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Blockchain for digital banking: enhancing financial inclusion and satisfaction in Lagos, Nigeria

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Abstract. Financial exclusion remains a challenge in Nigeria's banking sector, especially for marginalised groups, partly due to unclear perceptions of blockchain technology. Its role in increasing financial inclusion and consumer satisfaction is not fully examined, leaving its potential unexplored despite opportunities for digital transformation. To assess in what capacity blockchain technology can improve digital financial engagement and customer experience. The article examines its implementation in Nigeria's commercial banking industry. To understand the dynamics of user adoption and the perceived value of emerging technologies, the research is based on the diffusion of innovation theory (Rogers, 2003) and the technology acceptance model (Davis, 1989). The study uses a quantitative survey technique, interpreting client responses with regression analysis, chi-square testing, and descriptive statistics. Structured questionnaires were used to collect information from 266 Lagos-based commercial bank clients. Blockchain adoption is related to fintech growth but does not significantly affect traditional measures of financial inclusion. The key desired features are security and decentralisation, although awareness and complexity are challenges. The study shows the benefits of blockchain in Nigeria's financial sector and its potential to boost financial inclusion in Lagos.

Keywords: blockchain adoption, fintech engagement, financial inclusion, digital banking, customer satisfaction, commercial bank, innovation diffusion, Nigeria banking sector, fintech

Highlights:

- ♦ blockchain technology improves digital banking services by providing secure and decentralised systems in major financial centres such as Lagos, Nigeria;
- ♦ the study reveals how specific blockchain features, such as security and decentralisation, have a major impact on customer satisfaction, while other unique features, such as speed and transparency, have a lesser impact on customer satisfaction;
- ♦ blockchain technology is increasingly contributing to the evolution of financial technology (fintech), by enhancing user interaction and engagement. Nevertheless, this progress has not yet significantly improved traditional measures of financial inclusion.

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Технология блокчейн как инструмент цифрового банкинга: повышение финансовой доступности и удовлетворенности клиентов коммерческого банка в Лагосе, Нигерия

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Аннотация. Финансовая изоляция остается постоянной проблемой в банковском секторе Нигерии, особенно среди недостаточно обслуживаемых слоев населения. В то время как цифровая трансформация открывает новые возможности, интеграция технологии блокчейн в финансовые услуги еще не полностью изучена в качестве механизма продвижения инклюзивности и повышения удовлетворенности клиентов. В статье исследуется внедрение технологии блокчейн в коммерческом банковском секторе Нигерии с целью оценки ее роли в улучшении цифрового финансового взаимодействия и клиентского опыта. Исследование основано на распространении теории инноваций (Rogers, 2003) и модели внедрения технологий (Davis, 1989), которые объясняют динамику принятия пользователями и воспринимаемую ценность новых технологий. В исследовании используется количественный подход к опросу с использованием описательной статистики, регрессионного анализа и тестирования χ^2 (хи-квадрат) – критерия согласия Пирсона для интерпретации ответов клиентов. Данные были собраны у 266 клиентов коммерческих банков в Лагосе с помощью структурированных анкет. Полученные результаты показывают, что хотя внедрение технологии блокчейн сильно коррелирует с вовлеченностью в финтех, оно не оказывает существенного влияния на традиционные показатели финансовой доступности. Безопасность и децентрализация оказались наиболее ценными характеристиками, в то время как барьерами были низкая осведомленность и технологическая сложность. Автором сделан вывод о возможном потенциале технологии блокчейн для улучшения цифровых банковских услуг и углубления понимания его роли в финансовых инновациях.

Ключевые слова: внедрение технологии блокчейн, взаимодействие с финтехом, финансовая доступность, цифровой банкинг, удовлетворенность клиентов, коммерческий банк, диффузия инноваций, банковский сектор Нигерии, финтех

Основные положения:

- ♦ технология блокчейн улучшает цифровые банковские услуги, предоставляя безопасные и децентрализованные системы в крупных финансовых центрах, таких как Лагос, Нигерия;
- ♦ исследование показывает, как конкретные особенности блокчейн, такие как безопасность и децентрализация, оказывают существенное влияние на удовлетворенность клиентов, в то время как другие уникальные особенности, например скорость и прозрачность, оказывают меньшее влияние;
- ♦ технология блокчейн все больше способствует развитию финансовых технологий, улучшая взаимодействие и вовлеченность пользователей. Тем не менее этот прогресс пока не привел к значительному улучшению традиционных показателей финансовой доступности.

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Introduction

The rapid advancement of financial technology has transformed the global financial sector, with blockchain gaining importance as a means

to enhance transaction security, transparency, and efficiency. In emerging economies like Nigeria, it has a unique potential to advance financial inclusion, this is particularly relevant given that

a large portion of Nigeria's population continues to have limited access to formal financial services while some remain unbanked [1], highlighting the urgent need for alternative solutions such as blockchain to bridge the inclusion gap. By improving financial accessibility, affordability, and empowerment, blockchain can foster greater economic participation [2]. Similar changes have been recorded in global financial markets, where fintech innovations function as catalysts for systemic transformations in service delivery and customer engagement [3].

Lagos is at the forefront of economic transformation as the main financial hub with a rapidly expanding economy within Nigeria [4]. However, even with these advancements and the dynamic economic progression of the city, financial inclusion remains a significant issue. This is especially evident among low-income workers and owners of small businesses, who frequently encounter obstacles in accessing financial services. Some of these challenges include, but are not limited to, expensive account fees, strict documentation requirements, and sparse physical branch networks [5]. Conventional banks also experience operational inefficiencies, such as longer transaction times and higher transfer costs caused by multi-tiered intermediate systems. Furthermore, reliance on cash transactions puts individuals at risk of theft, fraud, and financial instability, while traditional banking institutions remain exposed to cyber-attacks [6]. These systemic inefficiencies create the urgent need for more a secure, inclusive, and alternative digital banking option.

Blockchain technology offers a decentralised approach to financial transactions, eliminating the need for intermediaries and reducing the expenses and processing lags that come with traditional banking systems. In addition, transparency is ensured by using a distributed ledger, making it more difficult to conduct fraudulent activities because all transactions are permanently recorded. Furthermore, blockchain makes cross-border transactions easier and faster, enabling individuals, SMEs, and large corporations to conduct international financial transactions without unnecessary restrictions imposed by traditional banking systems [7]. In theory, the adoption and implementation of

blockchain technology in the financial sector could further strengthen the banking ecosystem in Lagos [8].

Blockchain technology provides practical solutions to several ongoing problems in Nigeria's online banking industry. By providing decentralised access to banking services through mobile-based blockchain wallets, it reduces financial exclusion by reaching underserved and unbanked groups without relying on traditional banking infrastructure [9]. By eliminating third parties, blockchain technology also drastically reduces transaction costs and processing times, allowing faster and more economical peer-to-peer payments [10]. These technological advancements mirror similar patterns observed in the Russian financial sector, where the strategic implementation of digital banking tools is changing the accessibility and efficiency of financial services provided to businesses, individuals, and SMEs alike [11].

Furthermore, blockchain also improves transactional transparency through its tamper-proof distributed ledger (resistant to manipulation) that enables independent consumer verification and reduces the dependence on centralised authorities [12]. In addition to transparency, the decentralised structure, and cryptographic features of the blockchain improve security in the financial sector by making it extremely resistant to fraud and cyberattacks, which are prevalent issues in the Nigerian banking sector [13]. However, despite these advantages, there are still significant ethical and legal issues with data ownership and responsibility [14], creating the need for a more structured regulatory framework or governing bodies to balance innovation with accountability. In addition to enhanced security and transparency, blockchain also equip users with increased control and freedom over their financial information, and gives them a wide range of automated, error-free services through the smart contracts from blockchain technology. This autonomy not only increases user confidence, but also improves customer satisfaction [15]. In practice, blockchain can create digital financial identities for individuals without a formal financial record, which can then be used by fintech platforms to improve financial inclusion and credit evaluation [16].

However, despite the potential benefits of blockchain, there is still a noticeable research gap on its impact on the Lagos' financial service sector and users/customers. Although the theoretical advantages and worldwide applications of blockchain have been thoroughly discussed in the literature, little empirical research has been done on the practical implications of blockchain in Lagos's commercial banking industry. By examining how blockchain adoption can address certain financial issues such as restricted access to banking services, transaction inefficiencies, and security risks, this study aims to bridge that gap by examining the real world application of blockchain technology in the Lagos' financial sector, and offering valuable insights that can guide policy recommendations and strategic implementation frameworks for financial institutions wishing to incorporate blockchain technology into their services.

The primary objective of this study is to evaluate the efficacy of blockchain technology as a tool for digital banking in order to improve financial inclusion and customer satisfaction among commercial bank customers in Lagos, Nigeria.

Based on the literature reviewed and theoretical frameworks, this study developed the following hypotheses to guide the empirical analysis:

H1: Blockchain usage has a positive and significant effect on fintech engagement among commercial bank customers.

H2: Blockchain features have a positive and significant effect on customer satisfaction in digital banking.

H3: Blockchain adoption has a positive and significant effect on financial inclusion among commercial bank customers in Lagos.

The purpose of the study is to examine the effect of blockchain on the competitive position of Lagos financial institutions by testing these hypotheses. The study will focus on the features of blockchain relevant to this research, including security, transparency, decentralisation, transaction speed, and transaction cost. The results of this research will further establish Lagos as a major financial technology hub in Africa and add to the larger conversation on digital banking innovation by offering insights that can support the

development of a more resilient and inclusive financial ecosystem.

Methods

A formula developed by Yamane (1967) was used to calculate the proper sample size for this investigation. When determining sample sizes in large populations, this approach is highly respected, particularly when a particular margin of error is needed. This formula was considered suitable for ensuring statistical reliability due to Lagos State's large population, which is approximately 16.5 million [17].

The formula is stated as follows:

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

where n = required sample size;

N = population size (16,500,000);

e = margin of error (0.05, corresponding to a 95% confidence level).

Substituting the values into the formula:

$$n = \frac{16,500,000}{1 + 16,500,000 (0.05)^2},$$

$n \approx 399.99$.

The sample size was projected to consist of approximately 400 respondents. Out of these 400 customers who initially responded to the survey, 266 valid responses were used. With a 5% margin of error, this approach ensured the sample was both feasible and representative of the broader population, facilitating meaningful generalizations.

To ensure fair representation and increase the reliability of the data set, participants were selected using a random sampling method. The research was concentrated in Lagos mainly because it is Nigeria's hub for commerce and finance, where the integration of digital banking technologies such as blockchain is crucial to addressing financial inclusion challenges and improving consumer satisfaction.

Data were gathered using a structured online survey that was distributed via social media and customer email lists provided by affiliated commercial banks. To ensure the validity and reliability of the research tool, Item-Total Correlation and Cronbach's Alpha were employed. The Cronbach's Alpha coefficient surpassed the acceptable threshold of 0.70, indicating strong internal consistency. Meanwhile,

the Item-Total Correlation analysis demonstrated that each item had a positive correlation with the overall scale, thereby confirming the instrument's validity.

To demonstrate trends in blockchain usage, financial inclusion, and customer satisfaction, the data were further analysed using descriptive statistics to compile demographic traits and frequency distributions. While Spearman's Rank and Pearson's Correlation analyses were used to evaluate the direction and strength of relationships involving continuous variables, specifically between blockchain adoption and financial inclusion, the Chi-Square test of independence was used to investigate relationships between categorical variables. The effect of blockchain features including security, decentralisation, speed, and transparency on customer satisfaction was assessed using multiple regression analysis, and t-tests were used to compare the satisfaction levels of blockchain users and non-users. These statistical methods help provide solid insights on how blockchain technology might improve the digital banking experience of Lagos residents.

Ethical principles guided the study process, with informed consent obtained from all participants, and confidentiality and voluntary partici-

pation were ensured, in accordance with professional research standards.

Generative artificial intelligence tools, specifically ChatGPT developed by OpenAI, were used to facilitate two distinct processes: (1) the translation of selected Russian-language scholarly sources into the English language and (2) the improvement of the clarity and readability of English textual content. Subsequent to AI-assisted translations and revisions, the outputs were subjected to rigorous evaluation, correction, and elaboration by the author to ensure the preservation of semantic accuracy and to confirm that the intellectual substance accurately represents the author's individual analysis.

Results

Respondent Demographics and Blockchain Awareness. A total of 266 valid responses were collected from various respondents in Lagos state, Nigeria. It was observed from Table 1 that majority of respondents fall within the 25–34 age group (49.6%), followed by 18–24 years (27.1%), indicating that digital banking and blockchain awareness are more prevalent among young adults. Males make up 60.2% of the sample, while females constitute 39.8%. Most participants (90.2%) have attained higher

Table 1
Demographic Characteristics of The Respondents and Blockchain Awareness*

Variable	Category	Frequency	Percentage, %
Age Group	25–34	132	49.6
	18–24	72	27.1
	35–44	52	19.5
	45–54	10	3.8
Gender	Male	160	60.2
	Female	106	39.8
Education	Higher education	241	90.2
	Secondary education	21	7.9
	No formal/Primary	4	1.5
Employment	Employed (private)	126	47.1
	Self-employed	79	29.5
	Employed (public)	49	18.3
	Unemployed	12	4.5
Bank Account Ownership	Yes	259	97.4
	No	7	2.6
Mobile Internet Access	Yes	260	97.7
	No	6	2.3
Blockchain Awareness	Aware	164	61.7
	Not Aware	102	38.3

* Computation of the Author using SPSS.

education, while only a small fraction (1.5%) have no formal or primary education. In terms of employment, 47.1% work in the private sector, 29.5% are self-employed, and 18.3% are public sector employees, with only 4.5% being unemployed. Nearly all respondents (97.4%) own a bank account, and 97.7% have mobile internet access, indicating an elevated level of financial and digital inclusion. However, while 61.7% are aware of blockchain technology, 38.3% are not, highlighting a significant knowledge gap.

The Adoption of Blockchain and Financial Inclusion. To test H1, which predicts that blockchain usage has a positive and significant effect on fintech engagement among commercial bank customers, A chi-square test of independence was performed to assess the relationship between blockchain usage and fintech engagement. The results show higher engagements with blockchain users compared to non-users. In Table 2, 98.6% blockchain users depend on USSD, internet or mobile banking, whereas 93.4% of non-users do the same. Despite this,

only 6.6% of non-users and 6.9% of blockchain users report having no access barriers, which means that blockchain has not really altered access constraints. In addition, 91.7% of blockchain users take advantage of blockchain or fintech for money transfers, compared to 77.0% of non-users, revealing a solid link between blockchain adoption and fintech usage. Moreover, dependence on physical banking is reduced among blockchain users (1.4%) compared to non-users (6.6%), showing a shift towards digital transactions among blockchain adopters.

Reasons for The Adoption of Blockchain-Based Services. Based on Table 3, the main reason for adopting blockchain services was increased security and transparency, mentioned by 70.8% of users. This shows the technology's value in building trust and securing transactions. Access to financial services also played a key role (52.8%), highlighting blockchain's potential to drive financial inclusion. In Addition, benefits such as lower transaction costs (33.3%) and faster transactions (34.7%) shows that users ap-

Table 2

Adoption of Blockchain and Financial Inclusion*

Indicator	Blockchain Users, %	Non-Users, %
Uses Mobile / USSD / Internet	98.6	93.4
Reports "No" to Access Barriers	6.9	6.6
Uses Fintech or Blockchain Transfer	91.7	77.0
Relies on Physical banking only	1.4	6.6

* Computation of the Author using SPSS.

Table 3

Reasons for the adoption of Blockchain-Based Services*

Reason for Use	Frequency	Percentage, %
More security and transparency	102	70.8
Access to financial services	76	52.8
Faster transactions	50	34.7
Lower transaction costs	48	33.3

* Computation of the Author using SPSS.

Table 4

Barriers to the adoption of Blockchain-Based Services*

Reason for Not Using	Frequency	Percentage, %
Lack of awareness	80	78.4
Complexity in using blockchain	30	29.4
Lack of trust in blockchain	20	19.6
Regulatory uncertainties	18	17.6

* Computation of the Author using SPSS.

Table 5

Blockchain Features and Customer Satisfaction*

Blockchain Feature	Beta (β)	p-value	Significant?
Security	0.281	0.0023	Yes
Decentralisation	0.243	0.0001	Yes
Speed	0.110	0.1805	No
Transparency	0.011	0.9016	No

* Computation of the Author using SPSS.

Table 6

Blockchain Adoption vs Financial Inclusion Indicators*

Indicator	χ^2 Value	df	p-value	Significant?
Uses Mobile/USSD/Internet	3.55	1	0.0595	No
Reports "No" to Access Barriers	0.00	1	1.0000	No
Uses Fintech or Blockchain Transfer	9.93	1	0.0016	Yes
Relies on Physical banking only	3.55	1	0.0595	No

* Computation of the Author using SPSS.

preciate blockchain's efficiency and affordability compared to traditional banking systems.

In Table 4, the most notable barrier to blockchain acceptance was a lack of awareness, affecting 78.4% of non-users. This points to the importance for increased education and outreach on blockchain usages. Other notable difficulties include the complexity of using blockchain systems (29.4%), a lack of trust in the technology (19.6%), and regulatory uncertainties (17.6%). These findings show that building public trust, addressing usability issues, and clarifying government policies could enhance adoption rates.

Blockchain Features and Customer Satisfaction. To test H2, which predicts that blockchain features have a positive and significant effect on customer satisfaction in digital banking, multiple regression analysis was conducted to examine the effect of security, decentralisation, speed, and transparency on user satisfaction. The results show that security ($\beta = 0.281$, $p = 0.0023$) and decentralization ($\beta = 0.243$, $p = 0.0001$) significantly improves customer satisfaction, suggesting that users highly appreciate these attributes in digital banking. Nevertheless, speed ($\beta = 0.110$, $p = 0.1805$) and transparency ($\beta = 0.011$, $p = 0.9016$) do not produce a considerable change, indicating that additional factors may affect customer experience more strongly. These results in suggests that blockchain providers should focus on enhancing secu-

rity and decentralisation to improve customer satisfaction (Table 5).

Blockchain Adoption vs. Financial Inclusion Indicators. To test H3, which predicts that blockchain adoption has a positive and significant effect on financial inclusion among commercial bank customers in Lagos, chi-square analysis was conducted to examine the relationship between blockchain approval and inclusion indicators. The results shows that blockchain adoption significantly correlates with fintech usage ($\chi^2 = 9.93$, $p = 0.0016$), this means that blockchain users are likely to make use of digital financial services than non-users. However, blockchain approval does not reveal a considerable impact on access barriers, mobile banking use, or physical banking reliance, as these indicators have p-values greater than 0.05. This shows that while blockchain encourages fintech adoption, it does not automatically eliminate financial access barriers or drastically change banking habits (Table 6).

Discussion

All hypotheses proposed in this study were empirically tested and yielded statistically meaningful results. The findings of this study show the role of blockchain technology in improving financial inclusion and customer satisfaction among commercial bank customers in Lagos, Nigeria. By testing blockchain awareness, adoption, and

perceived benefits and challenges, this study aligns and expands the existing literature in the field of digital banking and financial technology.

The results paint a nuanced picture: In Lagos, the respondents exhibit a moderate level of awareness regarding blockchain technology. (61.7%), yet practical use remains limited, the findings show that awareness varies significantly by age ($\chi^2 = 18.67$, $p = 0.0003$) and employment status ($\chi^2 = 24.23$, $p < 0.001$). An effective approach to interpreting this concept involves considering it as a gap between frequent exposure and accessibility. In urban environments like Lagos, people pick up technology terms quickly through social media, news, and workplace conversations so "awareness" can reflect headline-level knowledge rather than operational competence. That explains why many respondents know the word "blockchain" but do not use it for transactions: the infrastructure (easy wallets, reliable on-/off-ramps, compliant KYC), the business models (bank-fintech partnerships, low-fee rails), and the user education needed to convert curiosity into use are still immature. This is in line with research by [Kumari et al., 2023], which discovered that although 58.2% of Nigerian bank clients had heard of blockchain, they were not familiar with its real-world uses in financial transactions. The strong correlation between blockchain adoption and fintech usage (91.7% vs. 77.0%) suggests blockchain often enters financial lives through fintech intermediaries rather than via mainstream banks i.e., adopters are typically already tech-literate, not the previously excluded unbanked.

Why do security and decentralisation drive satisfaction (security $\beta = 0.281$, $p = 0.0023$; decentralisation $\beta = 0.243$, $p = 0.0001$): these results reflect how lived experience shapes value. In contexts where fraud, account freezes, or opaque complaint processes are common, customers value mechanisms that promise greater control and tamper-resistance. "Security" represents a tangible benefit that people can easily understand, this is mainly because it limits potential losses, mitigates the risk of fraud, and reassures users who have had or heard negative banking experiences. "Decentralization" while technically abstract, aligns with cultural priorities of autonomy and distrust of centralized gate-

keepers; customers often interpret it as reducing the risk of arbitrary holds, censorship, or unilateral bank decisions. In short, features that protect customers from tangible harms better match their risk calculus than features that sound technically impressive but feel abstract.

The insignificance of speed and transparency in shaping customer satisfaction (speed $\beta = 0.110$, $p = 0.1805$; transparency $\beta = 0.011$, $p = 0.9016$) is especially revealing and deserves a deeper analysis. First, marginal utility: many Lagos customers already experience transactions that are "fast enough" via existing channels (bank apps, USSD, quick transfers), suggesting that additional speed offers limited marginal utility; what matters more to users is reliability, not raw speed.

Second, transparency as a concept can be vague or even threatening to end-users: telling customers a system is more "transparent" does not necessarily translate into perceivable day-to-day benefits unless transparency produces obvious results (clear fees, immutable receipts, faster problem resolution). For some users, transparency could mean loss of privacy, making the term "more transparent" unattractive if it involves exposing personal data. Finally, infrastructural constraints (intermittent connectivity, power outages) make speed unreliable in practice; the promise of faster transactions that fails under poor connectivity is less valuable than a slightly slower but dependable service.

The observation that the adoption of blockchain technology does not produce improvements in traditional financial inclusion indicators (such as the usage of mobile banking, barriers to access, or dependence on physical banking infrastructure) underscores a critical distinction between the mere adoption of technological innovations and the achievement of systemic inclusion, this contrasts with findings from Singh et al. [2024], who reported that blockchain significantly reduced financial exclusion rates in India by 12% over two years. Blockchain-enabled products in Nigeria often take the form of niche fintech services: remittance rails, crypto-trade platforms, or closed-loop wallets that serve users who already have some banking access or digital devices. Without effective on/off ramps (such as agents, cash-in/cash-out points), com-

pliant KYC that does not exclude informal workers, and regulatory clarity that integrates blockchain into formal banking processes, blockchain remains a parallel ecosystem that benefits the digitally literate rather than the structurally excluded. In short, blockchain can increase the choice for the connected, but it does not automatically remove barriers such as lack of identity documents, cost of data, or digital literacy that underpin exclusion.

Some demographic patterns invite further interpretation. The higher awareness among 25–34-year-olds and private-sector employees reflects occupational exposure: this cohort uses digital services at work, participates in cross-border payments, and consumes technology media, all factors that raise both visibility and willingness to experiment. The absence of association with gender, education, or account ownership can indicate sample homogeneity (urban Lagos respondents share baseline access to accounts and basic education) or ceiling effects (if most respondents already have bank accounts, account ownership will not explain variation).). It is also possible that formal education does not equate to digital literacy: someone with tertiary education may still lack confidence in navigating crypto wallets or fintech UX.

Methodological and alternative explanations are important to note. Some findings (particularly around abstract constructs like "transparency") could reflect instrument limitations: question language, respondents' interpretation of technical terms, and social desirability bias. Cross-sectional survey data cannot fully capture causal processes (for example, whether fintech use leads to blockchain adoption or vice versa). To deepen causal claims and understand motives, qualitative follow-ups (in-depth interviews, focus groups) and behavioural experiments (A/B testing different product messages emphasising security vs. speed vs. cost) would be valuable.

This study provides a contextualised interpretation of the appeal of blockchain in Lagos, showing that it is currently based on its promise to protect and empower customers who already participate in digital finance. Its broader potential to improve inclusion and satisfaction depends on translating technical properties such as transparency and speed into every day, verifi-

able benefits, while simultaneously addressing infrastructure limitations, regulatory ambiguities, and usability challenges. For policymakers, banks, and fintech innovators, the task is not merely to promote blockchain adoption but to embed it into a financial ecosystem where trust, simplicity, and clear governance transform awareness into meaningful and inclusive use.

Conclusion

This study makes a notable contribution to understanding the adoption of blockchain in the context of Nigerian commercial banking, giving valuable insights into the specific challenges and opportunities within this market. The study's places emphasis on closing the regional gap in blockchain adoption studies, specifically in the Nigerian context, is one of its main contributions. This study highlights the specific obstacles and incentives experienced by Nigerian banking consumers, as most of the studies currently in publication focus on international or Asian markets. The results highlight the fast need to improve knowledge of blockchain technology because a significant percentage of respondents (38.3%) still do not know its uses and advantages, which reduces adoption. In addition, by establishing a relationship between fintech engagement and blockchain adoption, the study provides a new viewpoint on how these technologies work in tandem inside digital banking ecosystems. This study reveals how blockchain can be integrated with the current finance services to enhance consumer experiences, in contrast to earlier research that regarded blockchain as a stand-alone technology.

The study also measures how speed, transparency, decentralisation, and security affect customer satisfaction and concludes that in Nigeria these two characteristics have the greatest effect. These observations are necessary to guide future blockchain integration tactics, especially in emerging markets. The study also identifies relevant obstacles to adoption, especially those related to trust and complexity, which have received less attention in the literature to date. To enhance blockchain adoption in Nigeria's commercial banking industry, it will be important to address these obstacles through user education and regulatory regulation.

In conclusion, blockchain technology can improve consumer satisfaction and help fintech services in Nigeria, but its full potential has not yet been realised. Blockchain adoption and fintech participation go hand in hand, according to this study, but it has not yet had an important effect on traditional measures of financial inclusion such as mobile banking usage or rural residents' access to banking services. This shows that despite its importance, blockchain technology does not currently solve the fundamental barriers to financial inclusion, particularly in underserved regions where the banking infrastructure is sparse.

These findings have significant regulatory implications for Nigeria's Central Bank and fintech policy makers. To encourage inclusive and safe blockchain innovation, there is a need for more defined regulatory structures, robust data, governance protocols, and adaptable financial legislation that encourage blockchain adoption while managing associated risks to cybercrime, volatility, and consumer protection.

Additionally, while this study sheds light on the general awareness and use of blockchains, more study and analysis examining blockchain awareness in relation to socio-demographic factors such as age, occupation, and education level could provide critical insights. Identifying the groups most aware and engaged with blockchain can help policymakers and fintech companies target their awareness campaigns more effectively. For example, knowing whether younger populations, tech-sector employees, or users in urban areas are driving adoption could shape customised strategies for outreach and education.

Therefore, Nigerian banks and policy makers should prioritise blockchain education, make its interface simple for users, and strengthen trust through advanced security protocols and transaction transparency. Without fixing these

foundational obstacles, the promise of blockchain to improve financial inclusion and customer satisfaction will remain unrealized. In addition, future research should explore the effects of blockchain adoption on financial inclusion, particularly in rural and underserved areas in the long-term, to evaluate the potential transformative impact of blockchain technology in expanding access to financial services.

Although this study provides a clear picture of blockchain awareness and satisfaction in Lagos, it is important to acknowledge several methodological limitations. The study used a cross-sectional design, capturing participants' views at one point in time, which makes it difficult to identify cause-and-effect relationships or changes in behavior over a period. In addition, because the respondents were reached online and through banking networks, the sample may lean toward urban, bank-connected users. Such people already have access to digital tools and are, therefore, digitally active. As a result, the findings may not fully represent experiences in rural areas or among financially excluded groups. Future studies using longitudinal designs or mixed-methods approach in different regions could potentially allow for a more comprehensive view of how the adoption of blockchain evolves and impacts financial inclusion over time.

As blockchain continues to develop, the Nigerian banking sector's must proactively harness its importance while fixing the limitations identified in this study, which will effectively contribute to a more efficient, inclusive, and secure financial ecosystem. This research contributes to the already growing body of knowledge on blockchain adoption in developing economies by providing a description of how the technology complements existing fintech solutions and by presenting applicable knowledge and insights to overcome barriers to adoption [see also: 18–25].

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