

ASSESSMENT OF THE IMPACT OF ISLAMIC AGENCY BANKING ON FINANCIAL INCLUSION IN MAIDUGURI METROPOLIS BORNO STATE, NIGERIA

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Abstract

This study examines the impact of Islamic Agency Banking (IAB) on financial inclusion in Maiduguri Metropolis, Borno State, Nigeria. Using a descriptive survey research design, primary data were collected from 383 bank customers through structured closed-ended questionnaires. The data were analyzed using the Multinomial Logistic Regression (MNL) technique to assess the multidimensional effects of IAB on financial inclusion indicators. The findings reveal that Islamic Agency Banking has significantly enhanced financial inclusion, particularly through expanded geographical coverage and improved security measures. Geographical coverage increased the likelihood of account ownership and improved service quality by 107% and 95%, respectively, while enhanced security reduced service complaints by 62.5%. However, liquidity demonstrated mixed effects, positively influencing service quality by 18% but decreasing the likelihood of account opening by 32%. This study contributes to the literature by addressing the limited evidence on the relationship between Islamic Agency Banking and financial inclusion in crisis-prone areas, a context that has received far less attention than countries in the Middle East, North Africa, and Asia. Methodologically, it introduces the application of Multinomial Logistic Regression to capture multidimensional outcomes, offering an alternative to the conventional use of least squares, binary, and thematic approaches. Furthermore, the study shifts the focus from conventional agency banking to Islamic Agency Banking, providing novel insights into how Shariah-compliant financial structures can promote financial inclusion. The findings offer valuable implications for policymakers and managers of Islamic financial institutions in designing effective strategies to reduce financial exclusion and expand access to financial services.

Keywords: agency banking; Islamic agency banking; financial inclusion; borno state

A. INTRODUCTION

Globally, the role of banks in any economy cannot be over emphasized, giving the pivotal roles they play in mobilizing funds from the surplus units and channel same to the deficit units. Banks especially the conventional types have been popular owing to their long history of existence and have been on the forefront in the discharge of these intermediation services. By so doing, they deal on interest, highly debt structured with little or no ethics on their transactions. However, among factors that have

accounted and sustained this popularity overtime, has been the increasing demand for loanable funds from these conventional banks for private and public investment arising from the exponential growth in the world population. According to World Bank (2023), there exists a total world population of about 7.951 billion as at 2022, with a bank penetration of 13% branches per 100,000 adults (International Monetary Fund, [IMF], 2018). This is considered inadequate to provide the needed financial services despite the number of conventional banks globally, which stood at 10,173 [Integrated Ballistics Identification System (IBIS) World, 2024]; hence a challenge to the financial inclusion drive.

Subsequently, out of the estimated global population of 7.951 billion, about 2 billion are Muslims out of which approximately 1.1 million earn less than US 2 Dollars per day (below US 1.96 Dollars poverty line) and 72 per cent either do not have access to formal financial services (Honohon, 2007; Karim, Tarazi, & Reille, 2008) or patronize the conventional banking system due to religious reasons and other factors such as little or irregular income, access to bank institutional exclusion, unemployment and cost of banking (Enhancing Financial Innovative and Access [EFInA] report, 2023). This religious factor stems from the fact that interest, which is the sole driver of such a banking system, is strictly prohibited in Islam (e.g., Q2:275 & 278) and Christianity (i.e., Luke 6:34-35, Psalm 15:5, Deuteronomy 23:19). However, the flaws of the conventional banking system were brought to the fore during the global financial crises of 2007/2008 because of its inability to deal with shocks. This was among other reasons that intensified the need for an alternative banking system called Islamic banking world over, even in non-Muslim countries such as the United Kingdom (UK) and United States of America (USA) because it was able to showcase its resilience to the global shock as evident in the Middle East and Asian countries.

This was a system that was first experimented by a renowned economist, Ahmad El-Naggar, in 1963 when the Mit Ghamr Savings Bank in the Northern Delta region of the Nile in Egypt was established and within the same year, the *Lembaga Tabung Haji* in Malaysia was set up; followed by the Cooperative Bank in Pakistan in 1965 (Laldin, 2008; Abdullahi, 2010; Humayon, 2015). Similarly, the Islamic Development Bank (IDB) in Saudi Arabia, Faisal Islamic Bank in Egypt and Sudan were established in 1975 and 1977, respectively. As at 2021, there are about 1,679 Islamic financial institutions (IFI's) globally, out of which 566 comprises of Islamic banks and windows in over 74 countries with a total asset of about USD2.765 Trillion, representing 69% of the total *Shari'ah* compliant asset of about USD4.0 Trillion (Islamic Corporation for Development [ICD], 2022).

In the Nigerian economy, financial activities are characterized with the conventional banking system since pre-independence era. The country has 26 commercial banks (Central Bank of Nigeria, 2024) to serve the financial needs of an adult population of 111 million (18+) out of which over 53.5 per cent are Muslims (EFInA, 2023; Statistica, 2021a). The number of these banks are grossly inadequate to meet the financial service demand, because commercial banks penetration is low as it was 4.45 and 4.28 bank branches per 100,000 adults in 2020 and 2021 respectively, which is still below the target of 7.6 bank branches per 100,000 adults in 2020 (National Financial Inclusion Strategy [NFIS], 2018; World Bank, 2022).

Different strategies have been implemented over the years among which include: the introduction of rural banking scheme (1977), People's Bank (1989) The National Microfinance policy (2005), Introduction of a comprehensive non-interest banks framework (2011) among others. Although, previous strategies yielded marginal successes towards achieving the desired results in relation to economic growth, access to credit and financial inclusion, ATM as a strategy was further employed, but its performance was low because in 2011 and 2016, it stood at 11.8 and 17.5 ATMs per 100,000 adults as against a target of 203 ATMs per 100,000 adults in 2020 (NFIS, 2018). Subsequently, the agency banking was launched in 2013 as a way of tackling these issues but it was still conventional in nature which is beclouded with the earlier issues identified with the conventional interest-based banking system.

Consequently, this revealed that the overhauling of the financial sector so far is yet to achieve the desired economic growth and development. This is evident in the high level of financial exclusion rate especially in Northern Nigeria. The Enhancing Financial Innovative and Access [EFInA] (2023), indicates that 26.0 per cent of adult Nigerians (18+) are financially excluded, which translates to 28.9 million adults in 2023. This invariably implies that 76 per cent against a target of 95 per cent in 2024 are financially included. The North East region, has an adult population of about 12.3 million adults (18+) as at 2019, out of which 64 per cent are between the ages of 18-35years while 85 per cent are from the rural areas (EFInA, 2019). The region has among the highest rate of financially excluded persons of about 38 per cent (Enhancing Financial Innovation and Access [EFInA], 2023).

Specifically, Borno state, has a financial inclusion rate of 51 per cent (formal and informal), leaving 49 per cent of its 2.8 million adults financially excluded (EFInA, 2019). This represents one of the highest exclusion rates in Nigeria's North-East region. This problem is exacerbated by limited physical access to financial institutions, as it takes an average of 15-20km to have access to a bank branch in the state (CBN, 2013; Mallum & Musti, 2019). The situation is further worsened by the lingering effects of prolonged insurgency which has disrupted economic activities and infrastructure. Financial exclusion in the state has severe consequences as it weakens economic resilience, deepens inequality, raises the cost of doing business, stifles growth and perpetuates poverty, particularly restricting access to credit, a critical driver of entrepreneurship and job creation (Salgotra *et al.* 2021; Gulani *et al.*, 2021). Given these challenges, expanding financial access is critical to boosting inclusion, through agency banking (Mallum & Musti, 2019; Gulani *et al.*, 2021). Islamic agency banking, a *Shari'ah* variant of agency banking introduced by Jaiz Bank and Taj Bank plc to address these gaps. This is a form of branchless banking which provides financial access services in the MSME sector and society unbanked through cooperation from third parties or bank representatives as bank agents in accordance with the primary purpose of *Shari'ah* banking which is adopted to *Maqasid Shari'ah* or welfare for the community (Hana and Mustaqim, 2023). However, it's impact remains understudied. Thus, this study seeks to answer the following question: To what extent has the activities of Islamic agency banking enhanced financial inclusion, employment, and wealth creation, particularly in Maiduguri metropolis of Borno state?

However, existing studies on Islamic agency banking such as Santoso and Ahmad (2016), Yudiana (2018), Al Arif and Cahyani (2021), Sabani and Ishak (2023), Asas and Muhydin (2024), Ashraf, Amir and Osman (2025) among others, have been predominantly carried out within specific geographical context such as Middle Eastern and North African countries, Asian Countries. Their findings may not adequately reflect the context of Nigeria, particularly in a conflict affected area such as Maiduguri, Borno state. Also, these studies have explored theoretical and operational dimensions of Islamic branchless banking or Islamic agency banking but, critical gaps remain in examining its multidimensional socioeconomic impact.

Furthermore, methodological limitations are evident in prior studies (i.e., Ismail, 2010; Kustina *et al* ,2019; Shakya 2022; Bashir, *et al* 2020; Abdullahi, Malik-Abdul Majid and Fakunmoju 2020; Alrawahdeh and Zyadat, 2021; Al Arif and Cahyani ,2021; Sabiu and Abduh, 2021; Asas and Muhydin, 2024; Ashraf, Amir and Osman, 2025) as they mostly employed Difference in Difference (DID) model, Path analysis, Thematic analysis, Binary, Multiple and Panel regression techniques without accounting for multiple outcome cases through approaches such as multinomial logistic regression. Therefore, it is against these identified gaps that necessitate the need for this study.

B. LITERATURE REVIEW

In Asian region, Ferdous *et al* (2015), Sohrab and Idris (2016), Banerjee *et al*. (2017), Nawaz (2018), Fahim (2020), Nisha *et al* (2021), Bangladesh Bank (2021), Kabir *et al* (2024), Ashraf, Amir and Osman (2025) stressed that agency banking is a critical driver of financial inclusion within their respective study area. However, this finding is limited to MENA countries as such serves as a constrain to generalisation to suite the Maiduguri context. Similarly, outcome is evident in Indonesia, particularly, the works of Santoso and Ahmad (2016), Yudiana (2018) which concluded that the development of branchless banking model in Indonesia especially in sharia banking enhance financial inclusion. State-specific gap is evident from these studies which necessitate the need for a local study. In Nepal, Mahato and Goet (2021) investigates the impact of Agency banking on financial inclusion with focus on Nepalese Commercial Bank stressed that Agency-POS banking, Mobile banking and Internet banking affect financial inclusion, whereas ATM banking has little influence over financial Inclusion. In other words, they all have a positive relationship, and their p-values were less than 5 per cent. This outcome also is consistent with Shakya (2022), reveals that geographical coverage, security, liquidity, cost and technology had a statistically significant positive effect on financial inclusion. On the contrary Sabani and Ishak (2023) while utilizing a qualitative analysis reveal that adoption of Islamic branchless banking is more suitable, particularly when integrates technology that aligns the local culture and local collaboration is required, thereby reaching out widely in the community of the unbanked individuals

In another related study, Asas and Muhydin (2024) affirms that agency banking services are viewed as positively due to their convenience, as they provide easy access to banking services without requiring to travel long distances to a physical branch, thereby saving time and money. On the other hand, security and privacy as the major concerns as such branchless banking in accordance with the *Shari'ah*

principles is generally acceptable as it promotes financial inclusion which aligns with the Islamic emphasis on promoting welfare and mutual benefit.

In Malaysia, studies by Bank Negara Malaysia (2016), World Bank (2017) in their report confirm that agent banking has significantly reduced financial exclusion in Malaysia as it ensures access to financial services. Also, studies were conducted in India which Nazar (2017), concluded that Islamic banking will drive financial Inclusion especially access to credit components of financial exclusion. Likewise, across Middle Eastern and North Africa region, Akhter, *et al* (2019) revealed that Islamic banking is significantly contributing to the demand side of financial Inclusion, especially on the borrowers' side or the users of banks financing. Khmous and Mustapha (2020) concluded that Islamic banking significantly affects financial Inclusion, especially in middle-income MENA countries. Also, in Organization of Islamic Cooperation (OIC) countries, Naceur *et al.* (2015), in their study on member nations as to whether or not Islamic banking can increase financial inclusion. Accordingly, the study reveals that among the indicators of financial inclusion, physical access to financial services witnessed significant growth, whereas the use of these services recorded low performance because the share of excluded individuals for not using bank accounts due to religious reasons was significant. Additionally, the study establishes a positive connection between Islamic banking and the provision of credit to households and firms to finance investment, but it is weak. In Kenya, Barasa (2013) reveals that geographical coverage is cogent towards achieving financial inclusion, and agency banking brought a full bouquet of access to financial services to unbanked persons, especially in rural settings. This aligns with Kipngetich (2013) but on the contrary with Munoru (2013) that discovered that the relationship between agency banking and financial inclusion was positive but statistically insignificant, and neither a unidirectional nor bi-directional relationship exists among the variables.

Moreso, Muasya and Kerongo (2015) using descriptive and product moment correlation analysis reveals that financial awareness, cost of service and bills payments among the rural dwellers of Kilindini have a positive relationship with financial access. This aligns with Afande and Mbugua (2015) that geographical coverage, security, liquidity and cost were all significant and positively related to financial inclusion. Similarly, Juddie, *et al* (2016) stress that agency banking plays an influential role in the convergence of various banking and non-banking stakeholders to provide financial services to consumers because they were an increase in the number of touch points that provide financial services. This finding confirms with Ragui (2019), which revealed that alternative banking channels such as automated teller machines (ATMs), Mobile Banking, Agency banking and Internet banking recorded a positive relationship to the financial Inclusion of women entrepreneurs.

Ojwang and Otunga (2019), in their study conducted in Kenya reveals that financial inclusion is positively related to agency banking performance, implying that a unit change in financial inclusion, result in 0.456 performance of equity agency banking performance. This is related to Dimbia and Wanjohi (2023) using descriptive statistics and multiple regression analysis reveals that with agency banking, time saved, serving hours is increased, and its convenience to all, thereby help to increase financial inclusion, whereas transaction costs do not. Thus, concludes a favourable relationship

between agent banking and financial inclusion in the studied area which aligns with Bizah *et al* (2017), that stress that agent banking had demonstrated its potential as a propeller of financial inclusion in Zimbabwe. In another related study by Mukorera (2018), on the role of agent banking in promoting financial inclusion shows that agent banking is beneficial in aspects of convenience and reduced costs as such this has invariably promoted financial inclusion taking into play the geographical coverage of these agents both in rural and urban areas. This outcome is a departure from another study by Hawkins (2012) carried out in South Africa, that stress that agency banking is a necessary but not a sufficient condition to improve financial inclusion.

Similarly, in Tanzania, Lotto (2015) examine the role of agency banking in promoting financial inclusion and reveals that agency banking had made access to financial access easier due to service touch points' availability. In addition, the study found that liquidity issues among agents have been minimized due to proper monitoring from the parent banks. The study concluded that larger geographical coverage made by agent banking is a stronger pointer to promote financial inclusion, therefore deepening financial inclusion. This is in tandem with Wilson and Hope (2024) in Uganda, explored the relationship between agency banking and financial inclusion in Lira District, Uganda, using a descriptive, correlational, and cross-sectional research design found that there is a statistically significant positive correlations between agency banking activities and financial inclusion. In Nigeria, Achugamonu (2017), using Multivariate regression finds that there is a positive relationship between agency banking service and financial inclusion particularly its geographical coverage were the strongest predictors. Contrarily, in another study in Jos by Kingsley *et al* (2019), stressed that the relationship between agency banking and financial inclusion is positive but weak. More so, cybercrime and the reduction of the cost of banking have a negative relationship to inclusion, whereas geographical coverage and illiquidity have a positive relationship, but they are not significant to inclusion. Despite, the outcome from these studies, they are conventionally biased and due to country and state specific peculiarities, their outcome cannot generalize to the context of Borno state.

Abdullahi *et al* (2020), in a study in Kwara State, Nigeria, used the Tobit regression model reveals that bank innovation strategy, geographical coverage strategy, and technological advancement strategy significantly affect financial inclusion in rural areas. The is related to a study in North East Nigeria, by Bashir *et al* (2020), revealed that agency banking spread, product, promotion, and license have a positive influence on financial Inclusion. Similarly, this outcome further confirms with Inegbedion *et al* (2022), that stressed that banking penetration and entrepreneurship creation has a positive relationship, so also financial products/services and usage of banking services. Consequently, these studies created a limitation in the literature particularly in the context of state specific percularities and it does not consider the Islamic variant of agency banking.

Additionally, in Benin city Idolor and Omehe (2022) employs ANOVA and linear regression to investigate the effect of agent banking, mobile money operators on financial inclusion. They found that cybercrime and cost of service have a negative relationship to financial inclusion whereas geographical coverage and liquidity have a

positive relationship but insignificant to financial inclusion. This outcome further aligns with Idoko and Chukwu (2022), that reveals that agency banking possesses a positive and significant relationship to savings consciousness and financial literacy which invariably impacted on financial inclusion. However, the method employed by these studies did not consider the multiple outcomes inherent in the concept of financial inclusion and also their works are biased to conventional agency banking. Agbor *et al* (2023) conduct a study in Cross River using chi-square and multiple regression analysis to explore the impact of agent banking policy on financial inclusion among rural unbanked populations, utilizing a purposive sample of bank marketers, stress that POS terminals in rural regions did not significantly boost the number of rural residents opening new bank accounts instead it was beneficial in money transfers and cash deposits in remote locations. This finding contradicts the works of Quadri *et al* (2024), that investigate the supply-side of the relationship between agent banking, mobile money operators, and financial inclusion in Nigeria, which concludes that POS and mobile money operations had a considerable positive influence on financial inclusion, whereas online and internet banking have the opposite effect. However, these studies are skewed to conventional agency banking as such its findings cannot be generalize to conflict prone areas such as Borno state.

From previous studies, such as those conducted by Santoso and Ahmad (2016), Palaon et al., (2020), Yuiana (2018), Sabani and Ishak (2023), Asas and Muhydin (2024), Ashraf, Amir and Osman (2025) among others, have primarily focused on Middle Eastern, North African and Asian countries. Considering the countryside effect, the result or outcome obtained from these studies may not be possibly generalized to Nigerian context, specifically Maiduguri Metropolis Borno state. Moreover, existing studies (e.g., Santoso and Ahmad, 2016; Palaon et al., 2020; Yuiana, 2018; Al Arif and Cahyani, 2021; Sabani and Ishak, 2023.; Asas and Muhydin, 2024, Ashraf, Amir and Osman, 2025) have largely examined: the readiness of *Sharia* banking in implementing *Shari'ah* branchless banking, the opportunities and challenges of implementing branchless banking in *Shari'ah* banking, transformation of Islamic Banking Branchless based on local culture and its impact on financial inclusion. However, few studies have explored the impact of Islamic agency banking on financial inclusion in a conflict zone area like Borno state. Additionally, most reviewed studies (e.g., Ismail, 2010; Kustina *et al*, 2019; Shakya 2022; Bashir, *et al* 2020; Abdullahi, Malik-Abdul Majid and Fakunmoju 2020; Alrawahdeh and Zyadat, 2021; Al Arif and Cahyani, 2021; Sabiu and Abduh, 2021; Asas and Muhydin, 2024; Ashraf, Amir and Osman, 2025) have employed methodologies such as Difference in Difference (DID) model, Path analysis, Thematic analysis, Binary, Multiple and Panel regression models in their analysis, This creates a methodology gap as few, (if any), of the prior research explicitly used model with more than two outcome categories in the likelihood estimation of the parameters and variance, such as multinomial logistic regression. Given these gaps, that necessitate the need for this study.

C. METHOD

1. Research design and Data

Descriptive survey research design was employed for this study as buttressed by previous studies (Santoso and Ahmad, 2016; Shakya, 2022; Bashir et al., 2021; Ashraf, Amir and Osman, 2025). This design is considered appropriate because it combines both qualitative and quantitative data to provide relevant and accurate information. The study majorly utilizes the primary source of data. The data source was facilitated by using questionnaire instrument administered to Bank customers in the study area.

2. Population and Sample

The population of the study captures Bank customers. The Bank customers are represented by all users of IAB operators' services not just users (customers) of the specific bank operating the agents (Mbiti & Weil, 2011; Kumar & Muhota, 2012). This approach was justified because IAB operators provides financial services to all users, irrespective of bank and to provide a more comprehensive and robust understanding of the impact of IAB on financial inclusion. Therefore, the population of bank customer in the study area stood at estimated at 214,863 (NPC, 2006; EFINA, 2023; World Bank, 2023; Statistica, 2023; and Author Computation, 2024). Purposive sampling was utilized in selecting the population in the study area, it was justified due to its strategic location or importance in terms of population size and commercial hubs or activities in the state.

Krejcie and Morgan's (1970) sample size determination was employed as shown in equation 1

$$S = \frac{X^2 NP (1-P)}{e^2 (N-1) + X^2 P (1-P)} \quad (1)$$

S = required sample size; X^2 = the table value of chi-square for 1 degree of freedom at a 95% confidence level (3.841); N = the population size; P = the population proportion (assumed to be .50 since this would provide the maximum sample size); e = Margin error (0.05 or 5%)

Substituting the 214,863 into Equation (1), the sample size is 383.5, which is approximately 384

Subsequently, convenience or snowball sampling was used for administering questionnaire to the bank customers. To ensure that the seven (7) administrative district (Waziri, 2012) is adequately represented without biasness, the study further employs proportionate sampling. This is to ensure that the questionnaire is distributed in proportion to the relative size of each district as thus; Bolori (56), Gwange (35), Galtimari (61), Maisandari (101), Maiduwuri (62), Shehuri (47) and Yerwa (22).

Closed-ended structured questionnaires was the primary instrument for data collection. The questionnaires were distributed to bank customers. This procedure was facilitated by the usage of Kobo toolbox. The collection of the data was done

offline by the research team so that by end of day, all the data obtained were uploaded to the sever for easy retrieval by the researcher.

3. Data Analysis

The study employed Descriptive Statistics and Multinomial Logistic Regression (MNLr). The MNLr model is used to predict a nominal dependent variable given one or more explanatory or independent variables which can be nominal or continuous (Mohammed, 2022). Couple with the fact that it is robust to violations of the assumptions of multivariate normality, and equal variance-covariance matrices across groups (Tabachnick, 2001). Also, it gives parameters estimates that are efficient, consistent and produce a statistically good result.

4. Model Specification

To achieve this objective of this paper, financial inclusion is the dependent variable while agency banking is to serve as the independent variables. Since multinomial regression model was adopted, the categorical outcome for financial inclusion (Y_i) being the polytomous dependent variable include account ownership, account usage and quality product or services [Alliance for Financial Inclusion, 2012 & World Bank, 2015] whereas the independent or explanatory variables comprises of geographical coverage (GeC), liquidity (LiQ), security (SeC) cost of service (CoS) and technology (TeC) as modified from the works of (Akighir *et al*, 2022; Shakya, 2022). Based on this, the functional relationship for the model is summarized as thus:

$$FI = f(GeC, LiQ, SeC, CoS, TeC, ExP) \quad (3.3)$$

Equation 3.3 can be further written in an econometric form as thus

$$Y_i = \alpha_0 + \beta_1 GeC + \beta_2 LiQ + \beta_3 SeC + \beta_4 CoS + \beta_5 TeC + \beta_6 ExP \quad (3.4)$$

Consequently, in order to specify equation 3.4 in MNLr model, the possible categorical outcome of Y_i (Financial inclusion) was coded as; account ownership (AcO), account usage (AcU) and quality of product or services (QpS). Therefore, account usage (AcU) was considered as the reference variable because it is the categorical variable or outcomes with the highest frequency (El-habil, 2022). Subsequently, since the multilevel categorical outcome variables for Y_i are three (3), then the required MNLr equation are 2 due to ($i - 1$) where $i = 3$. Therefore, the MNLr equation can be specify as thus:

$$\ln \left[\frac{Pr(AcO)}{Pr(AcU)} \right] = \alpha_{0,1} + \beta_{1,1} GeC_1 + \beta_{2,1} LiQ_2 + \beta_{3,1} SeC_3 + \beta_{4,1} CoS_4 + \beta_{5,1} TeC_5 + \beta_{6,1} ExP_6 \dots (3.5)$$

$$\ln \left[\frac{Pr(QpS)}{Pr(AcU)} \right] = \alpha_{0,2} + \beta_{1,2} GeC_1 + \beta_{2,2} LiQ_2 + \beta_{3,2} SeC_3 + \beta_{4,2} CoS_4 + \beta_{5,2} TeC_5 + \beta_{6,2} ExP_6 \dots (3.6)$$

Where:

$\frac{\Pr(AcO)}{\Pr(AcU)}$: Relative odds ratio of account ownership (AcO) in respect to account usage (AcU)

$\frac{\Pr(QpS)}{\Pr(AcU)}$: Relative odds ratio of quality product or services (QpS) in respect to account usage (AcU)

GeC: Geographical Coverage ; LiQ: Liquidity; SeE: Security; CoS: Cost of Service; TeC: Technology; ExP: Experience; AcO: Account Ownership; AcU: Account Usage: (Frequency of account usage in terms of deposit, transfers, withdrawals etc); QpS: Quality Product or Services β_0 : Constant; $\beta_1, \beta_2, \beta_6$: Coefficient of the parameter estimate > 0 and $\beta_3, \beta_4, \beta_5 < 0$

Table 1. Variable Definition and Measurement

Variables	Symbols	Measurements	Nature of Variables/ Aprior Expectations	Source
Geographical Coverage	GeC	Distance in Mins to IAB operator outlet	Independent variable (+ve)	Akighir <i>et al</i> , 2022; Shakya, 2022
Liquidity	LiQ	Average daily amount of cash available in Naira- ₦	Independent variable (+ve)	Akighir <i>et al</i> , 2022; Shakya, 2022
Security	SeC	Number of thefts recorded monthly	Independent variable (-ve)	Akighir <i>et al</i> , 2022; Shakya, 2022
Cost of Service	CoS	Average amount of fee per transaction in Naira- ₦	Independent variable (-ve)	Sultana, Rapti & Fahria, n.d; Akighir <i>et al</i> , 2022; Shakya, 2022
Technology	TeC	Number of network downtime daily	Independent variable (-ve)	Sultana, Rapti & Fahria, n.d; Akighir <i>et al</i> , 2022; Shakya, 2022
Experience	ExP	Number of years in operations	Independent variable (+ve)	Sultana, Rapti & Fahria, n.d

Account Ownership	AcO	Number of accounts opened by Household through IAB operators	Dependent variable	Alliance for Financial Inclusion, 2012 & World Bank, 2015
Account Usage	AcU	Frequency of account usage in terms of deposit, transfers, withdrawals etc	Dependent variable	Alliance for Financial Inclusion, 2012 & World Bank, 2015
Quality Product or Services	QpS	Frequency Compliant	Dependent variable	Alliance for Financial Inclusion, 2012 & World Bank, 2015

Note (s): This table presents variables utilized in the current study

Sources (s): Tables created by authors

The post-estimation test conducted include Goodness of Fit Test (i.e., Likelihood Test, Wald Test), Multicollinearity Test and Model Fit Evaluation. i.e., Pseudo R-Squared (Abd Aziz *et al*, 2016).

D. RESULT AND DISCUSSION

1. Response rate

Out of the 384 questionnaires administered, 381 were successfully retrieved, with a return rate of 99.2%. This is considered acceptable due to greater representation, reliability and validity which aligns with Frankel and Wallen (2004), that a response rate above 95% is considered valid to represent the population.

2. Background Information of Respondents

The study shows that majority of the respondents are male (76.38%) representing 291 respondents are male while 90 respondents representing 23.62% are female. This is attributed to the fact that most of the female's transactions are mostly consummated by their husbands or proxies despite having their accounts. In addition, the females do prefer to save funds through golds and other precious materials due to its appreciative nature.

Looking at the age of the respondents, it reveals that majority of the respondents are between the ages of 21-30 years and 31-40 years. In other words, it implies that they are between 21- 40 years of age. This depicts the fact that a large proportion of the bank customers in study area are within the working age, and this age bracket are tech friendly hence, their appetite for real time-online banking system is high. So also, majority of the bank customers are married. This is largely attributed to the religion and culture of the people in the study area as they marry in their early age.

Additionally, on their level of qualification, the majority of the respondents are GCE/SSCE (21.52%) and OND/NCE holders (18.11%). This means that majority of the bank customer has the minimum required level of educational qualification, thus they can read and write which further means that they are literate to furnish the researcher with vital information to aid the study. In a similar vein, the occupation of the respondents shows that 13.65% which represents 52 respondents are civil servants, 35.70% represents 121 are traders, which are considered as the majority. Therefore, with such a background, they have experience of financial dealings, hence, making them fit to assist the researcher with information on the theme.

Considering the working experience of the respondents, 121(31.76%) are within the age of 0-3years, 26.25% having business or working experience between 4-8years, are the majority. This informs the fact that most of the respondents in the study area possessed reasonable working experience between 0-8 years in business of trade and civil service thus, are relevant to provide information as it pertains the study. On the other hand, 31.50% which accounts for 120 respondents have monthly income of less than ₦30,000, 33.07% that constitute 126 respondents earn monthly income between ₦30,001- ₦60,000. This earning is below the national minimum wage, thus implies that they are mostly low-income earners.

Furthermore, on the respondents' house distance (time) to the nearest IAB operators, 17.59% of the respondents' stress that it took less than 2mins, 30.97% opted that it takes within 3-5mins while 15.75% and 35.70% stress that it took 6-8mins and above 8mins to reach the nearest IAB operators. On aggregate, it takes between 1-8mins to reach the nearest IAB operators. This further depicts that there is an improvement to access to financial services when compared to visiting a physical bank branch to consummate transactions. While on the average fee per transaction, majority of the respondents pays between ₦1- ₦100 which is relatively less when compared to the cost of visiting a physical branch in the study area. This further aligns with the previous findings that shows that majority of the respondents are low-income individuals, thus their low cost per transaction.

3. Contribution of Islamic Agency Banking on Financial Inclusion Indicators in Maiduguri Metropolis

This sub-section addresses the contribution of Islamic Agency Banking on financial inclusion in the study area with focus on its indicators such as account ownership, usage and quality of products or services.

Table 2. Contribution of IAB Operators on Financial Inclusion Indicators

Financial Inclusion Indicators	Frequency	Responses No. of Account (s)	Frequency	Percentage
Account Ownership	107	0 - 1 account	36	9.45
		2 - 3 accounts	54	14.17
		4 - 5 accounts	13	3.41
		Above 5 accounts	04	1.05

Account Usage	195	Frequency of Account Usage	
		Daily	77 20.21
		Weekly	55 14.44
		Monthly	15 3.94
		Rarely	48 12.60
Quality of products or services	79	Frequency of Complain	
		Frequently	28 7.35
		Never	19 4.99
		Occasionally	18 4.72
		Rarely	14 3.41

Source: Field Survey, 2024

Table 2, shows the contribution of IAB operators to financial inclusion. 107 of the respondents which represents 28% stress that IAB operators have contributed to access to financial services through number of accounts opened. It further reveals that 9.45% opened 0-1 accounts, 14.17% opted for 2-3 accounts while 3.41% and 1.05% opened 4-5 accounts and above 5 accounts within the proportion of bank customers. This implies that majority of the respondents have opened 2-3 accounts with IAB operators. More so, 195 (51%) respondents opted for usage of financial services specifically as 20.21% within its proportion opted for daily usage, 14.44% opted on the weekly basis while 3.94% and 12.60% opted for monthly and rarely basis for account usage frequency. This outcome indicates that majority of the respondents opted for daily usage of the financial services, invariably implying increase in financial services patronage.

In addition, 79 of the respondents representing 21% opted for quality of product or services offered by IAB operators with less complains, which means that the IAB operators services met the customer's demand. Overall, IAB operators has significantly contributed to financial inclusion particularly in the area of account usage in terms of cash deposits, cash withdrawals, transfers and number of accounts opened. This is a clear indication that IAB operators has brought financial services closer to the people in the study area, thus arousing their appetite to patronize banking services.

4. Multinomial logistics regression result

This sub-section captures the parameter estimates of the MNL on the impact of Islamic Agency Banking on Financial Inclusion in the Maiduguri Metropolis, Borno State.

Table 3. Model I Parameter Estimates of Islamic Agency Banking & Financial Inclusion

Financial Inclusion ^a		B	Std. Error	Wald	Df	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
								Lower Bound	Upper Bound
AcO	Intercept	-2.727	.886	9.482	1	.002			
	GeC	.730	.159	21.066	1	.000	2.075	1.519	2.834
	LiQ	-.404	.138	8.514	1	.004	.668	.509	.876
	SeC	.058	.235	.060	1	.806	1.059	.669	1.678
	CoS	-.066	.126	.271	1	.602	.936	.731	1.200
	TeC	.178	.227	.618	1	.432	1.195	.766	1.864
	ExP	.355	.199	3.174	1	.075	1.426	.965	2.107
QpS	Intercept	-3.279	1.006	10.629	1	.001			
	GeC	.669	.171	15.311	1	.000	1.952	1.396	2.730
	LiQ	.170	.147	1.338	1	.247	1.186	.888	1.583
	SeC	-.982	.343	8.203	1	.004	.375	.191	.734
	CoS	-.146	.140	1.082	1	.298	.864	.657	1.137
	TeC	.421	.219	3.683	1	.055	1.524	.991	2.342
	ExP	.325	.209	2.405	1	.121	1.384	.918	2.087

Source: SPSS, 20 Version Output (2024)
category is: AcU.

a. The reference

a. Account Ownership

Regarding the MNL outcome in Table 3, the first component focuses on the impact of Islamic agency banking on financial inclusion through account ownership (i.e., number of accounts). The geographical coverage of IAB operators (GeC) has a positive coefficient of 0.730 with a p-value of 0.000, indicating that it is statistically significant. This means that for every additional unit of coverage improvement (i.e., less time taken), increases the odds of account ownership by 2.075 times (Exp(B) = 2.075). In practical terms, expanding coverage implies that more people can access financial services, thereby reducing barriers to account ownership or opening. This is consistent with *a priori* expectation and previous studies of Lotto (2015), Afande and Mbugua (2015), Achugamonu (2017), Abdullahi *et al* (2020), Idolor and Omehe (2022), Shakya (2022) and Kabir *et al* (2024).

Liquidity (LiQ) shows a negative relationship, with a coefficient of -0.404 and a p-value of 0.004 (less than 5%), indicating that the predictor is statistically

significant. This implies that a naira (₦) increase in IAB operators' liquidity, decreases the odds of account ownership by 32%. This is contrary to *apriori* expectation and previous works of Afande and Mbugua (2015) and Idolor and Omehe (2022). By extension, this outcome implies that with greater liquidity, IAB operators focus on transactions that are driven by the pattern of customer demand (cash needs) rather than account opening, due to the fees or commissions they stand to gain. This suggests that cash availability might not be as critical for opening accounts compared to other factors such as customer awareness, perceived benefits of account ownership or ease of the account opening process.

Security (SeC) has a coefficient of 0.058 with a p-value of 0.806, indicating that the predictor has a statistically insignificant positive relationship with account ownership. In other words, it means that higher security (i.e., fewer thefts) increases the likelihood of account opening by 6%. The direction of the coefficient contradicts *apriori* expectation and confirms with existing study of Afande and Mbugua (2015). This further suggests that security is not a significant barrier to account ownership in the study area. Other factors, such as socioeconomic status, educational level, and financial literacy, are more influential in determining account ownership.

Cost of Service (CoS), proxied by the fee paid per transaction, has a coefficient of -0.066 with a p-value of 0.602, indicating it is statistically insignificant. The negative coefficient suggests that an increase in transaction fees by ₦1, reduces the likelihood of account ownership. Although not statistically significance, the direction of the coefficient is in tandem with *apriori* expectation and previous studies of Kingsley *et al* (2019), Idolor and Omehe (2022) and Shakya (2022). In contrast, Technology (TeC), has a coefficient of 0.178 with a p-value of 0.432, which implies that it is positively insignificant to account ownership. This in other words means that an increase in technology (i.e., less network downtimes), increases the likelihood of account ownership by 19%. This contradicts *apriori* expectation but aligns with existing studies of Abdullahi *et al.* (2020), Shakya (2022), Kabir *et al.* (2024). This further suggests that the network resilience of Islamic agency banking operators has a minimal impact, as customers often use alternative channels during network failures.

The years of operation of Islamic agency banking operators', proxied by experience (ExP), have a coefficient of 0.355 with a p-value of 0.075, indicating that the predictor is not statistically significant. However, the positive sign suggests that an increase in IAB operator's experience (i.e., increase in the number of years of operations), increases the odds of account ownership by 35.5%. This aligns with *apriori* expectation and further confirms with previous study of Sultana, Rapti & Fahria (n.d). Overall, the geographical coverage and liquidity of Islamic agency banking operators are critical for increasing financial inclusion, particularly in terms of opening more accounts for households in the study area.

b. *Quality of Product or Services*

On the other hand, the second component of Table 3, examines the impact of Islamic agency banking on financial inclusion through the quality of product or services. Geographical coverage (GeC) has a coefficient of 0.669 with a p-value of 0.000, indicating it is positively statistically significant. This suggests that for every additional unit of coverage improvement (i.e., less time taken), raises the odds of financial inclusion through quality services (i.e., less number of complains) by 95.2%. This is in conformity with with *apriori* expectation and previous studies of Barasa (2013), Lotto (2015), Bashir *et al* (2020), Abdullahi *et al* (2020) and Kabir (2024). By extension, this underscores the importance of proximity for perceived service quality because improving accessibility by increasing IAB outlets or enhancing service delivery could increase the impact of Islamic agency banking on financial inclusion. Liquidity (LiQ) has a coefficient of 0.170, an odds ratio of 1.186, and a p-value of 0.247 (greater than 5%), indicating the predictor is not statistically significant in influencing financial inclusion through the quality of products or services. The positive sign means that, a Naira (₦) increase in IAB operator's liquidity, might raises the likelihood of quality of products or services (i.e., less number of complaints) by 18%. The sign is in line with *apriori* expectation and consistent with previous works of Afande and Mbugua (2015) and Idolor and Omehe (2022). However, liquidity remains important for boosting customer trust, loyalty, and retention, as well as improving quality of services offered by IAB operators particularly by reducing the number of complaints.

Security (SeC), has a coefficient of -0.982 and a p-value of 0.004, indicating it is negatively statistically significant. This suggests that higher security (i.e., fewer thefts), is associated with a 62.5% reduction in the odds of number of complaints. By extension, this means that insecurity diminishes quality of services, therefore, enhancing security at IAB outlets could increase customer usage and satisfaction. This finding is in conformity with previous studies of Kingsley *et al* (2019), Shakya (2022) and Idolor and Omehe (2022). Also, the Cost of Service (CoS) has a coefficient of -0.146, indicating a negative relationship with financial inclusion through quality of service but it is not statistically significant. This imply that a naira (₦) increase in the cost of service, decreases the odds of quality of services (i.e., increase number of complaints). Invariably, its implies that lower cost of service may enhance satisfaction and thus reduces customer complaints. This finding is in line with *apriori* expectation and aligns previous studies of Kingsley *et al* (2019), Idolor and Omehe (2022) and Shakya (2022).

Conversely, Technology (TeC), shows a positive coefficient of 0.421 with a p-value of 0.055, which is statistical insignificant with quality of product or services. In other words, improved technology (fewer network downtimes), is associated with higher quality of services (i.e., less complaints). By this finding, it aligns with empirical studies such as Abdullahi *et al* (2020), Shakya (2022), Kabir *et al.*(2024). Experience (ExP), proxied by the number of years of operations of IAB operators, has a coefficient of 0.325, an odds ratio of 1.384,

and a p-value of 0.121, indicating that it is positively statistically insignificant. This means that an increase in IAB operator's years of experience, increases the odds of quality of product or services (i.e., less number of complaints). By this finding, it confirms with previous study of Sultana, Rapti & Fahria (n.d). Although not significant, the experience remains crucial because IAB operators with more years of operation may better managed customer expectations, thereby improving service quality and reducing the number of complaints. To sum up, security, liquidity, and experience are pivotal for improving the quality of services offered, which can, in turn, enhance financial inclusion in the study area.

Discussion of Major Findings

The study reveals that Islamic Agency Banking's (IAB) geographical coverage is the most critical driver of financial inclusion, significantly increasing both account ownership by 2.07 times and service quality by 1.95 times. This suggest that expanding physical assess to financial services through strategically located IAB outlets significantly reduces access barriers particularly for low-income, displaced persons, thus strengthening inclusion. Similarly, IAB's Security also proved to be a driver of financial inclusion, particularly by reducing service complaints by 62.5%.

This outcome reflects the unique context of the study area, where safety directly affects both customer willingness to engage with financial institutions and agent confidence in operating a cash-based services. However, IAB's liquidity presents a trade off by improving service quality by 18%, likely because agents with sufficient cash reserves are able to meet withdrawal demands promptly. On the other hand, it discourages account openings by 32%, due to a shift in focus of agents towards servicing existing customer rather than onboarding new ones. In contrast, IAB's Technology and experience shows weaker and less consistent impacts on financial inclusion.

Taken together, these findings confirms that Islamic Agency Banking (IAB) have played a meaningful role in promoting financial inclusion in the metropolis during the study period, thereby providing empirical justification for rejection of null hypothesis. These finding strongly aligns with prior research, including studies by Santoso and Ahmad (2016), Bank Negera Malaysia (2016), Bangladesh Bank (2017), Yuiana (2018), Sabani and Ishak (2023), Asas and Muhydin (2024), Quadri *et al.* (2024) & Ashraf, Amir and Osman (2025).

Post Estimation Tests

Likelihood Test: This captures information on the model fitting and as well as the Likelihood Test statistics for the individual predictors.

Table 4. Model Fitting Information

Model 1	Model Fitting Criteria		Likelihood Ratio Test	
	- 2 Log Likelihood	Chi-Square	Df	Sig.
Intercept Only	500.737			
Final	436.609	64.129	12	0.000

Source: SPSS, 20 Version Output (2024)

From Table 4, the model's -2 Log Likelihood (436.609) is significantly lower than the intercept-only model's -2 Log Likelihood (500.737). The Chi-Square statistic for the model is 64.129 with 12 degrees of freedom (df), and the significance value ($p = 0.000$) indicates that the model is a good fit for the data. The predictors significantly improve the model compared to a model without predictors.

Table 5. Likelihood Ratio Tests

Effect	Model Fitting Criteria		Likelihood Ratio Tests		
	-2 Log Likelihood	Reduced Model	Chi-Square	Df	Sig.
Intercept	453.631		17.023	2	0.000
GeC	469.842		33.233	2	0.000
LiQ	451.337		14.728	2	0.001
SeC	449.234		12.626	2	0.002
CoS	437.731		1.122	2	0.571
TeC	440.320		3.712	2	0.156
ExP	440.828		4.220	2	0.121

Source: SPSS, 20 Version Output (2024)

The chi-square statistic is the difference in -2 log-likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0. Based on the results it shows that Geographical Coverage (GeC), Liquidity (LiQ) and Security (SeC) have a p-value less than the significance level, indicating a rejection of the null hypothesis. This implying that these predictors are significant and contributed to the outcome of the model.

Wald Test: The test was conducted to ascertain the effect of the independent variable at a single outcome level. In the course of estimating the multinomial logistic regression (MNL), the Wald statistics was checked as displayed in Table 3. Therefore, the rule of thumb for the Wald Test states that if the Wald statistics is greater than 3.84 which correspond to a p-value of 0.05 for a chi-square distribution with 1 degree of freedom, the predictor variable is considered statistically significant. Also, same applies if the p-value is below 0.05. A significant Wald statistic suggests that the predictor variable has a meaningful impact on the dependent variable.

In lieu of this decision criteria for the Wald test when compared to the MNL output in Table 4.5, Geographical Coverage ($\chi=21.066$ & 15.311), Liquidity ($\chi=8.514$), Security ($\chi=8.203$), are statistically significant, Technology is marginally significant ($\chi=3.683$) while Cost of Service, Technology and experience are not statistically significance. Therefore, this outcome can be further explained as thus; Geographical Coverage (GeC) is the most significant predictor for both access to financial services and quality of product or services outcomes. Liquidity (LiQ) is significant for access to financial services but not for quality. Security (SeC) is significant for quality but has a negative effect. Other variables like Cost of Services (CoS), Technology (TeC), and

Experience (*ExP*) are either not significant or borderline significant. Conclusively, the Wald test results highlight the critical importance of Geographical Coverage in predicting financial inclusion.

Multicollinearity Test: The Tolerance and Variance Inflation Factor (VIF) values are used to assess multicollinearity among predictor variables in a regression model as shown in Table 6.

Table 6. Multicollinearity Test

Model Predictors	Collinearity Statistics		Interpretation
	Tolerance	VIF	
<i>GeC</i>	0.978	1.023	No multicollinearity (very low VIF, high tolerance).
<i>LiQ</i>	0.859	1.165	No multicollinearity.
<i>SeC</i>	0.721	1.387	No multicollinearity (VIF is slightly higher but still acceptable).
<i>CoS</i>	0.971	1.03	No multicollinearity.
<i>TeC</i>	0.748	1.338	No multicollinearity (slightly elevated VIF but acceptable).
<i>ExP</i>	0.832	1.201	No multicollinearity.

Source: SPSS, 20 Version Output (2024)

Based on the result from Table 6, all the predictors have tolerance values > 0.10 and VIF values < 2 , which indicates no significant multicollinearity among the independent variables. The low VIF values and high tolerance suggest that the predictors are relatively independent of one another, and the regression model is not being distorted by multicollinearity. Consequently, multicollinearity is not a concern in this model, and the predictor variables are appropriate for inclusion in the analysis.

Pseudo R-Square: This test statistic captures include Cox and Snell, Nagelkerke and McFadden R-squared.

Table 7. Pseudo R-Square

Pseudo R Square	Percentage (%)
Cox and Snell	0.214
Nagelkerke	0.245
McFadden	0.117

Source: SPSS, 20 Version Output (2024)

Table 7 presents the pseudo-R-square values for the model. The Cox and Snell value (0.214) indicates that approximately 21.4% of the variation in the outcome is explained by the predictors. The Nagelkerke value (0.245), which is a more adjusted measure, suggests that 24.5% of the variation in the outcome is explained by the model. This value is more interpretable and better suited for logistic regression. The McFadden value (0.117) is smaller, as is typical for logistic regression models, indicating that the

predictors explain 11.7% of the variation in the dependent variable. McFadden values between 0.1 and 0.2 are generally considered satisfactory in the social sciences, particularly for complex models. Therefore, these pseudo-R-square values suggest that the model has a moderate level of explanatory power. This is deemed acceptable, as the values fall within the threshold of 0.10 to 0.50, and some or most of the predictors are statistically significant (Ozili, 2022).

E. CONCLUSION

The outcome of this study affirms that Islamic Agency Banking (IAB) has contributed in promoting inclusive development particularly in economically marginalized and conflict affected areas such as Borno state. Deep-rooted in Islamic financial jurisprudence and guided by the principles of equity and social welfare, IAB serves as a conduit for extending banking services to the populations previously excluded from the formal financial system. The study's empirical results demonstrate that IAB has significantly contributed to socioeconomic advancement by addressing structural barriers to financial access. More importantly, the findings affirm the operational relevance of the theoretical constructs underpinning the study. The *Wakalah* model explains the agency relationship built on trust and delegated authority. The Technological Acceptance Model and Diffusion of Innovation theory contextualize the uptake of banking services through digital and agent-driven platforms. Within the fragile ecology of Maiduguri Metropolis, IAB has demonstrated resilience and adaptability which has facilitated in reviving the social and economic fabric affected by conflict through decentralizing banking services. This impact has succeeded in positioning IAB as a stopgap for financial exclusion aimed at ensuring long-term social transformation and empowerment of individuals area.

The study has implication to policymakers and Islamic financial institutions (IFI's) particularly they should prioritize expanding the geographical coverage of IAB operators as it will ease access to banking services for low-income and displaced populations in the area. The study recommends the need for IAB operators to improve security through partnership with local authorities as is essential to reduce customer complaints and build trust in IAB operations. Second, Efficient liquidity management must also be ensured through periodic financial training on the IAB operators so that they can manage transaction demands without compromising new account openings. Government and other relevant stakeholders (CBN, SMEDAN, Islamic Banks) should introduce various interventions through to Islamic microfinance instruments such as *Qard al-Hasan*, *Murabaha*, tax holidays so to help operators scale their operations. The limitation of the study is that it is conducted with Maiduguri metropolis as such its outcome cannot be generalized. Therefore, future studies should broaden the geographical scope to include other states and regions for better generalizability; Investigate the gender-specific impacts of Islamic Agency Banking on financial inclusion as well undertakes a comparative study with the conventional agency banking on financial inclusion.

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