ASSESSING THE INFLUENCE OF ARTIFICIAL INTELLIGENCE TECHNOLOGIES ON THE FINANCIAL SUSTAINABILITY OF PUBLIC PROJECTS IN LAGOS STATE, NIGERIA

KABIRU ISHOLA GENTY; ADEDAYO OPELE; KAZEEM ABIODUN BUSARI & HYLTON VILLET

NAMIBIA UNIVERSITY OF SCIENCE AND TECHNOLOGY &
LAGOS STATE UNIVERSITY, OJO, NIGERIA
kgenty@nust.na

PAPER PRESENTED AT THE 44TH ROUNDTABLE CONFERENCE, HOSTED BY THE KINGDOM OF ESWATINI FROM 2ND- 5TH DECEMBER 2025

CONTENTS

INTRODUCTION

- Sustainable investing has recently attracted considerable attention from policymakers, researchers, and academics.

- In today's age of AI, societies now rely on an extensive range of data, social media platforms, information management, and data science to ensure their survival and achieve sustainability objectives (Al-Sartawi et al.,2021).

- Sustainability requires adapting AI technologies (Memdani, 2020; Krüger et al., 2020; Barber et al., 2021; Bauer et al., 2021; Hannoon et al., 2021).

- AI's true value lies in its capacity to enhance and maintain environmental and social governance (Nishant et al., 2020).

- According to Craig (2021), the United Nations' estimate of the expenditure required to achieve the Sustainable Development Goals (SDGs) by 2020 was between $5 trillion and $7 trillion.

- The widespread adoption of intelligent systems has generated additional financial data, creating new challenges that require advanced financial and accounting solutions.

INTRO...

- Lagos State, a financially affluent region in Nigeria, encounters substantial challenges in maintaining the sustainable financial viability of its numerous projects.

- These issues stem from conventional financial management practices that inadequately address inefficiencies, lack transparency, and produce inaccurate estimates.

- AI offers transformative potential for financial management by addressing persistent challenges through advanced technologies (Gyau et al., 2024).

- For instance, blockchain enhances transaction security and transparency (Kayode-Bolarinwa, 2025). Big data analytics facilitate efficient processing and in-depth analysis of large datasets (Ayegbo et al., 2025). AI-powered ESG analytics assess the social and environmental impacts of financial initiatives (Hassan et al., 2023). Additionally, artificial neural networks (ANNs) enhance predictive accuracy (Adejumo et al., 2025).

- Despite some progress, empirical evidence on AI's influence on the financial sustainability of Public projects in Lagos State remains limited.

Therefore, the main objective of this study is to evaluate the influence of AI on the financial sustainability of public projects in Lagos State. Specific objectives are as follows:

i. Investigate the effect of blockchain on the financial sustainability of projects.
ii. Assess the impact of big data analytics on financial sustainability.
iii. Evaluate the influence of AI-driven ESG factors on financial outcomes.
iv. Determine the contribution of artificial neural networks to financial sustainability.

LITERATURE REVIEW

The concept of Financial Sustainability

Financial sustainability refers to an organization's ability to maintain its financial health over time while meeting operational and strategic goals (Ross, Westerfield, & Jaffe, 2013).

It requires effective management of financial resources **to ensure revenues consistently cover expenses without dependence** on unsustainable debt or imprudent financial policies.

- *Debt-to-equity ratio*

It provides insight into a company's leverage and solvency, where **a lower ratio** typically signals greater financial stability (Ross et al., 2013).

- *The price-to-earnings (P/E) ratio*

It reflects market expectations of future earnings growth, with higher ratios indicating anticipated growth and lower ratios potentially signaling undervaluation or underlying challenges (Bodie, Kane, & Marcus, 2014).

- *Sound cash flow management*

Ensuring liquidity to meet obligations and seize opportunities

- *Profitability ratios*

Such as net profit margin, return on assets, and return on equity, assess financial viability relative to revenue, assets, and equity (Damodaran, 2012).

LIT. CONT.

Artificial Intelligence (AI) Technologies

According to Adetoba et al (2025), Artificial Intelligence (AI) Technologies are the predictive analytics tools that help organizations to forecast demand more accurately, thereby optimizing resource allocation and minimizing waste.

AI is an automation system that rely on an extensive range of data, social media platforms, information management, and data science to ensure their survival and achieve sustainability objectives.

- *Blockchain Technology*

It is a decentralized digital ledger that securely records transactions across multiple computers, ensuring that once recorded, transactions cannot be altered retroactively.

- *Big Data Analytics*

Refers to the systematic examination and interpretation of vast and heterogeneous datasets to reveal underlying patterns, correlations, and insights relevant to business intelligence (Sanders, 2016).

- *Environmental, Social, and Governance (ESG) Analytics*

It involves assessing a company's performance based on environmental, social, and governance criteria to evaluate its sustainability and ethical practices (Hoffmann, Blume, & Müller, 2018).

- *Artificial Neural Networks (ANNs)*

These are computational frameworks modelled after the neuronal architecture of the human brain, designed to recognize patterns, forecast outcomes, and learn from data by mimicking human cognitive processes (Agrawal, 2022).

THEORETICAL FRAMEWORK

Technological Determinism Theory

Originally proposed by Thorstein Veblen (1857–1929), the theory was further advanced by Karl Marx and later refined by Marshall McLuhan.

The theory posits that technological advancements are central catalysts of societal change, profoundly shaping human behaviors and organizational practices.

- The theory emphasize relevant for understanding the transformative effects of AI technologies

- The integration of these technologies significantly improves the efficiency, accuracy, and transparency of financial operations, thereby promoting Public project sustainability.

- For instance, blockchain's immutable ledgers enhance transaction transparency and fraud prevention

- AI-driven predictive analytics also facilitate more accurate financial forecasting and risk evaluation, collectively advancing the effectiveness of financial practices.

THEORETICAL FRAMEWORK CONT...

Resource-Based View (RBV) Theory

Originally proposed by Wernerfelt in 1984 in his seminal work "A Resource-Based View of the Firm," the theory was further advanced by scholars such as Barney (1991)

- The RBV theory offers a strategic lens through which organisations can understand the internal sources of sustained competitive advantage, particularly through valuable, rare, inimitable, and non-substitutable (VRIN) resources.

- The theory emphasize intangible assets such as organisational culture, employee knowledge, and analytical capabilities.

- AI technologies can be seen as strategic assets in the realm of AI and Public project sustainability.

- AI technologies enhance the precision and effectiveness of financial operations, resulting in substantial value addition.

- AI systems possess a high level of intricacy and refinement, rendering them challenging to duplicate.

THEORETICAL FRAMEWORK CONT...

Stakeholder Theory

Originally developed by Edward Freeman in 1984 in his book Strategic Management: A Stakeholder Approach.

The Theory posits that organisations should consider the interests and effects on all their stakeholders, such as employees, customers, suppliers, and the community, rather than exclusively prioritising shareholders.

- The theory advocates for the incorporation of ESG analytics into financial decision-making, guaranteeing that corporations effectively handle their environmental and social obligations in addition to their financial performance.

- By integrating environmental, social, and governance (ESG) considerations, organisations can enhance their long-term viability and cultivate more robust connections with stakeholders.

- AI technologies such as blockchain have the potential to increase transparency, thereby guaranteeing that corporations fulfil stakeholder expectations regarding ethical and responsible conduct.

THEORETICAL FRAMEWORK CONT...

Diffusion of Innovations Theory

Originally developed by Everett M. Rogers in 1962.

The Theory elucidates the process, causation, and velocity at which novel ideas and technology disseminate across societies.

- The theory explains how new ideas, products, or technologies spread through a social system over time.
- The adoption rate of AI technologies in boosting financial sustainability is influenced by factors such as relative advantage, compatibility, complexity, trialability, and observability.
- AI technologies provide substantial enhancements compared to conventional methods, hence promoting their use.
- Concrete examples of successful outcomes and detailed analyses of specific situations can significantly enhance the adoption of AI technologies.

LIT REVIEW.....

- **Empirical Review.**

Blockchain and Financial Sustainability

- **H_1:** Blockchain positively impacts projects financial sustainability in Lagos State, Nigeria.

Big Data Analytics and Financial Sustainabilty

- **H_2:** Big data has positive impact on projects financial sustainability in Lagos State, Nigeria.

ESG Analytics and Financial Outcomes

- **H_3:** AI-driven ESG factors positively enhance the financial sustainability of projects.

Artificial Neutral Networks (ANNs) and Financial Sustainability

H4: ANNs contribute significantly to financial sustainability.

METHODOLOGY

- The descriptive survey research design was used.
- The population for this study comprises **100** professionals from various sectors in Lagos State, including finance, technology, and government agencies.
- From the population, the sample size selected was **50 respondents,** in accordance with the principle of simple random sampling technique (Sim et al., 2018).
- In selecting the sample size for this study, a purposive sampling technique was employed.
- The instrument for data collection for the study was a structured questionnaire developed from the review of related literature for the study.
- The instrument reliability was evaluated using Cronbach Alpha statistics.
- The data collected was analyzed using multiple linear regression analysis to test the formulated hypotheses.
- The multiple linear regression model is specified as follows:

$$FS=\beta_0+\beta_1 (BT)+\beta_2 (BDA)+\beta_3 (ESGA)+\beta_4 (ANN)+\varepsilon$$

Where:

β_0 is the intercept term.

$\beta_1,\ldots,\beta_4$ are the coefficients for blockchain technology, big data analytics, ESG analytics, and ANNs respectively.

ε is the error term.

Results: Demographic Characteristic

Parameters	Options	Frequency	Percentage (%)
Gender	Male	28	56
	Female	22	44
Age	Less than 30	10	20
	30-35	15	30
	36-40	12	24
	41-45	8	16
	46 and above	5	10
Highest Educational Qualification	Secondary School	0	0
	Diploma	8	16
	Bachelor's Degree	25	50
	Master's Degree	12	24
	Doctorate	3	6
	Other	2	4
Role in the Project	Project Manager	12	24
	Financial Analyst	15	30
	AI Technology Expert	10	20
	Policy Maker	8	16
	Other	5	10

Perception of AI Technologies Influence on Financial Sustainability

Parameters	Options	Frequency	Percentage (%)
Blockchain adoption has improved financial transparency	Not at all	2	4
	Slightly	5	10
	Moderately	15	30
	Significantly	20	40
	Very significantly	8	16
Big Data Analytics has enhanced financial decision-making	Not at all	2	4
	Slightly	5	10
	Moderately	18	36
	Significantly	15	30
	Very significantly	10	20
ESG Analytics has contributed to long-term financial sustainability	Not at all	2	4
	Slightly	6	12
	Moderately	18	36
	Significantly	16	32
	Very significantly	8	16
ANN has improved risk assessment and management	Not at all	3	6
	Slightly	5	10
	Moderately	15	30
	Significantly	18	36
	Very significantly	9	18

TEST OF HYPOTHESES

H1: Blockchain positively impacts projects financial sustainability in Lagos State.

H2: Big data has positive impact on projects financial sustainability in Lagos State.

H3: AI-driven ESG factors positively enhance the financial sustainability of projects.

H4: ANNs contribute significantly to financial sustainability.

Correlation Matrix

	Blockchain	Big Data Analytics	ESG Analytics	ANN
Blockchain_	1			
Big Data Analytics	-0.1067	1		
ESG Analytics	-0.1394	0.0292	1	
ANN	0.1867	-0.1803	-0.0387	1

Source: Author's Compilation.

DATA...

Model Summary

	Regression Statistics
Multiple R	0.9022
R Square	0.8139
Adjusted R Square	0.7974
Standard Error	0.7273
P-value	7.1591E-16

Regression Model

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	1.8828	0.4454	4.2273	0.000114
Blockchain	0.3834	0.0397	9.6669	1.49E-12
Big Data Analytics	0.2239	0.0346	6.4667	6.32E-08
ESG Analytics	0.2042	0.0365	5.6001	1.22E-06
ANN	0.2376	0.0371	6.4100	7.67E-08

Source: Author's Compilation.

DISCUSSION

- The findings of this study reveal a significant and positive impact of various AI technologies on the financial sustainability of projects in Lagos State.

- The regression model demonstrates that Blockchain, Big Data Analytics, ESG Analytics, and ANNs each contribute significantly to enhancing financial sustainability.

- Blockchain technology, with the highest coefficient, indicates its substantial role in improving financial transparency and accountability.

- Big Data Analytics and ANN also show strong positive effects, supporting their known capabilities in enhancing decision-making and risk management processes, respectively.

- ESG Analytics' significant positive impact reflects the growing importance of integrating environmental, social, and governance considerations into financial strategies, promoting long-term sustainability.

CONCLUSION & RECOMMENDATIONS

In conclusion, the findings highlight the significant positive effects of blockchain, big data analytics, environmental, social, and governance (ESG) analytics, and artificial neural networks (ANNs) on enhancing financial transparency, decision-making processes, sustainability integration, and risk management.

Based on the findings, it is recommended that:

- Policymakers in Lagos State's Public project management and financial sectors prioritise investments in AI capabilities and infrastructure.
- Developing robust regulatory frameworks tailored to the local context is essential.
- Policymakers should prioritize investments in AI infrastructure and educational programs to build technical capacity and expertise within Lagos State.
- Fostering collaboration between the public and private sectors and leveraging partnerships with tech companies can mitigate challenges such as high implementation costs and regulatory hurdles.
- Policymakers should incentivize research and development initiatives focused on AI applications that address local challenges and priorities.

These proactive measures will not only enhance financial sustainability but also position Africa at the forefront of technological innovation in financial management, driving economic growth and competitiveness.

Thank You