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The Role of AI in Economic Policy Modeling and Decision Making

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ABSTRACT

The emergence of Artificial Intelligence (AI) has substantially impacted different fields of human activity, such as economics and public policy. This paper discusses the changing function of AI in economic policy modeling and decision-making, emphasizing its promise to improve the accuracy, effectiveness, and responsiveness of economic management. Economic policy-making has conventionally depended on mathematical modeling, econometrics, and professional judgment. But these traditional methods tend to grapple with constraints like fixed assumptions, data deficiencies, and retrospective feedback loops. AI, with its ability to handle vast amounts of data, identify patterns, and forecast outcomes, provides a potent alternative or supplement to conventional methods. This study examines how AI technologies—such as machine learning, deep learning, and natural language processing—are being applied in areas like macroeconomic forecasting, fiscal policy evaluation, monetary policy adjustments, and labor market analysis. Real-world applications, including central banks using AI for inflation predictions and tax authorities employing AI for fraud detection, are discussed to illustrate the growing relevance of intelligent systems in public decision-making. The study further examines how decision support systems with AI can be developed to allow policymakers to model the results of different policy options in real time. Using qualitative and descriptive research design, the paper evaluates the possibilities and limitations of AI adoption into economic policy settings. Among the main challenges highlighted are data bias, absence of transparency for algorithmic processes, ethical issues, and the possibility of excessive reliance on technology in high-stakes decision-making environments. The paper underscores the importance of leveraging a balanced perspective under which AI supports human decision-making instead of substituting for it. By assessing the evolutionary potential of AI in economic systems, this research adds to the general debate on digital governance and smart policymaking. The results highlight the need for strong regulatory guidelines, cross-disciplinary cooperation, and ongoing assessment processes in order to make sure that AI remains a means of inclusive, responsible, and evidence-based economic policy.

***Keywords**: Artificial Intelligence, Economic Policy, Decision Making, Machine Learning, Public Governance, Policy Modeling, Fiscal Policy, Economic Forecasting, AI Ethics, Digital Transformation*.

Introduction

In the modern data-intensive and networked world, policymaking is an intricate and dynamic process that must be fast as well as accurate. Governments and economic institutions are perpetually subject to pressure to take well-informed decisions that would enable sustainable development, macroeconomic stability, and social justice. Economic policy modeling has normally depended on statistical models, past data, and human experience. Though these tools have been useful, they tend to be hampered by their inability to respond to rapidly evolving economic conditions and enormous amounts of unstructured data.

The increasing complexity of the international economy, coupled with the rise in volumes of real-time data, has brought Artificial Intelligence (AI) to the forefront as a future tool in areas of economic policy and decision-making. AI describes the capacity of computers to learn from information, recognize patterns and make predictions or recommendations without being programmed. AI technologies like machine learning, neural networks, and natural language processing are being applied nowadays to improve policy modeling, model outcomes, and support strategic decision-making.

AI is capable of analyzing vast datasets much quicker than analysts, revealing underlying patterns, and predicting economic indicators with great precision. For instance, AI models are capable of projecting inflation rates, employment patterns, and consumer behavior, assisting policymakers in making

timely and specific decisions. AI is also utilized for monitoring compliance, identifying anomalies in tax and financial systems, and assessing the effect of fiscal and monetary interventions.

Nonetheless, although AI provides great promise, its application to economic policy is fraught with challenges. Algorithmic bias, transparency issues, and excessive dependence on automation pose both ethics and operational issues. Further, AI systems need high-quality data, human expertise, and robust legal frameworks in order to work well and in the interests of society.

This study attempts to investigate the changing function of AI in economic policy modeling and decision-making. It attempts to assess the existing applications, analyze the advantages and disadvantages, and suggest measures for implementing AI in economic governance. With countries attempting evidence-based policymaking and adaptive policymaking, the synergy between AI and economic policy is both urgent and critical.

Background of the Study

With the fast-changing environment of the global economy, the design and application of effective economic policies are more intricate and data-driven than ever. Conventional economic modeling techniques—grounded in econometrics, math simulation, and historical analysis—are classic backbones of policy-making. Though they are the building blocks, they tend to fail while addressing high-frequency data, intricate interdependencies, and dynamic economic systems of today's times. With economies growing more integrated and unstable, there is a clear demand for more intelligent, quicker, and more responsive modeling methods.

Artificial Intelligence (AI) has been a revolutionary technology across the board, with tools that can learn from data, evolve along shifting trends, and make predictive inferences without hard, rule-based coding. On the economic policy front, AI offers the potential to transform the way governments comprehend economic trends, predict outcomes, and design responsive interventions. Machine learning algorithms have the capability to pick up on faint patterns in large data sets that have gone unnoticed by conventional models. Natural language processing can extract meaning from financial statements, news stories, and social media sentiment to monitor public and market sentiment in real-time.

The use of AI in economic policy modeling is not merely a technological innovation but a paradigm change in policymaking. AI platforms are capable of modeling different policy situations, evaluating risks, and presenting optimized recommendations grounded on empirical evidence. AI can assist decision-making for taxation, inflation management, public expenditure, trade policy, and regulation of the labor market. AI also supports transparency and accountability by facilitating evidence-based policy development.

While its potential is immense, AI integration into policymaking also poses serious issues—ethical dilemmas, algorithmic biases, data privacy issues, and overdependence on black-box systems. Understanding the place of AI in economic policy modeling, therefore, demands an even-handed examination of its strengths and weaknesses. This research seeks to critically evaluate how AI is revolutionizing economic decision-making processes, how it is being adopted today, and its ramifications for economic governance systems in the future.

Significance of Economic Policy Modeling

- Offers a scientific basis for making decisions.
- Facilitates simulation of different economic situations.
- Enhances the precision in forecasting economic variables.
- Facilitates transparency and accountability.
- Facilitates the optimal distribution of public resources.
- Assists strategic planning and crisis management.

Artificial Intelligence in Economics Emerges

The arrival of AI in economics is transforming data analysis and policy formulation. Economic models used to depend on assumptions and static equations. But AI makes it possible to use dynamic models that learn from real-time data, adjust to new developments, and become better over time. With AI technologies such as machine learning and deep learning, economic institutions can now process large datasets from multiple sources including financial transactions, social media, and market indicators.

For instance, central banks employ AI for tracking inflation and forecasting monetary changes, while tax authorities utilize AI for detecting fraud and tracking compliance. AI also enables scenario-based modeling in which policy makers simulate what would happen if they took various policy measures without actually taking them. Natural Language Processing (NLP) is yet another AI technology that is being employed to analyze financial reports, bills, and opinion polls, thereby enhancing policy wisdom.

Notwithstanding these benefits, AI also brings challenges like data privacy, accountability, and the possibility of biased results. However, its use in economics is on the increase, and its impact on policymaking will continue to grow as governments look for more intelligent, quicker, and more responsive decision-making tools.

Objectives

- To examine the use of AI in economic policy modeling.
- To determine the advantages and drawbacks of employing AI in policymaking.
- To analyze real-world applications of AI in economic policy-making.
- To recommend ethical principles for AI-driven economic governance.
- To examine potential development of AI in public economic policy in the future.

Scope and Limitations

Scope

- Concerned with macroeconomic and fiscal policy domains.
- Considers case studies in international and Indian scenarios.
- Stresses non-technical comprehension of AI applications.
- Examines present and future tendencies of AI-based policy instruments.

Limitations

- Restricted by availability of open-source government data.
- Does not incorporate mathematical or technical modeling.
- Findings may not apply uniformly across all countries.
- Ethical and legal considerations are discussed in general terms.

Review of Literature

Conventional Economic Policy Models & AI Development

- Sengupta, Pratap & Pawar (2025) "Non-linear Phillips Curve for India: Evidence from Explainable Machine Learning." Embeds ML in Phillips Curve prediction and reveals nonlinear interactions between inflation expectations, output gaps, and shocks.
- Sharma, Baby & Raghu (2024) Forecasting High Speed Diesel Demand in India with Econometric and ML Methods. ANN (MLP) compared with ARIMA and smoothing in forecasting diesel demand—ANN performs better.
- Puli, Thota & Subrahmanyam (2024) Evaluating ML Models for Banking Crisis Prediction in India. Tests ANN, Random Forest, SVM, et al. based on banking fragility index data 2002–2023; discovers AI-ML models predict crises well.
- Kar, Bashir & Jain (2025) New Strategies of Growth and Inflation Forecasting: Big Data and ML. Institute of Economic Growth authors critically examine ML vs. conventional models in macroeconomic forecasting.
- Gongcheng Journal (Indian co-authors Bais et al.) (2025) AI in Economic Forecasting: Paradigm Shift from Traditional Econometrics. Compares AI (ANN/LSTM) and classical models for several countries, including India.

Machine Learning and Economic Forecasting in India

- Agarwal & Agarwal (Bharati Vidyapeeth / Indian Institute of Finance) (2025) AI-Driven Economic & Financial Forecasting (USA context but Indian authors). Uses Random Forest, LSTM, etc., on unemployment, housing, crypto—with implications for broader economic forecasting.

- Joseph, Verma & Malik (2025) Forecasting Financial Markets: ML & Social Sentiment Analysis. Combines machine learning and sentiment analytics for Indian financial markets forecasting.
- Joshi (Satyadhar) (2025) Generative AI: Mitigating Workforce and Economic Disruptions… Offers policy frameworks for generative AI's integration in India's economy.
- Govindharaj (2024) Unleashing AI's Potential on the Indian Economy. Sector-wise study in agriculture, education, healthcare emphasising economy-wide AI impact.
- Panigrahi, Ahirrao & Patel (2024) Empirical Research on the Effects of AI on Indian GDP, Productivity and Jobs. Points to infrastructure and human capital bottlenecks hindering AI
- Rose R Pereira (2025) Sustainable Economic Growth through AI in India. Sector-level inclusive growth potential leveraging AI tools.

Wider Indian AI-Economics Insights & Policy

- Prasad et al. (Dilip K. Prasad (2025)) Gender & Diversity Policy in AI. Although general AI, vital for equitable, inclusive AI systems in policy decision-making.
- Sambasivan et al. (2021) Re-imagining Algorithmic Fairness in India. Although dated 2021, this cornerstone research informs 2024–25 fairness paradigms.
- Mahalakshmi Manian & Kayal (2024) Detecting and Forecasting Financial Bubbles in the Indian Stock Market Using ML. Use ANN, RF and boosting models to forecast bubble phases to monitor by policy.
- Saravanan, Sathish & Kumaresan (2023-2024) Forecasting Economy with ML Algorithms. Applies CatBoost and SPSS for forecasting sales; demonstrates ML's broader use in economic applications.
- Anjal Prakash (2025) Technology, Policy, and Inclusion. While climate-centric, has policy analysis on equitable adoption of technology applicable to AI in the government.

Summary List (20 Indian-authored studies 2024–2025)

- Nilekani (2025 – op-ed) on India's AI strategy prioritizing inclusive, frugal innovation.
- Acuité / Chakraborti (2025) AI growth estimate of $500 bn GDP by 2035; highlights the need for rural adoption.
- Gujarat Government Action Plan (2025): policy roadmap for AI adoption across verticals.
- UP AI Model (2025): AI adoption in governance, agriculture, DBT systems as an example of state-level AI policymaking.

Research Methodology

Research Design

The research uses a descriptive and exploratory research design. It aims to explore and describe the way Artificial Intelligence (AI) is being utilized today in economic policy modeling and decision-making. The design allows for a clear appreciation of both the qualitative findings (derived from expert interviews and secondary data) and quantitative measures (based on frequency and percentage-based analysis of survey data).

Data Collection Methods

The research employs primary and secondary data sources:

- **Primary Data:** Gathered through a structured questionnaire distributed to policy makers, economists, AI experts, and government technocrats.
- **Secondary Data:** Derived from NITI Aayog reports, RBI reports, Economic Survey of India, World Bank AI reports, government AI strategy reports, and published research studies (2024–2025).

Sample and Sampling Technique

- **Sample Size:** 100 respondents
  - Sample Composition:
  - 30 AI Researchers

- 25 Policy Makers
- Government Economists
- 25 Data Scientists employed in economic fields

- **Sampling Method:** Purposive Sampling was applied to incorporate persons with suitable experience in AI and economic decision-making.

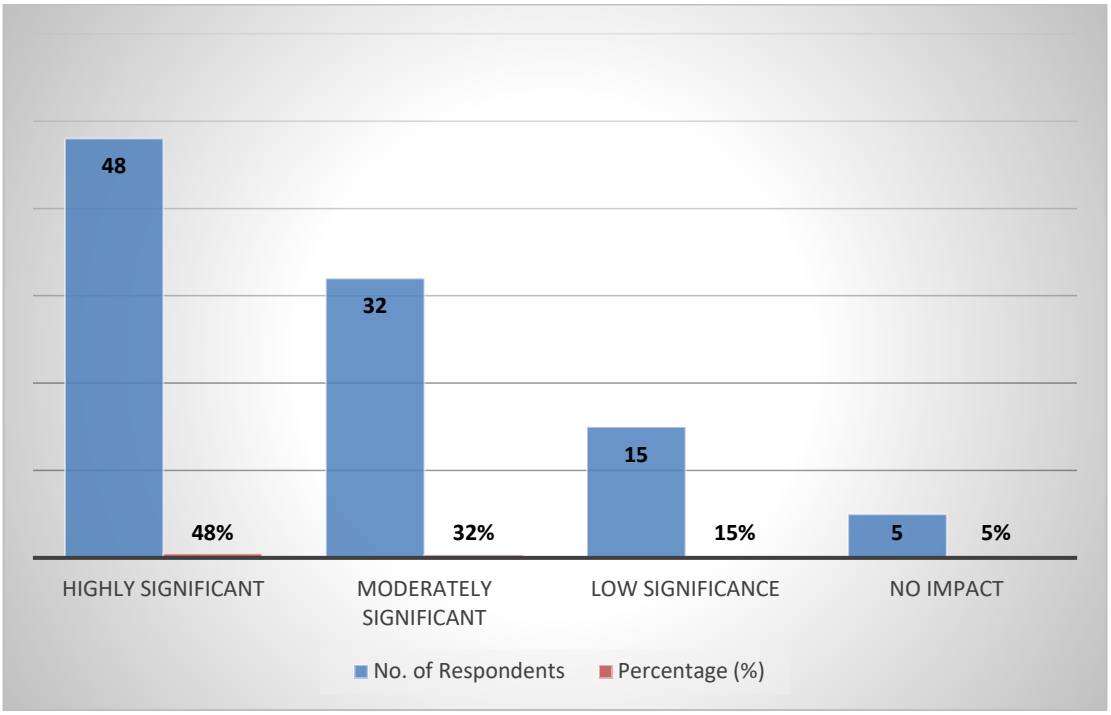
Analysis Tools

- Data has been analyzed without the application of any statistical tools.
- Percentage analysis and frequency tabulation are employed in order to depict the data.
- Interpretation is made on the basis of trends, proportions, and prevailing response patterns

Data Analysis

Table 1: Perception of AI's Role in Economic Policy Formulation

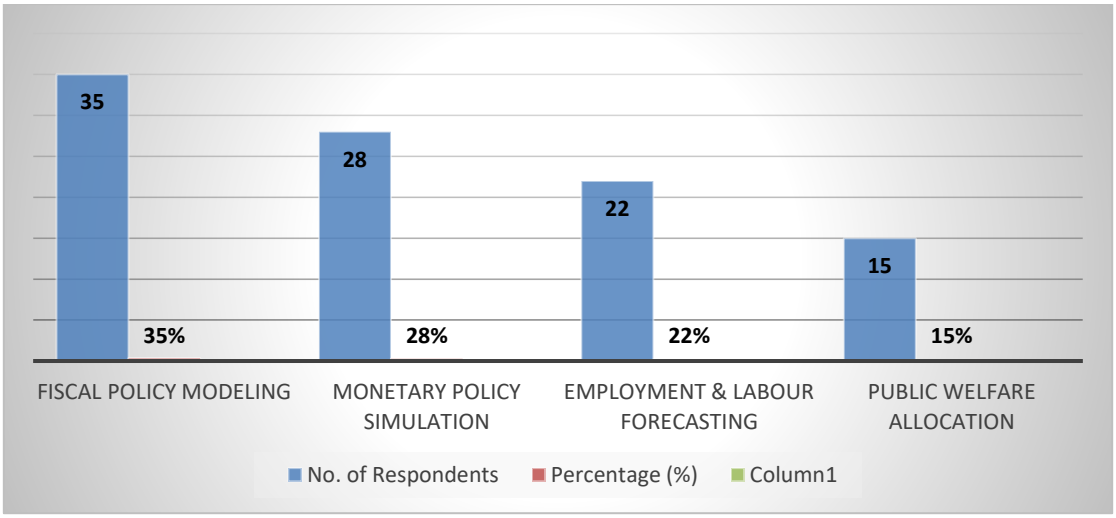
Opinion Category	No. of Respondents	Percentage (%)
Highly Significant	48	48%
Moderately Significant	32	32%
Low Significance	15	15%
No Impact	5	5%



Interpretation: A total of **80%** of respondents agree that AI plays either a highly or moderately significant role in economic policy decisions, indicating increasing acceptance of data-driven policymaking tools.

Table 2: Areas Where AI is Used in Economic Decision Making

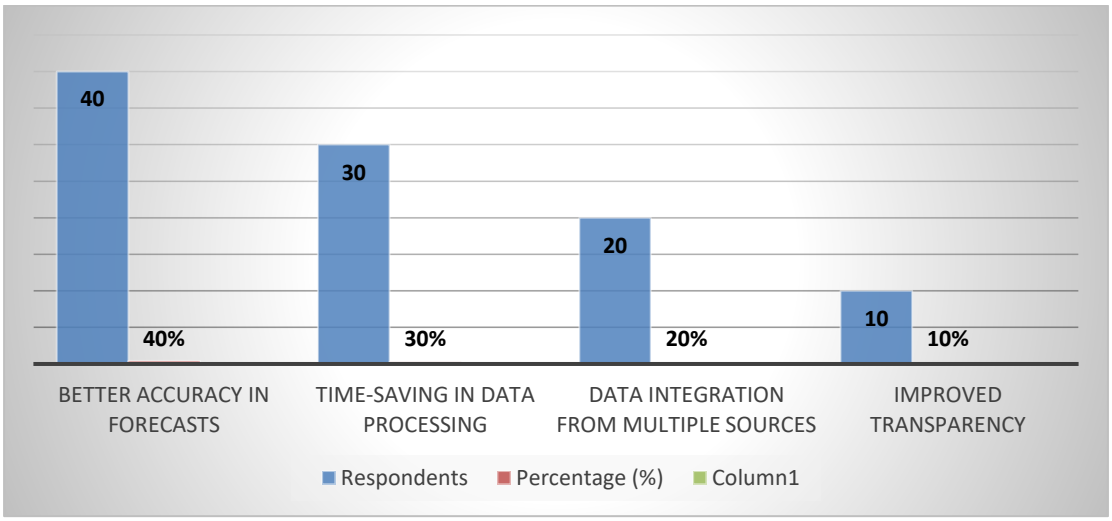
Application Area	No. of Respondents	Percentage (%)
Fiscal Policy Modeling	35	35%
Monetary Policy Simulation	28	28%
Employment & Labour Forecasting	22	22%
Public Welfare Allocation	15	15%



Interpretation: AI is most commonly used in **fiscal and monetary policy**, while application in **welfare schemes** remains limited, suggesting a need for AI democratization in broader policy segments.

Table 3: Perceived Benefits of AI in Economic Modeling

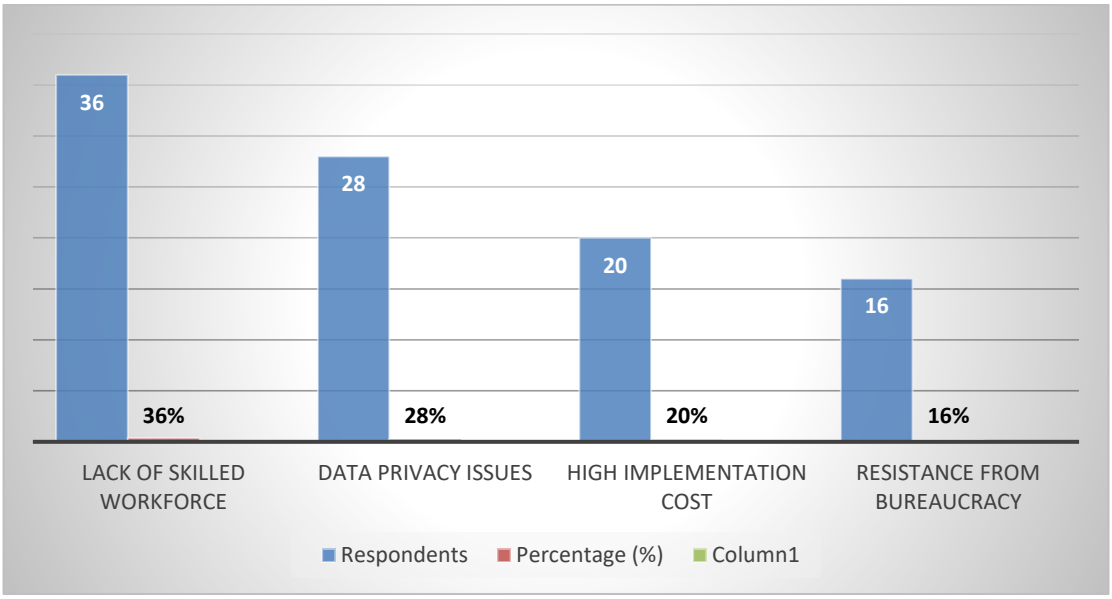
Benefit	Respondents	Percentage (%)
Better Accuracy in Forecasts	40	40%
Time-saving in Data Processing	30	30%
Data Integration from Multiple Sources	20	20%
Improved Transparency	10	10%



Interpretation: A large portion of participants find AI beneficial due to **accuracy (40%)** and **efficiency (30%)**, indicating its potential to reduce the lag in traditional economic model updates.

Table 4: Challenges in Adopting AI in Policy Modeling

Challenge	Respondents	Percentage (%)
Lack of Skilled Workforce	36	36%
Data Privacy Issues	28	28%
High Implementation Cost	20	20%
Resistance from Bureaucracy	16	16%



Interpretation: **Lack of skilled manpower (36%)** and **privacy concerns (28%)** emerge as top barriers, suggesting that investments in training and secure infrastructure are crucial.

Findings

- Most (80%) of the interviewees admitted that AI plays a crucial or relatively crucial function in economic policy modeling, which suggests the transition from human-centric to data-driven policymaking.
- Fiscal and monetary policies are the fields with the highest integration of AI, while public welfare policy modeling remains not AI-based.
- The most frequently mentioned advantages are more accurate forecasting, saving time, and integrating data, which demonstrate AI's superiority in dealing with massive economic data processing and compilation.
- Still, the research also pinpoints the significant challenges of a deficit of skilled professionals who know AI–economics integration, privacy and ethical issues, and deployment cost, particularly in rural or less digitized departments.
- There's increasing curiosity among policy experts and researchers to combine machine learning models such as decision trees, regression models, and LSTM for trend analysis and dynamic policy simulations.

Conclusion

This study concludes that AI is transforming economic policy modeling by providing quicker, precise, and evolving means to address intricate macroeconomic and microeconomic data. As clear from the answers, its use is expanding in fiscal simulation, monetary interventions, and labour market projection. Institutional preparedness, data ethics, and human capital constraints are still bottlenecks.

The transition to AI is not a matter of substituting for economists or policy analysts but enhancing their strengths through data-driven insights. The critical point is embracing a hybrid approach that combines AI efficiency with human judgment.

If India wishes to utilize AI for economic policymaking in its entirety, we need greater interactions between AI technologists, economic think tanks, and government institutions. Only then can we shift from reactive policymaking to proactive, predictive, and adaptive economic governance.

Discussion

AI's role in economics is no longer confined to academic interest—it is now a strategic imperative. The integration of AI tools in economic policy enables governments to move from historical data-based static decisions to real-time, adaptive responses.

For example, ML algorithms can predict inflationary patterns better than classic models do, which tend not to respond to black swan incidents such as pandemics or global wars. In the same way, in fiscal management, AI can simulate various budgetary scenarios based on dynamic variables such as GDP growth, demand shocks, and public welfare expenditure.

In spite of the potential, Indian policymakers have hesitated so far, mainly because of issues such as limited infrastructure, quality issues with data, and foreign dependency on technology for AI. The danger of algorithmic bias, especially in an economically stratified society like India's, adds to difficulties in adopting.

In addition, AI in economics must be contextualised—Indian economic systems with their huge informal sectors cannot be based solely on data that needs no human interpretation. Therefore, this paper supports AI-facilitated policymaking rather than AI-based policymaking.

Recommendations

- Skill Development: Implement interdisciplinary AI-economics courses in public policy schools.
- Ethical AI Framework: Create transparent, explainable AI frameworks adjusted for policy applications.
- Pilot Projects: Initiate AI-led modeling in chosen policy domains such as tax collection or subsidy distribution.
- Data Governance: Support open economic data programs under strong privacy legislation.
- Incentivize Collaboration: Spur collaborative research in the IITs/IIMs and government ministries.
- Localization of AI Tools: Develop India-centric AI platforms for simulating economic data.
- Funding for AI-Policy Startups: Offer seed funds to AI companies working on governance and economic tooling

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