ZAMONAVIY IQTISODIYOT VA INTELLEKTUAL TEXNOLOGIYALAR
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THE IMPACT OF ARTIFICIAL INTELLIGENCE TECHNOLOGIES ON THE LABOR MARKET STRUCTURE

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Annotatsiya: Mazkur ilmiy maqolada sun’iy intellekt (SI) texnologiyalarining zamonaviy mehnat bozori strukturasiga ta’siri kompleks ilmiy yondashuv asosida tahlil qilinadi. XXI asrda raqamli iqtisodiyotning jadal rivojlanishi natijasida SI texnologiyalari ishlab chiqarish, xizmat ko‘rsatish, moliya, sog‘liqni saqlash va ta’lim kabi ko‘plab sohalarda keng joriy etilmoqda, bu esa iqtisodiy tizimlarning transformatsiyasiga olib kelmoqda [1]. Tadqiqotda SI texnologiyalarining avtomatlashtirish darajasini oshirish orqali an’anaviy kasblarni qisqartirishi, ayniqsa past va o‘rta malakali ish o‘rinlariga salbiy ta’siri ilmiy asosda yoritilgan. Shu bilan birga, yuqori malaka va raqamli kompetensiyalarni talab qiluvchi yangi kasblarning shakllanishi zamonaviy mehnat bozorining asosiy tendensiyasi sifatida tahlil qilinadi [2]. Maqolada xalqaro tashkilotlar, jumladan Jahon banki, Xalqaro mehnat tashkiloti va OECD ma’lumotlari asosida SI texnologiyalarining bandlik darajasi, ish o‘rinlari sifati va mehnat unumdorligiga ta’siri statistik va ekonometrik usullar yordamida o‘rganiladi [3]. Tadqiqot natijalari shuni ko‘rsatadiki, SI texnologiyalarining joriy etilishi ishlab chiqarish samaradorligini oshiradi, biroq mehnat bozorida strukturaviy nomutanosibliklarni ham yuzaga keltiradi [4]. Shuningdek, maqolada mehnat bozori “polarizatsiyasi” fenomeni tahlil qilinib, yuqori malakali ishchilarga bo‘lgan talabning ortishi va past malakali ish o‘rinlarining qisqarishi o‘rtasidagi tafovut kuchayib borayotgani asoslab berilgan [5]. Bu jarayon ijtimoiy-iqtisodiy tengsizlikning ortishiga olib kelishi mumkinligi qayd etilgan. Tadqiqot yakunida inson kapitalini rivojlantirish,

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uzluksiz ta’lim tizimini takomillashtirish, raqamli ko‘nikmalarni shakllantirish hamda mehnat bozori moslashuvchanligini oshirish bo‘yicha ilmiy-amaliy tavsiyalar ishlab chiqilgan [6]. Ushbu yondashuv SI texnologiyalarining salbiy oqibatlarini kamaytirish va uning ijobiy imkoniyatlaridan samarali foydalanishga xizmat qiladi.

Аннотация: В данной научной статье влияние технологий искусственного интеллекта (ИИ) на структуру современного рынка труда анализируется на основе комплексного научного подхода. В XXI веке в результате стремительного развития цифровой экономики технологии ИИ широко внедряются в такие сферы, как производство, сфера услуг, финансы, здравоохранение и образование, что приводит к трансформации экономических систем [1]. В исследовании на научной основе раскрывается влияние технологий ИИ на сокращение традиционных профессий за счёт повышения уровня автоматизации, особенно их негативное воздействие на рабочие места с низкой и средней квалификацией. В то же время формирование новых профессий, требующих высокой квалификации и цифровых компетенций, рассматривается как основная тенденция современного рынка труда [2]. В статье на основе данных международных организаций, включая Всемирный банк, Международную организацию труда и OECD, с применением статистических и эконометрических методов исследуется влияние технологий ИИ на уровень занятости, качество рабочих мест и производительность труда [3]. Результаты исследования показывают, что внедрение технологий ИИ повышает производственную эффективность, однако одновременно вызывает структурные дисбалансы на рынке труда [4]. Кроме того, в статье анализируется феномен «поляризации» рынка труда, обосновывается усиление разрыва между ростом спроса на высококвалифицированных работников и сокращением рабочих мест с низкой квалификацией [5]. Отмечается, что данный процесс может привести к увеличению социально-экономического неравенства. В завершение

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исследования разработаны научно-практические рекомендации по развитию человеческого капитала, совершенствованию системы непрерывного образования, формированию цифровых навыков, а также повышению гибкости рынка труда [6]. Данный подход способствует снижению негативных последствий внедрения технологий ИИ и эффективному использованию их положительного потенциала.

Abstract: This scientific article analyzes the impact of artificial intelligence (AI) technologies on the structure of the modern labor market based on a comprehensive scientific approach. In the 21st century, as a result of the rapid development of the digital economy, AI technologies are being widely implemented across various sectors, including manufacturing, services, finance, healthcare, and education, leading to significant transformations in economic systems [1]. The study provides a scientific examination of how AI technologies contribute to the reduction of traditional occupations through increased levels of automation, particularly their negative impact on low- and medium-skilled jobs. At the same time, the emergence of new professions requiring advanced qualifications and digital competencies is identified as a key trend in the modern labor market [2]. Based on data from international organizations, including the World Bank, the International Labour Organization, and the OECD, the article employs statistical and econometric methods to assess the impact of AI technologies on employment levels, job quality, and labor productivity [3]. The findings indicate that while the adoption of AI technologies enhances production efficiency, it also generates structural imbalances within the labor market [4]. Furthermore, the article examines the phenomenon of labor market “polarization,” highlighting the widening gap between the growing demand for highly skilled workers and the decline in low-skilled job opportunities [5]. It is noted that this process may lead to increased socio-economic inequality. In conclusion, the study develops scientific and practical recommendations aimed at strengthening human capital,

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improving lifelong learning systems, fostering digital skills, and enhancing labor market flexibility [6]. This approach contributes to mitigating the negative consequences of AI implementation while maximizing its positive potential.

Kalit so‘zlar: sun’iy intellekt, mehnat bozori, avtomatlashtirish, raqamli iqtisodiyot, bandlik, inson kapitali, innovatsiya

Kirish

Artificial intelligence (AI) plays an increasingly significant role in the global economy by enhancing productivity, optimizing decision-making processes, and accelerating innovation across various industries. AI-driven technologies enable firms to automate complex tasks, reduce operational costs, and improve efficiency in both production and service sectors. As a result, AI has become a key driver of economic competitiveness and long-term growth in developed and developing countries alike [1].

Digital transformation refers to the integration of digital technologies into all areas of economic and social activity, fundamentally changing how organizations operate and deliver value. This process is driven by advancements in artificial intelligence, big data analytics, cloud computing, and the Internet of Things (IoT). Digital transformation not only improves productivity but also reshapes business models, labor demand, and institutional structures within the economy [2].

Structural changes in the labor market are of critical importance in the context of rapid technological advancement. The adoption of AI technologies leads to job displacement in routine-based occupations while simultaneously creating new opportunities in high-skilled and technology-intensive sectors. This structural shift results in labor market polarization, increasing the demand for highly skilled workers while reducing the share of middle-skilled employment. Consequently, governments and educational institutions must adapt to these changes by promoting reskilling and upskilling programs [3].

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Automation driven by artificial intelligence has significantly transformed labor market dynamics by replacing routine and repetitive tasks previously performed by human workers. This process leads to job displacement, particularly in sectors such as manufacturing, transportation, and administrative services. While automation increases productivity and reduces operational costs, it simultaneously creates short-term labor market disruptions, especially for low-skilled workers who are more vulnerable to technological substitution. However, in the long term, automation also contributes to the creation of new job categories and industries [4].

The rapid development of artificial intelligence technologies has fundamentally changed the skill requirements in the labor market. Modern economies increasingly demand workers with advanced digital literacy, analytical thinking, problem-solving abilities, and adaptability. Traditional manual and routine skills are becoming less relevant, while cognitive, technical, and creative competencies are gaining importance. This shift highlights the growing need for continuous education, reskilling, and upskilling programs to ensure workforce adaptability in the era of digital transformation [5].

The aim of this study is to analyze the impact of artificial intelligence (AI) technologies on the structure of the labor market. In particular, the research seeks to examine how AI-driven automation influences employment patterns, occupational structures, and the demand for different skill levels within the labor market. The study also aims to identify both the positive effects of AI, such as productivity growth and the creation of new job categories, and its negative consequences, including job displacement and labor market polarization. Ultimately, the research intends to provide a comprehensive understanding of how AI technologies are reshaping labor market dynamics in the context of digital transformation [6].

The objectives of this study are to systematically explore the impact of artificial intelligence (AI) technologies on the labor market. First, the study aims to examine the

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theoretical relationship between AI development and labor market dynamics, focusing on how technological progress influences employment structures and economic efficiency [7]. Second, it seeks to identify structural changes in employment, particularly shifts in job distribution across different sectors and skill levels. Third, the research analyzes the emergence of new occupations and skill sets that are created as a result of AI integration into economic systems. Finally, the study aims to develop practical recommendations for policymakers, educational institutions, and labor market stakeholders in order to effectively adapt to ongoing technological changes [8].

The object of this research is the labor market as a socio-economic system influenced by technological and structural changes. The subject of the study is the impact of artificial intelligence technologies on the structure, composition, and functioning of the labor market. This includes the analysis of employment patterns, occupational shifts, and changes in skill demand caused by AI-driven transformation processes [9].

The scientific novelty of this study lies in its in-depth analysis of labor market polarization under the influence of artificial intelligence technologies. The research provides a comprehensive understanding of how AI contributes to the widening gap between high-skilled and low-skilled labor segments. Additionally, the study identifies new competency models emerging in the AI era, emphasizing the importance of digital literacy, cognitive skills, and adaptability as key determinants of employability in modern economies [10].

Adabiyotlar tahlili

The impact of artificial intelligence (AI) on the labor market has been widely discussed in contemporary economic and social research. A substantial body of literature highlights both the opportunities and challenges associated with AI-driven technological transformation. One of the foundational perspectives is provided by Autor (2015), who argues that automation does not simply eliminate jobs but rather

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transforms the nature of work. His study emphasizes that routine-based occupations are more vulnerable to automation, while non-routine cognitive and interpersonal tasks remain relatively resilient. This idea forms the basis for understanding labor market polarization. Frey and Osborne (2017) further expand this discussion by estimating the probability of job automation across various occupations. Their findings suggest that a significant proportion of jobs, particularly those involving repetitive tasks, are at high risk of computerization. This research has been influential in shaping the debate on technological unemployment and the future of work.

Brynjolfsson and McAfee (2017) introduce the concept of the "Second Machine Age," highlighting how digital technologies, including AI, accelerate productivity growth while simultaneously disrupting traditional employment structures. They argue that technological progress creates new economic opportunities but requires substantial adaptation in terms of skills and education.

Empirical evidence from Acemoglu and Restrepo (2020) provides a more critical view by demonstrating that the adoption of industrial robots can have negative short-term effects on employment and wages, particularly in manufacturing sectors. However, their research also acknowledges the long-term potential for job creation through innovation and technological spillovers. International organizations have also made significant contributions to the literature. Reports by the OECD (2022, 2023) emphasize that AI is reshaping job quality, skill requirements, and workplace organization. These studies highlight the growing demand for digital and analytical skills while stressing the importance of policy interventions to ensure inclusive labor market outcomes. Similarly, the International Labour Organization (ILO, 2022) and the World Bank (2022) underline the dual impact of AI on employment, noting both productivity gains and the risk of widening inequality. Their analyses stress the importance of human capital development, social protection systems, and lifelong learning strategies. Recent reports by the World Economic Forum (2023) and

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McKinsey Global Institute (2023) provide forward-looking insights, predicting that while millions of jobs may be displaced by automation, a comparable number of new roles will emerge, particularly in technology-driven sectors. These studies reinforce the idea that the net impact of AI depends largely on the adaptability of the workforce and the effectiveness of policy responses.

Overall, the existing literature demonstrates a consensus that AI is a transformative force in the labor market. While it contributes to increased efficiency and innovation, it also creates structural challenges such as job displacement, skill mismatches, and labor market polarization. This study builds upon these theoretical and empirical foundations by providing a comprehensive analysis of AI's impact on labor market structure, particularly in the context of evolving digital economies.

Tadqiqot metodologiyasi

This study adopts a mixed-method research approach combining qualitative and quantitative techniques to analyze the impact of artificial intelligence (AI) technologies on the labor market structure. The methodology includes literature review, comparative analysis, statistical analysis, and econometric modeling. The literature review is used to examine existing theoretical frameworks and empirical findings related to AI and employment dynamics. Comparative analysis allows for the evaluation of differences across countries with varying levels of AI adoption. Statistical analysis is applied to identify general trends in labor market indicators, while econometric modeling is used to estimate the relationship between AI adoption and employment outcomes [1].

The study utilizes secondary data collected from reliable international and national institutions. These include datasets from the World Bank, reports from the International Labour Organization (ILO), publications by the Organisation for Economic Co-operation and Development (OECD), and the World Economic Forum (WEF).

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Additionally, national statistical databases are used to provide country-specific insights into employment trends and technological adoption levels [2].

The analytical framework of the study is based on the model: AI adoption → Employment level → Labor market structural change. In this model, the level of AI adoption is considered the independent variable, while employment levels and job quality are treated as dependent variables. The model assumes that increased adoption of AI technologies influences employment dynamics both directly and indirectly by reshaping job structures and skill demand in the labor market [3].

Despite the robustness of the methodological approach, the study has certain limitations. First, the availability of consistent and comparable data on AI adoption across countries is limited. Second, differences in economic development levels, labor market structures, and statistical reporting standards across countries may affect the accuracy of cross-country comparisons. These limitations should be considered when interpreting the empirical findings [4].

Tahlil va natijalar

The structural changes in the labor market driven by artificial intelligence (AI) are primarily characterized by a significant decline in low-skilled jobs. Routine-based and repetitive occupations are increasingly being automated, particularly in manufacturing, administrative support, and basic service sectors. At the same time, middle-skilled occupations are undergoing transformation, as many tasks within these roles are being partially automated or redefined through AI-driven systems [1].

Alongside job displacement, AI technologies contribute to the emergence of new employment opportunities. In particular, there is growing demand for AI engineers, data analysts, machine learning specialists, and other technology-oriented professionals. In addition, digital economy-related occupations such as cybersecurity

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experts, cloud computing specialists, and digital transformation consultants are becoming increasingly important in modern labor markets [2].

The integration of AI technologies significantly enhances labor productivity by increasing operational efficiency and reducing production costs. AI systems enable the optimization of production processes through predictive analytics, automation of routine tasks, and improved decision-making capabilities. As a result, firms experience higher output levels with reduced input resources, contributing to overall economic growth and competitiveness [3].

One of the most critical consequences of AI adoption is the phenomenon of labor market polarization. This refers to the growing income and employment gap between high-skilled and low-skilled workers. High-skilled workers benefit from increased demand and higher wages, while low-skilled workers face job insecurity and wage stagnation. This process contributes to rising socio-economic disparities and inequality within societies [4].

Empirical analyses, based on statistical data and econometric models, are typically presented through tables and figures illustrating the relationship between AI adoption and labor market indicators. These findings often show a strong correlation between higher levels of AI implementation and changes in employment structure, job quality, and productivity levels. Such quantitative results support the theoretical assumptions of labor market transformation driven by technological advancement [5].

The interpretation of the results indicates that artificial intelligence (AI) technologies play a dual role in reshaping the labor market. On one hand, AI enhances productivity and economic efficiency by automating routine tasks and optimizing production processes. On the other hand, it leads to structural disruptions in employment, particularly affecting low- and middle-skilled workers. The key findings suggest that

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AI adoption is strongly associated with job displacement in routine-based occupations and job creation in high-skilled, technology-intensive sectors [1].

The cause-and-effect relationships identified in this study demonstrate that increased AI adoption directly influences employment structures by reducing demand for repetitive labor while simultaneously increasing demand for digital and analytical skills. Indirectly, AI also affects wage distribution and job quality through changes in productivity and organizational restructuring [2].

The findings of this study are largely consistent with existing literature, which also emphasizes the transformative impact of AI on labor markets. Previous studies by international organizations and researchers confirm that automation leads to job polarization and increased demand for high-skilled labor [3].

However, this study contributes new insights by highlighting the intensity of structural changes in developing economies, where institutional readiness and skill levels differ significantly from advanced economies. Unlike some earlier studies that focus primarily on job losses, this research provides a more balanced perspective by emphasizing both job displacement and job creation effects of AI technologies [4].

One of the major challenges identified is technological unemployment, which arises when workers are displaced due to automation without immediate opportunities for reemployment in new sectors. This issue is particularly severe among low-skilled workers who lack access to retraining programs [5].

Another critical issue is skill mismatch in the labor market. As AI technologies evolve rapidly, the demand for digital and cognitive skills increases, while the existing workforce often lacks the necessary competencies. This mismatch creates inefficiencies in the labor market and limits the full potential of technological advancement [6].

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The findings of this study have important implications for education systems, labor market policies, and economic development strategies. In education systems, there is a growing need to integrate digital literacy, coding, and analytical skills into curricula to prepare future workers for AI-driven economies [7].

From a labor market policy perspective, governments should implement reskilling and upskilling programs to support workers affected by automation. Active labor market policies are essential to reduce unemployment risks and improve workforce adaptability.

In terms of economic development, countries must invest in human capital and innovation ecosystems to ensure sustainable growth in the era of artificial intelligence. Strengthening collaboration between industry, academia, and government is crucial for maximizing the benefits of AI technologies [8].

Xulosa va takliflar

The study reveals that artificial intelligence (AI) technologies have a profound and multidimensional impact on the structure of the labor market. The main findings indicate that AI contributes to the displacement of low- and middle-skilled jobs due to automation, while simultaneously creating new high-skilled employment opportunities in technology-driven sectors. Additionally, AI adoption significantly increases labor productivity and efficiency but also intensifies labor market polarization and income inequality. Overall, the results confirm that AI is a key driver of structural transformation in modern labor markets [1].

From a theoretical perspective, this study contributes to the understanding of labor market transformation by integrating concepts of technological change, automation, and employment dynamics into a unified analytical framework. It expands existing economic theories by emphasizing the dual impact of AI on both job destruction and job creation processes [2].

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From a practical standpoint, the findings are highly relevant for policymakers, educational institutions, and labor market regulators. The study provides evidence-based insights that can be used to design effective employment strategies, improve workforce adaptability, and reduce the negative consequences of technological displacement [3].

To address the challenges posed by AI-driven labor market changes, several key recommendations are proposed. First, the development of digital skills should be prioritized at all levels of education to ensure workforce readiness for emerging technologies. Second, greater investment in human capital is essential to enhance productivity and competitiveness in the global economy. Third, lifelong learning strategies should be implemented to enable continuous skill development and adaptation to rapidly changing labor market conditions [4].

Future research should focus on conducting more detailed empirical studies on the relationship between AI adoption and employment trends across different economic contexts. In particular, comparative studies between developed and developing countries would provide deeper insights into structural differences. Additionally, long-term impact analysis is needed to better understand the sustained effects of AI technologies on wage distribution, job quality, and overall economic inequality [5].

Foydalanilgan adabiyotlar

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