PhonePe Transaction Insights Dashboard

Comprehensive Data Analysis, EDA Findings, and Strategic Recommendations

Introduction

Digital payments have reshaped the Indian economy, and platforms like PhonePe have led this transformation. As digital infrastructure expands into semi-urban and rural regions, understanding transaction patterns and engagement becomes vital for strategic decision-making. This project explores PhonePe's transaction dataset to identify usage trends, user behavior, and geographic performance, presenting the insights through an interactive Streamlit dashboard.

Objective

The objective is to uncover patterns and insights that inform marketing strategies, user engagement tactics, product innovation, and insurance adoption plans. The analysis leverages structured datasets, SQL querying, and dynamic visualizations to empower decision-makers with contextual information across regions and timeframes.

Tools & Technologies Used

- Python : Core language for data analysis and dashboard integration.

- SQLite : Lightweight database for storing structured transactional records.

- Pandas & SQL : Used for merging datasets, running queries, and aggregating statistics.

- Matplotlib & Seaborn : Generated customized graphs and trend plots.

- Streamlit : Deployed the dashboard with interactive filters and query options.

Dataset Structure

The data is organized into three categories:

- Aggregated Tables : Contain overall stats by year, quarter, and state (transactions, users, insurance).

- Map Tables : Provide detailed breakdowns at the district level.

- Top Tables : Identify best-performing states/districts based on transaction metrics.

Each entry has fields such as count, amount, year, quarter, state, district, brand, and app opens. This enables slicing by geography, time, and user/device behavior.

Exploratory Data Analysis (EDA)

1. Transaction Trends

Steady year-over-year growth in transaction volume and value indicates rising trust and preference for digital payments. Seasonal peaks around festivals and year-end promotions reflect predictable behavior patterns. Temporal trend analysis also helps forecast future transaction load and infrastructure needs.

2. Top Performing States & Districts

Maharashtra, Karnataka, and Uttar Pradesh emerge as top states by transaction volume and amount. High-density urban centers like Mumbai, Bangalore, and Lucknow lead district-wise metrics, but semi-urban areas are growing rapidly, hinting at new market opportunities.

3. Brand vs Engagement

Device brands were analyzed to correlate transaction count and app opens. A few popular Android brands account for a significant share of high-engagement users. These insights can drive device-specific UI optimization and strategic brand collaborations.

4. Insurance Growth

PhonePe's insurance services show promising adoption in metro states like Delhi, Maharashtra, and Karnataka. However, several high-engagement states show relatively low insurance adoption—suggesting a lag in user trust or awareness, and a potential campaign focus.

5. App Opens vs Transactions

App opens serve as a proxy for user engagement. A high correlation was observed between opens and transaction activity, although a few states showed high opens but low transaction volume—flagging UX friction, language barriers, or value perception gaps.

Dashboard Features

- Multi-view layout covering Transactions, Users, Brands, Insurance.

- Dynamic filters by year, quarter, state, and brand.

- Interactive visuals and legends for enhanced storytelling.

- Custom SQL query support for advanced business users.

- Responsive layout built using Streamlit components.

Business Use Case Coverage

- User Engagement : Measured through app opens and transaction frequency.

- Product Development : Insights on preferred payment modes and active devices.

- Marketing Strategy : Regional engagement patterns and seasonal spikes guide promotional planning.

- Insurance Growth : Identify regions for policy awareness drives.

- Benchmarking : Track performance across time, region, and device type.

- Forecasting : Use historical behavior for future planning and resource allocation.

Strategic Recommendations

Enhance Marketing in Emerging States

Identify states with digital infrastructure but low usage to run regional campaigns. Use success patterns from top states as reference models for new growth zones.

Expand Insurance Footprint

Target semi-urban districts where users are transacting but not buying insurance. Launch region-specific insurance products with contextual messaging.

Build Device Partnerships

Leverage data on top-performing brands to develop exclusive offers, embedded wallet setups, or OEM-level incentives.

Localize and Optimize UI

Use regional app behavior data to tailor language, design, and workflows. Simplify transaction flows for high-app-open, low-conversion districts.

Why No Machine Learning?

This is an EDA and business intelligence project. The dataset is aggregate-level and not user-specific. As a result, it's more appropriate for pattern recognition and not predictive modeling. However, this project forms a strong foundation for future ML-driven applications like churn prediction and fraud detection.

Outcome

- Built a robust, interactive dashboard powered by clean data pipelines.

- Generated over 20 actionable visualizations and insights.

- Provided business-aligned recommendations for marketing, product, and insurance.

- Delivered a ready-to-use tool for stakeholders to explore PhonePe transaction patterns.

Conclusion

This project successfully demonstrates the power of exploratory data analysis (EDA) in uncovering patterns in digital payment behavior using PhonePe's publicly available datasets. Through carefully structured data pipelines and a visually interactive dashboard,

we derived actionable insights across multiple domains including user engagement, geographic trends, brand-device influence, and insurance adoption.

Our findings not only highlight current transaction dynamics but also inform future marketing, product, and regional strategy. The interactive Streamlit dashboard allows stakeholders to explore trends in real time, making the insights both accessible and scalable. As digital adoption accelerates across India, tools like this dashboard can guide timely and impactful decisions.

This analysis lays the groundwork for future extensions, such as incorporating user-level data for predictive modeling and integrating external factors like economic indices to enrich understanding.

Next Steps

- Integrate real-time API data to keep the dashboard dynamic.

- Incorporate user-level data (if available) for clustering or churn prediction.

- Merge PhonePe insights with broader economic or demographic datasets for deeper business context.