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AI-NEURAL NETWORKS AND ACCOUNTING OUTCOMES IN FINANCIAL SERVICES COMPANIES IN LAGOS METROPOLIS

Ozuomba, Chidinma Nwamaka[1]
Njoku, Kenneth Chukwudi[2]
***Iwuoha, Jude Chukwunyere[3]**

Authors' Affiliation

[1]Department of Accounting. University of Agriculture and Environmental Sciences(UAES), Umuagwo, Imo State. chidinma.ozuomba@uaes.edu.ng, +234803-866-2767

[2]Department of Business Administration. University of Agriculture and Environmental Sciences(UAES), Umuagwo, Imo State. kennethphd78@gmail.com +234803-262-5508

[3]Department of Accounting. University of Agriculture and Environmental Sciences(UAES), Umuagwo, Imo State.
* Corresponding author: jiwuohac@gmail.com, jude.iwuoha@uaes.edu.ng, +234803-372-2882

ABSTRACT

The research evaluates AI-neural networks and accounting outcomes in financial services companies in Lagos Metropolis. The study was conducted to examine the level of correlation between recurrent neural networks and accurate financial forecasts in financial services companies in Lagos Metropolis; and to assess the extent to which feedforward neural networks correlate with pattern recognition in financial services companies in Lagos Metropolis. The research adopts survey research design. The study uses primary sources of data. A structured questionnaire was the major instrument for data collection. The study adopts the purposive sampling technique. Cronbach Alpha statistic was used to obtain the value of 0.82 as the instrument reliability ratio. Descriptive and inferential statistics were employed for data analysis. The findings reveal that there is a positive and significant level of correlation between recurrent neural networks and accurate financial forecasts in financial services companies in Lagos Metropolis; feedback positively and significantly correlate with pattern recognition in financial services companies in Lagos Metropolis. The study concludes that AI-neural networks are correlates of accounting practices in financial services companies in Lagos Metropolis. The study recommends among others that Managements of enterprises need to ensure that more accountants and management experts are professionally equipped with recurrent neural network competences and skills for accurate financial forecasts; management of commercial entities should organize more training programmes for their accountants on the best ways to employ feedforward neural networks for effective pattern recognition in the organizations.

Keywords:

AI-neural networks,

Accounting outcomes,

Financial services.

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1.0 Introduction

Artificial intelligence (AI) has in the 21st century become the pivot of business transformation, spearheading innovation, efficiency and competitiveness in various industries. Researchers acknowledge AI as a collection of technologies that will allow machines to see, comprehend, translate speak, process written words, and interpret both quantitative and non-quantitative information with accuracy (Njoku, 2024). Traditionally, the conceptual background of machine intelligence was created by Alan Turing who introduced a Turing test in 1950, but it was not until 1956 that John McCarthy introduced the term Artificial Intelligence. AI has since then influenced how businesses operate allowing them to optimize their operations and realize sustainable performance (Njoku, Udo-Orji, Ebuenyi, & Oko, 2024).

Artificial Neural Networks (ANNs) are part of the wide realm of AI that have emerged as an effective method of mimicking the way the human brain works during the problem-solving process. ANNs are computing systems made up of interconnected nodes or neurons, each of which works on different aspects of a problem and together, processes complex functions (Staff, 2025). The model, theorized in the 1940s by Warren McCulloch and Walter Pitts, simulates biological neural behaviour, and forms the basis of current deep learning algorithms. According to Yada (2024), ANNs are designed in such a way that they receive raw data in input layers, extract features and identify patterns in the hidden layer. It then output predictions in output layers, which is why they are critical in solving complex business and financial problems.

The two ANN architectures that are very relevant to financial accounting are the recurrent neural networks (RNNs) and feedforward neural networks (FNNs). RNNs are developed to handle sequential or time-series data, making them suitable to perform predictive analysis of financial data because of historical trend analysis and the ability to model dynamic markets (Stryker, 2024). Research proves that RNNs increase the effectiveness and accuracy of financial forecasting (Dorcas, 2024) and can be used in algorithmic trading, risk management, and macroeconomic forecasting (Mercanti, 2025). Pattanayak, Swetapadma, and Sahoo (2024) demonstrate that the difference in RNN approaches enhances the accuracy of the prediction, whereas Adarsh and Suma (2024) underline their capacity to capture nonlinear dynamics in the financial data. Similarly, Burger (2024) describes financial forecasting as the prediction of organizational performance in the future based on historical data, market environment, and financial statements and notes the usefulness of RNNs in the forecasting process.

Furthermore, in comparison, FNNs work based on the unidirectional data flow, i.e., input to hidden and to output layers, without feedback loops, which qualifies them to solve pattern recognition problems (Geeks, 2025). They have been utilized effectively to forecast the financial distress (Marso & Merouani, 2020), customer attrition (Hedge & Mundada, 2019), and other business outcomes. According to Kuruma (2022), FNNs were one of the first and most successful machine learning algorithms, and Kanade (2025) notes that they are widely used to automate the process of pattern recognition, that is, categorizing data into groups, detecting anomalies, and facilitating fraud detection. These abilities show that FNNs are essential instruments to interpret the repetitive tendencies in financial data and enhance the precision of decision-making in accounting systems.

Though they have been found to be relevant, empirical evidence shows that most financial service firms in Lagos Metropolis are yet to embrace neural networks in their accounting outcomes including financial forecasting and pattern recognition. Such failure to adopt may subject firms to forecasting errors, inefficiencies in operations and increased risks of corporate collapse. Although previous studies of Nigeria have explored the use of AI in entrepreneurship (Godwin, Brownson, & Anietie, 2025), SME growth (Muktar, Ufua, & Okorie, 2024), sustainability and efficiency (Ndubuisi-Okolo, Eneh, & Anyahara, 2025), institutional goal realization (Ahannaya, Olalere, Oyetola, Olufolake, & Adesina, 2025), and customer management (Njoku, Udo-Orji This gap indicates a critical necessity to conduct empirical studies that can fit the local context.

This paper thus aims at examining how AI-neural networks can be used to improve the accounting

results of financial service firms in Lagos Metropolis. Based on the Diffusion of Innovation theory developed by Rogers (Njoku, 2024; Halton, Kelly, & Pere, 2023), the study focuses on two relationships, in particular: (i) the relationship between recurrent neural networks and correct financial predictions, and (ii) the relationship between feedforward neural networks and pattern recognition. By filling these gaps, this study would lead to the addition of the body of knowledge on AI in Nigeria and provide viable recommendations to financial service companies that want to improve their accounting systems, reduce risks, and remain competitive in a rapidly growing technologically oriented financial system.

This work has section one as introduction, section two as methodology, section three presents and analyses the data, while section four discusses the results. Finally, section five concludes the work.

2.0 Methodology and Scope

The research method employed in this study is descriptive survey research design, which was used to explore the relationship between recurrent neural networks, feedforward neural networks and how they are applied in financial forecasting and pattern recognition among the financial services companies in Lagos, Nigeria. The target of the scope was restricted to Lagos Metropolis and targeted the Chief Executives and Unit Heads of the major departments, which included Marketing, Accounting/Finance, Human Resources, IT, Customer Services, and Operations. The objectives of the study both informed the content and the scope of the units.

The population that was studied was 70 Chief Executives and Unit Heads of 10 randomly sampled financial services companies in Lagos Metropolis. The random choice of research units is consistent with the suggestions given by Ike et al. (2025). Based on Taro Yamane formula, a sample size of 60 was determined and 60 copies of a structured questionnaire were distributed to respondents. The primary and secondary sources of data were used, the questionnaire being the primary tool, and the information on journals, textbooks, and online sources came as the supplements.

Face and content validity were used to establish the validity of the questionnaire. Face validity of the instrument was reviewed by research experts, and the content was also reviewed to ensure that it aligns with the objectives of the study, which is supported by Uzodimma, Iwuoha, and Njoku (2025). Reliability of the instrument was determined through a pilot study and Cronbach alpha coefficient of 0.79 indicating that the instrument was 79 percent reliable. Descriptive statistics (mean scores and standard deviation) were used to analyse the data, and the Spearman rank correlation coefficient was used to test the hypotheses. Iwuoha, Uzodimma, and Njoku (2025) point out the importance of using mean scores and correlations in survey research. The level of significance was set at $p<0.05$ at which the null hypothesis was rejected.

3.0 Research Hypotheses, Data Presentation and Analysis

3.1 Research Hypotheses

In alignment with the research questions, the researchers developed the following null hypotheses:

H_{01}: There is no significant level of correlation between recurrent neural networks and accurate financial forecasts in financial services companies in Lagos Metropolis.

H_{02}: There is no significant extent to which feedforward neural networks correlate with pattern recognition in financial services companies in Lagos Metropolis.

3.2 Data Presentation & Analysis

Out of the sixty (60) questionnaire copies distributed to the respondents, only 56 copies were properly filled and returned. This means 93.3% return.

Research Question 1:
What is the level of correlation between recurrent neural networks and accurate financial forecasts in financial services companies in Lagos Metropolis?

Table 1: Respondents' responses on the level of correlation between recurrent neural networks and accurate financial forecasts in financial services companies in Lagos Metropolis

Q/No	Item	SA	A	UN	D	SD	N	Mean	Std. Dev.
1	AI-neural networks are essential tools for accurate financial forecasts in financial services firms.	23	22	5	2	4	56	4.04	0.93
2	Management always ensures that staff are always trained on recurrent neural networks for improved financial forecasts.	21	20	8	2	5	56	3.89	0.787

Field Survey (2025)

The Table 1 above presents data from responses by the respondents under study. The result also disclosed a strong agreement by the respondents on their opinion on the level of correlation between recurrent neural networks and accurate financial forecasts in financial services companies in Lagos Metropolis. The results further show that the respondents agreed to the facts that: AI-neural networks are essential tools for accurate financial forecasts in financial services firms ($\bar{\bar{x}} \pm \text{S.D}$ of 4.04 ± 0.93); management always ensures that staff are always trained on recurrent neural networks for improved financial forecasts (with a $\bar{\bar{x}} \pm \text{S.D}$ of 3.89 ± 0.787).

Research Question 2:
To what extent does feed forward neural networks correlate with pattern recognition in financial services companies in Lagos Metropolis?

Table 2: Respondents' responses on the level of correlation between feedforward neural networks and pattern recognition in financial services companies in Lagos Metropolis

Q/No.	Item	SA	A	UN	D	SD	N	Mean	Std. Dev.
3	Feedforward neural networks improve pattern recognition in financial services companies.	25	19	6	2	4	56	4.05	0.882
4	Feedforward networks are often appreciated by corporate professional accountants for all-round corporate success.	19	22	8	4	3	56	3.89	0.769

Field Survey (2025)

The Table 2 above presents data from responses by respondents on the level of correlation between feedforward neural networks and pattern recognition in financial services companies in Lagos Metropolis. The results show that majority of the respondents affirmed the statements. There is a high-level agreement by the respondents on the opinion that feedforward neural networks improve pattern recognition in financial services companies as the result accounted for a mean of 4.05 and a standard deviation of 0.882. The result has indicated that the majority of the respondents agreed to the item statement that feedforward networks are often appreciated by corporate professional accountants for all-round corporate success (with a $\bar{x} \pm \text{S.D}$ of 3.89 ± 0.769).

3.3 Hypotheses Testing

H_{01}: There is no significant level of correlation between recurrent neural networks and accurate financial forecasts in financial services companies in Lagos Metropolis.

Table 3: Correlation analysis between recurrent neural networks and accurate financial forecasts in financial services companies in Lagos Metropolis

Item	Mean	Standard Deviation	Correlation Coefficient	P-value
Recurrent neural networks	4.04	0.93	0.9	0.001
Accurate financial forecasts.	3.89	0.787		

SPSS Correlation Analysis Output (2025).

The above table shows the correlation analysis between recurrent neural networks and accurate financial forecasts in financial services companies in Lagos Metropolis. The result shows a p-value of 0.001. It also shows a correlation coefficient of 0.9. The result shows a p-value less than 0.05 being the level of significance. This implies the rejection of the null hypothesis and acceptance of the alternative hypothesis. Accordingly, the correlation coefficient between recurrent neural networks and accurate financial forecasts in financial services companies in Lagos Metropolis is statistically significant. And so, there is a significant level of correlation between recurrent neural networks and accurate financial forecasts in financial services companies in Lagos Metropolis.

H_{02}: There is no significant extent to which feedforward neural networks correlate with pattern recognition in financial services companies in Lagos Metropolis.

Table 4: Correlation analysis between feedforward neural networks and pattern recognition in financial services companies in Lagos Metropolis

Item	Mean	Standard Deviation	Correlation Coefficient	P-value
Feedforward neural networks	4.05	0.882	0.6	0.001
Pattern recognition	3.89	0.769		

SPSS Correlation Analysis Output (2025).

The table above shows the correlation analysis between feedforward neural networks and pattern recognition in financial services companies in Lagos Metropolis. The result shows a p-value of 0.001 and correlation coefficient of 0.6. Since the result shows a p-value less than 0.05 being the level of significance, it implies the rejection of the null hypothesis and the acceptance of the alternative hypothesis. Accordingly, the correlation coefficient between feedforward neural networks and pattern recognition in financial services companies in Lagos Metropolis is statistically significant. Therefore, there is a significant extent to which feedforward neural networks significantly correlates with pattern recognition in financial services companies in Lagos Metropolis.

Findings

After the data analysis, the study found that:

1. There is a significant level of correlation between recurrent neural networks and accurate financial forecasts in financial services companies in Lagos Metropolis.
2. There is a significant extent to which feedforward neural networks correlate with pattern recognition in financial services companies in Lagos Metropolis.

4.0 Discussion of Results

The results of the study show that AI-neural networks are fundamental in precise financial forecasting within financial services companies. This conclusion is backed by the fact that Table 1 indicates that the management focuses on training staff on recurrent neural networks to enhance financial forecasts. These results are consistent with the existing literature,

including a survey by Ahannaya et al. (2025) that revealed that the use of AI has a positive and significant effect on the attainment of institutional objectives in professional accounting institutes in Nigeria. Likewise, the finding of the study about the accuracy of financial forecasts concurs with that of Njoku (2024) that AI minimized the human error in financial data analysis in marketing companies.

Also, the study indicates that the feedforward neural networks improve pattern recognition among financial services companies as indicated in Table 2. The implementation of these networks enables organisations to go beyond guesswork, as organisations get a better understanding of customer behaviour and customer management. This is in agreement with a study by Njoku et al. (2024) which reported a positive correlation between AI-machine learning technology and positive customer management outcomes, such as customer segmentation and retention in the hospitality industry.

5.0 Conclusion and Recommendations

In summary, this paper has found that the artificial neural networks are important predictors of improved accounting practices in the financial services industry in the Lagos Metropolis. In particular, recurrent neural networks are instrumental in reliable financial forecasting, and feedforward neural networks greatly increase the effectiveness of pattern recognition. The study deduces that the willingness of the management to train employees on these technologies is central to the realization of these better results.

It can be concluded based on these findings that the management of the financial sector ought to focus on implementing professional development programmes to provide accountants and experts with skills in recurrent neural networks to make better financial predictions. At the same time, more training on the use of feedforward neural networks should be organized to enhance better pattern recognition and assist the professional accounting functions.

This study will make a contribution to knowledge by filling a gap identified that is, providing first-hand empirical evidence of the correlation between AI-neural networks and accounting outcomes in the Lagos Metropolis setting, which is a unique setting. It thus contributes a substantial visible work in the already existing literature on Artificial Intelligence applications in finance.

To carry out further research, researchers should not limit themselves to the geographical and industrial scope of this work since other sectors and a broader scope should be explored. The future scholars are recommended to change the methodological framework and apply a different design, such as ex post-facto or epistemological one, as well as add other staff to the unit of analysis and consider new variables, such as the relation between AI-neural networks and corporate sustainability.

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