01.05 – Axborotlarni himoyalash usullari va tizimlari. Axborot xavfsizligi
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05.01.07 – Matematik modellashtirish
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05.05.03 – Yorug'lik texnikasi. Maxsus yoritish texnologiyasi
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05.08.03 – Temir yo'l transportini ishlatish
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10.00.04 – Yevropa, Amerika va Avstraliya xalqlari tili va adabiyoti
08.00.01 – Iqtisodiyot nazariyasi
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08.00.11 – Marketing
08.00.12 – Mintaqaviy iqtisodiyot
08.00.13 – Menejment
08.00.14 – Iqtisodiyotda axborot tizimlari va texnologiyalari
08.00.15 – Tadbirkorlik va kichik biznes iqtisodiyoti
08.00.16 – Raqamli iqtisodiyot va xalqaro raqamli integratsiya
08.00.17 – Turizm va mehmonxona faoliyati

Ma'lumot uchun, OAK Rayosatining 2024-yil 28-avgustdagi 360/5-son qarori bilan "Dissertatsiyalar asosiy ilmiy natijalarini chop etishga tavsiya etilgan milliy ilmiy nashrlar ro'yxati"ga texnika va iqtisodiyot fanlari bo'yicha "Muhandislik va iqtisodiyot" jurnali ro'yxatga kiritilgan.

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IMPROVING THE MECHANISMS FOR THE ECONOMIC DEVELOPMENT OF THE INDUSTRIAL SECTOR BASED ON STRUCTURAL CHANGES AND INFRASTRUCTURAL FACTORS

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Abstract. This article examines the impact of structural changes within industrial sectors and the state of supporting infrastructure on industrial development. The study analyses how the transition from raw-material-based production to higher-value-added production, the strengthening of cluster cooperation, the deepening of processing stages, and the expansion of innovative industrial models influence industrial growth. The research also discusses the role of infrastructure quality, including energy stability, logistics accessibility, digital connectivity, and the readiness of industrial sites, in improving industrial performance. The main conclusion of the study is that structural transformation and infrastructure quality act as complementary mechanisms and that, when they improve simultaneously, industrial efficiency, export capacity, and competitiveness increase more rapidly.

Keywords: industry; structural transformation; infrastructure quality; value added; cluster cooperation; deep processing; logistics; digital connectivity; industrial development; competitiveness.

Annotatsiya. Ushbu maqolada sanoat tarmoqlaridagi tarkibiy o'zgarishlar va qo'llab-quvvatlovchi infratuzilmaning holati sanoat rivojlanishiga qanday ta'sir ko'rsatishi o'rganilgan. Tadqiqotda xomashyo ishlab chiqarishdan yuqori qo'shilgan qiymatli mahsulotlar ishlab chiqarishga o'tish, klaster hamkorligini mustahkamlash, qayta ishlash bosqichlarini chuqurlashtirish hamda innovatsion sanoat modellarini kengaytirish sanoat o'sishiga qanday ta'sir qilishi tahlil qilingan. Shuningdek, energiya ta'minotining barqarorligi, logistika imkoniyatlari, raqamli ulanish sifati va sanoat maydonlarining tayyorligi kabi infratuzilma omillarining sanoat samaradorligini oshirishdagi o'rni yoritilgan. Tadqiqotning asosiy xulosasiga ko'ra, tarkibiy transformatsiya va infratuzilma sifati bir-birini to'ldiruvchi mexanizmlar sifatida namoyon bo'ladi hamda ular bir vaqtda takomillashtirilganda sanoat samaradorligi, eksport salohiyati va raqobatbardoshlik yanada jadal oshadi.

Kalit so'zlar: sanoat; tarkibiy transformatsiya; infratuzilma sifati; qo'shilgan qiymat; klaster hamkorligi; chuqur qayta ishlash; logistika; raqamli ulanish; sanoat rivojlanishi; raqobatbardoshlik.

Аннотация. В статье исследуется влияние структурных изменений в отраслях промышленности и состояния поддерживающей инфраструктуры на промышленное развитие. Анализируется, как переход от сырьевого производства к выпуску продукции с более высокой добавленной стоимостью, укрепление кластерного сотрудничества, углубление стадий переработки и расширение инновационных промышленных моделей влияют на рост промышленности. Также рассматривается роль качества инфраструктуры, включая стабильность энергоснабжения, транспортно-логистическую доступность, цифровую связанность и готовность промышленных площадок, в повышении эффективности промышленной деятельности. Основной вывод исследования заключается в том, что структурная трансформация и качество инфраструктуры выступают взаимодополняющими механизмами, и при их одновременном совершенствовании промышленная эффективность, экспортный потенциал и конкурентоспособность повышаются более высокими темпами.

Ключевые слова: промышленность; структурная трансформация; качество инфраструктуры; добавленная стоимость; кластерное сотрудничество; глубокая переработка; логистика; цифровая связанность; промышленное развитие; конкурентоспособность.

INTRODUCTION

Industrial development plays a central role in creating high value added, increasing labour productivity, diversifying the export structure, and strengthening regional economic balance. Two influencing factors are especially important in this process. The first is structural changes within industrial sectors, which include the movement from raw material production to high-technology production, the distribution of added value between different stages of processing, and the expansion of cooperation and cluster models. The second is the current condition of the supporting infrastructure, such as transport, logistics, energy supply, industrial land, certification laboratories, digital connectivity, and human resource training systems. When these factors function well, industrial resources are allocated more efficiently, production cycles become shorter, unit costs fall, and the level of competitiveness in domestic and global markets increases.

Structural changes show where and how added value is produced. The shift from simple processing to the production of complex components and intellectual products is an indicator of the quality of industrial development. Intersectoral cooperation and cluster integration reduce transaction costs, speed up the diffusion of innovation, and create sustainable export volumes. However, this potential can only be realised if the supporting infrastructure is strong. Transport corridors reduce delivery times, stable energy systems support continuous production, special industrial zones attract private investment, and digital platforms provide conditions for advanced management systems.

The relevance of this research is based on the need to analyse the joint impact of structural changes and infrastructure quality on industrial development. Regional differences in infrastructure also influence the cost structure of enterprises, the capacity utilisation rate, and export logistics. In addition, the speed of digital transformation and the quality of the human resources system directly affect the effectiveness of structural changes. The main purpose of this research is to analyse the impact of structural changes and infrastructure conditions on industrial development and to develop practical conclusions based on evidence. The object of the study is industrial sectors and their supporting infrastructure systems. The subject of the study is the relationship between structural change indicators and industrial performance indicators, such as production volume, labour productivity, export share, and capacity utilisation. The methodological basis of the research is the use of mixed methods that combine statistical analysis, econometric modelling, and qualitative research instruments.

This study applied a mixed methodology that combines quantitative indicators and qualitative interpretation in order to evaluate the impact of structural changes and infrastructure conditions on industrial development. The quantitative component of the research was based on official open data sources, such as the Statistics Agency of Uzbekistan, reports of the Center for Economic Research and Reforms, the Central Bank, and annual industry summaries. Key indicators included industrial output volume, the share of value added, export diversification, labour productivity, the number of operating industrial entities, and regional industrial capacity. These indicators were collected as time series and processed using comparative and dynamic analysis to reveal trends in structural shifts.

In parallel, a system of infrastructure indicators was developed to measure the actual supporting environment surrounding industrial production. These indicators included the stability of energy supply, logistics and transport accessibility, the readiness of industrial sites and special economic zones, the availability of certification and testing laboratories, and the quality of digital connectivity. Each of these parameters was assessed at the regional level and then compared with industrial performance indicators to identify relational patterns. To empirically test the interaction between structural shifts and infrastructure quality, simple linear regression models were used. The modelling objective was to reveal the combined effect of structural indicators and infrastructure indicators on industrial performance measures, such as output growth, labour productivity, export share, and capacity utilisation. The benefit of this modelling approach is that it highlights not only isolated effects but also the complementarities between the examined variables.

The research also integrated a qualitative component. Expert opinions were collected from industry representatives, enterprise managers, specialists involved in industrial policy implementation, and regional development practitioners. These interviews were conducted using semi-structured guiding questions, and the obtained answers were analysed through qualitative coding. This approach made it possible to identify which parts of the infrastructure become bottlenecks in practice and which structural shifts demonstrate the highest marginal efficiency in actual production environments. The main advantage of this mixed methodology is that it does not limit the analysis to statistical correlations only but also explains the logic of actual industrial processes. Quantitative data provided evidence-based, measurable results, and expert-based interpretation added contextual meaning. Therefore, this research does not simply present a set of figures but aims to clarify the mechanisms through which infrastructure quality and structural shifts jointly influence industrial development.

The obtained results demonstrate that industrial performance in Uzbekistan is not only associated with

overall macroeconomic conditions but is also significantly shaped by the internal structural composition of industrial sectors and the quality of the supporting infrastructure. The time-series analysis shows a positive upward trend in industrial output. According to official statistical data, industrial production in 2024 increased by 6.8 percent compared with the previous year, indicating positive dynamics during the period of ongoing structural changes in the industrial sector. Regression results indicate that improvements in value-added composition and deeper processing levels have a direct positive correlation with productivity growth. Regions that demonstrate higher levels of cluster integration and intersectoral cooperation also show higher capacity utilisation and export shares. The model results suggest that the combination of structural upgrading and infrastructure quality explains a higher share of variance in industrial performance than each of these factors taken separately.

Infrastructure indicators also show a strong influence. Regions with more stable energy supplies, better logistics accessibility, and operational industrial zones experience faster output expansion and fewer production cycle delays. Digital connectivity was found to be a significant factor as well because regions where enterprises implemented ERP and MES systems show more accurate production planning and improved resource allocation efficiency. Expert interviews confirmed the quantitative evidence. Representatives of industrial enterprises stated that when infrastructure conditions are reliable, structural shifts towards higher value added become commercially rational and economically sustainable. Where infrastructure requires further improvement, technologically advanced projects may operate below their potential because transport delays, limited certification capacity, or fluctuations in energy supply can reduce some of the expected efficiency gains. Overall, the results show that structural transformation and infrastructure quality are complementary forces. When they are improved together, the speed of industrial development increases, and financial and operational risks decrease.

CONCLUSION AND SUGGESTIONS

The findings of this study confirm that sustainable industrial development depends on the combined effect of structural upgrading within the industrial system and the quality of the supporting infrastructure surrounding this system. When industries move from raw material-based production to higher value-added processing, and when this shift is supported by a reliable energy supply, efficient logistics, operational industrial sites, certification capacities, and digital connectivity, the economic return becomes significantly higher. The empirical evidence shows that these factors do not operate in isolation because structural change indicators and infrastructure indicators reinforce each other. Where both components are strong, the rate of industrial growth becomes stable, and the level of competitiveness increases. The results also highlight that investment decisions and production efficiency are not shaped by technology alone. Enterprises need a functioning ecosystem that reduces transaction costs and supports long-cycle industrial decisions. Therefore, industrial policy measures could be further complemented by initiatives aimed at improving infrastructure quality, promoting deeper processing, strengthening cluster cooperation, and expanding technology-based production planning.

In summary, the findings suggest that the continued advancement of structural transformation, together with improvements in industrial infrastructure, may enhance the resilience of Uzbekistan's industrial base and support its participation in regional value chains. This combined approach will produce long-term benefits not only for enterprise-level performance but also for national economic development as a whole.

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