

Wisabi Bank

ATM Transactions Analysis

Time Period from January to December 2022



I. INTRODUCTION



Overview

Wisabi Bank is a leading financial institution in Nigeria, headquartered in Lagos with branches in Kano, Rivers State, Enugu, and FCT Abuja. Wisabi Bank provides a wide range of financial services to its customers, including savings accounts, current accounts, loans, and investments.

As part of its commitment to improving customer experience and optimizing its operations, Wisabi Bank has engaged me as an external consultant to conduct a data analytics project to analyse its ATM transactions data from January 1st, 2022 to December 31st, 2022.

*** Scope:**

This data analytics project will involve analyzing the ATM transactions data, which includes the Transactions fact table and 4 dimension tables namely Location dimension table, Customers Dimension table, Transaction Type Dimension Table, Hour dimension table, and Calendar dimension. The analysis will involve data cleaning, data transformation, and data visualization using Excel/Power BI.

Data Dictionary

Table Name	Column Name	Description
Fact_Transactions	TransactionID	Unique identifier for each transaction in the database
	TransactionStartDatetime	Datetime when the transaction started
	TransactionEndDatetime	Datetime when the transaction was completed
	Cardholder ID	Unique identifier for the cardholder performing the transaction
	Location ID	Unique identifier for the location of the ATM where the transaction occurred
	Transaction Type ID	Unique identifier for the type of transaction that was performed (e.g., withdrawal, savings, balance enquiry, transfer)
	Transaction Amount	Amount of money involved in the transaction
Dim_Location	Location ID	Unique identifier for the ATM location
	Location Name	Name of the bank branch where the ATM is located
	No of ATMs	Number of ATMs
	City	City in which the ATM is located
	State	State in which the ATM is located
	Country	Country in which the ATM is located
Dim_Transaction Type	TransactionTypeID	Unique identifier for the transaction type (e.g., 1 for withdrawal, 2 for savings, 3 for balance enquiry, 4 for transfer)
	Transaction Type	Name of the transaction type (e.g., "withdrawal", "savings", "balance enquiry", "transfer")

Dim_Customers	Cardholder ID	Unique identifier for the cardholder
	First Name	First name of the cardholder
	Last Name	Last name of the cardholder
	Gender	Gender of the cardholder (e.g., male, female, other)
	ATM ID	Unique identifier for the ATM that the cardholder uses
	Age	Age of the cardholder
	Occupation	Occupation of the cardholder
	Account Type	Type of account that the cardholder has (e.g., savings, checking, etc.)
	Is Wisabi	Boolean flag that indicates whether the cardholder is a customer of Wisabi Bank or another bank
Dim_Hour	Hours	Hour of the day (0-23)
	Hour Start Time	Time at which the hour begins (e.g., 12:00 AM for hour 0)
	Hour End Time	Time at which the hour ends (e.g., 1:00 AM for hour 0)
Dim_Calendar	Date	Date in YYYY-MM-DD format
	Quarter	Quarter of the year in which the date falls (e.g., Q1 for January-March, Q2 for April-June, etc.)
	Month	Month in which the date falls (e.g., 1 for January, 2 for February, etc.)
	Month Name	Name of Month (E.g January, February, etc.)
	Day	Day of the week in which the date falls (e.g., Monday, Tuesday, etc.)
	Is Holiday	Boolean flag that indicates whether the date is a public holiday
	Day Name	Name of Day (E.g Monday, Tuesday, etc.)
	Week of Year	Week of Year (From 1 to 54)
	Year	Year (2022)
	Start of Month	Start of Month for each date value

Business Requirements:

Wisabi Bank wants to answer several business problem questions related to its ATM transactions data, which include:

1. What is the average transaction amount by location and transaction type?
2. Which ATM location has the highest number of transactions per day, and at what time of the day do the transactions occur most frequently?
3. Which age group has the highest number of transactions, and which transaction type do they usually perform?
4. What is the trend of transaction volume and transaction amount over time, and are there any seasonal trends or patterns?
5. What is the most common transaction type, and how does it vary by location and customer type (Wisabi customer vs. non-Wisabi customer)?
6. What is the average transaction amount and transaction frequency per customer by occupation and age group?
7. What is the percentage of transactions that are withdrawals, savings, balance enquiries, and transfers, and how does it vary by location and time of day?
8. What is the distribution of transaction amounts and transaction frequency, and are there any outliers?
9. Which ATM locations have the highest and lowest utilization rates, and what factors contribute to this utilization rate?
10. What is the average transaction time by location, transaction type, and time of day, and how does it vary by customer type and occupation?

Expected Deliverable

The purpose of this project is to analyze the ATM transaction data for Wisabi Bank to gain insights on customer behavior, ATM usage, and identify opportunities to improve the bank's services:

- A report containing insights on customer demographics, transaction patterns, and popular ATM services.
- A dashboard with visualizations that provide an overview of Wisabi Bank's ATM transactions and highlight key insights.
- Recommendations for improving the bank's operations based on the findings from the analysis.

II. DATA PREPARATION



II. DATA PREPARATION

After importing transaction data into Power Query, data from the headquarters and 4 branches will be compiled and cleaned to create a Fact Transaction table. In addition, it also has 2 calculated columns such as "Duration" and "Hour" for ease of calculation. Unnecessary columns have been removed to avoid interference.

Table.TransformColumnTypes(*Removed Columns1,{{"TransactionStartDateTime", type date}, {"Duration", Int64.Type}})

	TransactionID	TransactionStartDateTime	CardHolderID	LocationID	TransactionTypeID	TransactionAmount	Duration
1	EN-2022-1000000001	1/1/2022	EN-003-1067	EN-003	4	3000	
2	EN-2022-1000000002	1/1/2022	EN-006-1040	EN-006	1	4000	
3	EN-2022-1000000003	1/1/2022	EN-002-1080	EN-002	1	9000	
4	EN-2022-1000000004	1/1/2022	EN-002-1024	EN-002	1	10000	
5	EN-2022-1000000005	1/1/2022	EN-001-1095	EN-001	4	10000	
6	EN-2022-1000000006	1/1/2022	EN-007-1067	EN-007	2	10000	
7	EN-2022-1000000007	1/1/2022	EN-005-1076	EN-005	3	0	
8	EN-2022-1000000008	1/1/2022	EN-009-1033	EN-009	1	20000	
9	EN-2022-1000000009	1/1/2022	EN-001-1102	EN-001	1	9000	
10	EN-2022-10000000010	1/1/2022	EN-004-1012	EN-004	4	20000	
11	EN-2022-10000000011	1/1/2022	EN-003-1011	EN-003	1	20000	
12	EN-2022-10000000012	1/1/2022	EN-006-1034	EN-006	4	7000	
13	EN-2022-10000000013	1/1/2022	EN-001-1083	EN-001	1	10000	
14	EN-2022-10000000014	1/1/2022	EN-007-1023	EN-007	1	1000	
15	EN-2022-10000000015	1/1/2022	EN-006-1038	EN-006	4	10000	
16	EN-2022-10000000016	1/1/2022	EN-008-1055	EN-008	1	50000	
17	EN-2022-10000000017	1/1/2022	EN-005-1067	EN-005	1	20000	
18	EN-2022-10000000018	1/1/2022	EN-003-1048	EN-003	3	0	
19	EN-2022-10000000019	1/1/2022	EN-008-1009	EN-008	1	9000	

Query Settings

PROPERTIES

Name
Transaction

All Properties

APPLIED STEPS

- Source
- Filtered Hidden Files1
- Invoke Custom Function1
- Renamed Columns1
- Removed Other Columns1
- Removed Errors1
- Expanded Table Column1
- Changed Type
- Removed Columns
- Added Custom
- Inserted Hour
- Removed Columns1
- Changed Type1

For the Dimension Customer table, two new calculated columns will be added "Age" and "Age Group" to group customers according to each age group.

Queries [10]

Transform File from F...

Helper Queries [3]

Transform Sample File

Other Queries [6]

Transaction

Transaction Type

Hour

Customer

Calendar

Location

Table.RenameColumns(#"Removed Columns",{{"Round Up", "Age"}})

	Birth Date	Occupation	AccountType	IsWisabi	Age	Age Group
1	2/14/2002	Mechanic	Current	1	21	16-25
2	6/28/1987	Factory Worker	Current	0	36	36-45
3	5/28/2003	Trader	Current	1	20	16-25
4	8/20/1978	Human Resources Specialist	Current	1	45	36-45
5	10/2/1985	Trader	Current	1	38	36-45
6	8/30/1991	Marketing Executive	Savings	1	32	26-35
7	11/9/1982	Software Developer	Savings	1	41	36-45
8	6/1/1991	Electrician	Savings	1	32	26-35
9	4/23/1990	Engineer	Savings	1	33	26-35
10	1/28/1997	Manager	Current	1	26	26-35
11	2/20/1997	Construction Worker	Current	1	26	26-35
12	5/17/1982	Health Professional	Savings	1	41	36-45
13	10/6/2002	Student	Savings	1	21	16-25
14	11/10/1987	Health Professional	Savings	1	36	36-45
15	7/14/1990	Accountant	Current	1	33	26-35
16	1/27/1984	Manager	Savings	0	39	36-45
17	4/23/1986	Human Resources Specialist	Current	2	37	36-45
18	3/6/1990	Marketing Executive	Current	0	33	26-35
19	7/24/1986	Trader	Current	1	37	36-45
20	7/11/1985	Marketing Executive	Savings	0	38	36-45
21	3/21/1989	Trader	Savings	0	34	26-35
22	11/9/1997	Marketing Executive	Current	1	26	26-35
23	1/21/1996	Health Professional	Savings	1	27	26-35
24	12/22/1993	Human Resources Specialist	Current	1	30	26-35
25	8/21/1982	Human Resources Specialist	Savings	1	41	36-45
26	6/9/1992	Factory Worker	Current	1	31	26-35
27	7/8/1993	Marketing Executive	Current	1	30	26-35
28						

Query Settings

PROPERTIES

Name

Customer

All Properties

APPLIED STEPS

Source

Promoted Headers

Changed Type

Added Custom

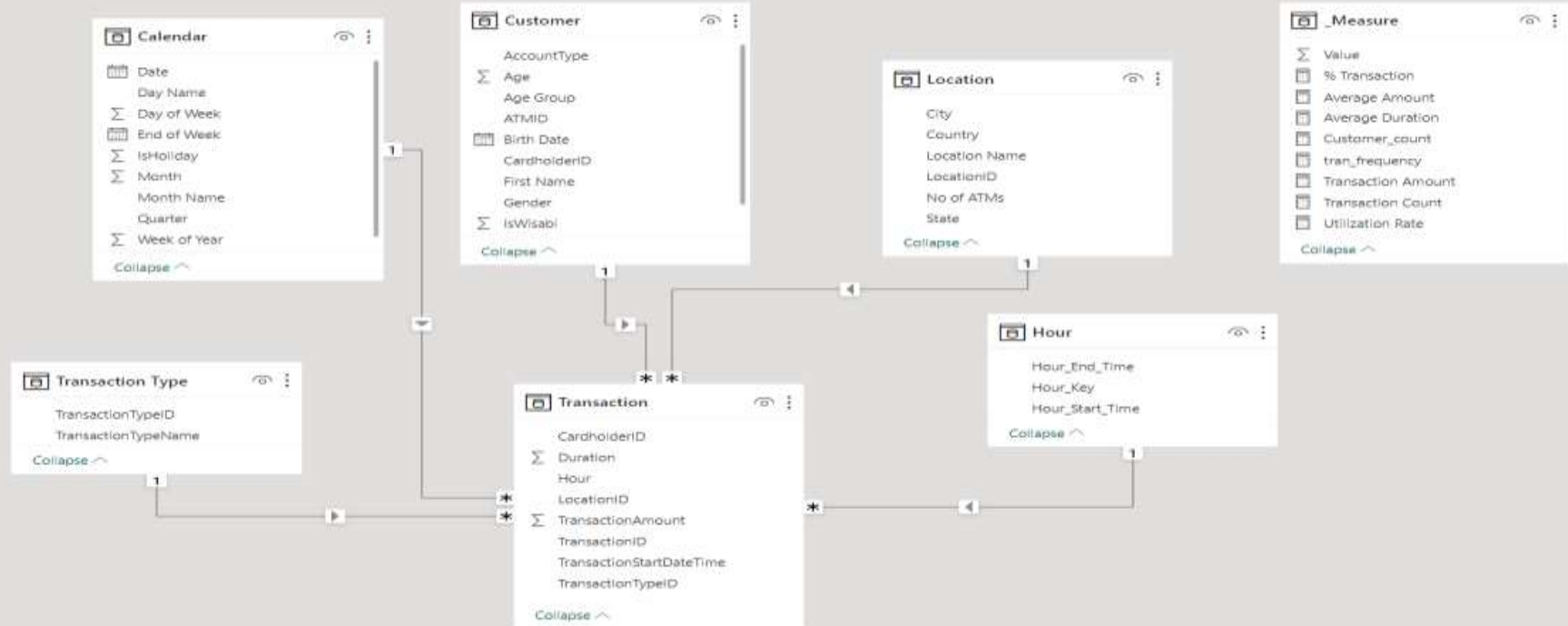
Inserted Round Up

Added Conditional Column

Removed Columns

Renamed Columns

After the data cleaning steps is Data Modeling. 1 Fact table and 5 Dimension tables linked in a "one to many" relationship. It allows an entity in one table to be linked to multiple entities in another table. This creates a flexible structure that allows for easy data expansion. This helps maintain consistency and synchronization in the database

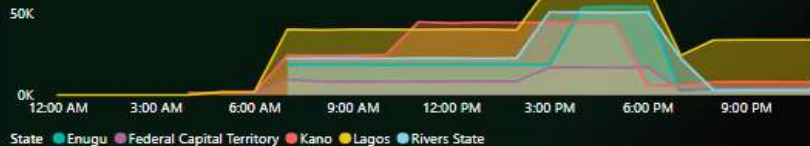


III. DATA ANALYSIS



ATM TRANSACTION REPORT

Daily Trend of Transactions



Relationship between Average Amount & Average Duration

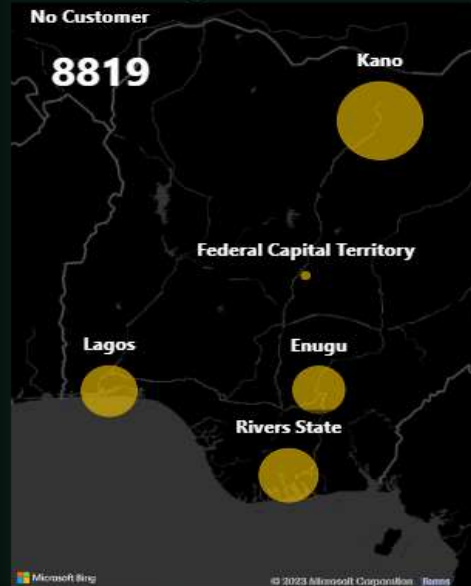


Average Transaction Amount by State & Type

TransactionType: Withdrawal Transfer Deposit Balance Inquiry



Utilization Rate by State



Transaction Amount



₦ 39bn

Total Transaction



2144K

Utilization Rate



12.9%

Transaction Amount & Count Trend

Transaction Amount Transaction Count

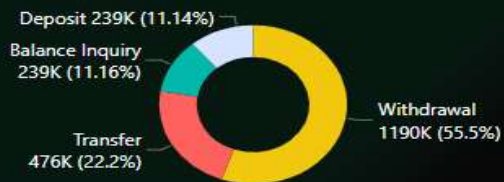


DEMOGRAPHIC REPORT

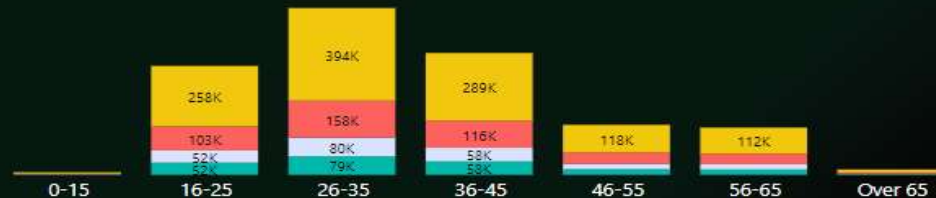
Transaction Frequency by Age Group



Transaction Count by Type

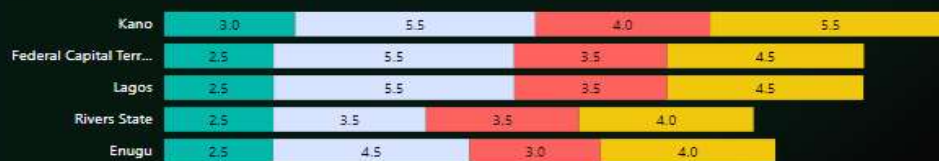


Transaction Count by Age Group & Type



TransactionTypeNames: Balance Inquiry, Deposit, Transfer, Withdrawal

Average Duration by State & Type



TransactionTypeNames: Balance Inquiry, Deposit, Transfer, Withdrawal

~~₦~~38,555,885,000

Total amount processed by Wisabi ATMs in 2022

2,143,838

Number of Transactions Processed

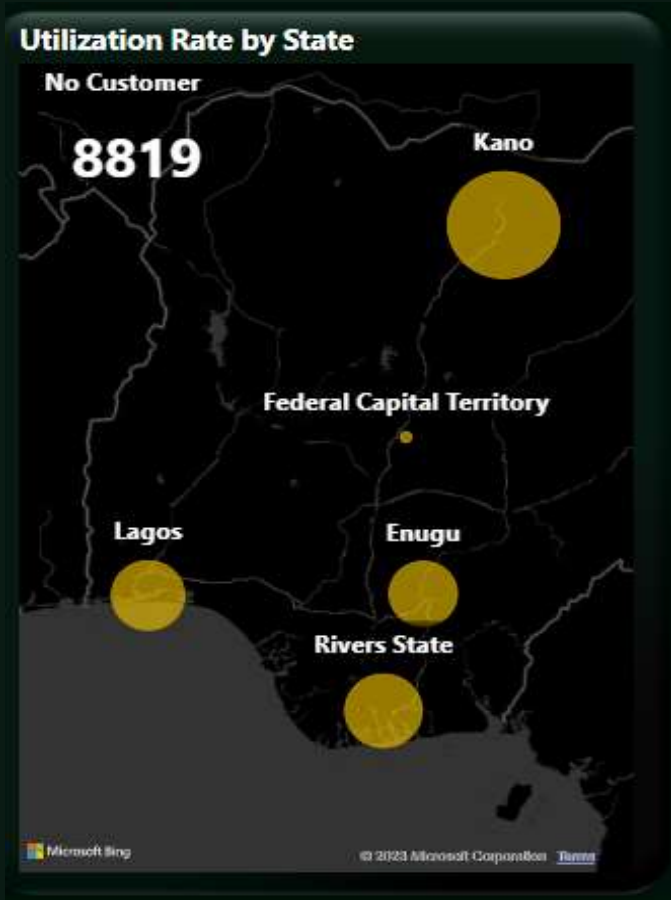
8819

Unique persons who carried out at least one transaction

12.9%

Utilization Rate

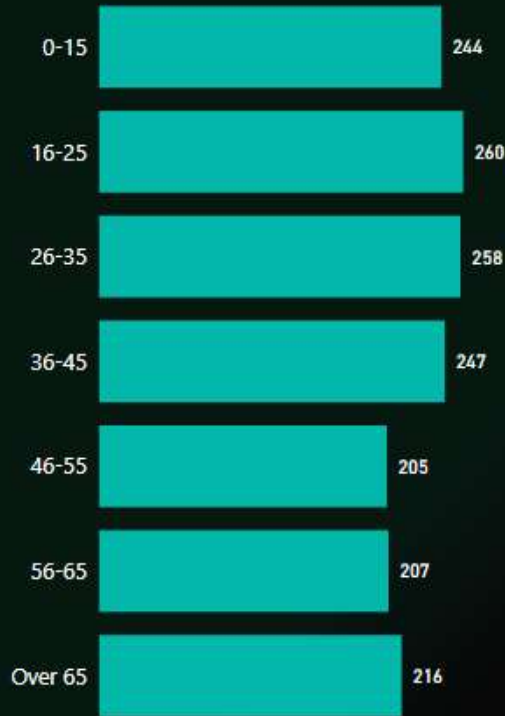
Utilization Rate



- ❖ ATMs in Kano have the highest Utilization Rate (18.6%)
- ❖ Rivers & Lagos have Utilization Rates greater than 12% (12.7% & 12.2% respectively) while that for Enugu is 11.6%
- ❖ The FCT has the lowest Utilization Rate (8.5%)

Transaction Frequency

Transaction Frequency by Age Group



- ❖ Customers between 15-25 years have the highest transaction frequency (260).
- ❖ Interestingly, customers above 65 years have a higher transaction frequency (216) than the 56 - 65 & 46 - 55 age groups (207 & 205 respectively).

Average Amount vs Average Duration

Relationship between Average Amount & Average Duration

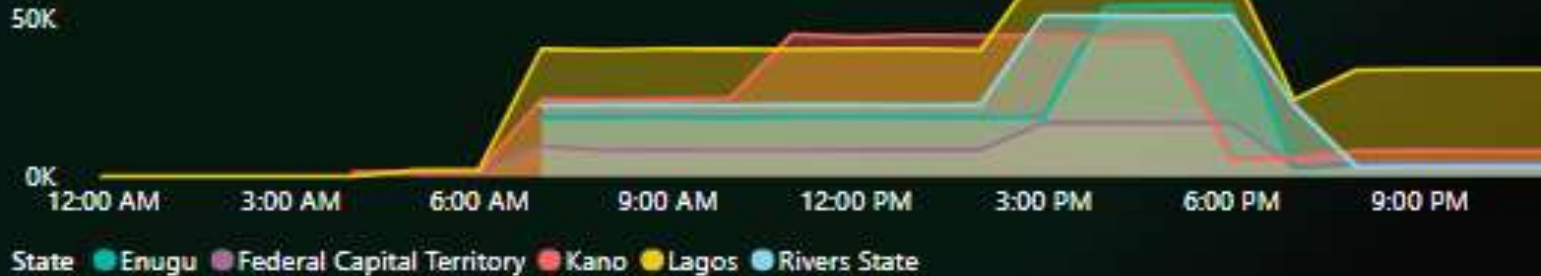


- ❖ On Average, while the transaction amount is comparatively similar, Withdrawals in Kano have the longest transaction duration (>5 mins) when compared with other states.
- ❖ Kano, Lagos, and the FCT have longer transaction duration for Deposits (>5 mins) while Rivers has the lowest transaction duration for deposits (<4 mins)

- ❖ Kano also has the longest transaction duration for Balance Inquiries and Transfers
- ❖ Withdrawals have the highest transaction amount on average as expected. Withdrawals and Deposits have longer transaction duration on average while Balance Inquiries have the least transaction duration.

Daily Transactions Trend

Daily Trend of Transactions

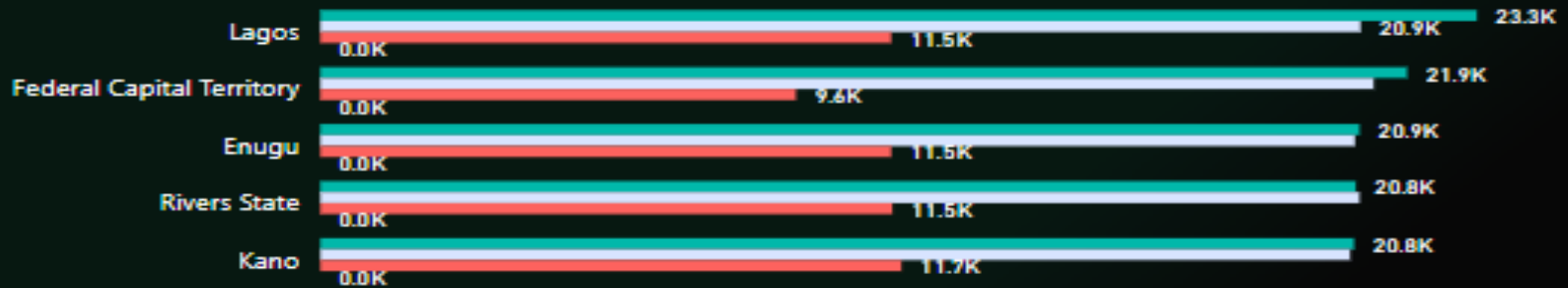


- ❖ ATM Transactions in Lagos increase gradually from 6 am and peaks between 3 and 7 pm.
- ❖ Similar behavior is seen across other states however transactions peak earlier in Kano (around 11 am) and this is sustained till about 5 pm after which activity sharply declines.
- ❖ Compared to other states, Lagos has significant transactions activity after 7 pm.

Average Transaction Amount

Average Transaction Amount by State & Type

TransactionTypeName ● Withdrawal ● Transfer ● Deposit ● Balance Inquiry



- ❖ On Average, Withdrawals have the highest transaction amounts across all states, next is Transfers, with Deposits have the lowest.
- ❖ Across all locations, The FCT has comparatively lower Deposit amounts on Average

Transaction Count

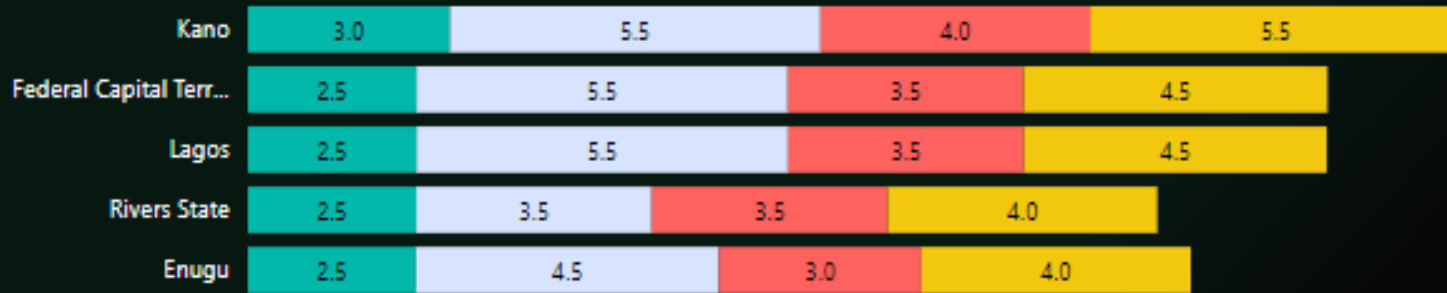
Transaction Count by Age Group & Type



- ❖ Across all Age Groups, Withdrawals is the common transaction type (>50%), followed by Transfers (>20%)
- ❖ Interestingly, Deposits & Transfers account for a significant amount of transactions (>10% each) across all Age Groups

Average Transaction Duration

Average Duration by State & Type



TransactionTypeName ● Balance Inquiry ● Deposit ● Transfer ● Withdrawal

- ❖ Across all locations, Withdrawals has the longest duration on average.
- ❖ Kano's average Withdrawal, Transfer, and Balance Inquiry durations are comparatively higher than other locations.
- ❖ Rivers & Enugu have lower average transaction duration for Deposits, Transfers, & Withdrawals when compared to other locations.

Trend of Transaction Amount & Count



- ❖ We had the highest number of transactions and transaction amount in March
- ❖ Other months with high transaction activity include January, May, July, October, and December
- ❖ We had the lowest number of transactions and transaction amount in February

Recommendations

Utilization rate in the FCT is comparatively low. Possible solutions to remedy this include:

- i. Make sure that the ATMs are visible and accessible to customers. This could involve relocating the ATMs to more prominent locations, installing signage, or improving lighting and landscaping around the ATMs.
- ii. Offer incentives to customers such as waived transaction fees or cashback rewards.
- iii. Use various marketing channels to promote the availability and convenience of the ATM to customers, such as through social media, email newsletters, or in-branch promotions.
- iv. Consider offering additional services at the ATM, such as the ability to deposit checks or make cash withdrawals in different denominations.
- v. Conduct surveys or use customer analytics to understand the preferences and habits of customers who use the ATM, and tailor the ATM's services and features to better meet their needs.

Recommendations

Average Transaction Duration in Kano is longer when compared to other locations. Possible solutions to remedy this include:

- i. Increase the number of ATMs available in the branch, as this can reduce wait times and congestion at each individual ATM.
- ii. Consider upgrading the ATMs to newer models with faster transaction times and more advanced features. This can improve the overall experience for customers using the ATM and may encourage them to use it more often.
- iii. Ensure that the ATMs are regularly serviced and maintained to prevent downtime and minimize technical issues that can contribute to longer transaction times.
- iv. Analyze transaction data to identify bottlenecks or issues that may be contributing to longer transaction times. This could involve looking at patterns of usage, common user errors, or technical issues that may be slowing down the process.
- v. Provide customers with education on how to use the ATM more efficiently, such as by highlighting common errors to avoid or offering guidance on how to complete transactions more quickly.

Recommendations

A significant proportion of transactions (>20%) are either Balance Enquiries or Transfers. Possible solutions to remedy this include:

- i. Provide customers with education on alternative banking channels such as phone banking or online banking, highlighting the benefits of these channels and how to use them effectively. This could involve providing brochures or other materials in the branch, as well as online resources and tutorials.
- ii. Consider offering incentives to customers who use alternative banking channels, such as waiving transaction fees or offering cashback rewards. This can encourage customers to try these channels and may help to shift usage away from the ATM.
- iii. Ensure that the phone banking process is simple and straightforward for customers to use, with clear instructions and minimal waiting times.
- iv. Continue to monitor customer behavior and analyze usage data to identify areas where usage of alternative banking channels can be improved.
- v. Offer personalized support to customers who may be hesitant to use alternative banking channels, such as providing one-on-one assistance or guidance on how to get started with phone banking or online banking. This can help to build trust and confidence in these channels and may help to shift usage away from the ATM.

Recommendations

Transactions Activity:

- ❖ ATMs have significantly reduced activity in the early and late hours of the day (Before 5 am & After 8 pm). Lagos is the only exception as there is still noticeable activity after 8 pm.
- ❖ Scheduled maintenance should coincide with these periods of reduced activity.
- ❖ Additionally, ATMs should have maximum availability especially during the peak activity periods for each bank branch.