

Artificial Intelligence and Inflation Forecasting: Implications for Central Bank of Nigeria Policy Decisions.

1.Hamza Ibrahim, 2. Samuel Vintenaba, 3. Onuh Sunday Michael

1. Department of Economics, Federal University Wukari, Taraba State Nigeria

2. Department of Computer Science, College of Agriculture, Science and Technology Jalingo, Taraba State Nigeria.

3. Department of Economics, Bingham University Kodape Karo, Nasarawa State Nigeria.

Correspondence Email Address: henryishaya@gmail.com

Abstract: Inflation is not new to Nigeria as a sovereign country over years as it continues to affect the economy negatively as many scholars offer their views on the matter. For Nigeria, adopting artificial intelligence-driven inflation forecasting will improve its inflation forecasting. Conventional forecasting techniques frequently experience reduced predictive performance because of structural economic changes, volatile exchange rate, fiscal shocks, insecurity, and supply-side disruptions. The primary objective of the study is to examine the role of Artificial Intelligence in improving inflation forecasting and its implications for monetary policy decisions of the Central Bank of Nigeria. The research work adopted the Data-Driven Decision-Making Theory as its theoretical framework. Qualitative and Descriptive research design was used for the research where only secondary sources of data were utilised. The research found out that Central Bank of Nigeria currently combines both conventional economic models and data-driven forecasting techniques. Also, Artificial Intelligence-generated inflation forecast have important implications for monetary policy. Challenges limiting adoption of Artificial Intelligence in inflation forecasting by the Central Bank of Nigeria include poor availability of high quality real-time economic data, inadequate digital infrastructures and limited Artificial Intelligence expertise. The study recommended complete shifting from traditional inflation forecasting to Artificial Intelligence models for inflation forecasting and need to ensure availability of high quality real-time economic data, adequate digital infrastructures, as well as training and retraining of its staff on Artificial Intelligence operational models by the Central Bank of Nigeria.

Key words: Artificial Intelligence, Inflation, Forecasting, Central Bank of Nigeria, Monetary Policy.

1.Introduction

Inflation is not new to Nigeria as a sovereign country over years as it continues to affect the economy negatively as many scholars offer their views on the matter. According to Darius et al. Inflation has remained one of Nigeria's most persistent macroeconomic challenges over the past decade, driven by food supply disruptions, exchange rate depreciation, insecurity, energy price increases, fiscal deficits, and structural bottlenecks. Between 2023 and 2025, inflation accelerated significantly following the removal of fuel subsidies and exchange-rate reforms, increasing the cost of living and creating uncertainty for businesses and households. Recent evidence suggests that although inflation persistence has begun to moderate due to tighter monetary policy and ongoing reforms, food inflation remains the dominant contributor to headline inflation. These developments underscore the need for reliable inflation forecasting models capable of anticipating future price movements and supporting proactive monetary policy decisions.

Adebiyi et al. (2022) reported that, accurate inflation forecasting is essential for effective macroeconomic management because it enables central banks to implement timely monetary policy interventions, anchor inflation expectations, and maintain macroeconomic stability. Reliable forecasts reduce uncertainty in financial markets, improve interest rate decisions, and enhance policy credibility. Recent studies demonstrate that incorporating big data, machine learning, and sentiment analysis into forecasting models significantly improves predictive accuracy compared with traditional econometric approaches, particularly during periods of economic shocks such as the COVID-19 pandemic and global supply-chain disruptions.

Ayivodji et al. (2026) revealed that, artificial intelligence has transformed macroeconomic forecasting by enabling the analysis of large and complex datasets that conventional statistical models often struggle to process. Artificial Intelligence techniques including machine learning, deep learning, natural language processing, and big-data analytics can identify nonlinear relationships and improve forecast accuracy. Central banks and international financial institutions increasingly employ Artificial Intelligence to forecast inflation, GDP growth, unemployment, and financial market conditions. In Nigeria, recent research by the Central Bank of Nigeria demonstrates that integrating sentiment analysis and machine learning into inflation forecasting significantly enhances predictive performance, highlighting Artificial Intelligence's growing relevance for evidence-based monetary policy.

According to CBN (2026), The Central Bank of Nigeria (CBN) has the statutory responsibility of maintaining monetary and price stability. In recent years, the Bank has strengthened its monetary policy framework through higher policy rates, improved communication, exchange-rate reforms, and a gradual transition toward a formal inflation-targeting framework. The CBN recognizes that inflation targeting requires forward-looking policy decisions supported by credible inflation forecasts, institutional transparency, and effective policy transmission mechanisms. Consequently, improving forecasting accuracy has become a strategic priority for achieving sustainable price stability and enhancing confidence in Nigeria's monetary policy.

For Nigeria, adopting artificial intelligence-driven inflation forecasting will improve its inflation forecasting. However, empirical evidence on application of artificial intelligence in inflation forecasting and their implications for central bank of Nigeria policy decisions making remains inadequate, hence the need for this study to investigate how artificial intelligence applications can be used in inflation forecasting and its implications for central bank of Nigeria policy decisions making.

2.Statement of the problem.

Although, there are series monetary policy interventions by the Central Bank of Nigeria, inflation rate in Nigeria has remained volatile over the past decade. Conventional forecasting techniques frequently experience reduced predictive performance because of structural economic changes, volatile exchange rate, fiscal shocks, insecurity, and supply-side disruptions.

Similarly, Artificial Intelligence-based forecasting techniques have demonstrated superior predictive performance in many countries by capturing complex and nonlinear relationships among macroeconomic variables. Nevertheless, the extent to which these Artificial Intelligence techniques can improve inflation forecasting and support Central Bank of Nigeria monetary policy decisions has received limited scholarly attention leading to paucity of literatures in Nigeria.

It is based on these problems that the study seeks to examine how Artificial Intelligence can improve inflation forecasting and enhance evidence-based monetary policy decisions by the Central Bank of Nigeria for effective performance.

3. Objective of the Study

The primary objective of the study is to examine the role of Artificial Intelligence in improving inflation forecasting and its implications for monetary policy decisions of the Central Bank of Nigeria.

Specifically, the research will investigate:

- 1.Examine the current approaches used by the Central Bank of Nigeria for inflation forecasting.
- 2.Evaluate the effectiveness of Artificial Intelligence models in forecasting inflation in Nigeria.
- 3.Examine the implications of AI-generated inflation forecasts for CBN monetary policy decisions.
- 4.Identify the challenges limiting AI adoption in inflation forecasting by the Central Bank of Nigeria.

4.Research Questions

- 1.What methods are currently employed by the Central Bank of Nigeria in forecasting inflation?
- 2.How effective are Artificial Intelligence models in forecasting inflation in Nigeria?
- 3.How can AI-generated inflation forecasts improve monetary policy decisions of the Central Bank of Nigeria?
- 4.What challenges hinder the adoption of Artificial Intelligence for inflation forecasting in Nigeria?

5.Conceptual Framework

Artificial Intelligence:

Artificial intelligence is the imitation of human intelligence by machines or the ability of machines to perform tasks using human intelligence (Ozili, 2023a).

Artificial Intelligence (AI) refers to the capability of computer systems and machines to perform tasks that typically require human intelligence, such as learning, reasoning, problem-solving, pattern recognition, decision-making, and natural language processing.

AI systems utilize algorithms, machine learning, deep learning, and large datasets to improve their performance over time without explicit programming for every task (Russell & Norvig, 2021).

Artificial intelligence is a machine-based system that can make predictions, recommendations, or decisions influencing real or virtual environments based on human-defined objectives. AI has increasingly become a tool for public sector governance, economic forecasting, tax administration, budget planning, and monetary policy analysis (OECD, 2019).

Inflation Forecasting

Inflation forecasting is the systematic process of predicting future movements in the general price level using historical, current, and forward-looking economic information. It enables policymakers to anticipate inflationary pressures and implement timely monetary policy measures that maintain price stability. Traditional forecasting techniques rely on econometric models such as ARIMA and Vector Autoregression (VAR), while recent approaches integrate artificial intelligence and machine learning algorithms to capture nonlinear relationships, process high-frequency data, and improve forecasting accuracy. AI-based forecasting has become increasingly important because it provides faster and more accurate inflation predictions than many conventional statistical methods (Var, et al. 2026).

Central Banking

Central banking refers to the institution responsible for formulating and implementing monetary policy, regulating the banking system, maintaining financial stability, managing foreign exchange reserves, issuing national currency, and ensuring price stability within an economy. Contemporary central banks increasingly employ artificial intelligence, big data analytics, and advanced forecasting models to improve monetary policy formulation, financial supervision, and macroeconomic surveillance. AI enhances central banks' ability to analyse complex economic conditions and produce timely policy responses while strengthening evidence-based decision-making (AI-Maadeed et al. 2026).

Decision Support System (DSS)

A Decision Support System (DSS) is a computer-based information system designed to assist decision-makers by collecting, processing, analysing, and presenting relevant information for solving structured and unstructured problems. Modern DSS integrates artificial intelligence, machine learning, data analytics, and visualization tools to improve the quality, speed, and consistency of organizational decisions. Within central banking, AI-powered DSS assists policymakers by evaluating macroeconomic indicators, forecasting inflation, assessing policy alternatives, and generating real-time recommendations that support monetary policy decisions (Chapman et al. 2026).

Data-Driven Economic Policy

Data-driven economic policy refers to the formulation, implementation, and evaluation of fiscal and monetary policies using empirical evidence generated from large-scale data analysis, artificial intelligence, statistical modelling, and predictive analytics. Rather than relying solely on theoretical assumptions, policymakers use real-time economic indicators, administrative data, satellite imagery, financial transactions, and digital information to make objective and timely decisions. Recent literature indicates that AI-powered data analytics significantly improves policy effectiveness by enhancing economic forecasting, identifying emerging risks, and supporting evidence-based interventions in central banking and macroeconomic management (Sirello & Tissot, 2026).

6.Theoretical Framework

The research work adopted the Data-Driven Decision-Making Theory as its theoretical framework. Data-Driven Decision-Making (DDDM) Theory evolved from many fields of management sciences rather than being propounded by a single or group of authors. But the concept gained recognition through the works of Davenport & Harris (2007).

Frisk & Bannister (2017) also explained that although the skillful use of data analytics and big data can radically improve a company's performance, managers need to change their decision-making culture in order to be able to achieve such improvements. Their case studies on three public fire and rescue service organisations in Sweden showed a structural problem in the way decisions were driven. Although having a strong technology focus, decisions were taken in silos, there was little to no involvement of the users, and IT was not realised as a strategic resource. Accordingly, there was too much focus on the technology when investing in costly ICT systems and services, but too little focus on how they affect the business and organizational decision making, as well as on the total picture. Therefore, the incorporation of big data and analytics requires moving towards a more considered and systematic form of data-driven decision making. Current research has highlighted the importance of big data, analytics, and AI in decision making, as well as their implications on decision factors, such as quality, efficiency and success. However, such research, while inevitably tackling important individual opportunities and challenges, has not provided an overall theory of data-driven decision

making which encompasses the parts altogether. Furthermore, although the decision-making approaches, methods, and theories of renowned scholars, such as Herbert Simon

and Henry Mintzberg, have successfully withstood countless tests of time and application, every era requires the addition of modern approaches to current theories in order to support environmental changes and technological advancements. The best that a large part of current information systems (IS) research has done in recent data-driven decision-making topics, is synonymous to forcing a square peg into a round hole, by having to accept the application of existing theories, and abstractly compelling them to explain what they cannot with the current technological advancements (Elgendy, et al. 2021).

Relating to this paper, the use of Artificial Intelligence inflation forecasting and central bank of Nigeria policy decisions in Nigeria can assist the central bank of Nigeria to be effective in its inflation forecasting and save the economy from the various effects of the inflation. It will equally help the central bank of Nigeria from planning ahead. Also, all delays and human errors will be eliminated to the barest minimum if Artificial Intelligence tools are fully involved in performing such daunting task that can salvage the nation from lagging behind in this 21st century.

7. Methodology

Qualitative and Descriptive research design was used for the research where only secondary sources of data were utilised. The secondary sources of data were drawn from Academic Journals, Central Bank of Nigeria (CBN) Reports, National Bureau of Statistics (NBS), IMF Reports, World Bank Reports, and African Development Bank Reports. The secondary data was analysed using Qualitative Content Analysis, Analysis of policy documents and Institutional Reports.

8. Current Approaches Used by Central Bank of Nigeria for Inflation Forecasting.

Recent evidence indicates that the Central Bank of Nigeria (CBN) combines conventional econometric models with data-driven forecasting techniques to monitor inflation dynamics. Traditionally, the Bank has relied on Seasonal Autoregressive Integrated Moving Average (SARIMA) and SARIMAX models to generate short-term inflation projections using Consumer Price Index (CPI) data and macroeconomic variables. These forecasts support Monetary Policy Committee (MPC) decisions regarding the Monetary Policy Rate (MPR). More recently, the CBN has strengthened its forecasting framework by incorporating broader macroeconomic indicators, scenario analysis, and medium-term inflation projections as part of its transition toward a more explicit inflation-targeting regime (Doguwa & Alade, 2014).

Similarly, recent study further notes that the CBN is increasingly exploring data-driven forecasting techniques capable of integrating high-frequency economic indicators and improving forecast accuracy beyond traditional time-series models. Such developments are intended to enhance monetary policy effectiveness under Nigeria's evolving macroeconomic environment (Central Bank of Nigeria, 2025).

From the empirical evidences above, it can be deduced that the central bank of Nigeria is already on her way to move from her current traditional method of inflation forecasting to the Technological-driven inflation forecasting using artificial intelligence models for effectiveness and efficiency.

9. Effectiveness of Artificial Intelligence Models in Forecasting Inflation in Nigeria.

Recent empirical evidence demonstrates that Artificial Intelligence models outperform many traditional econometric methods in forecasting Nigerian inflation. A 2025 study comparing LSTM deep learning, Random Forest, XG Boost, Support Vector Regression (SVR), and SARIMA models found that deep recurrent neural networks consistently achieved superior forecasting accuracy by capturing nonlinear relationships among macroeconomic variables. The study concludes that AI models are more suitable for inflation forecasting in Nigeria's volatile economic environment (Adeyemi, et al. 2025).

Similarly, Das and Das (2025) reviewed global evidence on Artificial Intelligence-based inflation forecasting and concluded that machine learning algorithms including Artificial Neural Networks, Random Forests, Gradient Boosting, and Deep Learning produce more accurate inflation forecasts than many conventional econometric techniques, particularly when handling large and complex datasets.

From the empirical evidences above the artificial intelligence models used in forecasting inflation in Nigeria is effective and providing positive results hence the urgent need to adopt it for efficiency.

10. Implications of Artificial Intelligence Generated Inflation Forecast for Central Bank Monetary Policy Decisions.

Artificial intelligence-generated inflation forecasts have important implications for monetary policy because they provide faster, more accurate, and forward-looking estimates of inflationary pressures. Improved forecasts enable central banks to adjust policy

interest rates proactively, strengthen inflation expectations management, and improve communication with financial markets. International evidence indicates that AI-based forecasting enhances monetary policy formulation by integrating large volumes of structured and unstructured data into decision-making (Liu, et al. 2024).

Similarly, Artificial Intelligent-generated forecasts could improve the CBN's policy responsiveness by identifying emerging inflation risks earlier than conventional forecasting techniques. This would support more timely adjustments of the Monetary Policy Rate and enhance the credibility of the Bank's transition toward inflation targeting. However, Artificial Intelligence forecasts should complement not replace expert judgment in monetary policy deliberations (CBN, 2025).

The artificial intelligence generated inflation forecast could assist the central bank of Nigeria greatly in its monetary policy decisions in addition to available human experts in forecasting monitoring the result. That means adoption of AI is not enough reason to reject the services of human inflation forecasters.

11. Challenges Limiting Artificial Intelligence Adoption in Inflation Forecasting by the Central Bank of Nigeria.

Despite Artificial Intelligence's potentials in inflation forecasting, several challenges hinder its adoption within central banking in Nigeria. These include poor availability of high-quality real-time economic data, inadequate digital infrastructure, limited Artificial Intelligence expertise, cybersecurity concerns, weak institutional capacity, and regulatory uncertainty. Artificial Intelligence systems also face challenges related to transparency, explainability, and governance, which are critical for public institutions responsible for monetary policy (Das, and Das, 2025).

Furthermore, studies caution that Artificial Intelligence forecasting models require continuous validation because they may generate biased or unreliable predictions when economic conditions change abruptly. Successful implementation therefore depends on robust data governance, investment in digital infrastructure, capacity building, and institutional reforms that support trustworthy Artificial Intelligence deployment within central banks (BIS, 2024).

There are myriads of challenges limiting the adoption of artificial intelligence models in inflation forecasting. Some of the challenges are technological while some are lack of enough experts to handle the computers. Also, some the problems are inadequacies of the artificial intelligence in terms of accuracy of forecasting.

12. Conclusion

In view of the foregoing submissions, the research concluded that the Central Bank of Nigeria currently combines both conventional economic models and data-driven forecasting techniques. But Central Bank of Nigeria is currently increasing exploring data-driven forecasting techniques capable of integrating high frequency economic indicators. Similarly, it is concluded that Artificial Intelligence models like Artificial neural networks, Random Foresting, Gradient Boosting and Deep learning are effective than traditional econometric methods and provides more excellent results.

Also, Artificial Intelligence-generated inflation forecast have important implications for monetary policy because they provide faster, more accurate and forward-looking estimates of inflationary pressures. It could equally improve the Central Bank of Nigeria's policy responsiveness by identifying emerging inflation risk earlier than the conventional forecasting techniques. Finally, Challenges limiting adoption of Artificial Intelligence in inflation forecasting by the Central Bank of Nigeria include poor availability of high quality real-time economic data, inadequate digital infrastructures, limited Artificial Intelligence expertise, cyber security concerns, weak institutional capacity and regulatory uncertainty. Also, Artificial Intelligence forecasting models may generate biased and unreliable predictions when economic conditions change abruptly.

13. Recommendations

In view of the foregoing conclusions, the study recommended as follows:

1. There is need for complete shifting from traditional inflation forecasting to Artificial Intelligence models for inflation forecasting by the Central Bank of Nigeria.
2. There is also need for the Central Bank of Nigeria to improve its broadband technology to provide excellent internet services for its operations.
3. There is need for Central Bank of Nigeria to permanently adopt Artificial Intelligence-Generated inflation forecast for its monetary policy because it is more reliable than the traditional inflation forecasting.
4. There is need for the Central Bank of Nigeria to ensure availability of high quality real-time economic data, adequate digital infrastructures, as well as training and retraining of its staff on Artificial Intelligence operational models.

References

Adebiyi, M. A., Adenuga, A. O., Olusegun, T. S., & Mbutor, O. O. (2022). Big data and inflation forecasting in Nigeria: A text mining application. *CBN Economic and Financial Review*, 60(1), 1–23. <https://doi.org/10.33429/1957-2968.2071>

Adeyemi, A., Bartholomew, D.C., Iwu, H. C., & Ibere, I., P. (2025). A deep recurrent neural network approach to inflation forecasting in Nigeria: Evaluating the impact of feature selection methods. *Finance Research Open*. <https://doi.org/10.1016/j.fraope.2025.100443>.

Al-Maadeed, N. S., Aysan, A. F., & Unal, I. M. (2026). Artificial intelligence in central banking: A nexus for the future. *Journal of Central Banking Theory and Practice*, 15(2). <https://reference-global.com/article/10.2478/jcbtp-2026-0012>

Ayivodji, F., Briand, E., Moran, K., & Stevanovic, D. (2026). *Monetary policy in the media spotlight: Sentiments, signals, and economic impact*. arXiv.

Bank for International Settlements. (2024). *Artificial intelligence and central banking*. <https://www.bis.org>

Central Bank of Nigeria. (2025). *Macroeconomic Outlook for Nigeria Report*. https://www.cbn.gov.ng/Out/2025/CCD/CBN%20Macroeconomic%20Outlook%20for%20Nigeria%20Report_28_122025_DG.pdf

Central Bank of Nigeria. (2026). *Current reforms to the monetary policy framework*. Retrieved from the CBN website. www.cbn.gov.ng on 10/07/2026.

Chapman, J., Desai, A., Haghighi, M., & MacGee, J. C. (2026). Integrating non-traditional data and AI into central banking: A Canadian perspective. *Bank of Canada Staff Analytical Paper No. 2026-17*.

Darius, R., Fernandes, C. M., & Stumphius, C. (2026). Inflation in Nigeria: A descriptive analysis of recent developments. *IMF Selected Issues Paper No. 2026/044*. <https://doi.org/10.5089/9798229049375.018>

Das, P. K., & Das, P. K. (2025). Artificial intelligence and inflation forecasting: A contemporary perspective. *South Asian Journal of Macroeconomics and Public Finance*, 14(1), 133–164. <https://doi.org/10.1177/22779787251318831>

Davenport, T. H., & Harris, J. G. (2007). *Competing on Analysis: The new science of winning*.

Havard Business School Press.

Doguwa, S. I., & Alade, S. O. (2014). Short-term inflation forecasting models for Nigeria. *CBN Journal of Applied Statistics*, 4(2). <https://dc.cbn.gov.ng/jas/vol4/iss2/6/>

Central Bank of Nigeria. (2025). *Macroeconomic Outlook for Nigeria Report*. https://www.cbn.gov.ng/Out/2025/CCD/CBN%20Macroeconomic%20Outlook%20for%20Nigeria%20Report_28_122025_DG.pdf

Elgendy, N., Elrage, A., & Palvarinta, T. (2021). DECAS: a modern data-driven decision theory for big data and analytics Nada Elgendy, Ahm. *Journal of Decision Systems*. ISSN: (Print) (Online) Journal homepage: <https://www.tandfonline.com/loi/tjds20>

Frisk, J.E., & Bannister, F. (2017). Improving the use of analytics and big data by changing the decision-making culture: A design approach. *Management Decision*, 55(10), 2074–2088. <https://doi.org/10.1108/MD-07-2016-0>

Liu, Y., Pan, R., & Xu, R. (2024). Mending the crystal ball: Enhanced inflation forecasts with machine learning. *IMF Working Paper No. 2024/206*. <https://www.elibrary.imf.org/view/journals/001/2024/206/article-A001-en.xml>

Organisation for Economic Co-operation and Development (OECD). (2019). *OECD Principles on Artificial Intelligence*.

Ozili, P. K. (2023). Big data and artificial intelligence for financial inclusion: benefits and issues. *Artificial Intelligence Fintech, and Financial Inclusion*.

Russell, S., S. & Norvig, P., P. (2021). *Artificial Intelligence: A Modern Approach* (4th ed.). Pearson.

Sirello, O., & Tissot, B. (2026). Linking data for better evidence-based policy: A landscape review in central banks. *Data & Policy*, 8, e28. <https://doi.org/10.1017/dap.2026.10073>

Var, Ö., D., A., & Dereli, T. (2026). A review of nowcasting, forecasting and AI in economic indicator prediction. *Computational Economics*. <https://doi.org/10.1007/s10614-026-11380-1>