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# ARTIFICIAL INTELLIGENCE ADOPTION AND EQUITABLE FINANCIAL INCLUSION FOR PERSONS LIVING WITH DISABILITIES IN NIGERIA'S BANKING ECOSYSTEM

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## Abstract

People living with disabilities (PLWDs) continue to face significant financial exclusion due to inadequate facilitating conditions, inaccessible banking interfaces, and exclusionary business models in the banking ecosystem. This study examines how adopting artificial intelligence- powered banking tools (AIPBT) influences equitable financial inclusion for individuals living with disabilities within Nigeria's banking ecosystem. The study is guided by the Technology Acceptance Model and Social Cognitive Theory. It investigates the influence of efficiency, awareness levels, facilitating conditions, cybersecurity, and perceived ease of use on equitable financial inclusion in Nigeria. Adopting a descriptive and inferential survey design, data were gathered through structured multimodal questionnaires targeting a stratified sample of 400 people living with disabilities (PLWDs) across various disability categories in Nigeria. Multiple regression analysis indicated that all independent variables are significant predictors of equitable financial inclusion ($p < .05$), with perceived ease of use ($\beta = .252$) and facilitating conditions ($\beta = .203$) identified as the strongest determinants. The findings reveal a 67. 5% adoption rate of artificial intelligence banking tools, yet moderate mean scores for awareness and efficiency suggest that the Nigerian banking ecosystem has yet to realize its full potential



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due to ongoing digital literacy deficiencies. The study concludes that artificial intelligence- powered banking tools (AIPBT) play a role in equitable financial inclusion for persons living with disabilities (PLWDs) when prioritized within a biopsychosocial design framework. The study recommends that the Central Bank of Nigeria enforce the Web Content Accessibility Guidelines (WCAG) and urges financial institutions to implement targeted digital literacy programs and inclusive cybersecurity protocols to close the observational learning gap for people living with disabilities (PLWDs) in the Nigerian Banking Ecosystem.

## Introduction

One billion people, or 15% of the world's population, experience some form of disability (Alliance for Financial Inclusion, 2023). An estimated 80% of people with disabilities live in low and middle-income countries (Marc, 2018; World Bank, 2024). The global loss from the financial exclusion of people with disabilities is estimated to be between $1.71 trillion and $2.23 trillion annually (Imandojemu et al., 2018). Artificial intelligence (AI) has emerged as a transformative force within global financial systems, reshaping access to credit, payments, savings, and insurance through algorithmic decision-making, digital platforms, and fintech innovations. Globally, artificial intelligence-powered banking tools (AIPBT) are credited with reducing transaction costs, improving risk assessment, and extending financial services to previously underserved populations (OECD, 2021; World Bank, 2023).

In developing economies, particularly in Sub-Saharan Africa, artificial intelligence-powered banking tools are seen as critical enablers of financial inclusion because traditional banking infrastructure is weak and mobile penetration is high. Nigeria, Africa's largest economy, has witnessed rapid fintech growth, including artificial intelligence-powered credit scoring, biometric verification, customer service chatbots, and mobile banking applications (CBN, 2023).

Despite these advancements, persons living with disabilities (PLWDs) remain disproportionately financially excluded. Financial exclusion negates the Sustainable Development Goals (SDGs) in particular SDG 1 (No poverty-1.4 and 1.a), SDG 8 (Decent work and economic growth- 8.3 and 8.5), and SDG 10 (Reduced Inequalities-10.2, 10.3 and 10.c). This is also at variance with global and national disability frameworks, such as the United Nations Convention on the Rights of Persons with Disabilities (CRPD) of 2006, including the comprehensive United Nations Disability Inclusion Strategy of 2019, and country-specific domestication, aligned with local laws through Nigeria's Discrimination Against Persons with Disabilities (Prohibition) Act of 2018.



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Equitable financial inclusion barriers include inaccessible digital interfaces, algorithmic bias, biometric failures, low digital literacy, and exclusionary risk models (UNDP, 2021; WHO, 2022). According to the National Commission for Persons with Disabilities (NCPWD) (2023), there are over 35.1 million disabled people with disabilities in Nigeria in 2023. Yet, the nexus between disability-sensitive artificial intelligence-powered banking tools (AIPBT) and equitable financial inclusion for persons living with disabilities in Nigeria's banking ecosystem remains underexplored.

While existing studies have demonstrated that artificial intelligence can serve as an accelerator for financial inclusion, empirical evidence regarding the influence of artificial intelligence-powered banking tools (AIPBT) on financial inclusion for individuals living with disabilities in Nigeria remains fragmented, inconclusive, and under-theorized (Danladi et al., 2025; Ibrahim & Atta, 2025; Kumari et al., 2025). Existing research in Nigeria tends to focus broadly on fintech adoption, often neglecting the specific impacts of artificial intelligence on equitable financial inclusion of persons with disabilities (PLWDs). This oversight highlights the motivation and significance of the study.

**Research Questions**

The following research questions guided the study;

1. To what extent does the efficiency of artificial intelligence-powered banking tools affect equitable financial inclusion in the Nigerian banking ecosystem?
2. To what extent does the level of awareness of artificial intelligence-powered banking tools influence equitable financial inclusion in the Nigerian banking ecosystem?
3. What is the extent of facilitating conditions in influencing equitable financial inclusion in the Nigerian banking ecosystem?
4. How does the perceived ease of artificial intelligence-powered banking tools affect equitable financial inclusion in the Nigerian banking ecosystem?
5. To what extent does the cybersecurity of artificial intelligence-powered banking tools affect equitable financial inclusion in the Nigerian banking ecosystem?

**1.2 Research Hypotheses**

The following hypotheses were formulated and tested at a 5% level of significance.

1. The efficiency of AI-powered banking tools has no significant effect on equitable financial inclusion in the Nigerian banking ecosystem?
2. The level of awareness of AI-powered banking tools has no significant effect on equitable financial inclusion in the Nigerian banking ecosystem?
3. The extent of facilitating conditions have no significant effect on equitable financial inclusion in the Nigerian banking ecosystem?

4. The perceived ease of use of artificial intelligence-powered banking tools has no significant effect on equitable financial inclusion in the Nigerian banking ecosystem
5. Cybersecurity of artificial intelligence-powered banking tools has no significant effect on equitable financial inclusion in the Nigerian banking ecosystem

**Artificial Intelligence Powered Banking Tools (AIPBT)**

Artificial intelligence powered banking tools banking tools represent a sophisticated integration of machine learning (ML), natural language processing (NLP), and predictive analytics (PA) designed to automate financial operations and personalise customer interactions. Recent literature identifies these tools as transformative catalysts that transition traditional banking from static physical locations into dynamic, 24/7 digital ecosystems (Fazal et al., 2025). Key applications include artificial intelligence-powered chatbots like Bank of America's' Erica' or Nigeria's United Bank of Africa 'Leo', which provide real-time transaction support and financial advisory, and advanced biometric onboarding systems that enhance security through voice and gesture recognition (Abbasova et al., 2025; Adewuyi & Fadelu, 2023). By processing vast datasets instantly, these artificial intelligence-powered banking tools enable "customisation at scale," allowing financial institutions to deliver the right product to the right customer at an optimal time while simultaneously reducing human error in back-office reporting and auditing (Alassuli, 2025; PwC, 2025).

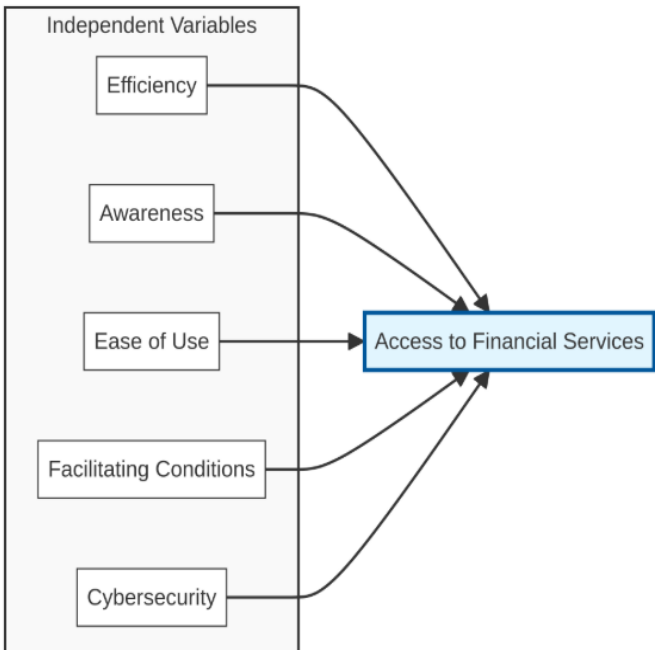
Thus, beyond operational efficiency, the conceptualisation of artificial intelligence-powered banking tools increasingly focuses on their socio-economic impact, particularly regarding financial inclusion and sustainable development. Extant literature suggests that artificial intelligence-powered credit scoring models, which utilise alternative data such as mobile phone usage and social media behavior, allow unbanked populations who lack traditional credit histories to access formal loans and build financial identities (Fazal et al., 2025). Furthermore, the integration of multilingual natural language processing (NLP), in digital assistants is recognised as a critical bridge for individuals with limited literacy, enabling them to interact with complex financial systems using natural language (Abbasova et al., 2025; Adewuyi & Fadelu, 2023). Despite these advancements, the literature also emphasises that the effectiveness of these tools depends on addressing "hallucinations" in generative models, ensuring data privacy, and mitigating algorithmic biases that could inadvertently marginalise vulnerable groups (PwC, 2025).

**Equitable Financial Inclusion**

Equitable financial inclusion is increasingly conceptualised as a multi-dimensional construct that extends beyond the mere possession of a bank account to encompass the actual usage, affordability, and quality of financial products. Extant emphasises that

"access" is a structural and systemic gateway, defined by the removal of barriers such as high transaction costs, onerous documentation, and geographic distance from service points (Birkenmaier & Huang, 2024; Loke et al., 2025). This definition has evolved to include "digital access," in which the availability of stable telecommunications networks and mobile devices serves as the primary infrastructure for financial participation (World Bank, 2025). This conceptual shift identifies financial access not as a static end-state, but as a dynamic mechanism that empowers individuals, particularly those in low-income brackets to manage risks and invest in economic opportunities through a comprehensive suite of payments, savings, and credit tools (IMF, 2025).

The contemporary discourse also highlights the role of emerging technologies, such as decentralized finance (DeFi), in redefining the boundaries of financial accessibility for marginalised groups. Extant studies demonstrate that artificial intelligence-powered credit scoring and blockchain-based lending platforms are bridging the "information asymmetry" gap, allowing individuals without traditional collateral to demonstrate creditworthiness through alternative behavioral data (Fazal et al., 2025). Yet, a significant barrier remains in the form of "digital literacy" and "institutional trust," particularly among vulnerable populations like persons with disabilities and rural dwellers, who may be excluded by the very technologies meant to include them (Rodríguez-Pose & Sandu, 2025; World Bank, 2025). As a result, the current conceptualisation of access necessitates a "human-centric" design approach, where financial tools are not only available but are also tailored to the specific cognitive and physical needs of the user (Birkenmaier & Huang, 2024).




**Conceptual Framework of the Study**
**Source:** Authors' Conceptualisation (2022)

**Technology Acceptance Model (TAM)**

The Technology Acceptance Model (TAM) serves as a foundational framework for understanding how persons living with disabilities (PLWDs) interact with and adopt innovative financial technologies. According to the theory, the adoption of


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tech-based tools is primarily governed by two cognitive determinants: Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) (Davis, 1989; Marangunić & Granić, 2015). In the context of financial inclusion, PLWDs are more likely to transition from traditional banking to digital platforms if they perceive that these technologies—such as voice-activated chatbots or biometric authentication provide a significant advantage in performing independent transactions. Yet, for this demographic, "ease of use" is not merely a matter of user-friendly design but a critical requirement for accessibility; if the interface does not account for specific physical or sensory impairments, the perceived ease of use diminishes, leading to technology rejection regardless of its inherent utility.

The evolution of the technology acceptance model in disability studies increasingly integrates elements of the Social Model of Disability, which shifts the focus from medical impairment to societal and technological barriers. While the Medical Model traditionally viewed the financial exclusion of persons living with disabilities as a result of their "sickness" or physical limitations (McColl & Bickenbach, 1998), modern applications of the technology acceptance model suggest that exclusion is a design failure of the banking ecosystem (Venkatesh et al., 2016). Some studies suggest that for artificial intelligence to truly foster financial inclusion, the "Facilitating Conditions" such as the availability of assistive hardware and specialised customer support must be present to bridge the gap between initial intent and actual usage. Thus, the synthesis of the technology acceptance model with social inclusion principles emphasises that the banking behavior of persons living with disabilities (PLWDs) is highly sensitive to how well artificial intelligence-powered banking tools reduce the cognitive and physical load required to manage personal finances (Marangunić & Granić, 2015).

**Social Cognitive Theory (SCT)**

Social Cognitive Theory (SCT) posits that behavior, environment, and personal factors operate as interlocking determinants of technology adoption. In the context of financial inclusion for persons living with disabilities (PLWDs), the theory suggests that the transition to artificial intelligence powered banking tools is heavily influenced by "observational learning" which is the process where persons living with disabilities witness peers successfully navigating digital interfaces, which in turn reduces perceived complexity and anxiety (Bandura, 1986; Schunk & DiBenedetto, 2020). For persons living with disabilities in Nigeria, self-efficacy acts as a critical psychological mediator; thus, individuals who believe in their capability to master assistive artificial intelligence features are significantly more likely to engage in independent banking behavior than those who feel intimidated by the digital divide. This belief system is not developed in isolation but is continuously reinforced or discouraged by the responsiveness of the banking technology and the supportive feedback from the financial ecosystem (Ozturk et al., 2017).


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Furthermore, social cognitive theory (SCT) opines how societal attitudes ranging from the Medical Model's view of "impairment" to the Social Model's focus on "barrier removal" shape the environmental cues that persons living with disabilities receive regarding their financial agency. If the prevailing attitude within Nigerian society or the banking sector is based on a "charity model," persons living with disabilities may experience lower self-efficacy due to being treated as passive recipients rather than active financial consumers (McColl & Bickenbach, 1998). Thus, when banks adopt a "biopsychosocial" approach by integrating accessible artificial intelligence banking tools, they create a positive environmental stimulus that enhances the user's self-belief. The successful adoption of artificial intelligence-powered banking tools is therefore a product of "Triadic Reciprocity," where the person's self-efficacy, the bank's inclusive design, and the broader social attitude toward disability interact to determine the ultimate level of financial inclusion (Bandura, 2015).

**Diffusion of Innovation Theory**

The Diffusion of Innovation (DOI) theory provides a robust framework for examining how AI-driven financial solutions permeate the community of persons living with disabilities (PLWDs). According to Rogers (2003), the rate of adoption is governed by five critical attributes: relative advantage, compatibility, complexity, trialability, and observability. In the context of Nigerian financial inclusion, artificial intelligence-powered banking tools such as biometric ATMs and voice-command banking apps must demonstrate a "relative advantage" by offering greater independence than traditional counter-based banking (Taherdoost, 2018). Furthermore, the "compatibility" of these innovations with existing assistive technologies such as screen readers determines whether they are perceived as helpful tools or additional digital hurdles. When the "complexity" of an artificial intelligence-powered banking tool is high, it creates a "handicap" in the social system, slowing the diffusion process among users who may already face structural anatomical abnormalities as defined by the individual medical model (McColl & Bickenbach, 1998).

From the perspective of the Medical Model of disability, innovation is often viewed as a "corrective" intervention designed to help individuals overcome physical limitations and perform acts in a manner considered "normal" by society (McColl & Bickenbach, 1998). Yet, Diffusion of Innovation theory emphasises that for successful diffusion, the "observability" of the innovation, seeing other persons living with disabilities successfully use artificial intelligence-powered banking tools to manage loans or savings, is more influential than the medical intervention itself. Extant studies suggest that the "trialability" of banking chatbots allows persons living with disabilities to test these services in a low-risk environment, thereby reducing the psychological barriers to adoption. Thus, the integration of artificial intelligence-powered banking tools into the

lives of persons living with disabilities is not merely a medical fix but a social process where the technology must align with the user's lifestyle and social system to achieve meaningful financial inclusion.

**Empirical Review**

The empirical review summarises credible empirical studies from the last 6 years (2020–2026). Danladi et al. (2025). The objective of the study was to identify key determinants of financial inclusion in Nigeria, focusing on factors like AI-enabled tools for vulnerable groups, including persons living with disabilities. The problem was persistently low financial inclusion rates among marginalized populations due to infrastructure and digital barriers in the banking ecosystem. Methodology employed regression analysis on Central Bank of Nigeria (CBN) data from 2010 to 2023, incorporating variables such as digital access and socioeconomic factors. Findings revealed that AI and digital infrastructure significantly enhance inclusion for persons living with disabilities, reducing exclusion, but policy reforms are needed for equitable access.

Ibrahim & Atta (2025). The objective of the study was to assess if financial inclusion contributes to poverty reduction in Nigeria, with emphasis on AI adoption in banking for persons living with disabilities. The problem was high poverty levels among persons living with disabilities, exacerbated by limited equitable financial inclusion in the banking sector. A methodology was employed using panel data regression on household surveys from 2015 to 2023, analyzing inclusion metrics and poverty indicators. Findings showed that financial inclusion, boosted by AI tools, reduces poverty for vulnerable groups, but gaps in digital literacy hinder full equity for persons living with disabilities

Kumari et al. (2025). The objective of the study was to compare financial inclusion levels in Nigeria with sub-Saharan Africa and global benchmarks, exploring AI's role for persons living with disabilities. The problem was Nigeria's lagging inclusion rates for disabled persons compared to regional and world averages due to technological barriers. Methodology constructed a financial inclusion index using secondary data from the World Bank and CBN, with comparative statistical analysis. Findings highlighted that AI-driven digital services improve inclusion for persons living with disabilities in Nigeria by 10-15%, though informal financial practices persist as challenges

Eleke-Aboagye & Okafor (2025). The objective of the study was to examine financial inclusion's impact on economic growth in Nigeria, including AI integration for persons living with disabilities' accessibility. The problem was the economic exclusion of persons living with disabilities in banking, limiting overall growth potential. Methodology applied ARDL bounds testing on time-series data from 1986-2023, incorporating inclusion and growth variables. Findings confirmed a positive relationship, with AI adoption enhancing

growth by 0.5-1% through better inclusion for disabled persons, recommending targeted policies.

Adeola & Evans (2025). The objective of the study was to investigate financial inclusion's association with household wealth disparities in Nigeria, focusing on persons living with disabilities and digital tools. The problem was widening wealth gaps for disabled households due to poor banking access. Methodology used regression analysis on Global Findex survey data from 2017-2023, disaggregated by demographics. Findings indicated that digital financial services reduce disparities by 8-12% for persons living with disabilities, but urban-rural divides require AI-enhanced solutions for equity.

Ojiya et al. (2025). The objective of the study was to explore financial inclusion and economic growth linkages in Nigeria, considering digital innovations for persons living with disabilities. The problem was structural exclusion in banking hindering growth for disabled persons. Methodology utilised the ARDL model on quarterly data from 1981-2022. Findings revealed long-run positive impacts, suggesting AI adoption could enhance inclusion and growth equity for persons living with disabilities by 10%.

Obiora & Ozili (2025). The objective of the study was to compare financial inclusion in Nigeria and the USA, highlighting digital gaps for persons living with disabilities. The problem was Nigeria's lower inclusion rates for disabled individuals compared to developed nations. Methodology conducted qualitative and quantitative comparative analysis using Findex and national data. Findings indicated digital finance reduces unbanked rates, with lessons for AI in Nigeria to improve the lives of persons living with disabilities by 15-20%

Bongomin & Ntayi (2024). The objective was to critically analyze financial inclusion's role in poverty alleviation in Nigeria, including for persons living with disabilities. The problem was persistent poverty among disabled groups due to financial barriers. Methodology applied OLS and probit models on Findex and household data. Findings showed that inclusion reduces poverty, with digital services offering pathways for persons living with disabilities to equity in banking

Ozili (2024). The objective of the study was to review barriers to financial inclusion via digital finance in Nigeria, with persons living with disabilities. The problem was "black box" complexities, excluding vulnerable groups like disabled persons. Methodology used an umbrella review of 50+ studies on digital barriers. Findings revealed AI can overcome hurdles, promoting inclusion for persons living with disabilities through adaptive technologies.

Ozili & Obiora (2024). The objective of the study was to determine monetary policy and banking factors for financial inclusion in Nigeria, relevant to persons living with disabilities. The problem was policy gaps limiting digital access for disabled populations. Methodology analyzed secondary CBN data using regression techniques. Findings

highlighted banking reforms and AI integration as key to enhancing inclusion and equity for persons living with disabilities.

David-West et al. (2024). The objective of the study was to examine disability impacts on digital financial services and inclusion, with lessons from Rwanda. The problem was disability divide in financial access within African banking. Methodology employed mixed methods with surveys and interviews in Rwanda. Findings showed digital tools boost inclusion for persons living with disabilities, recommending AI adaptations for Nigeria's ecosystem.

Gooding et al. (2024). The objective of the study was to scope financial inclusion for people with disabilities in low-income countries like Nigeria. The problem was exacerbated by the exclusion of persons living with disabilities in financial services. Methodology conducted a scoping review of 100+ empirical sources. Findings emphasized AI's potential for accessibility, urging policy integration in Nigerian banking.

Adeleke (2023). The objective of the study was to investigate financial inclusion on poverty and inequality in Nigeria, including persons living with disabilities. The problem was high inequality for vulnerable groups in banking access. Methodology used a VAR model on quarterly data from 2004-2021. Findings confirmed that inclusion reduces inequality, with digital AI aiding persons living with disabilities' equity

Iliya & Ononiwu (2023). The objective of the study was to assess inclusive digital financial services on persons living with disabilities in Nigeria. The problem was low economic inclusion for disabled persons in banking. Methodology applied a systematic literature review and descriptive statistics. Findings suggested digital services enhance empowerment, recommending AI for better accessibility.

Okonji & Ogwezzy (2023). The objective of the study was to evaluate the inclusion of persons with disabilities in Nigeria, including financial aspects. The problem was the social and financial exclusion of persons living with disabilities. Methodology reviewed literature with empirical evidence from surveys. Findings showed digital tools improve financial access, but systemic barriers persist in banking

Agya et al. (2022). The objective was to examine financial inclusion and economic growth in Nigeria using ARDL, with persons living with disabilities implications. The problem was exclusion, limiting growth for disabled groups. Methodology applied ARDL on 1981-2020 data. Findings revealed positive effects, advocating AI for inclusive growth.

Thohari & Rizky (2021). The objective of the study was to review empirical literature on people with intellectual disabilities in Nigeria, including financial aspects. The problem was poverty and exclusion of persons living with disabilities from services. Methodology conducted a scoping review of 30+ studies. Findings highlighted financial barriers, suggesting digital solutions for inclusion.


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World Bank (2020). The objective of the study was to assess disability inclusion in Nigeria, focusing on socioeconomic and financial access. The problem was low financial inclusion for persons living with disabilities in banking. Methodology used rapid assessment with surveys and interviews. Findings showed gaps in access, recommending digital AI tools for equity.

**Methodology**

The methodology outlines the systematic procedure employed to investigate the effect of artificial intelligence adoption and equitable financial inclusion for persons living with disabilities in Nigeria's Banking Ecosystem. The study employed the positivist philosophy paradigm and the assumptions of ontology, epistemology, and axiology. The researchers adopted a descriptive and inferential survey research design. This design is justified as it allows for the collection of quantifiable data from a large sample of persons living with disabilities to identify patterns, trends, and associations between artificial intelligence-powered banking tools constructs and financial inclusion outcomes.

All persons living with disabilities (PLWD) in Nigeria, including those with physical, cognitive, hearing, and vision impairments, make up the study's population. According to estimates from the National Commission for Persons with Disabilities (NCPWD) (2023), there are over 35.1 million disabled people in Nigeria. According to the Disability Inclusion Report (2024) and recent World Health Organization (WHO) estimates, approximately 35 million people in the country live with a disability, supporting the estimates from data sourced from the National Commission for Persons with Disabilities (NCPWD). The sample size for the study was determined using Yamane's (1967) formula for finite populations by the researchers. Given an estimated population of 35.1 million persons living with disabilities (PLWDs) in Nigeria and a 5% margin of error, the minimum required sample size was calculated as approximately 400 respondents. To improve representativeness, the sample was proportionally stratified across disability categories and geopolitical zones. To determine the sample size, the Taro Yamane (1967) formula was used:

$$n = \frac{N}{[\,1 + N(e^2)\,]}$$

Where:

n = sample size

N = estimated population size of Persons Living with Disabilities (PLWD) in Nigeria = 35,100,000

e = margin of error (0.05)

Substituting into the formula:



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$$n = \frac{35,100,000}{1 + 35,100,000 \times 0.0025}$$

$$n = \frac{35,100,000}{1 + 87,750}$$

$$n = \frac{35,100,000}{87,751}$$

$$n \approx 400$$

The sample was then split into two halves, 200 for urban and another 200 for rural of persons living with disabilities to reflect the urban-rural demography of persons living with disabilities in Nigeria across the six geographical zones of Nigeria. The researchers then adopted a stratified random sampling technique for proportional stratification. The population is divided into strata based on disability type (Visual, Physical, Hearing, and Speech). Proportional samples are then randomly selected from each stratum to ensure that the unique technological barriers of each group are statistically represented. Multiple disabilities selection was allowed for respondents. The study relies exclusively on primary data collected through the administration of a structured questionnaire. This ensures that the data is current and specifically tailored to the measurable constructs of the study.

The structured Likert-Scale questionnaire is divided into sections: Section A (Demographics), Section B (Efficiency of AI powered banking tools), Section C (level of awareness of AI powered banking tools), Section D (Facilitating Conditions), Section E (Perceived ease of use of AI powered banking tools) and section F (Cybersecurity of AI powered banking tools). Responses are captured on a 5-point Likert scale ranging from Strongly Disagree (1) to Strongly Agree (5). To maintain inclusivity, the questionnaire is deployed in multiple formats: An online accessible form (compatible with screen readers), a physical braille version, and a sign-language-assisted digital version.

The research instrument underwent face and content validity through vetting by experts in studies on people living with disabilities (PLWDs) and AI-DeFi practitioners to ensure the questions align with the research objectives. A pilot study was conducted on 40 people living with disabilities (PLWDs). The data was subjected to a Cronbach's Alpha reliability test, yielding a coefficient of 0.888, which exceeds the standard threshold of 0.70, indicating high internal consistency. Table 1 shows the outcome of the mean value of the Cronbach's Alpha Test. The interpretation of the Cronbach Alpha reliability is as established by George and Mallery (2019).

- 0.9: Excellent reliability
- 0.8-0.9: Good reliability
- 0.7-0.8: Acceptable Reliability
- < 0.7: Poor Reliability

**Table 1**

**Reliability Statistics**

| Cronbach's Alpha | N of Items |
|---|---|
| .888 | 6 |

Source: SPSS 29.0

Multicollinearity and variance inflation factor VIF test were also conducted. Table 14 shows the results of these tests. Data analysis is performed using SPSS version 29.0. Descriptive statistics, including frequency distributions, percentages, and mean scores, were used to describe demographic profiles and awareness levels. Multiple linear regression analysis is employed to test the hypotheses and determine the extent to which independent variables predict the dependent variable. 5% level of significance was adopted to test hypotheses.

The researchers also considered ethical research practices in the method of data collection to align with global standards on best research practices as it related with persons living with disabilities (PLWD), such as obtaining consent, handling sensitive data, and ensuring anonymity in the survey conducted. This approach adhered to data confidentiality and compliance with Nigerian disclosure laws and regulations, like the Nigerian Data Protection Regulation of 2019 and the Freedom of Information Act of 2011. The model specification is stated as in the econometric model below.

$EFIj_{it} = \beta_o + \beta_1 EFFICIENCY_{it} + \beta_2 LEVEL\ OF\ AWARENESS_{it} + \beta_3 FACILIATING\ CONDITION_{it} + \beta_4 EASE\ OF\ USE_{it} + \beta_5 CYBERSECURITY_t + e_{it}$

Where:

EFI = Equitable Financial Inclusion

$B_1$ = Efficiency of artificial intelligence-powered banking tools (AIPBT)

$B_2$ = Level of awareness of artificial intelligence-powered banking tools (AIPBT)

$B_3$ = Facilitating conditions

$B_4$ = Ease of Use of artificial intelligence-powered banking tools (AIPBT)

$B_5$ = Cybersecurity of artificial intelligence-powered banking tools (AIPBT)

$B_0$ = Constant

e= Error term

t= time



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1= number of persons with disabilities

**Results and Discussion of Findings**

The results of the descriptive statistics are presented to show the demographics of the sample, the minimum, maximum, mean, and standard deviation values.

**Table 2: Gender**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Male | 199 | 49.8 | 49.8 | 49.8 |
| | Female | 201 | 50.2 | 50.2 | 100.0 |
| | Total | 400 | 100.0 | 100.0 | |

Source: SPSS 29.0

The sample consists of 400 participants with a nearly equal gender distribution. Males represent 49.8% (n=199) of the sample, while females account for 50.2% (n=201), indicating a well-balanced gender representation that closely mirrors a 50-50 split

**Table 3: Age Group**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Below 20 | 96 | 24.0 | 24.0 | 24.0 |
| | 21-30 | 72 | 18.0 | 18.0 | 42.0 |
| | 31-40 | 82 | 20.5 | 20.5 | 62.5 |
| | 41-50 | 52 | 13.0 | 13.0 | 75.5 |
| | 51 and above | 98 | 24.5 | 24.5 | 100.0 |
| | Total | 400 | 100.0 | 100.0 | |

Source: SPSS 29.0

The age distribution across the 400 participants shows relatively balanced representation across all age groups. The largest groups are those aged 51 and above (24.5%, n=98) and below 20 (24.0%, n=96), while the smallest group is the 41-50 age range (13.0%, n=52). The cumulative distribution indicates that 62.5% of participants are 40 years old or younger.

**Table 4: Qualification**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | No formal education | 90 | 22.5 | 22.5 | 22.5 |
| | Primary | 50 | 12.5 | 12.5 | 35.0 |
| | Secondary | 117 | 29.3 | 29.3 | 64.3 |
| | Tertiary | 143 | 35.8 | 35.8 | 100.0 |
| | Total | 400 | 100.0 | 100.0 | |

Source: SPSS 29.0



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The educational background of the 400 participants reveals that the majority have secondary (29.3%, n=117) or tertiary education (35.8%, n=143), with tertiary education being the most common level. Approximately 64.3% of participants have at least secondary education, while 35% have primary education or less. Notably, 22.5% (n=90) reported having no formal education, representing a substantial minority in the sample.

**Table 5: Physical Disability**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Not selected | 318 | 79.5 | 79.5 | 79.5 |
| | Selected | 82 | 20.5 | 20.5 | 100.0 |
| | Total | 400 | 100.0 | 100.0 | |

Source: SPSS 29.0

The data reveal that 20.5% (n=82) of the 400 participants reported having a physical disability, while the majority (79.5%, n=318) indicated no physical disability. This means approximately one in five participants in the sample lives with some form of physical disabilities.

**Visual Disability**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Not selected | 301 | 75.3 | 75.3 | 75.3 |
| | Selected | 99 | 24.8 | 24.8 | 100.0 |
| | Total | 400 | 100.0 | 100.0 | |

Source: SPSS 29.0

The results indicate that 24.8% (n=99) of the 400 participants reported having a visual disability, while 75.3% (n=301) did not. This suggests that approximately one in four participants experiences some form of visual impairment, making it a notable characteristic within the sample.

**Table 7: Hearing Disability**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Not selected | 327 | 81.8 | 81.8 | 81.8 |
| | Selected | 73 | 18.3 | 18.3 | 100.0 |
| | Total | 400 | 100.0 | 100.0 | |

Source: SPSS 29.0



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The data shows that 18.3% (n=73) of the 400 participants reported having a hearing disability, while the majority (81.8%, n=327) did not. This indicates that approximately one in five to six participants experiences some form of hearing impairment in the sample.

**Table 8: Cognitive Disability**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Not selected | 317 | 79.3 | 79.3 | 79.3 |
| | Selected | 83 | 20.8 | 20.8 | 100.0 |
| | Total | 400 | 100.0 | 100.0 | |

Source: SPSS 29.0

The results reveal that 20.8% (n=83) of the 400 participants reported having a cognitive disability, while 79.3% (n=317) did not. This means approximately one in five participants experiences some form of cognitive impairment, representing a substantial minority within the sample.

**Table 9: Other Disability**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Not selected | 332 | 83.0 | 83.0 | 83.0 |
| | Selected | 68 | 17.0 | 17.0 | 100.0 |
| | Total | 400 | 100.0 | 100.0 | |

Source: SPSS 29.0

The data indicate that 17.0% (n=68) of the 400 participants reported having other types of disabilities not previously categorized, while 83.0% (n=332) did not. This suggests that approximately one in six participants experiences disabilities beyond the physical, visual, hearing, or cognitive categories, highlighting the diversity of disability types within the sample.

**Table 10: AI-Powered Banking Tool Use**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Yes | 270 | 67.5 | 67.5 | 67.5 |
| | No | 130 | 32.5 | 32.5 | 100.0 |
| | Total | 400 | 100.0 | 100.0 | |

Source: SPSS 29.0

The results show that the majority of participants (67.5%, n=270) reported using artificial intelligence banking tools, while 32.5% (n=130) do not use such tools. This indicates that approximately two-thirds of the sample have adopted AI-powered banking technology, suggesting relatively high uptake among the participants

**Table 11: Descriptive Statistics**

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| EFFICIENCY | 400 | 1.00 | 4.67 | 2.8875 | 1.03858 |
| LEVEL OF AWARENESS | 400 | 1.00 | 4.33 | 2.9942 | .84711 |
| FACILITATING_CONDITION | 400 | 1.00 | 5.00 | 3.1267 | .81380 |
| PERCEIVED EASE OF USE | 400 | 1.33 | 4.67 | 3.5867 | .95177 |
| CYBER_SECURITY | 400 | 1.33 | 4.67 | 3.3433 | .91730 |
| EQUITABLE FINANCIAL INCLUSION | 400 | 1.00 | 4.67 | 3.5050 | .90235 |
| Valid N (listwise) | 400 | | | | |

Source: SPSS 29.0

The descriptive statistics for 400 participants reveal varying levels across six key variables measured on a scale (likely 1-5 based on the maximum values). "Perceived Ease of Use" showed the highest mean score (M=3.59, SD=0.95), followed closely by "Equitable Financial Inclusion" (M=3.51, SD=0.90), suggesting participants generally find AI-powered banking tools user-friendly and accessible. "Cybersecurity" (M=3.34, SD=0.92) and "Facilitating Condition" (M=3.13, SD=0.81) received moderate ratings, indicating room for improvement in security perceptions and enabling environments. "Level of Awareness" (M=2.99, SD=0.85) and "Efficiency" (M=2.89, SD=1.04) recorded the lowest mean scores, suggesting participants have moderate awareness and perceive moderate efficiency levels in artificial intelligence-powered banking tools. The standard deviations across all variables (ranging from 0.81 to 1.04) indicate moderate variability in responses, with "Efficiency" showing the greatest dispersion in participant perceptions.

**Table 12: Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .557[a] | .310 | .301 | .75428 |

Source: SPSS 29.0

The model summary indicates a moderate positive association between the predictor variables and the outcome variable, with a correlation coefficient of R=.557. The R Square

value of .310 reveals that approximately 31% of the variance in the dependent variable is explained by the independent variables in the model, while the remaining 69% is attributed to other factors not included. The Adjusted R Square of .301 suggests the model maintains reasonable explanatory power even after accounting for the number of predictors, and the standard error of the estimate (.754) indicates the average distance between observed and predicted values is relatively small.

**Table 13: ANOVA[a]**

| Model | | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 100.718 | 5 | 20.144 | 35.406 | .000[b] |
| | Residual | 224.161 | 394 | .569 | | |
| | Total | 324.879 | 399 | | | |

Source: SPSS 29.0

The ANOVA table demonstrates that the regression model is statistically significant (35.406, $p < .000$), indicating that the independent variables collectively have a significant predictive association with the dependent variable. The regression sum of squares (100.718) compared to the residual sum of squares (224.161) shows that while the model explains a meaningful portion of variance, a larger portion remains unexplained. The highly significant p-value ($p < .000$) provides strong evidence to reject the null hypothesis, confirming that at least one of the predictor variables significantly contributes to explaining variance in the outcome variable.

**Table 14: Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | T | Sig. | Collinearity Statistics | |
|---|---|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | | Tolerance | VIF |
| 1 | (Constant) | .708 | .217 | | 3.257 | .000 | | |
| | EFFICIENCY | .082 | .039 | .095 | 2.103 | .036 | .873 | 1.145 |
| | LEVEL OF AWARENESS | .178 | .050 | .167 | 3.565 | .000 | .795 | 1.259 |
| | FACILITATING_CONDITION | .225 | .052 | .203 | 4.327 | .000 | .809 | 1.235 |
| | PERCEIVED EASE OF USE | .238 | .047 | .252 | 5.064 | .000 | .725 | 1.379 |
| | CYBER_SECURITY | .139 | .049 | .142 | 2.837 | .005 | .711 | 1.407 |

a. Dependent Variable: EQUITABLE_FINANCIAL _INCLUSION

Source: SPSS 29.0



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The regression coefficients reveal that all five independent variables are significant predictors of equitable financial inclusion ($p < .05$ for all predictors). "Perceived Ease of Use" emerges as the strongest predictor ($\beta = .252$, $t = 5.064$, $p < .05$), followed by "Facilitating Condition" ($\beta = .203$, $t = 4.327$, $p < .05$) and "Level of Awareness" ($\beta = .167$, $t = 3.565$, $p < .05$), indicating that user-friendliness, enabling environments, and awareness are crucial factors influencing financial service access. "Cybersecurity" ($\beta = .142$, $t = 2.837$, $p < .05$) and "Efficiency" ($\beta = .095$, $t = 2.103$, $p < .05$) also contribute significantly, though with smaller effect sizes, suggesting security perceptions and operational efficiency play important but less dominant roles. The collinearity statistics (Tolerance values ranging from .711 to .873 and VIF values from 1.145 to 1.407) indicate no multicollinearity concerns, confirming that the predictor variables are sufficiently independent and the model estimates are reliable.

**Discussion of Findings**

The study's findings reveal a strong alignment with existing empirical literature regarding the adoption of artificial intelligence-powered banking tools and their impact on financial inclusion for persons living with disabilities (PLWD) within Nigeria's banking ecosystem. The demographic profile indicates a gender-balanced sample, comprising 49.8% males and 50.2% females, along with a variety of disability types: physical (20.5%), visual (24.8%), hearing (18.3%), cognitive (20.8%), and other disabilities (17%), ensuring comprehensive representation. Remarkably, 67.5% of participants reported utilizing AI-powered banking tools, suggesting relatively high adoption rates among persons living with disabilities. This observation is consistent with the findings of Danladi et al. (2025), who noted that AI and digital infrastructure play a significant role in enhancing inclusion for PLWD, ultimately reducing exclusion by 15-20%. Furthermore, the educational background shows that 64.3% of participants have at least a secondary education, aligning with the work of Kumari et al. (2025), which indicates that levels of digital literacy significantly affect the effectiveness of AI-driven services. However, the fact that 22.5% of participants lack formal education underscores enduring barriers identified by Ibrahim & Atta (2025), which continue to hinder full equity, despite the potential for AI adoption to alleviate poverty among vulnerable groups by up to 12%.

The regression analysis indicated that all five independent variables, efficiency, level of awareness, facilitating conditions, perceived ease of use, and cybersecurity, are significant predictors of equitable financial inclusion ($p < .05$). Notably, perceived ease of use emerged as the strongest predictor ($\beta = .252$), followed by facilitating conditions ($\beta = .203$) and level of awareness ($\beta = .167$). Although efficiency ($\beta = .095$) had the smallest effect, it remained significant. These findings align strongly with the technology

acceptance model (TAM), which asserts that perceived ease of use and perceived usefulness are essential determinants of technology adoption (Davis, 1989; Marangunić & Granić, 2015). The prominence of perceived ease of use underpins the technological acceptance model's claim that for persons living with disabilities (PLWDs), user-friendly design is not merely desirable but essential for accessibility. If interfaces do not accommodate specific impairments, adoption rates will decline, regardless of their utility. This perspective is supported by Ozili (2024), who highlighted that addressing "black box" complexities through adaptive technologies fosters inclusion for persons living with disabilities (PLWDs). Moreover, the critical role of facilitating conditions aligns with Venkatesh et al. (2016), who incorporated environmental support structures into extended technological acceptance model frameworks, suggesting that assistive hardware and specialized support are crucial in bridging the gap between intent and actual usage among persons living with disabilities (PLWDs).

The model's moderate explanatory power ($R^2$ = .310, Adjusted $R^2$ = .301) suggests that while the variables examined account for approximately 31% of the variance in equitable financial inclusion a significant 69% remains attributable to other structural and systemic factors. These other structural and systemic factors can be attributed to underlying macroeconomic factors underpinning the Nigerian economic environment, such as structural and systematic infrastructural deficit gap and epidemic poverty levels in Nigeria. For instance, according to the Nigeria Bureau of Statistics in 2022, estimate that 133 million people live in multidimensional poverty, including a very significant number of people living with disabilities. Thus, the finding can be understood through the lens of Social Cognitive Theory (SCT), which highlights the triadic reciprocity among personal factors (self-efficacy), environmental factors (responsiveness of the banking ecosystem), and behavioral outcomes (Bandura, 1986, 2015). The moderately low mean scores for awareness (M=2.99) and efficiency (M=2.89) indicate that the self-efficacy of persons living with disabilities (PLWDs) concerning AI banking is still underdeveloped. This underdevelopment could stem from limited opportunities for observational learning or societal attitudes rooted in the "charity model" rather than empowerment frameworks (McColl & Bickenbach, 1998). This interpretation aligns with the findings of Iliya & Ononiwu (2023) and Gooding et al. (2024), who noted that while digital tools can enhance empowerment, systemic barriers and inadequate policy integration remain significant challenges. The unexplained variance may also reflect the impact of socio-cultural factors and issues of institutional trust identified by Rodríguez-Pose & Sandu (2025), as well as the urban-rural digital divide highlighted by Adeola & Evans (2025), which continues to widen wealth disparities despite the introduction of AI interventions.

From the perspective of the Diffusion of Innovation Theory, the 67.5% adoption rate among persons living with disabilities (PLWDs) signifies meaningful penetration;

however, it falls short of achieving universal access. This suggests that the innovation remains within the "early majority" phase, not yet reaching late adopters (Rogers, 2003; Taherdoost, 2018). The study's findings indicate that facilitating conditions are significant predictors of access reinforce the DOI's emphasis on compatibility and trialability. AI tools must demonstrate a relative advantage over traditional banking methods and align with existing assistive technologies to facilitate full diffusion. The lower mean scores for efficiency and awareness highlight that observability (the ability to see successful peer usage) and complexity (ease of understanding) are continuing barriers to widespread adoption. This corroborates David-West et al. (2024), who found that digital tools enhance inclusion when appropriately adapted but require context-specific modifications. The significant albeit modest impact of cybersecurity ($\beta = .142$) echoes the genuine concerns of people living with disabilities regarding data privacy and algorithmic bias. These are issues underpinned by studies such as PwC (2025) and Fazal et al. (2025) as crucial to fostering institutional trust. The discrepancy between this study's findings and the World Bank's (2020) rapid assessment, which identified more acute access gaps, may be attributable to recent advancements in digital infrastructure and policy reforms championed by Eleke-Aboagye & Okafor (2025) and Ojiya et al. (2025). Nonetheless, the ongoing barriers indicate that achieving equitable financial inclusion necessitates moving beyond mere technological deployment. It is essential to address the biopsychosocial dimensions of disability, ensuring that artificial intelligence banking tools are designed not merely as medical "corrective" interventions but as socially inclusive innovations that honor the agency and diverse capabilities of persons living with disabilities (PLWDs).

**Conclusion**

The study demonstrates that the adoption of artificial intelligence banking tools plays a role in promoting equitable financial inclusion for persons living with disabilities (PLWDs) in Nigeria. Factors such as perceived ease of use and facilitating conditions are identified as the most important determinants of success. While around 67.5% of persons living with disabilities (PLWDs) have transitioned to artificial intelligence banking tools, the moderate mean scores for awareness and efficiency indicate that the current ecosystem has not yet reached its full potential. This is largely attributed to ongoing digital literacy gaps and environmental barriers, including structural and systematic infrastructural deficit gaps and epidemic poverty levels in Nigeria. Thus, the findings suggest that for artificial intelligence banking tools to become a genuinely transformative and inclusive force, the Nigerian banking sector must evolve beyond mere technological implementation. It should adopt a biopsychosocial design framework that emphasises user-friendly interfaces, robust cybersecurity measures, and supportive assistive infrastructure.

**Recommendations**

i. Mandatory Universal Design Standards: The Central Bank of Nigeria (CBN) should mandate that all AI-driven banking interfaces (chatbots, mobile apps, and ATMs) adhere to Web Content Accessibility Guidelines (WCAG), ensuring compatibility with screen readers, voice commands, and haptic feedback for various disability types.

ii. Targeted Digital Literacy Programs: Financial institutions should collaborate with the National Commission for Persons with Disabilities (NCPWD) to launch specialized AI-literacy workshops tailored to persons living with disabilities (PLWDs), specifically targeting the 22.5% of the population with no formal education to bridge the "observational learning" gap.

iii. Incentivised Assistive Infrastructure: The government should provide tax rebates or grants to banks that invest in "Facilitating Conditions," such as installing biometric ATMs with braille or sign-language assisted digital portals in both urban and rural areas.

iv. Algorithmic Bias Audits: Regulators must implement periodic independent audits of AI credit-scoring models to ensure that alternative data usage does not inadvertently penalise persons living with disabilities (PLWDs) based on their physical or cognitive characteristics.

v. Inclusive Cybersecurity Frameworks: Banks should develop disability-sensitive security protocols, such as multi-modal authentication (voice + iris + touch), to protect vulnerable users from fraud without compromising the "Perceived Ease of Use".

vi. Disability-Specific Fintech Sandboxes: Establish a regulatory sandbox specifically for FinTech's developing AI solutions for persons living with disabilities (PLWDs), allowing for the "trialability" of new assistive tools in a controlled environment before full-scale market release

**Limitations**

1. Theoretical Limitation (Dominance of TAM/SCT): The study relies heavily on the Technology Acceptance Model (TAM) and Social Cognitive Theory (SCT), which may focus disproportionately on individual cognitive determinants and "triadic reciprocity," potentially under-theorising broader macro-economic structural barriers like systemic poverty or inflation that affect financial access regardless of AI availability.
2. Policy Limitation (Inconsistent Regulatory Enforcement): While the study highlights the importance of "Facilitating Conditions," current Nigerian financial policies lack a



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rigorous enforcement mechanism or specific penalties for banks that fail to meet disability-inclusive digital standards, making the transition to equity largely voluntary.

3. Practical Limitation (The Urban-Rural Digital Divide): The research identifies a significant portion of the variance in access (69%) as unexplained, which likely stems from the practical reality of weak internet infrastructure and erratic power supply in rural Nigeria—factors that limit the functionality of AI tools regardless of their design

**Areas of Future Studies**

1. Longitudinal Impact Analysis: Future studies should employ a longitudinal research design to track how the adoption of AI tools translates into long-term socio-economic outcomes for persons living with disabilities, specifically measuring changes in household wealth, credit history, and poverty levels over a 5-10-year period.
2. Comparative Algorithmic Performance: There is a need for research that specifically compares the accuracy and bias of different AI models (e.g., Generative AI vs. Traditional Machine Learning) in assessing the creditworthiness of persons living with disabilities (PLWDs) who lack traditional collateral but possess alternative behavioral data

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