

# 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  $\leq 25$
- **A2:** Age **26–35** (because it's ">25 and  $\leq 35$ ")
- **A3:** Age  $\geq 36$

### 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.

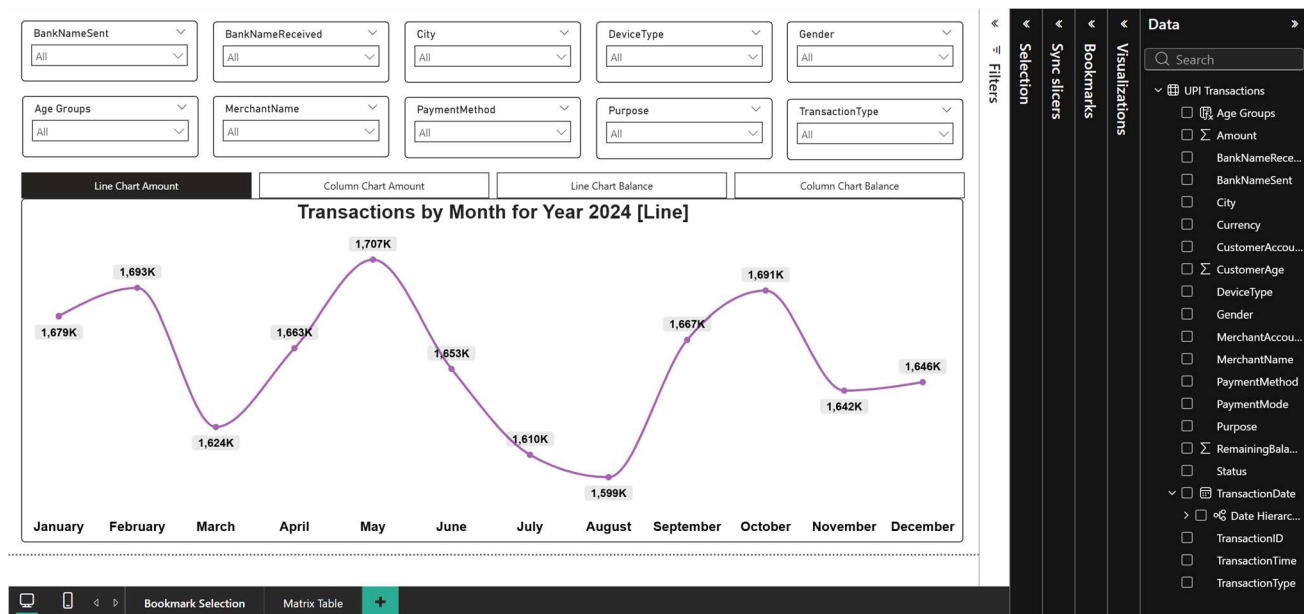


Figure 2. Bookmark Selection page – Line chart (Amount)



- **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.

Insert image here

**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