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# AI, as a Catalyst for Digital Transition in Nigerian Pension Administration

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## **Abstract**

This work explores the transformative potential of artificial intelligence (AI) as a catalyst for the digital transition in Nigerian pensions administration. It analyses how AI can enhance inclusive pension coverage, especially among Nigeria's large informal workforce, improve operational efficiency through automation, optimise investment strategies, and strengthen risk management. The study also identifies significant ethical, regulatory, and technical barriers to AI adoption in traditional pension frameworks and examines the synergistic benefits of integrating AI with blockchain technology to foster security and transparency. By comparing Nigeria's AI initiatives to global best practices, particularly those in the Netherlands, the work offers strategic insights on how Nigeria can leverage AI responsibly to build a more robust, efficient, and inclusive pension system, crucial for the financial security of future generations. This comprehensive analysis emphasises the importance of a holistic digital strategy combining technology, regulation, and ethics to realise sustainable pension reform in Nigeria

## **1. Introduction**

The global pensions sector is undergoing a profound transformation, driven by the pervasive integration of artificial intelligence (AI) technologies. This digital revolution is addressing systemic challenges such as demographic shifts, fiscal pressures, and member disengagement, which are particularly acute in developing economies like Nigeria. The country's pension landscape is characterized by infrastructural limitations and a large informal workforce, which poses significant hurdles to achieving universal pension coverage and operational efficiency.

AI offers a transformative pathway to modernize Nigeria's pension systems, enhancing operational efficacy, improving stakeholder interaction, and optimizing investment protocols. By leveraging AI, pension administrators can streamline operations, automate manual

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processes, and provide personalized services to members. This transition is critical for ensuring the sustainability and inclusivity of pension systems, especially in contexts where traditional models struggle to meet the demands of modern beneficiaries.

This paper explores the potential of AI in driving a digital transition in Nigeria's pensions administration. It delves into strategies for leveraging AI to achieve inclusive pension coverage, enhance member engagement, optimize investment decisions, and manage risks. Additionally, it examines the ethical, regulatory, and technical barriers to AI adoption and provides a comparative analysis of global best practices. Finally, it explores the transformative potential of blockchain and AI synergy in revolutionizing pension administration, offering insights into how Nigeria can harness these technologies to build a robust and equitable pension system for its future.

## **2. Leveraging AI for inclusive pension coverage and automated operational efficiency in Nigeria**

Research and expert consensus increasingly validate the transformative potential of Artificial Intelligence (AI) in expanding pension coverage, particularly in contexts like Nigeria, where participation rates remain sub-optimal. The strategic adoption of AI by pension fund operators can drive substantial improvements in market reach and operational efficiency, especially for underserved populations, such as those within the informal economy.<sup>1</sup>

The implementation of AI within Nigeria's pension infrastructure offers a significant opportunity to rectify existing operational inefficiencies while extending coverage to previously neglected demographics, primarily the informal sector. By leveraging AI to automate routine administrative procedures and refine service delivery, pension systems can achieve marked enhancements in efficacy and ensure broader inclusion, as follows:

### **i. Inclusive Pension Coverage**

#### **a. Micro-Pension Penetration**

To significantly increase micro-pension participation among Nigeria's predominantly informal workforce, representing over 80% of the working population, Artificial Intelligence (AI) offers a powerful approach.<sup>2</sup> Digital platforms and mobile applications, powered by AI, streamline the enrollment process, reducing obstacles to participation.<sup>3</sup>

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<sup>1</sup> World Bank. (2022). *Social Protection and Pension Systems in Developing Economies*. <<https://www.worldbank.org/>> accessed March 13, 2025.

<sup>2</sup> K Zaka, 'AI To Trigger Huge Leap In Insurance, Pension Penetration, Says Experts.' *Leadership News*

<<https://leadership.ng/ai-to-trigger-huge-leap-in-insurance-pension-penetration-says-experts/>> (Abuja, Nigeria). accessed March 13, 2025.

<sup>3</sup> SIS International. *Pension Fund Automation and Artificial Intelligence Consulting*. <<https://www.sisinternational.com/solutions/fintech-strategy-consulting->

Algorithmic analysis of diverse data sources, such as mobile money transactions and community records, facilitates eligibility assessments, extending coverage beyond individuals with standard documentation; AI-driven chatbots and customised communication systems deliver personalised information, building trust and promoting enrollment.<sup>4</sup>

AI enables cost-effective scaling by automating enrollment and contributions processing, minimising administrative costs and making micro-pensions financially viable for low-income earners.<sup>5</sup> AI-driven chatbots also simplify remote enrollment for individuals in geographically isolated areas, and predictive analytics identify underserved demographic segments, enhancing the overall reach and effectiveness of micro-pension schemes.<sup>6</sup>

#### *b. Data-Driven Outreach*

Modern pension administration is undergoing a significant shift, driven by the integration of Artificial Intelligence (AI) and Big Data analytics.<sup>7</sup> These technologies empower pension operators to refine their strategies and reach previously overlooked segments of the population. In nations such as Nigeria, where participation in the Contributory Pension Scheme (CPS) remains limited to a relatively small portion of the workforce, specifically 10.2 million individuals, AI plays a pivotal role. Through the application of predictive analytics, AI can examine demographic datasets to identify populations that are currently outside of pension programs.<sup>8</sup> This facilitates the development of focused outreach initiatives, customized to address the unique needs and challenges of these groups, such as limited awareness or access.<sup>9</sup> AI also enhances the

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[research/pension-fund-automation-artificial-intelligence-consulting/](#)> (New York, NY, USA). Accessed March 13, 2025.

<sup>4</sup> C Nwaimo, A Adegbola, and M Adegbola, 'Predictive analytics for financial inclusion: Using machine learning to improve credit access for under banked populations.' *Computer Science & IT Research Journal*. Access: 2024 Computer Science & IT Research Journal. 5(6):1358-1373.

<sup>5</sup> M Goswami, 'Leveraging AI for Cost Efficiency and Optimized Cloud Resource Management' (2020) *International Journal of New Media Studies: International Peer Reviewed Scholarly Indexed Journal* 21-27.

<sup>6</sup> B Orimisan, Bankole. 'PenOP seeks adoption of AI, big data to promote sector's growth.' *The Guardian Nigeria*. Access: <https://guardian.ng/business-services/penop-seeks-adoption-of-ai-big-data-to-promote-sectors-growth/>. (Lagos, Nigeria) 24 October 2022.

<sup>7</sup> BPM. 'How AI is transforming pension management: The Netherlands is leading the way.' *Benefits and Pensions Monitor*. <<https://www.benefitsandpensionsmonitor.com/news/industry-news/how-ai-is-transforming-pension-management/380655>>. (Toronto, ON, Canada). October 19, 2023.

<sup>8</sup> G Hayman, 'Pensions in the Age of Artificial Intelligence.' *CFA Institute Research and Policy Center*. <<https://rpc.cfainstitute.org/sites/default/files/docs/research-reports/pensions-in-the-age-of-artificial-intelligence-online.pdf>>. (Charlottesville, VA, USA). December 2024.

<sup>9</sup> American Academy of Actuaries. 'Big Data, Big Changes for Insurance and Pensions.' <[https://www.actuary.org/sites/default/files/files/publications/BigData\\_11.2018.pdf](https://www.actuary.org/sites/default/files/files/publications/BigData_11.2018.pdf)>. (Washington, D.C., USA). November 2018.

experience for existing members by providing personalised communication and streamlined procedures, often utilising tools like virtual assistants and user-friendly online interfaces.

*c. Trust-Building via Claims Automation*

Historically, prolonged claims processing times have eroded public confidence in both pension and insurance sectors.<sup>10</sup> To address this, integrating Artificial Intelligence (AI) presents a significant opportunity. By deploying AI to automate claims verification and settlement, processing durations can be substantially shortened. Evidence from sectors such as automotive insurance demonstrates that AI-driven systems can achieve claim resolutions within a significantly reduced timeframe compared to traditional methods, which typically require weeks. This improvement in efficiency not only optimizes operational procedures but also strengthens user trust by facilitating swift and precise settlements.<sup>11</sup> Therefore, the adoption of AI can incentivise greater participation in pension programs by mitigating concerns related to protracted payout delays.

To build confidence and encourage participation, particularly in schemes with low enrollment rates such as Nigeria's Contributory Pension Scheme, pension administrators can leverage AI. Automation minimises human error and guarantees regulatory compliance, fostering a sense of reliability. AI's ability to identify fraudulent claims through data analysis reinforces security and protects member assets.

*d. Personalised Financial Advisory*

Delays in claims processing have historically diminished public trust in pension and insurance systems. To counter this, the integration of Artificial Intelligence (AI) presents a viable solution. By automating claims verification and settlement procedures, AI can significantly reduce processing durations. Evidence from sectors like automotive insurance shows AI-driven systems achieve claim resolutions within a notably shorter timeframe compared to traditional methods, which often require weeks.<sup>12</sup> This enhanced efficiency optimises operational workflows and strengthens user trust through rapid and accurate settlements.

The implementation of AI also serves as an incentive for increased participation in pension programs by addressing concerns related to prolonged payout delays. By streamlining the claims process, AI directly tackles a major point of friction for potential and existing members. This not only makes pension systems more appealing but also contributes to building a more reliable financial security.

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<sup>10</sup> Zaka, (n.2).

<sup>11</sup> EY. 'How a Nordic insurance company automated claims processing.' <[https://www.ey.com/en\\_gl/insights/financial-services/emeia/how-a-nordic-insurance-company-automated-claims-processing](https://www.ey.com/en_gl/insights/financial-services/emeia/how-a-nordic-insurance-company-automated-claims-processing)>. (Global). Accessed March 15, 2025.

<sup>12</sup> Forbes Finance Council. 'The Impact of Artificial Intelligence on Financial Decision Making.' (New York, NY, USA). May 1, 2024.



## ii. Automating Operational Efficiency

### a. Fraud Detection and Risk Management

To enhance the security of pension funds, Artificial Intelligence (AI) algorithms are deployed to conduct real-time transaction monitoring.<sup>13</sup> This allows for the identification of anomalies, including atypical contribution behaviours and unauthorised withdrawals. The Pension Fund Operators Association of Nigeria (PenOp) has emphasised the utility of AI in fraud prevention and data integrity, thereby protecting the financial interests of members.

### b. Streamlined Administrative Workflows

To ensure the fiscal integrity of pension schemes, Artificial Intelligence (AI) algorithms are deployed for contemporaneous transaction surveillance. This enables the detection of anomalous activities, including deviations from standard contribution schedules and illicit fund withdrawals.<sup>14</sup> The Pension Fund Operators Association of Nigeria (PenOp) has articulated the probative value of AI in fraud deterrence and data remediation, thereby safeguarding the proprietary interests of pension scheme participants.<sup>15</sup>

### c. Investment Optimisation

To enhance investment performance, Artificial Intelligence (AI) is utilised to scrutinise extensive data repositories, enabling the forecasting of market fluctuations and the refinement of asset distribution strategies.<sup>16</sup> This analytical capacity is particularly salient for Nigerian pension funds, which are subject to demands for competitive yields within an environment of economic instability. AI-powered portfolio evaluation can generate recommendations for adaptive modifications to holdings in both equity and fixed-income instruments.

In Nigeria, the use of Artificial Intelligence (AI) in financial advisory services is transforming the pension landscape by offering tailored guidance to individuals. AI systems analyze a person's financial situation, goals, and risk tolerance to create customized retirement plans. These plans are adaptable, adjusting to changes in market conditions and personal circumstances. AI-powered tools manage investments by continuously monitoring financial progress and adjusting asset allocations based on risk tolerance and retirement goals. This ensures that investment strategies remain aligned with evolving life circumstances.

The increasing reliance on Artificial Intelligence (AI) in the pension industry poses significant cybersecurity risks. AI systems, which handle

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<sup>13</sup> Orimisan, (n.6)

<sup>14</sup> SIS International. *Pension Fund Automation and Artificial Intelligence Consulting*.

<<https://www.sisinternational.com/solutions/fintech-strategy-consulting-research/pension-fund-automation-artificial-intelligence-consulting/>> (New York, NY, USA). Accessed March 15, 2025.

<sup>15</sup> Orimisan, (n.6).

<sup>16</sup> Zaka, (n.2).

sensitive contributor data, are vulnerable to breaches, necessitating robust encryption protocols and stringent oversight mechanisms. The regulatory compliance is critical, as AI tools must align with guidelines set by the National Pension Commission (PenCom). Ensuring transparency in automated decision-making processes is essential to maintain trust among contributors and regulators. Consequently, while AI offers automation and efficiency, human oversight remains indispensable for ethical decision-making in complex cases, emphasizing the need for collaboration between AI systems and human judgment.

### **3. AI-Driven Strategies for Enhanced Member Engagement, Investment Optimisation, and Risk Management in Pension Systems**

AI-Driven Strategies for Enhanced Member Engagement, Investment Optimisation, and Risk Management in Pension Systems' essentially means using Artificial Intelligence (AI) to improve three key areas of how pension systems operate.

#### **i. AI-Driven Strategies for Enhanced Member Engagement**

Member engagement in pension systems can be significantly enhanced through the strategic application of AI to deliver personalised communication and value-added resources.<sup>17</sup> AI-powered virtual assistants and chatbots can provide real-time, tailored support, efficiently addressing member inquiries and offering personalised guidance based on individual profiles,<sup>18</sup> beyond personalised support, the strategic integration of AI serves to bolster trust and enhance efficiency within pension administration. Consistent with the principles of responsible innovation, the deployment of machine learning algorithms allows for the continuous monitoring of financial transactions, detecting anomalies and preventing fraudulent activities. This enhances trust in the system and supports adherence to ethical governance frameworks. AI also automates routine administrative tasks, which in turn increases operational efficiency. This frees up customer-facing personnel to provide more valuable interactions. In addition, by analysing large datasets, administrators can obtain valuable insights into member behaviours and preferences, informing data-driven strategies that facilitate targeted

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<sup>17</sup> E Hart, 'Revolutionising pension schemes: the power of artificial intelligence in boosting member engagement.' *Dentons*.

<<https://www.dentons.com/en/insights/articles/2023/december/6/revolutionising-pension-schemes-the-power-of-artificial-intelligence-in-boosting-member-engagement>>. December 6, 2023.

<sup>18</sup> N Ikemefune, 'Pension Operators Endorse Artificial Intelligence, Data Analytics & Big Data For Early Transformation.' *Business Post*.

<<https://www.businesspost.com.ng/pension/pension-operators-endorse-artificial-intelligence-data-analytics-big-data-for-early-transformation/>>. (Lagos, Nigeria). April 27, 2024.

services, are consistent with sound risk management, and help improve overall retirement preparedness.

## **ii. Investment Optimisation and Risk Management**

Systems such as the Electronic Pension Administration System (e-PAS), implemented by PenCom, automate processes to minimise errors and fraud in pension administration. However, with the advancement of digitalisation, vulnerabilities to cybersecurity threats also increase.

To fully leverage technological advancements, regulators must adapt existing frameworks to accommodate new digital tools and practices. This adaptation should include promoting financial literacy among contributors and ensuring compliance with data protection regulations, such as the DPA. A proactive regulatory approach will foster innovation while safeguarding the interests of retirees.

Effective development of advanced investment strategies and risk management techniques in Nigerian pension administration necessitates building the skills of those responsible for their execution. This requires providing pension administrators with relevant training to apply these methods successfully. The integration of technology is a vital aspect of this development.

Achieving optimal investment outcomes and effective risk management in Nigerian pension administration requires a comprehensive approach that merges financial knowledge with regulatory compliance. By diversifying portfolios and utilizing strong risk management practices, pension funds can aim for consistent growth while protecting the interests of contributors.<sup>19</sup> The use of AI and data analytics can significantly improve investment decision-making and risk monitoring by delivering real-time insights and predictive analytics.

## **4. Ethical, Regulatory, and Technical Barriers to AI in Traditional Pension Data Frameworks.**

While AI offers opportunities to improve efficiency and member engagement, its incorporation into traditional pension data frameworks introduces notable ethical, regulatory, and technical complexities.

### **i. Ethical barriers**

#### **a. Bias and Discrimination**

Nigeria's diverse population, which includes informal workers and rural communities, faces the risk of exclusion from AI-driven pension solutions if datasets used to train AI algorithms are not representative or are heavily skewed towards urban populations. Furthermore, because AI algorithms learn from data, pre-existing societal biases (such as those

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<sup>19</sup> Bolton, R. N., Lemon, K. N., & Verhoef, P. C. (2004). The theoretical underpinnings of customer asset management: A framework and propositions for future research. *Journal of the Academy of Marketing Science*, 32(3), 271–292.



related to gender, race, or socioeconomic status) can be perpetuated or amplified by AI systems, leading to potentially unfair or discriminatory outcomes in areas of pension administration like risk assessment for investment strategies, personalised retirement projections, and customer service interactions involving AI-driven chatbots.

*b. Trust and Transparency Issues*

Due to past inefficiencies and a lack of transparency, many Nigerians are sceptical of pension systems.<sup>20</sup> This scepticism may be heightened by AI adoption if decisions, like benefit allocations, are not adequately explained.

*c. Accountability and Justification*

Many AI algorithms, particularly deep learning models, operate as 'black boxes,' making it difficult to discern the reasoning behind their decisions. This lack of transparency raises ethical concerns regarding accountability<sup>21</sup> (i.e., determining responsibility when an AI system errs), trust (i.e., fostering confidence in a system whose processes are opaque), and fairness (i.e., ensuring impartiality in a system whose operations are not understood).

*d. Data Privacy and Security*

Pension systems possess vast quantities of sensitive personal and financial data, raising ethical concerns about data collection, use, and storage practices; the potential for data breaches and misuse, and balancing data utilisation for service improvement with respecting individual privacy.

*e. Job Displacement*

AI automation can displace jobs in the pension industry, raising ethical concerns about fairly managing this transition; retraining /supporting affected workers; and the societal impact of increased automation.

**ii. Regulatory barriers**

*a. Lack of Specific Regulations*

Many current pension regulations were not established with AI in mind.<sup>22</sup> This creates uncertainty regarding how AI systems should be governed, what standards they should meet, and who is responsible for their oversight.

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<sup>20</sup> KPMG Nigeria. *2024 Nigeria Pension Industry Customer Experience Survey*.

<<https://assets.kpmg.com/content/dam/kpmg/ng/pdf/2024/12/2024%20KPMG%20Nigeria%20Pension%20Industry%20CX%20Survey.pdf>>. (Lagos, Nigeria). Accessed March 17, 2025.

<sup>21</sup>E Zuccarelli, 'Emerging Technologies Building trust in AI means moving beyond black-box algorithms. Here's why.' *World Economic Forum*.

[<https://www.weforum.org/stories/2024/04/building-trust-in-ai-means-moving-beyond-black-box-algorithms-heres-why/#>] (Cologny, Switzerland). April 2, 2024.

<sup>22</sup> Zaka, (n.2).

*b. Data Governance and Compliance*

The absence of comprehensive legislation governing AI use in pensions in Nigeria creates uncertainty for operators and exposes gaps in existing accountability frameworks.<sup>23</sup> While regulations like the NDPR and other data protection laws impose strict requirements on data handling, challenges remain in ensuring AI systems comply with these regulations; establishing clear rules for data sharing and access, and auditing AI systems to ensure compliance.

*c. Liability and Accountability*

Determining liability in cases where an AI system's mistake causes financial harm presents a significant; the procedures for resolving disputes involving AI systems and the legal validity of AI-driven decisions.

*d. Algorithmic Bias*

Regulatory bodies express concern regarding the capacity of AI algorithms to perpetuate or even amplify pre-existing societal biases, posing multifaceted challenges that encompass: the development of effective methodologies for the detection and mitigation of bias embedded within AI systems, the establishment of robust strategies to ensure fairness and equity in outcomes generated through AI-driven processes, and the definition of the appropriate role and responsibilities of regulators in the continuous oversight and assurance of algorithmic fairness.<sup>24</sup>

*e. Cybersecurity Risks*

The integration of Artificial Intelligence (AI) into pension administration introduces significant cybersecurity risks. The complexity of AI systems expands the attack surface, creating more potential entry points for cyberattacks.<sup>25</sup> Pension systems, holding sensitive personal and financial data, become prime targets for data breaches and exfiltration, potentially leading to identity theft and fraud.<sup>26</sup>

AI-specific attacks, such as model poisoning, model theft, and adversarial attacks, pose unique threats, while insider threats and the lack of security by design in some AI systems further compound these risks. Addressing these challenges requires a proactive approach, including robust security measures, data protection protocols,<sup>27</sup> AI-specific security

<sup>23</sup> KPMG Nigeria. *2024 Nigeria Pension Industry Customer Experience Survey*. <<https://assets.kpmg.com/content/dam/kpmg/ng/pdf/2024/12/2024%20KPMG%20Nigeria%20Pension%20Industry%20CX%20Survey.pdf>>. (Lagos, Nigeria). Accessed March 17, 2025.

<sup>24</sup> E Lichtenstein, 'Who is Responsible When AI Makes Mistakes?' *AgentSync*. <<https://agentsync.io/blog/technology/who-is-responsible-when-ai-makes-mistakes#:~:text=New%20AI%20technology%20challenges%20current,inscrutable%2C%20unintuitive%2C%20and%20statistically%2D>>. (Denver, CO, USA). June 26, 2023.

<sup>25</sup> Satori Cyber. 'What is Data Security? Threats, Controls, and Solutions.' *satoricyber.com*. accessed March 17, 2025.

<sup>26</sup> PenOp. 'What has Data Analytics, Artificial Intelligence (AI) and Big Data got to do with Pensions?' <[penop.org.ng](https://penop.org.ng)>. Access: October 18, 2023.

<sup>27</sup> ThisDayLive. 'PenCom issues consumer protection framework (Part 3).' *thisdaylive.com*. Access: May 20, 2024.

considerations, employee training, regulatory compliance, and continuous monitoring to adapt to the evolving threat landscape.<sup>28</sup> Prioritising cybersecurity is crucial for pension systems to leverage AI benefits while protecting beneficiaries' interests

### iii. Technical barriers

#### a. Data Quality and Availability

While AI systems depend on substantial volumes of high-quality data to operate effectively, pension administration frequently encounters limitations in data availability and quality.<sup>29</sup> These limitations manifest as incomplete, inaccurate, or inconsistent pension data; data silos across different systems, hindering accessibility;<sup>30</sup> incompatibility between legacy systems and AI technologies; the negative impact of poor recordkeeping, such as missing or inaccurate contributor details, on the reliability of AI models for personalized services and risk assessments.

#### b. Legacy Systems and Infrastructure

Many pension systems globally rely on outdated technology infrastructure, presenting significant challenges to modernization. These challenges include the complexities involved in integrating AI with these legacy systems, as well as the substantial costs and logistical hurdles associated with upgrading the infrastructure to support new technologies. In Nigeria, the issue of outdated infrastructure is particularly salient, with many pension schemes still operating on systems that hinder effective integration with modern AI tools, such as chatbots and fraud detection systems. This reliance on legacy systems creates obstacles to efficiency and innovation.<sup>31</sup>

Beyond the systems themselves, infrastructure limitations such as inadequate access to high-speed internet and secure cloud storage, particularly in rural areas, further restrict the ability to scale and deploy AI solutions across the pension sector. This digital disparity limits the potential benefits of AI for a significant portion of the population.

#### c. Technical Expertise and Skills Gap

Technological advancements have rapidly changed various sectors, and pension administration is no exception. While these advancements bring increased efficiency, cost reduction, and better service delivery, they

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<sup>28</sup> Fingerprint. 'Transaction fraud detection and prevention tips.' <fingerprint.com.> Access ed March 17, 2025.

<sup>29</sup> O Zdrok, 'The Critical Role of Data Quality in AI Implementations.' *Shelf.io Blog*. < <https://shelf.io/blog/data-quality-in-ai-implementations/#:~:text=By%20investing%20in%20good%20data,smarter%20business%20decisions%20and%20a> May 2, 2024.

<sup>30</sup> Equable. 'A Pension Data Primer: What to Look for and Where.' < equable.org.> January 29, 2021.

<sup>31</sup> Zaka, (n.2).

also introduce new legal challenges.<sup>32</sup> As pension fund administrators increasingly adopt digital technologies, traditional regulatory frameworks may struggle to keep pace.

The intersection of technology and law raises complex questions regarding data privacy, cybersecurity, contract enforcement, and liability.

*d. Interoperability and System Integration*

The need for pension systems to interface with other systems, such as those related to healthcare or government administration, introduces complexities.<sup>33</sup> These complexities include the challenge of achieving seamless integration of AI systems across these various platforms, the necessity of developing and implementing standards for data exchange and interoperability, and the importance of mitigating potential security vulnerabilities associated with this interconnectedness of systems.<sup>34</sup>

To address the ethical, regulatory, and technical barriers hindering the adoption of AI in Nigeria's pension sector, stakeholders must focus on key priorities. Investments in digitization are essential to modernize legacy systems and improve data quality. Strengthening data protection laws and ensuring their enforcement will safeguard sensitive pension information against misuse and cyber threats. Additionally, inclusivity must be prioritized by designing AI solutions that accommodate Nigeria's diverse population, including rural and informal workers.

Initiatives like PenOp's advocacy for AI adoption have highlighted the transformative potential of technology in areas such as fraud detection, customer service enhancement, and investment analysis. However, achieving meaningful progress requires sustained collaboration among policymakers, regulators, pension operators, technology developers, and other key players. This collective effort is vital for responsibly integrating AI into traditional pension frameworks while enhancing efficiency, trust, and accessibility for all Nigerians.

## **5. The Transformative Potential of Blockchain and AI Synergy in Pensions Administration**

The incorporation of blockchain and AI into pension systems creates a powerful combination that enhances operational effectiveness, strengthens security measures, and deepens member engagement. By merging blockchain's reliable record-keeping capabilities with AI's

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<sup>32</sup> OECD. *OECD Employment Outlook 2023 Artificial Intelligence and the Labour Market*. <[https://www.oecd.org/en/publications/oecd-employment-outlook-2023\\_08785bba-en/full-report/skill-needs-and-policies-in-the-age-of-artificial-intelligence\\_fe530fbf.html](https://www.oecd.org/en/publications/oecd-employment-outlook-2023_08785bba-en/full-report/skill-needs-and-policies-in-the-age-of-artificial-intelligence_fe530fbf.html)> (Paris, France). July 11, 2023.

<sup>33</sup> C Riumallo-Herl and E Aguila, 'The effect of old-age pensions on health care utilization patterns and insurance uptake in Mexico.' *BMJ Global Health* 4, no. 6 (2019) <<https://gh.bmj.com/content/bmjgh/4/6/e001771.full.pdf>> (London, UK).12 November 2019.

<sup>34</sup> G Nwaobi, (2024). *Nigerian Firms and Digital Transformation: Incubations, Unipoding and Prospects*. Quantitative Economic Research Bureau. MPRA Paper No. 121833.

analytical capabilities, pension administrators can tackle long-standing challenges, foster greater confidence among stakeholders, and improve retirement outcomes for beneficiaries.

The blockchain technology offers a revolutionary solution to Nigeria's pension system, addressing crucial issues such as security, transparency, and operational efficiency. It further explains that Artificial Intelligence (AI) and Machine Learning (ML) are reshaping the Nigerian pension sector by enhancing efficiency, accuracy, and decision-making processes.

The transformative potential of blockchain and AI synergy in pension administration introduces the following:

#### **i. Leveraging Technology for Enhanced Security, Transparency, and Expanded Pension Coverage**

Blockchain technology, with its decentralized and immutable ledger, establishes a secure and verifiable record of all transactions within a pension system. This encompasses contributions, benefit disbursements, and modifications to beneficiary details. By ensuring that each transaction is recorded and validated across the network, blockchain diminishes the likelihood of fraud, data manipulation, and errors. Additionally, smart contracts operating on the blockchain can automate processes and enforce agreements, thereby enhancing transparency and reducing reliance on intermediaries.<sup>35</sup>

Artificial Intelligence (AI) algorithms can provide continuous surveillance of blockchain networks to detect anomalies and identify potential fraudulent activities in real-time. AI also strengthens identity verification procedures, making it more challenging for unauthorized individuals to access or interfere with pension accounts. Additionally, AI can analyze large datasets within the blockchain to uncover trends and patterns that may indicate fraudulent behaviour.

The combined application of blockchain's secure and transparent record-keeping with AI's intelligent monitoring and analysis creates a robust system that substantially improves the security and transparency of pension administration.<sup>36</sup> AI offers the capacity to interpret and act upon the data securely stored on the blockchain, while blockchain delivers the secure and verifiable foundation essential for AI's operations. Beyond security and transparency, AI-powered tools, such as chatbots, can enhance customer service and expand the accessibility of pension products to Nigeria's underserved mass market. In a country with over 200 million people but only about 10 million pension accounts, these tools can offer timely guidance, address inquiries, and simplify processes for individuals

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<sup>35</sup> D Kovács, M Bálint and V Weininger. 'Blockchain-Enabled Pension System Innovations: A Hungarian Case Study on Business Process Management Integration.' *Computers*, 13(12), 345. 2024.

<sup>36</sup> Ikemefune, (n.18).

who may have limited financial literacy, thereby fostering greater inclusion.<sup>37</sup>

## **ii. Improving Efficiency and Reducing Costs**

Virtual assistants can automate routine pension tasks, such as account updates, balance inquiries, and claims processing.<sup>38</sup> This automation leads to reduced operational costs and cycle times, resulting in faster execution and improved service delivery—a critical benefit for Nigeria's resource-constrained pension industry.<sup>39</sup>

## **iii. Personalized Communication and Guidance**

AI chatbots offer the capability to analyze individual profiles and deliver tailored guidance on retirement planning and contributions. For example, they can alert users to milestones such as salary changes or provide personalized investment recommendations based on personal data.<sup>40</sup> This personalized approach helps to cultivate trust and engagement within the Nigerian workforce.

## **iv. Overcoming Data Challenges**

The Nigerian pension industry faces challenges related to incomplete or outdated data. AI offers solutions by processing historical data to uncover trends and anomalies, and by promoting accurate record-keeping.<sup>41</sup> This results in improved decision-making capabilities for both operators and members.

## **v. Engaging Millennial and the Informal Sector**

Given that a significant portion of Nigeria's workforce is in the informal sector, AI tools can enhance inclusion by offering user-friendly, mobile-based solutions. Additionally, chatbots can cater to millennial by providing digital-first experiences.<sup>42</sup>

AI-powered virtual assistants and chatbots offer Nigeria's pension industry a pathway to resolve systemic challenges and improve member engagement, operational efficiency, and accessibility.

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<sup>37</sup> T Adenmosun, 'The problem with pensions in Nigeria.' *Stears*. <<https://www.stears.co/article/the-problem-with-pensions-in-nigeria/>>. (Lagos, Nigeria). September 9, 2022.

<sup>38</sup> Ikemefune, (n.18).

<sup>39</sup> Okwechime, Janie. 'What has Data Analytics, Artificial Intelligence (AI) and Big Data got to do with Pensions?' <<https://www.penop.com.ng/training/what-has-data-analytics-artificial-intelligence-ai-and-big-data-got-to-do-with-pensions>> (Lagos, Nigeria). Accessed March 17, 2025.

<sup>40</sup> J Okwechime, (n.18).

<sup>41</sup> Kovács Molnár, and Weininger. (n,35).

<sup>42</sup> Adenmosun, (n.37).



## 6. Comparative Analysis of AI-Driven Digital Transition in Nigerian Pension Administration, with Global Best Practices.

Globally, the pension administration landscape is experiencing a profound shift towards digitalization, notably through the adoption of artificial intelligence. Nigeria is also partaking in this evolution, albeit with a unique approach. By comparing Nigeria's current initiatives with established international best practices, we can highlight both its progression and distinctive focus within this AI-driven digital transformation.

### i. Operational Automation

#### *Nigeria's Approach*

As earlier stated, Nigeria's pension sector is undergoing a transformative integration of artificial intelligence (AI) to enhance operational efficiency, security, and customer service. This integration involves the automation of administrative tasks, the deployment of AI-driven fraud detection systems, the utilization of chatbots for addressing customer inquiries, and the analysis of data to inform strategic decisions.<sup>43</sup> Particularly, the automation of Pension Clearance Certificates (PCCs) has significantly reduced processing times from two weeks to 48 hours, with over 38,000 digital certificates issued since 2024.<sup>44</sup> Additionally, four Pension Service Solution Providers (PSSPs) are set to deploy standardized remittance templates starting in April 2025.<sup>45</sup>

However, to ensure the successful and ethical implementation of AI within the pension system, several challenges must be addressed. These include overcoming infrastructure limitations, mitigating data privacy concerns, establishing a robust regulatory framework, and bridging the skills gap. Addressing these challenges is crucial for harnessing the full potential of AI in Nigeria's pension sector.

#### *Global Best Practices*

The Netherlands is at the forefront of leveraging AI in pension management, leading to significant improvements in operational efficiency and investment outcomes. AI is being used to automate various aspects of pension administration, such as data analysis and investment decision-making, which reduces operational costs and enhances decision-making

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<sup>43</sup> E Nwoji, 'PenCom: Pension Assets to Hit N22tn 2025'Q1 on Tech-driven Transformation,' THISDAYLIVE, (23 December 2024), <[PenCom: Pension Assets to Hit N22tn 2025'Q1 on Tech-driven Transformation - THISDAYLIVE](#)> accessed March 23, 2025.

<sup>44</sup> Nwoji, (n.43).

<sup>45</sup> B Chimobi, 'PenCom's New Policy: What Organisations and Employees Need to Know,' (Blog Post, March 19, 2025), <[PenCom's New Policy: What Organisations and Employees Need to Know](#)>. Accessed March 23, 2025.

processes.<sup>46</sup> This automation allows professionals to focus on more strategic tasks, improving overall productivity and customer service. Additionally, AI plays a crucial role in risk mitigation by identifying potential risks and enabling proactive measures to safeguard investments. The Dutch Pension Federation is actively working on a controlled and responsible use of AI, emphasizing principles such as transparency and human oversight.<sup>47</sup>

AI is also transforming the way pension providers interact with their clients. For instance, APG, a leading pension administrator in the Netherlands, is using generative AI like ChatGPT to create intelligent chatbots that provide personalized information to clients, enhancing their experience and understanding of retirement planning.<sup>48</sup> AI and machine learning models are also boosting analytical capacities in portfolio management and enhancing actuarial analyses of pension fund risks.<sup>49</sup> The integration of AI in the Dutch pension sector is guided by a principle-based approach, ensuring that AI applications are aligned with regulatory frameworks and sector-specific needs.<sup>50</sup> This approach not only supports operational efficiency but also fosters trust and rapport with pension plan members by maintaining transparency and robust governance.<sup>51</sup>

A key difference lies in the approaches to artificial intelligence within the Nigerian and Dutch pension sectors. In Nigeria, AI implementation is geared towards automating specific, isolated processes like issuing clearance certificates, and standardizing remittances.<sup>52</sup> The Netherlands, conversely, adopts a comprehensive strategy, integrating AI technologies throughout the pension value chain.<sup>53</sup> This reflects a fundamental divergence in how strategically AI is being utilized.

Nigeria's strategy focuses on streamlining individual tasks, leading to localized efficiency gains. However, this approach may not fully capture

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<sup>46</sup> 'How AI is transforming pension management.' *Benefits and Pensions Monitor*, 19 Oct. 2023. <[How AI is transforming pension management | Benefits and Pensions Monitor](#)> accessed March 23, 2025.

<sup>47</sup> N Tuck, 'Dutch pension sector working on 'controlled and responsible' use of AI.' *European Pensions*, 20 Sep. 2024. <[Dutch pension sector working on 'controlled and responsible' use of AI - European Pensions](#)> accessed March 23, 2025.

<sup>48</sup> 'How AI is transforming pension management.' *Benefits and Pensions Monitor*, 19 Oct. 2023. <[How AI is transforming pension management | Benefits and Pensions Monitor](#)> accessed March 23, 2025.

<sup>49</sup> 'AI & Pensions' <<https://expatpensionholland.nl/ai-pensions>> accessed March 23, 2025.

<sup>50</sup> Tuck, (n.47).

<sup>51</sup> 'AI Consultation response submission - Dutch pension funds.pdf.pdf.' Targeted consultation on artificial intelligence in the financial sector, 13 Sep. 2024.

<sup>52</sup> N Jones-Biyere, 'An Overview of Nigeria's National Artificial Intelligence Strategy (Draft), 2024.' *Kenna Partners*, August 2024.

<sup>53</sup> International Monetary Fund. Monetary and Capital Markets Department. 'Kingdom of the Netherlands-The Netherlands Financial Sector Assessment Program-Technical Note on Insurance and Pension Fund Regulation and Supervision.' 18 Jun. 2024.

the synergistic benefits of a comprehensive, interconnected AI ecosystem.<sup>54</sup> The Dutch model prioritizes the seamless integration of AI across all stages of pension management, from data collection and member interaction to investment strategy and risk assessment. This end-to-end integration creates a more dynamic and responsive system, enabling real-time adjustments and personalized services. The Dutch approach facilitates a fluid exchange of data and insights, leading to better-informed decision-making at all levels and creating a system that learns and adapts holistically, rather than improving isolated components.

## **ii. Member Experience Enhancement**

### *Nigeria's Pension System*

Nigeria's pension system currently lags behind global standards, as reflected in its lower ranking of 4.3 in the Allianz Global Pension Report.<sup>55</sup> This is primarily due to limited coverage, particularly within the informal sector, and a need to improve financial literacy and access to financial services among the population.<sup>56</sup> Besides, the system struggles to effectively redistribute wealth or provide adequate insurance against old-age risks, with benefits being heavily reliant on fluctuating investment returns and economic conditions.

### *Global Best Practices*

Global best practices in pension systems encompass several key strategies to enhance security and inclusivity. Hybrid models, combining defined contribution and defined benefit elements, offer a balanced approach to managing retirement funds.<sup>57</sup> Inclusive approaches, extending coverage to the informal sector, ensure broader participation and reduce old-age poverty. Multi-pillar systems, integrating various pension schemes, mitigate risks and improve the capacity to protect retirees against financial uncertainties in old age.<sup>58</sup>

For instance, Sweden's pension system exemplifies a hybrid model that incorporates explicit redistribution, savings, and insurance functions, providing a comprehensive safety net.<sup>59</sup> Similarly, the UK pension system demonstrates an inclusive approach by extending its reach to the informal sector, ensuring that a larger segment of the population has access to retirement benefits.<sup>60</sup> These strategies reflect a commitment to building

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<sup>54</sup> Hayman, (n.8).

<sup>55</sup> 'Allianz ranks Nigeria bottom of global pension system.' Financial Nigeria, 28 Apr. 2023.

<sup>56</sup> O Muslim, 'Comparative Analysis of Pension Scheme in Nigeria and United Kingdom: Bridging the Gap' (2024) 12(11) Journal of Law and Sustainable Development, 1-24.

<sup>57</sup> R Holzmann, 'Global Pension Systems and Their Reform: Worldwide Drivers, Trends, and Challenges.' IZA Discussion Paper No. 6800, Aug. 2012.

<sup>58</sup> F Durán-Valverde, 'The ILO Multi-Pillar pension model: Building equitable and sustainable pension systems.' Social Protection for All Issue Brief.1-5.

<sup>59</sup> Holzmann, (n.57).

<sup>60</sup> Durán-Valverde, (n.58).

pension systems that are resilient, equitable, and capable of meeting the diverse needs of their populations

*Significant Disparities between Nigeria and Global Leaders*

A notable divergence exists between the Nigerian pension landscape and leading international models concerning the breadth of coverage. While nations such as the United Kingdom are actively pursuing strategies to integrate individuals engaged in informal economic activities into their pension frameworks, Nigeria faces ongoing challenges in expanding its overall pension coverage. This disparity underscores the necessity for Nigeria to explore and implement more inclusive approaches to pension provision.

The structural design of Nigeria's pension system, which is primarily based on a defined contribution (DC) model, contrasts with those employed by countries like Sweden. Sweden's approach integrates defined contribution (DC) and defined benefit (DB) elements, fostering a more diversified and robust system that allow for greater savings flexibility, insurance provisions, and redistribution mechanisms. This structural difference highlights potential areas where Nigeria could enhance its pension framework to provide greater security and flexibility for its participants.

The provision of minimum benefit guarantees also reveals significant differences. Unlike the Swedish model, which offers a more universally accessible minimum pension, Nigeria's system imposes specific eligibility criteria that individuals must meet to qualify for such benefits. This distinction in minimum benefit accessibility underscores the need for Nigeria to examine and potentially revise its qualification requirements to ensure a more equitable distribution of pension benefits.

The stability of pension investments represents another important area of divergence. Nigeria's pension system, heavily reliant on investment returns, is more susceptible to market volatility. In contrast, models such as Sweden's incorporate mechanisms that mitigates market risks, providing greater stability and predictability for pension beneficiaries. This difference in investment stability highlights the importance for Nigeria to consider diversifying its investment strategies and implementing risk mitigation measures to safeguard pension funds against market fluctuations.

Nigeria possesses the financial resources to improve its pension system, despite existing challenges.<sup>61</sup> Given its relatively young population and limited spending on elderly care, the country can strategically invest in reforms to broaden coverage, enhance benefit security, and ensure long-term sustainability. The anticipated moderate increase in the old-age

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<sup>61</sup> Muslim, (n.56).

dependency ratio by 2050<sup>62</sup> offers an opportunity to implement such reforms.

### iii. Risk Management

Globally, the application of artificial intelligence is fundamentally altering how pension risk is managed, with improvements seen in predictive modeling, streamlined operations, and increased participant interaction. Nations with developed economies, such as the Netherlands and Sweden, are at the forefront of this technological integration. In contrast, Nigeria's pension industry is just beginning to explore AI's potential for resolving its inherent systemic issues.

#### a. *Predominance of Manual Operations*

A significant impediment to the efficiency of Nigeria's pension sector is the continued reliance on manual procedures. This reliance results in extended processing times for claims resolution and a diminished overall experience for users.<sup>63</sup> Still, the participation rate in the Contributory Pension Scheme (CPS) remains notably low, with only a small fraction of the population actively involved.

#### b. *Limited Integration of Advanced AI*

The application of sophisticated AI tools, particularly in areas such as risk evaluation and predictive modeling, is currently underdeveloped within Nigeria's pension industry.<sup>64</sup> Similarly, the integration of AI into investment management practices is minimal, hindering the potential for enhanced decision-making and performance.

#### c. *Initial Explorations of AI Applications*

Insurance providers and Pension Fund Administrators (PFAs) are beginning to investigate the use of AI chatbots for fundamental customer interactions and claims processing. For instance, AI technology holds the potential to drastically reduce the timeframe for resolving motor insurance claims, from weeks to mere hours. Pilot initiatives are also being conducted in areas such as fraud detection and data normalization, but the expansion of these projects is constrained by infrastructure limitations.

#### d. *Regulatory and Trust-Related Obstacles*

A lack of financial understanding and skepticism towards pension systems present significant obstacles to increased participation.<sup>65</sup> While the use of AI-driven personalization could potentially address these issues by tailoring services and information, the implementation of such solutions

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<sup>62</sup> P. Tanyi, P. André, and P. Mbah, 'Care of the elderly in Nigeria: Implications for policy,' *Cogent Social Sciences* 4, no. 1 (2018).

<sup>63</sup> 'Analysts show how AI will shape Nigeria's insurance, pension sectors,' *Businessamlive*, April 9, 2024, < [Analysts show how AI will shape Nigeria's insurance, pension sectors - Businessamlive](#) > accessed March 24, 2025.

<sup>64</sup> Zaka, (n.2).

<sup>65</sup> KPMG Nigeria, '2024 Nigeria Pension Industry Customer Experience Survey,' (2024< 2024-nigeria-pension-industry-customer-experience-survey - KPMG Nigeria> accessed March 24, 2025.

necessitates the establishment of robust regulatory frameworks to guarantee data protection and security.

#### *Global Best Practices*

Artificial intelligence is being employed to evaluate market patterns, life expectancy risks, and financial projections, allowing for the simulation of various disruptive events, such as inflationary pressures or company failures.<sup>66</sup> In a notable example, Sweden's integrated pension framework utilizes AI to perform adaptive asset-liability management, effectively harmonizing both defined benefit and defined contribution components.<sup>67</sup> Techniques such as generative AI are improving the accuracy of actuarial estimations and strategies for risk reduction, facilitating the ability to make instant adjustments to investment portfolios based on current market conditions.<sup>68</sup>

The automation of data processing is significantly improving the efficiency of pension risk transfer (PRT) activities, minimizing errors in benefit calculations and regulatory reporting. In the United Kingdom, AI is used to standardize the data from smaller pension schemes, enabling faster large-scale annuity purchases from insurance providers. AI-powered chatbots and customized dashboards are being implemented to improve financial education and increase member participation. In the Netherlands,<sup>69</sup> AI is utilized to develop individualized retirement plans, contributing to the nation's high ranking in the 2023 Mercer CFA Institute Global Pension Index.

Natural language processing is also being leveraged to monitor changes in regulations and ensure adherence to compliance standards. Swedish pension funds are also utilizing AI to enhance decision-making processes involving multiple stakeholders and to improve the effectiveness of trustee governance.

Globally, pension fund management is increasingly leveraging advanced technologies, with real-time risk simulations,<sup>70</sup> AI-driven personalized planning, AI-enhanced governance, and automated legal compliance becoming commonplace. In contrast, Nigeria's pension sector

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<sup>66</sup> Olivier Fines, 'AI and machine learning to enhance pension plan governance and the investor experience: new CFA Institute research,' *CFA Institute*, December 17, 2024, <[AI and machine learning to enhance pension plan governance and the investor experience: new CFA Institute research | CFA Institute](#)> accessed March 24, 2025.

<sup>67</sup> CFA Institute. (n.d.). AI and Machine Learning to Enhance Pension Plan Governance and the Investor Experience: New CFA Institute Research. FF News | Fintech Finance.<<https://ffnews.com/news/fintech/ai-and-machine-learning-to-enhance-pension-plan-governance-and-the-investor-experience-new-cfa-institute-research/>> accessed March 24, 2025.

<sup>68</sup> Scribbledata. (n.d.). Generative AI in Pension Risk Transfer: Introduction, and Key Use Cases. <[Generative AI in Pension Risk Transfer: Introduction, and Key Use Cases](#)> accessed March 24, 2025.

<sup>69</sup> BPM, (n.7).

<sup>70</sup> O Onabowale, The Rise of AI and Robo-Advisors: Redefining Financial Strategies in the Digital Age. *International Journal of Research Publication and Reviews*, (2024). 6.



predominantly relies on traditional methods, characterized by static risk models, basic member engagement through SMS and portals, manual governance oversight, and manual regulatory reporting, indicating a significant technological gap.

#### **iv. Inclusion Strategies**

AI has the potential to significantly expand financial inclusion, particularly for marginalized populations.<sup>71</sup> AI simplifies complex financial tasks, making it easier for underserved populations to understand and make financial decisions. Nigeria is striving to broaden pension coverage to include its large informal workforce, while global leaders are leveraging AI to enhance inclusion.

In an effort to broaden pension coverage in Nigeria, PenCom is focusing on the informal sector, creating micro-pension plans that offer flexible contribution options tailored to the income streams of these workers. This initiative seeks to integrate over 60 million individuals into the national pension scheme, ensuring they have access to retirement savings.<sup>72</sup> Recognizing that a lack of confidence in the pension system and insufficient understanding of its benefits are significant hurdles for informal sector workers, the National Pension Commission (PenCom) is actively working to build trust and raise awareness through targeted outreach. This involves proactive engagement with strategic stakeholders, including organizing sensitization campaigns to educate potential participants about the advantages of the micro-pension scheme and addressing any concerns they may have. Also, PenCom is forging strategic partnerships with trade associations and other relevant organizations that represent informal workers. By collaborating with these established groups, PenCom aims to leverage existing relationships and communication channels to effectively disseminate information and encourage participation in the micro-pension initiative.

To overcome the challenges of reaching and enrolling a widely dispersed and often less digitally connected informal workforce, Nigeria is leveraging the power of mobile technology. This includes utilizing mobile phone platforms and Unstructured Supplementary Service Data (USSD)-based services, which are accessible even on basic mobile phones without internet access. By employing these technologies, the micro-pension scheme aims to simplify the enrollment process, making it more convenient and accessible for informal workers to register and begin

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<sup>71</sup> N Aishwaryalaxmi, and P Rathod, (2024). Artificial Intelligence (AI) as a Moderating Variable in the Relationship Between Financial Inclusion, Digital Adoption, and Financial Literacy in Developing Economies. In ITM Web of Conferences (Vol. 68, p. 01034). EDP Sciences.

<sup>72</sup> D Kadaba, P Aithal, and S KRS, 'Impact of Digital Financial Inclusion (DFI) Initiatives on the Self-Help Group: For Sustainable Development', (2023) 8 *Int'l J. Mgmt., Tech., & Soc. Sci. (IJMTS)* 20.

contributing. This approach directly addresses logistical barriers and seeks to increase participation by meeting individuals where they are, both geographically and technologically.

#### *Global Best Practices*

In Brazil, behavioral AI is used to encourage enrollment in pension plans by analyzing individual behaviours and delivering customized prompts to increase participation.<sup>73</sup> This approach leverages principles of behavioral economics to promote voluntary pension savings through automatic enrollment in employer-sponsored supplementary pension plans, with the option for workers to opt out. Brazil launched an automatic enrollment public policy on February 27, 2024 for employer-sponsored supplementary pension plans, where all workers hired by a company that offers a sponsored pension plan will be automatically enrolled in the plan without needing to apply for membership.<sup>74</sup>

India's Aadhaar-linked pension system utilizes biometric identification to reach a high coverage rate of 98%, which helps ensure access to and management of pension benefits, even for marginalized populations.<sup>75</sup> This system, known as Jeevan Pramaan, uses the Aadhaar platform for biometric authentication of pensioners, streamlining the process of obtaining life certificates and making it easier for pensioners to receive their rightful pension amount.<sup>76</sup> Pensioners provide their Aadhaar number and biometrics (fingerprint or iris scan) for authentication.<sup>77</sup> Digital Life Certificates are generated and stored in a repository, accessible to pension disbursing agencies.<sup>78</sup>

## **7. Conclusion**

The integration of Artificial Intelligence (AI) presents a transformative opportunity for Nigeria's pension sector, addressing critical challenges such as low coverage, operational inefficiencies, and diminished member engagement. This analysis reveals AI's capacity to drive inclusive pension coverage, particularly within the informal economy,<sup>79</sup> and to automate administrative processes, significantly

<sup>73</sup> M Nicolás, and R Sampaio, 'Balancing Efficiency and Public Interest: The Impact of AI Automation on Social Benefit Provision in Brazil' (2024) 13(3) *Internet Policy Review*. 1

<sup>74</sup> Boletín, Pension Notes N° 80 / Automatic enrolment in pension plans in Brazil and other jurisdictions\* (Pension Notes N° 80, June 2024). Accessed 24 March 2025.

<sup>75</sup> S Banerjee, 'Digital Dividends world development report Aadhaar: Digital Inclusion and Public Services in India' *Conference Proceedings* (2016) 1-16.

<sup>76</sup> S Kulkarni, Biometric-enabled digital life certificate for pensioners: 6 benefits, how to avail from home The Economic Times (India, Oct 24, 2024) <economictimes.indiatimes.com> accessed March 24, 2025.

<sup>77</sup> Kulkarni, (n.76).

<sup>78</sup> Banerjee, (n.75).

<sup>79</sup> H Falaiye 'Inclusive pension scheme vital for informal workforce' *Punch Newspaper* (Lagos, 8th January 2025)< ['Inclusive pension scheme vital for informal workforce'](#)> accessed March 24, 2025.

enhancing operational efficiency. Additionally, AI-driven strategies have demonstrated their effectiveness in optimizing investment decisions, managing risks, and fostering stronger member relationships through personalized services and real-time information access.

However, the successful deployment of AI necessitates a strategic approach that acknowledges and mitigates existing ethical, regulatory, and technical barriers. Specifically, the complexities of traditional pension data frameworks require robust data protection measures and a commitment to ethical AI practices. The exploration of blockchain and AI synergy highlights the potential for creating a more transparent and secure pension ecosystem.

Nigeria can improve its pension system by learning from global best practices, particularly the Netherlands' success in using AI for member engagement and efficiency. Collaboration between regulators, administrators, and tech providers is vital for establishing transparent and accountable frameworks. By adapting global strategies and addressing cybersecurity, regulatory compliance, and the need for human interaction, Nigeria can leverage AI to reduce costs by 20-40% and expand pension coverage significantly.

The successful integration of AI into Nigerian pension administration requires a comprehensive strategy that includes technological advancements, regulatory adherence, and ethical considerations. By focusing on data, partnerships, and beneficiary needs, Nigeria can create a strong and sustainable pension system. This digital shift is crucial for the financial security of future generations and, with ethical implementation guided by global examples, will lead to a more just and stable pension landscape, promoting social justice and economic stability.

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