

# **Global Financial Transactions Data Analytics Project**

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## Project Overview

This project analyzes over 44,000 financial transactions from January 2022 to June 2025 across 8 countries. The aim is to simulate a real-world data analyst workflow, from raw data handling and cleansing to exploratory analysis and dashboard preparation.

We explored key metrics like transaction trends, fee impact, customer activity, and channel usage, with the final goal of building an interactive dashboard using Tableau or Power BI.

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## Data Model Summary

The dataset contains three linked tables:

- customers: customer\_id, name, country, join\_date
- accounts: account\_id, customer\_id, account\_type, open\_date
- transactions: txn\_id, account\_id, txn\_date, txn\_type, amount, channel, note

Each transaction links to an account, and each account links to a customer. This star schema enables robust joins and segmentation.

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## Data Quality & Cleaning Process

A total of 10+ issues were documented and resolved. Highlights include:

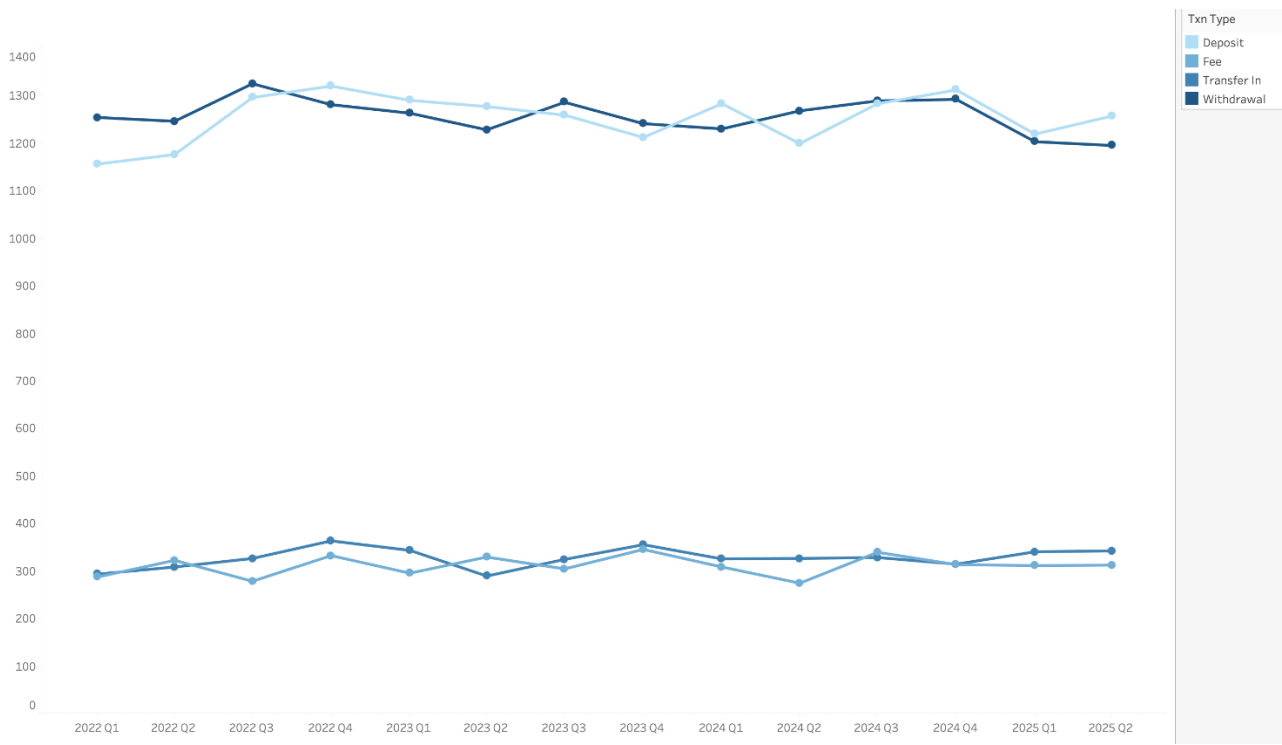
- Typo fix: 'withdrl' corrected to 'Withdrawal'
- Standardized casing: 'atm', 'mobile', etc. unified to proper case
- Missing values: Removed or flagged nulls in amount, txn\_date, note
- Categorical mix: Cleaned txn\_type and channel
- Duplicate detection: Deduplicated rows by txn\_type, amount, and date
- Outlier review: Flagged high-value Fees and Withdrawals using IQR
- Ambiguous logic: Added "Transfer In" and "Transfer Out" labels to clarify money direction

A full issues log is available in the workbook.

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# Exploratory Data Analysis (EDA Highlights)

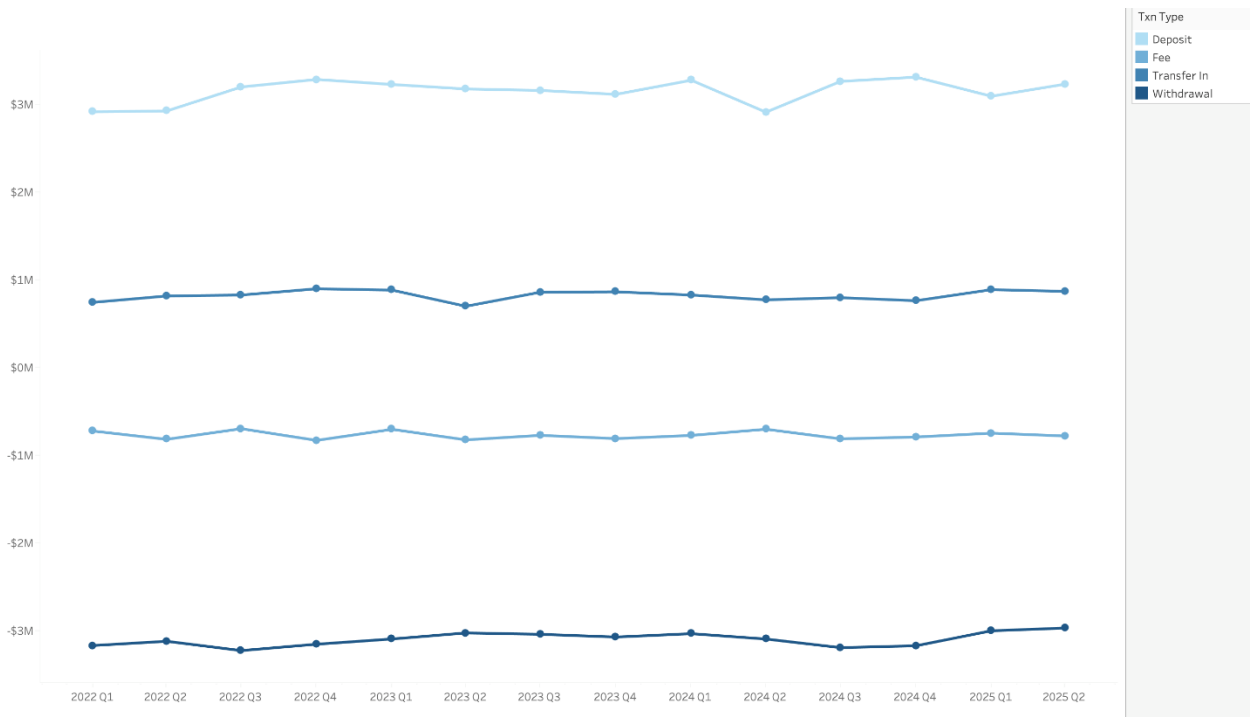
## Monthly Transaction Volume



### Insight:

Transaction counts remained consistently high from Q1 2022 to Q2 2025, with **Deposits** and **Withdrawals** averaging around 1,200–1,300 per quarter. **Fees** and **Transfer Ins** remained stable at a lower range (~300–400), showing less variability over time.

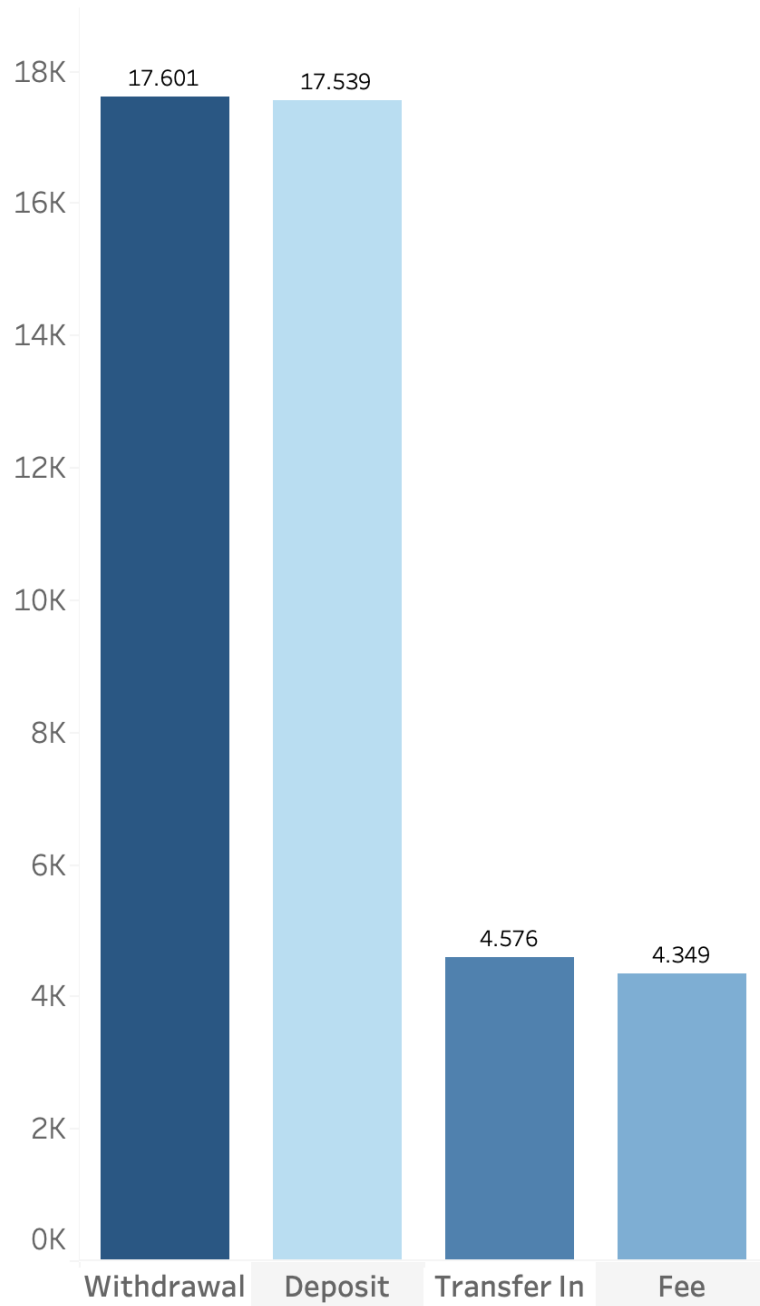
Monthly Transaction Amount



Insight:

The **total transaction amounts** for Deposits and Withdrawals both hovered around **\$3M–\$3.3M per quarter**, showing a tight band of financial flow. Despite high volume, Fees remained in the - **\$1M** range, while Transfer In ranged around **\$800K–\$900K**.

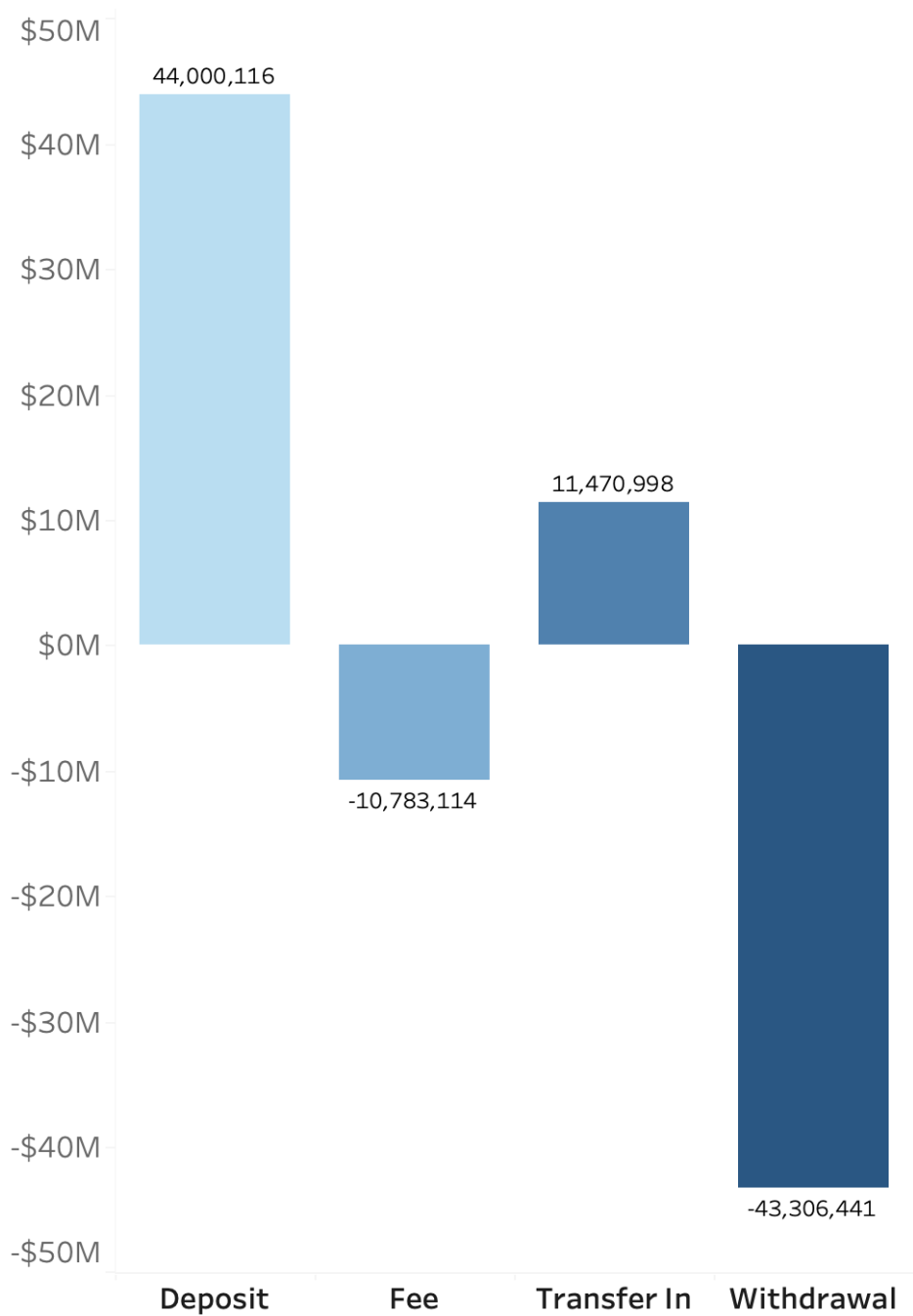
**Transaction by Type (Bar Chart)**



**Insight:**

Withdrawals and Deposits were nearly tied, each accounting for ~17,500 transactions. Transfer In and Fee were notably less common at ~4,500 each.

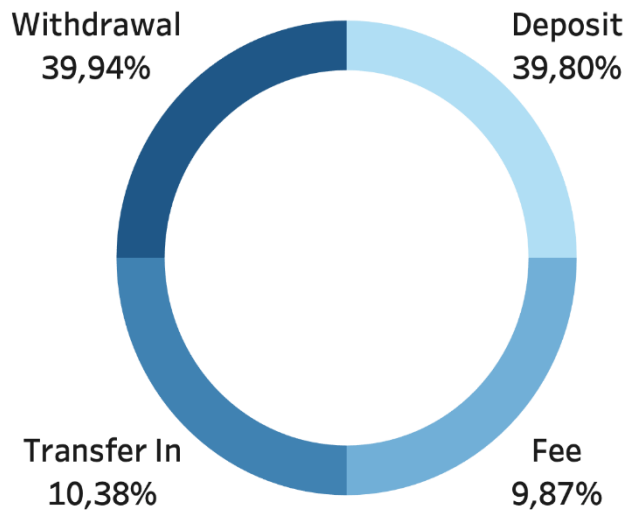
Total Amount by Type (Bar Chart)



Insight:

Withdrawals and Deposits are nearly balanced in total value: **-\$43.3M** and **+\$44M** respectively. Fees amounted to over **-\$10.7M**, highlighting their cumulative impact despite lower frequency.

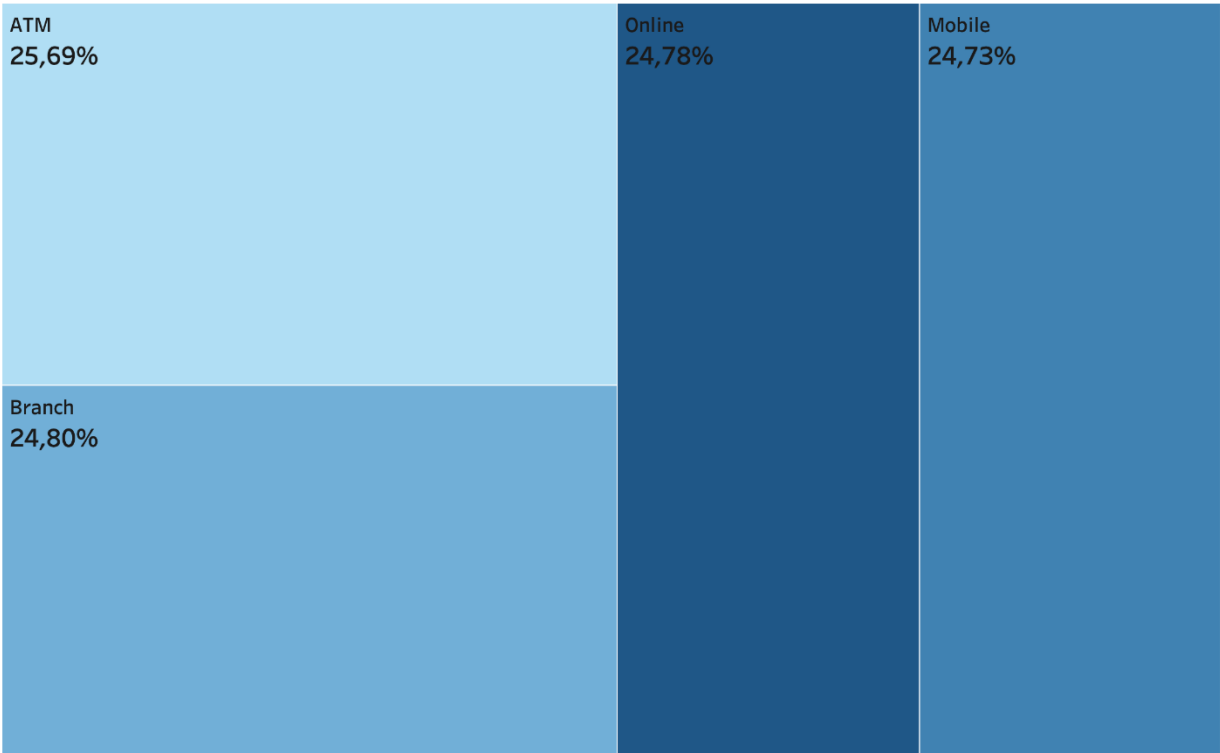
### Share of Transaction Volume by Type (Donut Chart)



#### Insight:

Withdrawals (39.94%) and Deposits (39.80%) dominate transaction count. Fees and Transfer Ins account for under 21% combined, reflecting operational overhead and internal account movements.

Channel Usage (Treemap)

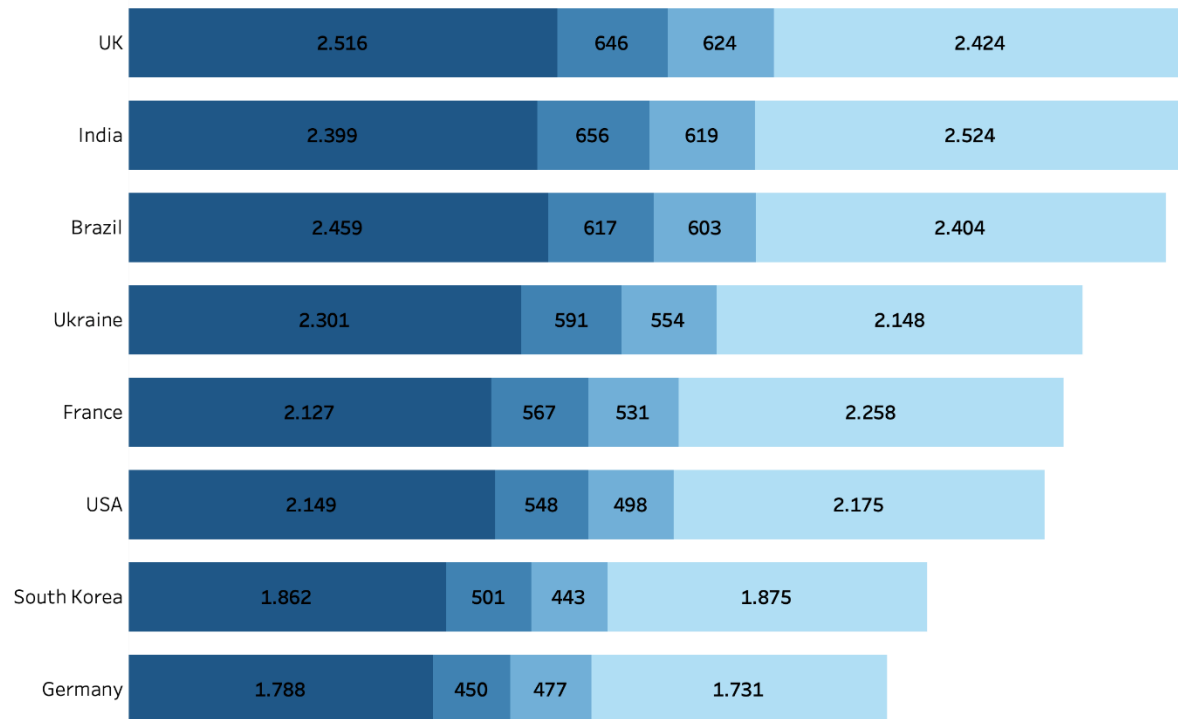


Insight:

Channel usage is remarkably balanced: **ATM (25.7%)**, **Branch (24.8%)**, **Online (24.8%)**, **Mobile (24.7%)**. This suggests a mature multi-channel strategy with consistent customer adoption.



## Number of Transactions by Country (Bar Chart)



### Insight:

The **UK**, **India**, and **Brazil** lead in total transaction volume, each with over 2,400 transactions. Lower activity in **Germany** and **South Korea** may present optimization or growth opportunities.

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## Dashboard Preparation (in Progress)

12 Tableau worksheets were created, including:

- KPI Cards (total amount, total transactions, unique accounts)
- Line Charts for time trends
- Donut chart for txn type share
- Treemap for channel usage
- Map and bar chart for country trends

The dashboard layout is still in progress. Challenges with KPI alignment and visual space may lead to reworking layout or switching to Power BI.

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## Recommendations

1. Fee Monitoring  
High-value fees (some > \$4,000) are rare but impactful. Recommend implementing automated alerts or thresholds to flag unusually large fees for review.
2. Channel Optimization  
Channel usage varies significantly by country. Consider tailoring promotions or support strategies based on regional channel preferences (e.g., boosting mobile adoption where it's low).
3. Customer Behavior Tracking  
Withdrawals dominate transaction volume. Consider customer segmentation and targeted retention strategies, especially for those with high withdrawal-to-deposit ratios.
4. Data Integrity Checks  
Inconsistent entries (e.g., typo in transaction types like 'withdrl') suggest a need for better data validation at the source.
5. Outlier Policy  
Some transactions (especially Fees/Withdrawals) are statistical outliers. A clear business rule should define whether these are exceptional cases or require further investigation.

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## Tools Used

- MySQL for database management and cleaning
- Excel for issue tracking and EDA output
- Tableau for dashboard prototyping
- (Power BI planned for next phase)

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## Outcome & Next Steps

This project demonstrates end-to-end analytical workflow:

- Realistic messy data simulation
- SQL-based cleaning

- Structured EDA
- Dashboard readiness

Next: polish final Tableau dashboard or migrate to Power BI for better KPI layout and publishing options.