

UPI Transactions - Power BI Project

Documentation

Data source: UPI_Transactions.xlsx

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1. Executive Summary

This document provides a structured documentation and a recommended implementation outline for a Power BI report built on a UPI (Unified Payments Interface) transactions dataset. It covers the data source, suggested Power Query (ETL) transformations, a star-schema data model, a baseline set of DAX measures, and a recommended report page layout. The content is generated from the available Excel dataset; if you later provide screenshots of Power Query steps, model view, and report pages, the documentation can be aligned 1:1 with the final implementation.

2. Dataset Overview

Source file	UPI_Transactions.xlsx / Sheet1
Row count	20 000
Column count	20
Date range	2024-01-01 - 2024-12-30
Total Amount (sum)	19,872,274.03
Average Amount	993.61

Success rate (Status = Success): 80.0%

Distinct values (nunique): BankNameSent=4, BankNameReceived=4, City=4, Gender=2, TransactionType=2, Status=2, DeviceType=3, PaymentMethod=3, MerchantName=5, Purpose=5, PaymentMode=2, Currency=4.

Note: the CustomerAccountNumber field is unique on every row (20,000/20,000) in this file. For analyses that require repeat customers (retention, cohorts, RFM), consider introducing a separate customer master table or generating a synthetic customer key.

3. Fields and Meaning (Data Dictionary)

Field	Type	Description	Example	Recommended handling / transformation
TransactionID	Text	Unique transaction identifier.	TXN00001	Keep as text; primary key in the fact table.
TransactionDate	Date	Transaction date.	2024-02-02	Ensure Date type; relate to the Date dimension.
TransactionTime	Time/Text	Transaction time (hh:mm:ss).	17:12:14	Convert to Time; optionally derive hour/minute.
Amount	Decimal	Transaction amount.	271.64	Consider currency filters or

				conversion measures.
Currency	Text	Currency code.	INR	Dimension and/or slicer; add FX conversion if needed.
Status	Text	Transaction status (Success/Failed).	Success	Create helper column IsSuccess = Status = 'Success'.
TransactionType	Text	Transaction type (Transfer/Payment).	Transfer	Dimension/slicer.
PaymentMode	Text	Payment mode (Instant/Scheduled).	Instant	Dimension/slicer.
PaymentMethod	Text	UPI identifier/method (e.g., QR Code).	QR Code	Dimension/slicer.
BankNameSent	Text	Sender bank name.	SBI Bank	Bank dimension (Sent).
BankNameReceived	Text	Receiver bank name.	HDFC Bank	Bank dimension (Received).
RemainingBalance	Decimal	Balance after the transaction.	5557.02	Validate outliers; useful for anomaly checks.
City	Text	City.	Delhi	Geography dimension/slicer.
Gender	Text	Customer gender.	Female	Dimension/slicer (privacy considerations).
CustomerAge	Whole number	Customer age.	21	Create age bands (e.g., 18-24, 25-34...).
DeviceType	Text	Device type.	Tablet	Dimension/slicer.
MerchantName	Text	Merchant name.	Amazon	Dimension; useful for Top N analyses.
Purpose	Text	Transaction purpose/category.	Food	Dimension; supports category KPIs.
CustomerAccountNumber	Number/Text	Customer account number.	123456789013	Mask before publishing (e.g., last 4 digits).
MerchantAccountNumber	Number/Text	Merchant account number.	987654321013	Mask before publishing (e.g., last 4 digits).

4. Age Group Classification (Calculated Column)

Name: Age Groups

Type: Calculated column (DAX)

Table: UPI Transactions

Purpose: Categorizes customers into predefined age bands to enable quick segmentation in visuals (slicers, legends, axis groupings) and to support age-based comparisons across transaction metrics.

DAX Definition

Age Groups =

```
IF(  
    'UPI Transactions'[CustomerAge] <= 25, "A1",  
    IF('UPI Transactions'[CustomerAge] <= 35, "A2", "A3")  
)
```

Business Logic (Rule Set)

This column assigns a group label based on the value of CustomerAge:

- **A1:** Age ≤ 25
- **A2:** Age $26-35$ (because it's " >25 and ≤ 35 ")
- **A3:** Age ≥ 36

Why This Is Useful in Power BI

- Enables **clean segmentation** without manually creating bins in each visual.
- Works well as:
 - **Slicer** (filtering the entire report by age band)
 - **Legend** (split bars/lines by age group)
 - **Axis** (age group on X axis)
- Helps answer questions like:
 - Which age band generates the highest **transaction volume**?
 - Do **fraud levels** differ by age group?
 - Which **merchant categories** are popular per group?

Practical Usage Examples

- **Stacked column chart:** Total Amount by MerchantCategory, legend = Age Groups
- **Matrix:** Rows = Age Groups, Columns = DeviceType, Values = Transaction Count, Fraud Rate
- **Slicer:** Age Groups to filter KPIs on the page (Avg Amount, Success Rate, etc.)

Data Quality and Edge Cases

- If CustomerAge contains **blank** or **non-numeric** values, the current logic will return **A3** (because the conditions won't evaluate as TRUE in the intended way depending on data type/blank handling).
 - Recommended improvement (optional) to handle blanks explicitly:

Age Groups =

```
IF(  
    ISBLANK('UPI Transactions'[CustomerAge]), "Unknown",  
    IF(  
        'UPI Transactions'[CustomerAge] <= 25, "A1",  
        IF('UPI Transactions'[CustomerAge] <= 35, "A2", "A3"))  
    )  
)
```

Implementation Notes (Best Practice)

- Keep the labels short (A1/A2/A3) for compact visuals, but you can also use descriptive labels if you want:
 - "A1 (<=25)", "A2 (26–35)", "A3 (36+)".
- If you want a **custom sort order**, create a numeric sort column (e.g., A1=1, A2=2, A3=3) and set **Sort by column** in Power BI.

5. Bookmark Selection Page

This report page is designed to demonstrate **bookmark-driven navigation** for exploring monthly trends using multiple chart types, while keeping the same filter context. Users can switch between **Line vs Column** views and between **Amount vs Balance** visuals without rebuilding the page or changing slicer selections.



Figure 1. Bookmark Selection page – Column chart (Amount)

Page-level slicers

At the top of the page, a set of slicers provides consistent filtering for all bookmark states. These slicers enable users to narrow the analysis by bank routing, location, customer demographics, merchant, and transaction characteristics:

- **BankNameSent**
- **BankNameReceived**
- **City**
- **DeviceType**
- **Gender**
- **Age Groups**
- **MerchantName**
- **PaymentMethod**

- **Purpose**
- **TransactionType**

All slicers are set to **All** by default, providing an immediate overview of the full dataset. When a slicer selection is changed, the visible chart updates accordingly, and the same selection remains active when switching between bookmarks.

Bookmark navigation (visual switcher)

A navigation strip (button-like tabs) is placed above the main visual area to control bookmarks. Each tab triggers a bookmark that changes which chart is displayed:

- **Line Chart Amount**
- **Column Chart Amount**
- **Line Chart Balance**
- **Column Chart Balance**

This approach provides a clean user experience: the layout remains the same, and only the targeted visual is swapped, enabling fast comparison between different chart types and metrics.

Visual: Transactions by Month for Year 2024 (Line)

The **Line** version is used to highlight the **trend** and month-to-month changes over the year. Data labels and markers support quick identification of peaks and dips.

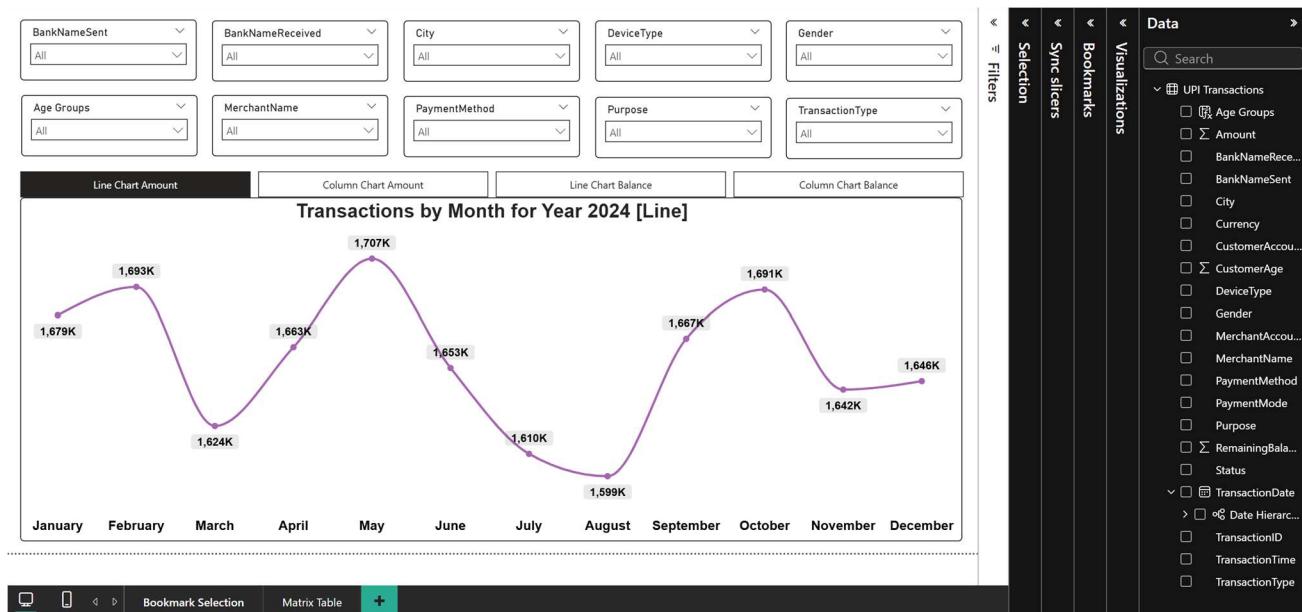


Figure 2. Bookmark Selection page – Line chart (Amount)

- **X-axis:** Month (January–December)
- **Y-axis:** Aggregated metric (Amount or Balance, depending on bookmark)
- **Purpose:** Trend tracking and pattern recognition across 2024

Visual: Transactions by Month for Year 2024 (Column)

The **Column** version is used for clearer **month-to-month comparison** and ranking (which months are highest/lowest). Data labels above the columns provide a quick numeric reference.

- **X-axis:** Month (January–December)
- **Y-axis:** Aggregated metric (Amount or Balance, depending on bookmark)
- **Purpose:** Comparing monthly values at a glance

Interaction and user experience

- **Slicers control the active visual** regardless of which bookmark is selected.
- **Bookmark switching does not reset filters**, ensuring consistent analysis context.
- The page supports exploratory analysis by letting users quickly toggle between:
 - trend view (**Line**) vs comparison view (**Column**)
 - transaction value (**Amount**) vs post-transaction metric (**Balance**)

This bookmark-based design reduces clutter (no need to show four visuals at once) while still providing multiple perspectives on the same monthly transaction behavior.

6. Matrix Table Page (City × Currency × Month)

This report page contains a **Matrix visual** that provides a compact, cross-dimensional view of transaction performance by **City**, **Currency**, and **Month**. The matrix is designed to support quick comparison of both **Amount** and **Remaining Balance** across multiple segments in a single table.

Insert image here

Figure X. Matrix Table – Monthly Amount and Remaining Balance by City and Currency.

(Place: *images/matrix-table.png* — source screenshot: */mnt/data/matrix.png*)

Page-level slicers

A consistent set of slicers is placed at the top of the page to filter the matrix dynamically:

- **BankNameSent**
- **BankNameReceived**
- **City**
- **DeviceType**
- **Gender**
- **Age Groups**
- **MerchantName**
- **PaymentMethod**
- **Purpose**
- **TransactionType**

These slicers allow users to narrow the matrix to specific customer segments, transaction characteristics, merchants, or routing banks while keeping the monthly structure unchanged.

Matrix structure and layout

The matrix is configured to show:

- **Rows:** Month (January–December)
- **Columns (hierarchy):** City → Currency
- **Values:**
 - Amount (aggregated total)
 - Remaining Balance (aggregated total)

This layout enables side-by-side comparison between cities and currencies for each month, while also providing two key measures in the same view.

Conditional formatting (heatmap effect)

The matrix uses **conditional formatting** (shaded purple gradient) on numeric cells to emphasize relative magnitude. This makes it easy to identify:

- Months with **higher/lower** transaction amounts
- Cities/currencies with **higher/lower** remaining balances
- Potential outliers or unusual patterns without scanning every number manually

Analytical use cases

- Compare monthly transaction amounts across cities (e.g., Bangalore vs Mumbai)
- Evaluate whether remaining balances follow the same seasonal pattern as amounts
- Spot dominant currency usage per city and month
- Quickly validate trends seen in charts using a detailed tabular breakdown

Project Summary

This Power BI project provides an interactive analysis of UPI transactions for the year 2024, combining trend visuals, bookmark-based navigation, and a detailed matrix view to support both high-level monitoring and deeper drill-down exploration. The report is built around a consistent slicer panel that enables fast segmentation by banks, city, customer demographics, merchant, payment method, purpose, and transaction type.

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Figure X. Bookmark Selection page – Line/Column switching for monthly trends (Amount/Balance).

(Place: *images/bookmark-selection-line.png* and/or *images/bookmark-selection-column.png*)

Insert image here

Figure Y. Matrix Table – Monthly Amount and Remaining Balance by City and Currency.

(Place: *images/matrix-table.png*)

Key features delivered

- **Unified filtering experience:** All pages share the same slicer set (BankNameSent/Received, City, DeviceType, Gender, Age Groups, MerchantName, PaymentMethod, Purpose, TransactionType), ensuring consistent analysis context across visuals.
- **Bookmark-driven UX:** A dedicated page uses bookmarks to switch between **Line vs Column** and **Amount vs Balance** views. This design reduces visual clutter while enabling quick comparisons from multiple perspectives.
- **Monthly trend monitoring:** The trend charts highlight seasonality and month-to-month changes, supporting fast identification of peak and low periods.
- **Cross-dimensional detail view:** The Matrix page aggregates **Amount** and **Remaining Balance** by **Month**, with columns structured as **City → Currency**, providing a compact multi-dimensional breakdown.
- **Customer segmentation:** A calculated column (**Age Groups**) supports demographic analysis through standardized age bands for slicers, legends, and axis grouping.

The final report enables stakeholders to:

- Monitor transaction performance over time
- Compare trends using different visual forms (trend vs comparison)
- Validate chart insights using a detailed matrix breakdown
- Segment results by key operational and demographic dimensions
- Identify patterns, outliers, and potential areas for further investigation