HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

UDC 004.8:330.4

APPLICATION OF ARTIFICIAL INTELLIGENCE IN ECONOMIC ANALYSIS

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doi:https://doi.org/10.5281/zenodo.23018017

Abstract. The article systematises the directions of artificial intelligence (AI) use in economic analysis on the basis of current international data and assesses the conditions for its application in Uzbekistan. Using documentary, comparative and typological analysis of the Stanford AI Index 2025–2026, IMF, BIS and peer-reviewed studies, the paper shows that the share of organisations using AI rose from 55 % in 2023 to 88 % in 2025, while U.S. private AI investment increased from USD 109.1 billion to USD 285.9 billion in 2024–2025. AI methods are matched to the main tasks of economic analysis – nowcasting and forecasting, causal policy evaluation, text analysis, credit and tax risk assessment – and a conceptual scheme of AI-enabled analysis with human oversight is proposed. Field evidence indicates productivity gains of about 15 % from generative AI assistants. For Uzbekistan, which moved from 87th to 62nd place in the Government AI Readiness Index in 2023–2025, priorities include open statistical data, pilot nowcasting models, model validation standards and training of economists in data science.

Keywords: artificial intelligence, machine learning, economic analysis, nowcasting, forecasting, generative AI, productivity, Uzbekistan.

IQTISODIY TAHLILDA SUN’IY INTELLEKTDAN FOYDALANISH

Annotatsiya. Maqolada zamonaviy xalqaro ma’lumotlar asosida iqtisodiy tahlilda sun’iy intellektdan (SI) foydalanish yo‘nalishlari tizimlashtirilgan va uni O‘zbekistonda qo‘llash shart-sharoitlari baholangan. Stanford AI Index 2025–2026, XVJ, XHB hisobotlari va ilmiy maqolalarni hujjatli, qiyosiy va tipologik tahlil qilish natijasida SIdan foydalanuvchi tashkilotlar ulushi 2023-yildagi 55 % dan 2025-yilda 88 % ga yetgani, AQShda SIga xususiy investitsiyalar 2024–2025-yillarda 109,1 mlrd dollardan 285,9 mlrd dollarga oshgani ko‘rsatilgan. SI usullari iqtisodiy tahlilning asosiy vazifalari – joriy baholash va prognozlash, siyosat ta’sirini baholash, matn tahlili, kredit va soliq risklarini baholash bilan moslashtirilgan hamda inson nazorati ostidagi SI asosidagi tahlilning konseptual sxemasi taklif etilgan. Generativ SI yordamchilari mehnat unumdorligini o‘rtacha 15 % ga oshirgani qayd etilgan. Hukumatning SIga tayyorgarlik indeksida 2023–2025-yillarda 87-o‘rindan 62-o‘ringa ko‘tarilgan O‘zbekiston uchun ochiq statistik ma’lumotlar, joriy baholash modellarini sinovdan o‘tkazish, modellarni tekshirish standartlari va iqtisodchilarni ma’lumotlar tahliliga o‘qitish ustuvor vazifalar sifatida belgilangan.

Kalit so‘zlar: sun’iy intellekt, mashinali o‘qitish, iqtisodiy tahlil, joriy baholash (nowcasting), prognozlash, generativ SI, mehnat unumdorligi, O‘zbekiston.

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ПРИМЕНЕНИЕ ИСКУССТВЕННОГО ИНТЕЛЛЕКТА В ЭКОНОМИЧЕСКОМ АНАЛИЗЕ

Аннотация. В статье на основе актуальных международных данных систематизированы направления использования искусственного интеллекта (ИИ) в экономическом анализе и оценены условия его применения в Узбекистане. Документальный, сравнительный и типологический анализ докладов Stanford AI Index 2025–2026, МВФ, БМР и рецензируемых исследований показал, что доля организаций, использующих ИИ, выросла с 55 % в 2023 г. до 88 % в 2025 г., а частные инвестиции в ИИ в США увеличились со 109,1 до 285,9 млрд долл. в 2024–2025 гг. Методы ИИ сопоставлены с основными задачами экономического анализа – наукастингом и прогнозированием, оценкой эффектов политики, анализом текстов, оценкой кредитных и налоговых рисков; предложена концептуальная схема анализа на основе ИИ под контролем эксперта. Полевые исследования фиксируют рост производительности около 15 % при использовании генеративных ИИ-ассистентов. Для Узбекистана, поднявшегося в индексе готовности правительств к ИИ с 87-го на 62-е место в 2023–2025 гг., приоритетами являются открытые статистические данные, пилотные модели наукастинга, стандарты валидации моделей и подготовка экономистов в области анализа данных.

Ключевые слова: искусственный интеллект, машинное обучение, экономический анализ, наукастинг, прогнозирование, генеративный ИИ, производительность, Узбекистан.

INTRODUCTION

Economic analysis has traditionally relied on econometric models estimated on relatively small sets of official statistics published with considerable delays. Over the past decade the volume, frequency and variety of economic data have grown sharply – transaction records, online prices, satellite images, news and company reports – while the cost of computing has fallen. These changes have created the conditions for using artificial intelligence (AI), primarily machine learning (ML) and, more recently, generative models, in forecasting, risk assessment, policy evaluation and the preparation of analytical materials.

The pace of diffusion is unprecedented. According to the Stanford AI Index, the share of organisations reporting the use of AI rose from 55 % in 2023 to 78 % in 2024 [1] and reached 88 % in 2025 [2]. AI is also expected to change the content of analytical work: IMF staff estimate that almost 40 % of global employment is exposed to AI, including about 60 % in advanced economies [3].

For Uzbekistan the topic has direct practical relevance. The Strategy for the Development of Artificial Intelligence Technologies until 2030, approved by Presidential Resolution PQ-358 of 14 October 2024, sets the targets of bringing the volume of AI-based software products and services to USD 1.5 billion and raising the share of AI-based services on the Unified Interactive Public Services Portal to 10 % [4]. Achieving these targets requires economists and analysts who can apply AI tools correctly and understand their limitations.

The theoretical basis for using ML in economics was laid by H. Varian, who showed how big-data methods complement traditional econometrics [5], by S. Mullainathan and J. Spiess, who distinguished prediction problems from the estimation of economic parameters [6], and by S. Athey and G. Imbens, who reviewed ML methods adapted to causal inference [7]. Empirical studies have demonstrated the usefulness of ML algorithms for real-time GDP nowcasting [8; 9], and central banks

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increasingly apply AI to data collection and analysis [10]. However, the literature rarely brings together global evidence on adoption, a typology of AI methods by economic analysis tasks and the institutional conditions of an emerging economy such as Uzbekistan.

The aim of the article is to systematise the directions of AI use in economic analysis on the basis of current international data and to identify the conditions for its effective application in Uzbekistan.

MATERIALS AND METHODS

The study is based on secondary data from international and national sources published in 2014–2026: the Stanford AI Index reports for 2025 and 2026 [1; 2], IMF Staff Discussion Note SDN/2024/001 [3], the BIS Annual Economic Report 2024 [10], peer-reviewed articles in economics journals, and regulatory documents and official information of the Republic of Uzbekistan [4; 11]. Sources were included if they contained quantitative indicators or a description of AI methods applied to economic data.

The following methods were used: documentary and content analysis of reports and articles; comparative analysis of indicators by year and country group; grouping and typology to match AI methods with the tasks of economic analysis; and graphical modelling to construct a conceptual scheme of AI-enabled economic analysis. Indicators are presented as published by the original sources, without additional estimation. The results are summarised in two tables, three diagrams and one scheme.

RESULTS

3.1. Global dynamics of AI adoption and investment

The use of AI by organisations has grown rapidly over three years (Fig. 1). In 2025, generative AI was used in at least one business function by 70 % of organisations, whereas the deployment of AI agents remained in single digits across almost all functions [2]. At the population level, generative AI reached 53 % adoption within three years, faster than the personal computer or the internet [2].

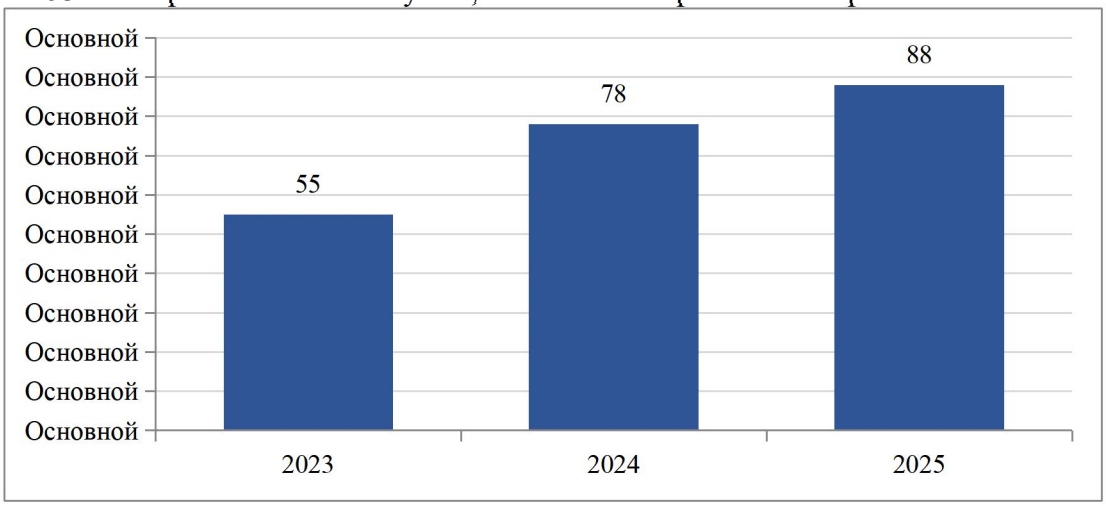


Fig. 1. Share of organisations using AI, % (compiled by the authors from [1; 2])

Investment is growing even faster. U.S. private AI investment increased from USD 109.1 billion in 2024 to USD 285.9 billion in 2025, while China's rose from USD 9.3 billion to USD 12.4 billion (Fig. 2) [1; 2]. Global private AI investment in 2025 reached USD 344.7 billion, 127.5 % more than a year earlier [2]. The main indicators, including those for Uzbekistan, are summarised in Table 1.

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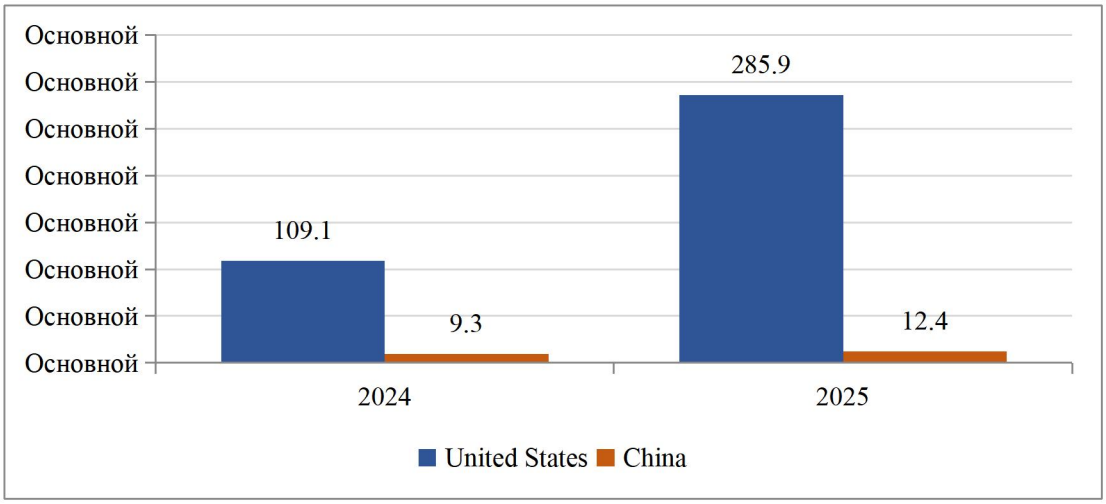


Fig. 2. Private investment in AI in the United States and China, USD billion (compiled by the authors from [1; 2])

Table 1. Key indicators of AI adoption and investment

Indicator	Value	Source
Organisations using AI	55 % (2023); 78 % (2024); 88 % (2025)	[1; 2]
Organisations using generative AI in at least one business function	70 % (2025)	[2]
Population-level adoption of generative AI	53 % within three years	[2]
Global private AI investment	USD 344.7 billion (2025; +127.5 %)	[2]
U.S. private AI investment	USD 109.1 billion (2024); USD 285.9 billion (2025)	[1; 2]
Share of employment exposed to AI	World ≈40 %; advanced economies ≈60 %; emerging markets 40 %; low-income countries 26 %	[3]
Uzbekistan: Government AI Readiness Index rank	87 (2023); 70 (2024); 62 (2025)	[11]
Uzbekistan: 2030 targets	AI-based software and services USD 1.5 billion; 10 % of public services based on AI	[4]

3.2. AI methods and the tasks of economic analysis

Grouping the reviewed studies by the tasks they address yields six main directions of AI use in economic analysis (Table 2). In macroeconomic nowcasting and forecasting, ML algorithms process large sets of indicators and capture non-linear relationships. In a real-time assessment for New Zealand, most of the ML algorithms tested produced more accurate GDP nowcasts than a simple

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autoregressive benchmark [8]; IMF staff proposed a scalable framework combining dynamic factor models, ML and novel data for European economies [9].

At the same time, ML is primarily a prediction tool. Mullainathan and Spiess warn that the coefficients of ML models should not be interpreted as estimates of economic parameters [6], while Athey and Imbens show how ML can be adapted to estimate heterogeneous treatment effects in policy evaluation [7]. Central banks use AI for text analysis, data collection and nowcasting [10], and Uzbekistan's strategy identifies banking and finance (fraud prevention and creditworthiness assessment) and taxation and customs (reducing the shadow economy) among the priority areas [4].

Table 2. AI methods by task of economic analysis

Task	AI / ML methods	Examples of application	Source
Nowcasting and forecasting of macroeconomic indicators	Gradient boosting, random forests, neural networks, support vector machines, dynamic factor models combined with ML	Real-time GDP nowcasting in New Zealand and European economies	[8; 9]
Prediction problems and variable selection	Regularised regression (LASSO), tree-based models	Selecting predictors from large data sets; prediction-based policy problems	[5; 6]
Causal policy evaluation	Causal forests and other ML methods adapted for treatment effects	Estimating heterogeneous effects of programmes and policies	[7]
Analysis of text and unstructured data	Natural language processing, large language models	Analysis of documents and communication, data collection by central banks	[10]
Credit, fraud and tax risk assessment	Classification and anomaly detection models	Creditworthiness assessment, fraud prevention, reducing the shadow economy	[4]
Support of analysts' work	Generative AI assistants	Drafting texts and reports, answering queries; productivity gains of 15–40 %	[12; 13]

On the basis of this typology, a conceptual scheme of AI-enabled economic analysis was developed (Fig. 3). It includes five consecutive stages – from data sources to decision-making – and emphasises that expert oversight is required at every stage: in framing the problem, selecting data, validating models and interpreting results.

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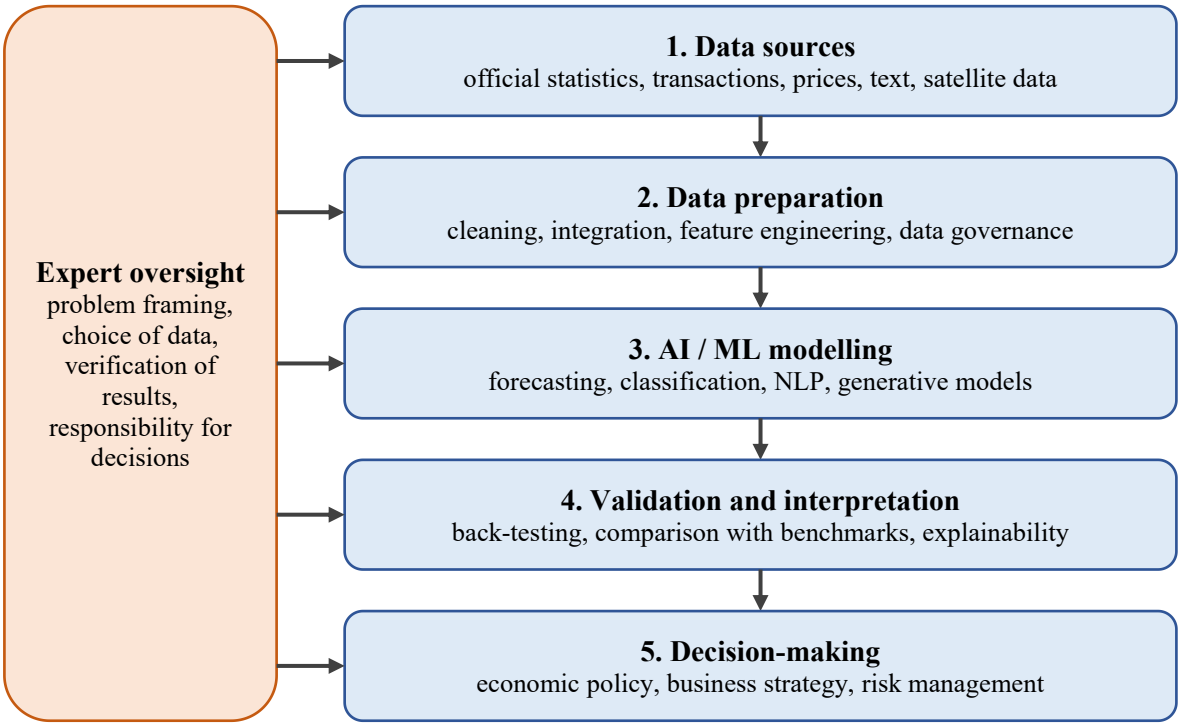


Fig. 3. Conceptual scheme of AI-enabled economic analysis (developed by the authors)

3.3. Effects on analytical work and productivity

The IMF estimates that AI exposure is highest in advanced economies and lowest in low-income countries (Fig. 4); about half of the exposed jobs may benefit from complementarity with AI through higher productivity [3]. Field and experimental studies confirm such gains. In a study of more than 5,000 customer-support agents, access to a generative AI assistant increased productivity, measured as issues resolved per hour, by 15 % on average, with the largest gains for less experienced workers [12]. In a controlled experiment with professional writing tasks, ChatGPT reduced completion time by about 40 % and raised output quality by about 18 % [13]. Similar routine components – drafting reports, writing code and cleaning data – make up a significant part of an economic analyst's work.

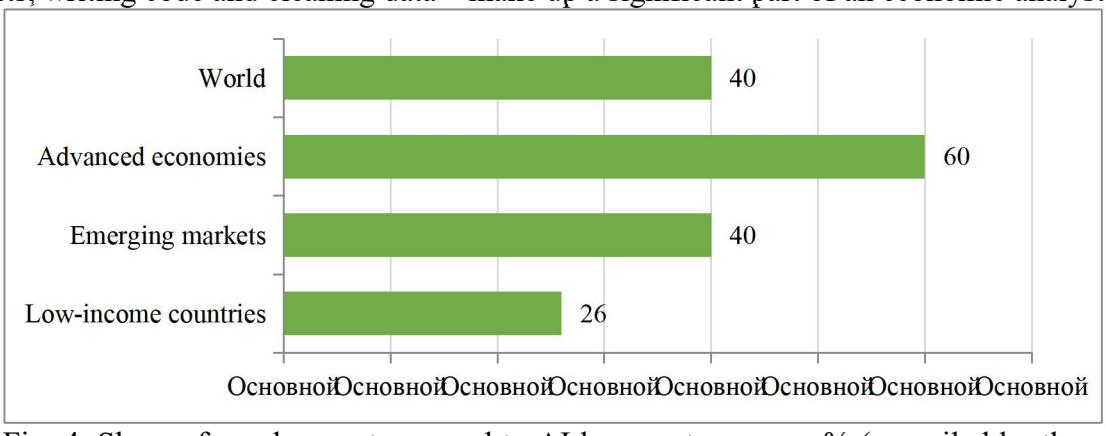


Fig. 4. Share of employment exposed to AI by country group, % (compiled by the authors from [3])

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3.4. Institutional framework and readiness of Uzbekistan

Uzbekistan has created a basic institutional framework for AI. Resolution PQ-358 set target indicators for 2030 and instructed the creation of a Big Data database by 1 September 2025 and the launch of computing capacities for AI projects by 1 May 2026 [4]. The country's position in the Government AI Readiness Index improved from 87th place in 2023 to 70th in 2024 and 62nd in 2025 [11]; the strategy aims for a place in the top 50 by 2030 [4]. These measures create the infrastructure prerequisites for the use of AI in economic analysis, although the achieved level of readiness still leaves room for improvement.

DISCUSSION

The results show that AI does not replace traditional economic analysis but extends it. ML methods are most useful where the task is prediction – nowcasting GDP, forecasting prices, detecting fraud or tax risks – whereas questions about the causes of economic phenomena still require econometric identification strategies [6; 7]. A hybrid approach, in which ML improves forecasts and variable selection while econometric models ensure interpretability, therefore appears the most productive.

Several limitations must be taken into account. Economic time series are often short and subject to structural breaks, which increases the risk of overfitting flexible models. Decisions in public administration require explainable models, so validation procedures and explainability tools should accompany any AI model used for policy. Generative models can produce plausible but incorrect statements, which makes expert verification of AI-generated text and calculations mandatory. Finally, the gap between widespread adoption (88 % of organisations) and limited deployment of autonomous AI agents [2] suggests that most organisations are still at an early stage of integrating AI into analytical processes.

For Uzbekistan, the following priorities can be proposed: publishing long, consistent and machine-readable statistical series; piloting ML-based nowcasting of GDP and inflation in economic authorities and comparing its accuracy with existing models; adopting standards for the validation and explainability of models used in public decisions; and including courses on machine learning and data analysis in economics curricula. These measures are consistent with the tasks of the national strategy on data infrastructure and human capital [4].

The study has limitations. It relies on secondary data whose methodologies differ between sources, and AI indicators change rapidly, so the figures presented reflect the situation as of 2025–2026. Empirical testing of AI models on Uzbek economic data is a task for further research.

CONCLUSIONS

1. AI is rapidly becoming a standard tool of economic activity: the share of organisations using AI rose from 55 % in 2023 to 88 % in 2025, and U.S. private AI investment increased from USD 109.1 billion to USD 285.9 billion in 2024–2025.

2. AI methods are most effective in the prediction tasks of economic analysis – nowcasting and forecasting, credit and tax risk assessment and text analysis; for causal policy evaluation, they should be combined with econometric methods.

3. Generative AI raises the productivity of analytical work (by about 15 % on average in field conditions), with the largest gains for less experienced specialists, but requires expert verification of results.

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4. The proposed conceptual scheme of AI-enabled economic analysis links data sources, data preparation, modelling, validation and decision-making under continuous expert oversight.

5. Uzbekistan has established the institutional basis for AI and improved its position in the Government AI Readiness Index to 62nd place; open statistical data, pilot nowcasting models, validation standards and training of economists in data science are priority conditions for the effective use of AI in economic analysis.

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