

Artificial Intelligence Introduction and 'AI' Impacts in Economics

Priya Sharma*

Assistant Professor

Department of Commerce

Kunwar Satya Vira

Degree College, Bijnor

Email: petalsharma2@gmail.com

Reference to this paper should be made as follows:

Received: 01.04.2025
Accepted on: 15.06.2025

Priya Sharma

Artificial Intelligence
Introduction and 'AI' Impacts
in Economics

Vol. XVI, Sp.Issue July1 2025
Article No.10, Pg. 065-074

Similarity Check: 02%

Online available at <https://anubooks.com/special-issues?url=-jgv-vol-xvi-special-issue-july-25>

DOI: <https://doi.org/10.31995/jgv.2025.v16iSI7.010>

Abstract

The term 'Artificial Intelligence' comes from two words 'artificial' and 'intelligence' which mean something created by humans and the ability to comprehend, learn or perform tasks respectively. AI is a construct made by humans for creating the intelligence of machines utilizing computer programming languages such as Python. This machine or artificial intelligence has been made possible because of the development and application of machine learning.

Artificial neural networks have been developed in which computers are programmed to mimic the network of neurons present in the human brain. AI is able to understand human language, receive commands and execute them using natural language processing. With deep learning, machines are taught how to interpret visual information which enables them to perform tasks that are more complex and human-like.

The area of AI started its development in 1955 with the fundamental ideas of John McCarthy who is considered by many the father of AI. AI is now common world wide for example in the form of virtual assistants such as Cortana and Siri, Alexa and Google Assistant and even in cars that drive themselves. AI can execute lethargic tasks at an exceptionally high speed without stopping, making a single error or getting tired. The growth of its application in medicine, telecommunications, emergency response and agriculture displays the merits. This technology, however, is challenging and expensive and needs to be controlled. When supervised by humans it can provide many, but, non-regulated.

Introduction –” Artificial Intelligence is a term composed of two words “Artificial”, meaning man made and “ Intelligence” which refers to the capacity to understand, learn and work”.

Definition -

“Artificial Intelligence (AI) refers to the development and technological revolution of computer systems that can learn from experiences simulate human thought processes, and adapt to new situations. These intelligent machines can analyze vast amounts of data, recognize patterns and make informed decisions or predictions, often autonomously or with minimal human intervention.”

In other words AI is “AI significantly impacts economics by allowing better analysis of data and decision-making, while also improving productivity”.

Below are specific areas where AI impacts Economics:-

1. Economic Forecasting & Modeling

AI enhances predictions by leveraging vast amounts of data, identifying patterns, and analyzing correlations which are often overlooked by traditional approaches .The role of AI in economic prediction and modeling has grown tremendously because AI improves the accuracy and productivity of economic predictions. Traditional approaches to economic forecasting based on the use of fixed models or the examination of previously recorded information have a limited range of responsiveness. Exponential adoption of AI, in particular ML and DL, is transforming the way economists process large sets of data, recognize patterns, and construct future scenarios pertaining to the economy. Models based on machine learning are applied in predicting GDP, inflation, and analyzing market movements. These are the reasons why AI matters in economic forecasting and modeling

a. Understanding and Evaluating Information -AI is capable of automating the processing and analysis of huge volumes of data from traditional resources like the financial market, consumer behavior, and government reports alongside non-conventional sources such as social media and weather patterns. The pacing and volume of which AI handles data augments the efficiency with which economists may derive conclusions or formulate predictions and insights to a level which would have been beyond reach or too exhaustive in the absence of AI.

Integration of Big Data: AI enables real-time integration and analysis of vast data sets, leading to more accurate forecasts. Sweeping changes AI implements allow economists to account for previously non-considerable parameters like global

trade, political turmoil, or natural catastrophes which determine the state of the economy. **Real-Time Data Processing:** AI enables the processing of real-time data, be it stock market and commodity movement or interest rate changes, to constantly revise and enhance economic models. This fosters more agile generic responding forecasting, particularly regarding AI-augmented changing conditions.

b. More Accurate Predictions -Particularly, AI models and machine learning algorithms have the ability to detect deep and complex non-linear relationships within data that traditional models fail to capture. These correlations are essential in estimating important economic variables such as GDP growth, inflation, unemployment, and interest rates. **Machine Learning Models:** ML algorithms are capable of being trained on historical data to forecast economic events and improve upon new data over time. These models outperform the traditional econometric models as they incorporate the impact of human behavior, global events, and other unpredictable features which is often difficult to quantify using orthodox methods. **Time-series Forecasting:** AI is excellent in time-series forecasting, which refers to predicting future values with reference to past data. Recurrent Neural Networks (RNNs), Long Short-Term Memory (LSTM) networks, and a few other AI models are adept at predicting time-related variables such as unemployment rates and stock prices.

c. Better Decision Making & Policy Making-Scenario Analysis & Stress Testing: The power of AI allows forward looking, dynamic simulation of potential policies and their effects. **Policy Formulation in Real-time:** Using a real-time feedback loop from the AI models, governments can fine-tune their approaches to meet citizens' welfare. **Use Chances in Banking:** AI models for risk assessment improve financial stability by identifying potential pitfalls.

d. Resilience & Lifelong Learning-Self-Learning Models: AI models can be developed to learn from fresh data, thus continuing to enhance robustness. **Adaptive Forecasting:** More models can adapt rapidly to shocks like an economic crisis or geopolitical event.

e. Challenges & Risks-Bias & Fairness: If the training data contains bias, AI models can generate biased forecasts, which in return can impact the decisions negatively. **Interpretation Constraints:** Deep studying fashions usually work as “black container” fashions which makes it tough to grasp how the predictions are made. **Ethics & Privacy Concerns:** Sensitive economic data also presents various ethical and privacy challenges. **Ensuring compliance with regulations:** Ensuring AI models adhere to legal and ethical standards is an ongoing challenge.

2. Financial Markets & Trading

Traffic AI implies data models to aid high-frequency trading (HFT) permitting supervision of an expanding volume of portfolios. Analysis of feelings from social media and news sentiments affect the investment stimulation.

a. Enhanced Trading Strategies- Algorithmic Trading: By analyzing massive datasets, AI systems can spot profitable trading opportunities, executing orders in milliseconds. Reinforcement Learning: Self-learning models adapt and improve over time, optimizing trading strategies based on market feedback. High-Frequency Trading (HFT) — AI algorithms can execute trades within microseconds, taking advantage of tiny price differentials before human traders have time to react. Algorithmic Trading: By analyzing massive datasets, AI systems can spot profitable trading opportunities, executing orders in milliseconds. Reinforcement Learning: Self-learning models adapt and improve over time, optimizing trading strategies based on market feedback.

b. Analysis and Optimizing the Financial Market- Algorithmic and High Speed Trading: AI performs trade actions at record speeds for better market efficiency. Security Services: Fraud detection algorithms improve the protection of financial assets by spotting unusual cash flow patterns. Investment Strategy And Portfolio Management: Portfolios and investments are made smarter with AI and can be changed actively based on the market.

c. Risk Management & Fraud Detection - Anomaly Detection: These AI techniques detect fraudulent trading like market manipulation, insider trading, or even fraud. Credit Scoring Models: AI analyses data features that are not standard, and therefore computes the risk profiles of borrowers with greater accuracy. Stress Testing: AI simulates extreme market conditions and observes the performance of portfolios under those conditions to improve the realism of rebalancing descriptions.

3. Labor Markets & Automation

The AI is supporting economists with the studies on the effects of automation on employment and wage changes. Forecasting skill needs of the workforce proactively aids education and policy as well as workforce planners. AI profoundly affects services, automation, business operations, and employment, as well as the competitiveness skills needed in the marketplace. Understanding these impacts is crucial for strategic policy and decision-making.

a. Job Loss & Redundancy: Mechanization of Simple Steps - Repetitive and predictable tasks, particularly in the areas of manufacturing, logistics, customer service, data entry, and even clerical work, are being automated more than ever before. Software tools powered by artificial intelligence: Some administrative tasks such as bookkeeping, scheduling, and even some HR activities are being automated. Change in Supply: supply is declining for low-skill, monotonous jobs, and increasing for those skilled in AI, and data.

b. Change in Employment AI Implementation and Support - Greater fragmentation of AI focused research will result in greater numbers of AI researchers, data scientists, machine learning engineers, and ethicists. Complementary Roles: AI trainers, explainability experts, and AI strategy consultants. New Domains: autonomous automobiles, smart city infrastructure and a many more industries are blooming with technology

c. Productivity & Efficiency Gains Improved Output- The productivity of different industries processes increases automation also raises the efficiency in Healthcare, finance, Logistics and even Manufacturing. Cost Reduction: Companies are able to improve efficiency as well reduce labor costs by automating manual processes. Enhanced Decision-Making: AI systems enables more accurate and speedy business decisions due to the swift accuracy that these systems offers.

d. Economic Inequality Wage polarization- The negative side of AI dependency is felt strongest by low – skilled workers as they face a greater risk of being displaced from their jobs while high-skilled workers efficiently utilize it. Geographical Disparities: Advanced urban areas with already advanced technical infrastructure benefit more than underdeveloped rural areas. Those who obtain AI education and training freely have a higher likelihood of advanced opportunities, thus widening the socio-economic gap even more.

e. Industry-Specific Impacts: Manufacturing- Predictive maintenance, automation of assembly lines, supply chain optimization Healthcare: Personalized AI driven diagnostics and treatment plans along with administrative task automation Finance: Fraud detection, algorithmic trading, customer service chatbots Retail: AI enabled recommendation systems, customer experience personalization, inventory management.

4. Supply Chain & Accordingly

AI enhances global trade models as a result of its impact on logistics and eliminating certain inefficiencies. Firms are aided in proactively responding to

anticipated demand changes by modifying supply accordingly. This helps businesses predict demand shifts and adjust supply. Market Integration- AI enable better global trade models as improves efficacy of logistics and weed out

a. How AI is playing a role in real-world logistics: Route Optimization: AI systems optimize your logistics. stockouts. Here are some more examples of trends, and exogenous variables (e.g., weather, geopolitical events) to enhance the accuracy of demand forecasting. Inventory Management: ML algorithms assist in optimizing inventory levels, minimizing costs associated with overstocking or spawning more meshed and optimal systems.

b. Here's one way this looks: Supply Chain Optimization Demand Forecasting: AI-based predictive analytics leverage historical data, real-time market optimizing efficiency, accuracy, and responsiveness in interconnected global networks. It's also dismantling legacy barriers to competitive entry, AI is redefining the landscapes of supply chains and market integration by Cost Reduction & the process to help carry out the quality of products mostly in the domain of computer vision by detecting defects or anomalies in the process of machine learning. to prevent failure and optimize maintenance schedules.

c. Ensure Quality: AI denotes costs across the supply chain. Predictive Maintenance: AI systems can monitor equipment and infrastructure in real time.

d. Efficiency Automation: AI helps automate manual processes to improve efficiency, accuracy, and to reduce labor Sustainability & learning models that focus on identifying the opportunities for minimizing waste in production, packaging, and distribution. verifying adherence to ethical standards and promoting corporate social responsibility.

e. Reducing Waste: Category of machine Footprint Reduction: AI is used to optimize routes, processes and energy consumption across the supply chain to reduce carbon emissions. Ethical Sourcing Verification: AI tools enable companies to trace the origin of their raw materials, Ethical Sourcing-Carbon

5. Taxation & Fraud Detection

AI assists in the identification of tax evaders and fraudulent activities.

a. Tax Administration October 2023-It aids governments and organizations in more optimally collecting revenue, in Your training data goes up to & offering tailored advice and optimizing case handling Machine learning models improve predicting tax revenue performance by analyzing economic indicators, industry trends, and historical tax data.

b. Personalized taxpayer assistance - NLP systems will enhance taxpayer communication, AI chatbots and virtual assistants simplify the tax filing process by assisting taxpayers navigate complex requirements, thereby reducing errors.

c. Automated Processing of Data- AI systems are able to process larger volumes of tax-related data at much higher speeds and with greater accuracy than traditional.

d. Policy Design & Evaluation :-

- i. Simulation tools- AI helps analyze the impact of proposal tax policies by modeling the behavior of the phenomenon or process before implementation, simulating it and understanding possible outcomes and behaviors before implementing it in the real world.

e. Advance fraud detection / Mechanism Anomaly detection –Machine learning algorithms can identify unusual patterns in tax filings or financial transactions that may indicate fraudulent.

6. Behavioral Economics and Consumer Understanding

AI will help analyze consumer behavior to inform marketing strategies and make more appropriate pitches. Explains the patterns of spending and the responsiveness of demand. AI analysis will focus on the enhancement of consumer behavior to rework marketing strategies and customize recommendations. Lends illumination to buying behavior and demand elasticity. AI is revolutionizing behavioral economics and consumer insight by providing more accurate, data-driven analysis into decision-making behavior, tastes, and prejudices. Through sophisticated analytics, machine learning, and natural language processing, AI delivers richer insights into consumers' behavior, which enriches economic models and makes personalized services better. Let's delve into the details:

a. More Powerful Consumer Behavior Analysis.

- i. Personalized Recommendation Systems: AI programs scan users' tastes, history, preferences, and context to make product and service recommendations (e.g., Netflix, Amazon, Spotify).
- ii. Adaptive Marketing: In real-time, marketing campaigns are adjusted according to consumer interactions and changing preferences.

b. Consumer Segmentation - Dynamic Clustering: Machine learning algorithms classify consumers according to behavior patterns, lifestyle, demographics, and psychographics.

c. Sentiment Analysis - Natural Language Processing (NLP): AI processes social media posts, reviews, surveys, and other text data to determine public opinion regarding products, brands, or policies.

d. Emotion Detection- AI identifies emotions in speech, text, or facial expressions to recognize consumer reactions.

7. Environmental and Development Economics

An economic AI model assesses the ramifications of climate change and suggests actionable policies to mitigate its effects. Analyzes information regarding economic mobility in order to provide support in designing poverty alleviation policies. Economic AI model forecasts the impact of climate change and proposes effective policies to reverse it. Analyzes information regarding economic mobility to help reduce poverty policies. AI is increasingly influencing environmental and development economics through the improvement of data gathering, the maximization of the use of resources, and the enhancement of policy formulation towards sustainable development. It provides new solutions for tracking environmental changes, forecasting economic growth trends, and developing interventions that facilitate inclusive growth. Here's the detailed explanation-

a. Environmental Economics-

- i. **Climate Change Mitigation & Adaptation**Carbon Footprint Reduction: AI streamlines energy usage in industries using predictive analytics, reducing emissions and maximizing efficiency.
- ii. **Renewable Energy Management**: Machine learning algorithms enhance the forecasting of renewable energy resources (solar, wind), increasing grid stability and efficiency.
- iii. **Climate Modeling**: AI improves the accuracy of climate models by analyzing intricate environmental data, enhancing projections regarding global warming and extreme weather patterns.

b. Resource Management & Conservation –

- i. **Sustainable Agriculture**: AI systems enhance crop yield forecasts, soil condition monitoring, and precision agriculture methods to minimize wastage of resources.
- ii. **Water Resource Management**: AI enhances water utilization in agriculture and industry, increasing efficiency and minimizing wastage.
- iii. **Biodiversity Monitoring**: AI-based computer vision and NLP tools help track wildlife populations and monitor loss of biodiversity in real-time.

c. Circular Economy –

- i. **Waste Management:** AI optimizes sorting and recycling procedures, making processes more efficient and fostering environmentally friendly waste disposal.
- ii. **Lifecycle Analysis:** AI algorithms evaluate the green footprint of products across their lifecycle, informing the creation of environmentally friendly alternatives.
- iii. **Supply Chain Sustainability:** Increased transparency and traceability of resources in supply chains guarantee compliance with environmental principles and ethical methods.

d. Development Economics –

- i. **Economic Growth & Poverty Reduction Predictive Analytics:** Macro and microeconomic indicators are processed by AI models to forecast growth patterns, point out high-growth sectors, and efficiently invest resources. **Inclusive Growth Strategies:** AI-based systems identify target groups that lack access or remain vulnerable, thereby offering data-supported insights for implementing targeted interventions (e.g., financial inclusion and access to healthcare). **Microfinance Optimization:** Credit risk for poor borrowers is enhanced through machine learning, thus enhancing financial inclusion and economic mobility.
- ii. **Infrastructure & Urban Development -Smart Cities:** AI optimizes urban planning by processing data on traffic flow, energy usage, and pollution, enhancing sustainability and quality of life. **Transportation Networks:** AI systems enhance the efficiency of public transport, minimizing congestion and carbon footprint. **Infrastructure Resilience:** Predictive models increase the resilience of infrastructure projects against natural disasters and climate change effects.

4. Macroeconomic Policy & Central Banking

The central bank utilizes AI in tracking inflation, adjusting interest rates, and other economic phenomena. An AI has already been integrated into assessing risks for financial sustainability.

Conclusion

Artificial Intelligence (AI) is transforming the international economy by triggering Productivity, innovation, and efficiency in industries. It improves decision-making, streamlines repetition, and develops new marketplaces. Yet, AI also has

challenges, including job loss, income disparity, and ethical issues around data privacy and prejudice.

Economies will be able to reap the most from AI while reducing risks if governments, companies, and institutions invest in education, workforce up skilling, and regulatory systems. A balanced strategy that leverages AI powered growth without sacrificing inclusiveness and equity will dictate how well societies can transition to this technology revolution.

Reference:

1. <https://www.coursera.org/articles/what-is-artificial-intelligence>
2. <https://adamasuniversity.ac.in/artificial-intelligence-in-economics/>
3. https://www.youtube.com/watch?v=_PeQ8KMfG4c
4. https://www.researchgate.net/publication/369539881_Impact_of_Artificial_Intelligence_on_Supply_Chain_Management_Performance
5. <https://www.emerald.com/insight/content/doi/10.1108/jebde-10-2023-0022/full/html>