Retail Network Performance Analysis

Operational Efficiency, Risk Detection & Strategic Forecasting

Prepared For: Operations Directorate
Prepared By: VIPIN KUMAR
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PROJECT RESOURCES & SOURCE CODE

This analysis is fully reproducible. Click the links below to access the live dashboard or inspect the underlying Python code.

1. • Open Interactive Dashboard

(Best for Stakeholders: Zoom, Filter, Explore Data)

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2. • View GitHub Repository

(Access raw data, .py scripts, and version history)

3. • Run in Google Colab

(Execute the Python code in your browser)

1 Executive Summary

This report details the findings of a comprehensive analysis of **120+ retail branches**. By applying Machine Learning clustering and volatility analysis, we have segmented the network to identify high-risk assets and capital drains.

- **Operational Strength: Delhi NCR** remains the most robust region, showing the highest median performance.

- **Critical Risk:** The **Pune Region** suffers from extreme volatility. While it contains high performers, the inconsistency indicates a lack of standardized SOPs.

- **Capital Drain:** Approximately **12% of the network** (primarily in Thane/Mumbai) are classified as "Zombie Stores" ($< 5\%$ avg), consuming budget with near-zero return.

- **Anomaly Alert:** A 16-sigma event was detected at *Haryana (M G Road)*, requiring immediate audit.

2   Strategic Segmentation

2.1   Risk vs. Reward Mapping

We categorized every store based on two metrics: **Performance** (Y-Axis) and **Instability** (X-Axis).
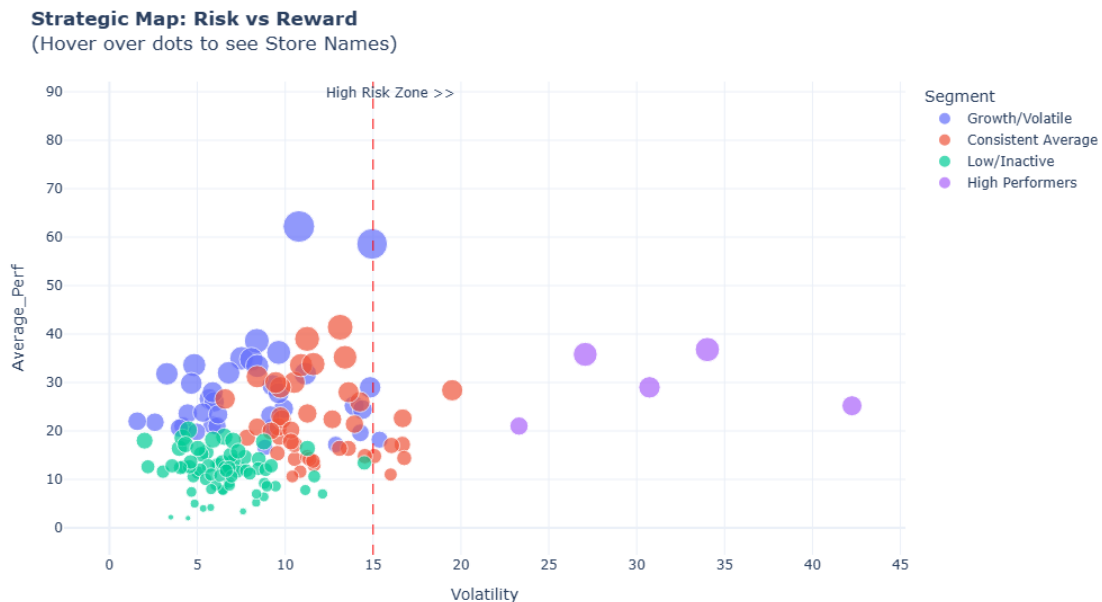

Figure 1: Strategic Map: Ideally, stores should be in the top-left (High Perf, Low Risk).

INSIGHT: THE "VOLATILE" CLUSTER

The purple dots on the far right represent our most dangerous assets. These stores (mostly in Pune) achieve high numbers occasionally but are unpredictable. **Action:** Do not rely on these stores for consistent monthly revenue forecasting.

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3   Regional Health & Efficiency

3.1   The Battle of Territories

Comparing median performance reveals the systemic strength of Delhi compared to the struggles in Thane.
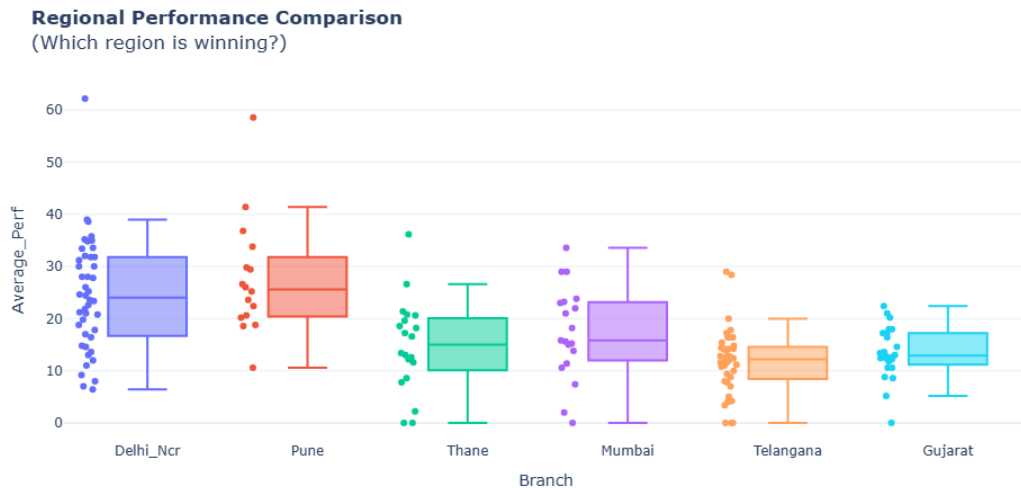
Figure 2: Regional Boxplot: Note Delhi's compact, high-positioned box indicating consistency.

3.2   Cost Optimization: The "Zombie" Stores

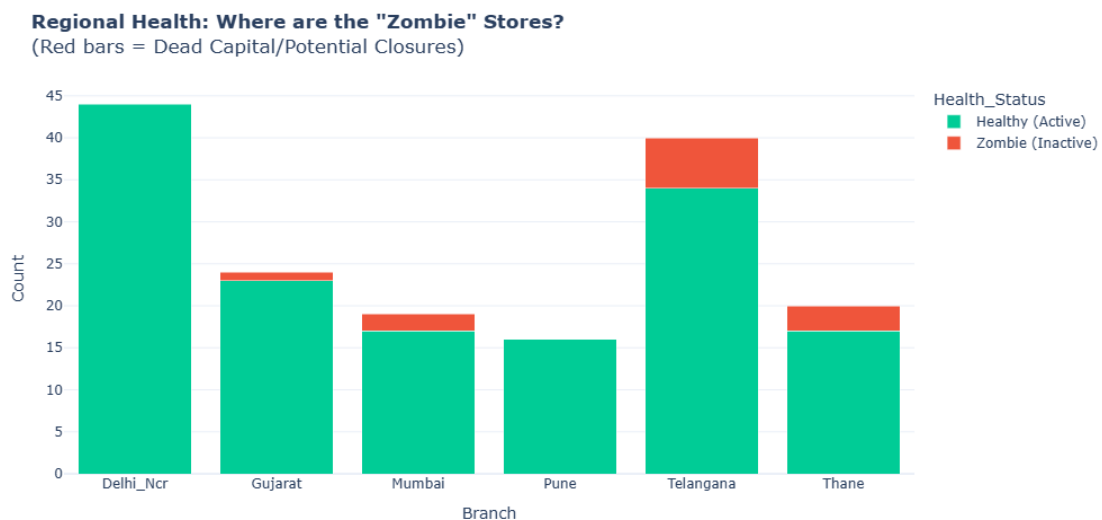We identified stores that are statistically "Inactive" (Red Bars).

Figure 3: Dead Capital Analysis: High density of inactive stores in Thane and Telangana.

STRATEGIC RECOMMENDATION

The red portions of the bar chart represent **Dead Capital**. We recommend a 90-day closure or relocation plan for the 35+ stores identified as "Zombies" to free up OpEx for the high-performing Delhi cluster.

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4   Operational Deep Dive

4.1   The "Pune" Volatility Trap

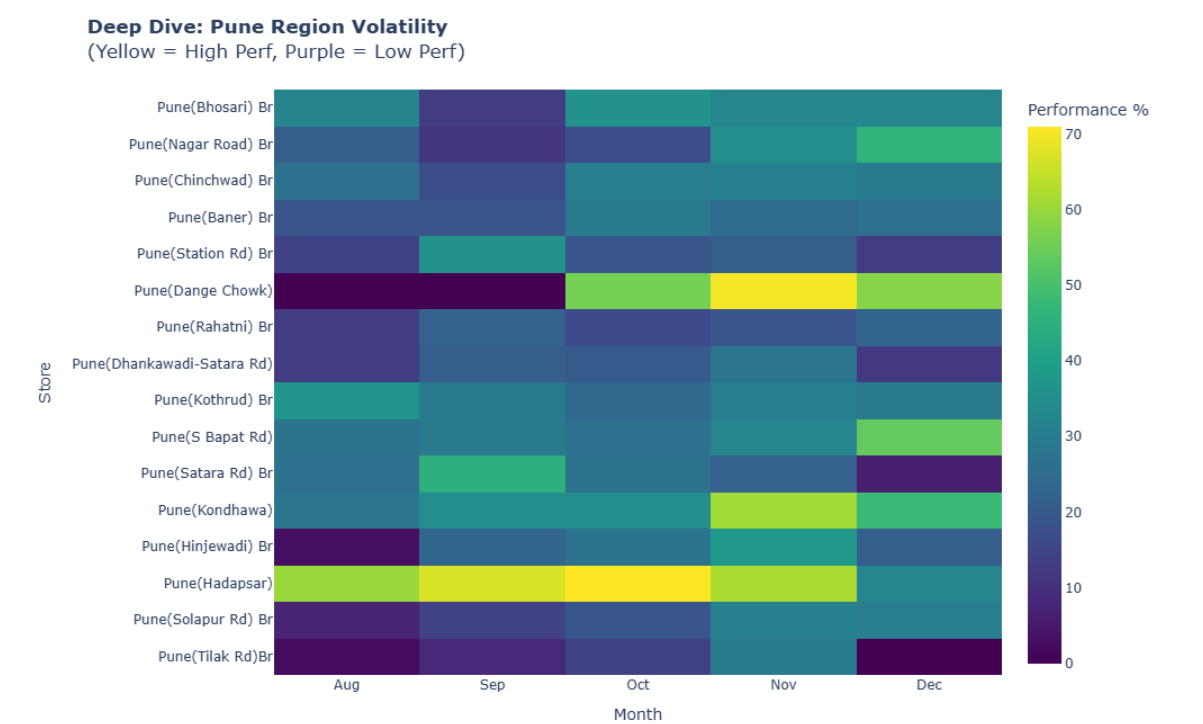A heatmap analysis was conducted to visualize the inconsistency in our most volatile region.

Figure 4: The "Checkered" Pattern: Yellow blocks (Success) are randomly dispersed among Purple blocks (Failure), proving operational instability.

4.2   Reliability Analysis: The Anchors

While Pune is volatile, we identified our most reliable stores to serve as training hubs.
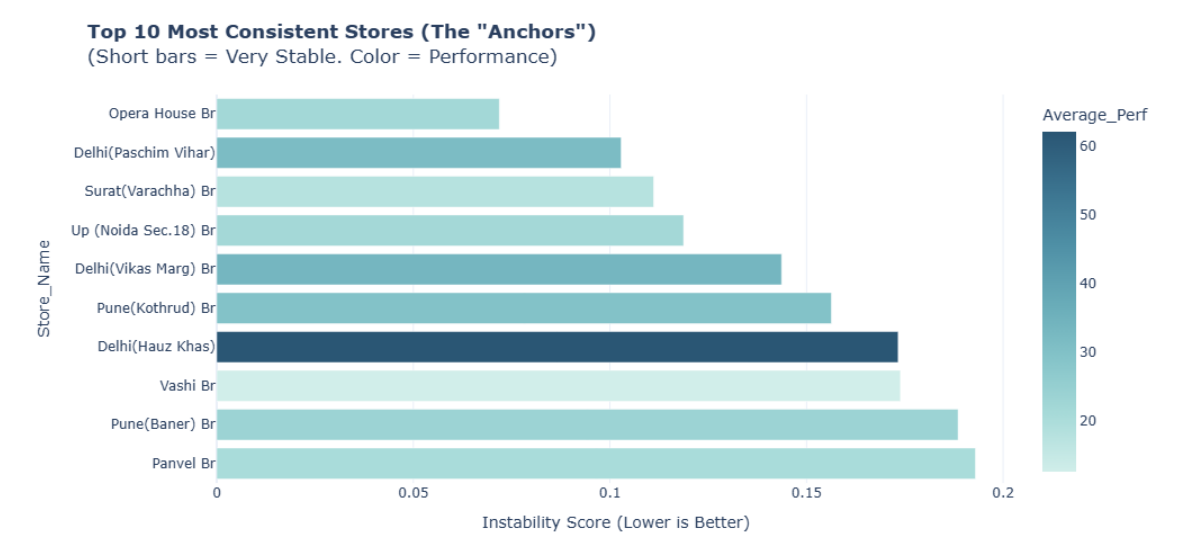
Top 10 Most Consistent Stores (The "Anchors")
(Short bars = Very Stable. Color = Performance)

Figure 5: Top 10 Most Consistent Stores: These locations have the lowest standard deviation.

> **TRAINING OPPORTUNITY**
>
> *Delhi (Hauz Khas)* and *Opera House Br* are our "Anchors." **Action:** Deploy managers from these stores to conduct training workshops for the struggling Pune branches.

5   Trend Anomalies & Forecast

5.1   The "Hockey Stick" The Crash

We isolated the most extreme movements in the network to detect potential data errors or market shifts.
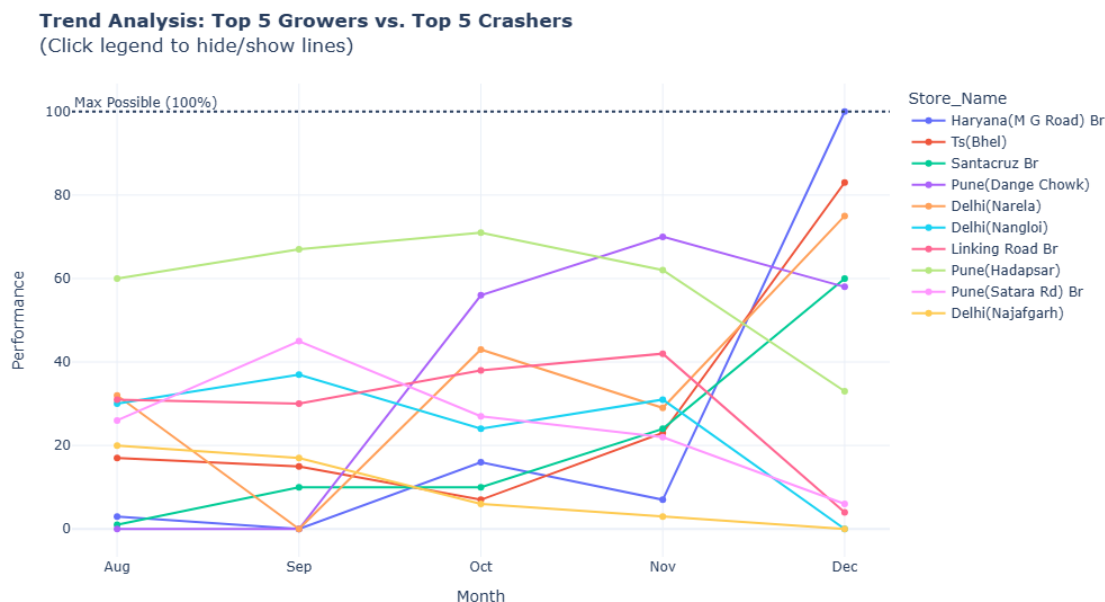

Figure 6: Trend Lines: Note the vertical blue line (Haryana M G Road) hitting 100%.

5.2   Strategic Action Plan

Based on the visual evidence, the following immediate actions are recommended:

1. **Audit Haryana (M G Road):** The 100% spike visible in Figure 5 is a statistical anomaly. Verify data integrity before paying incentives.

2. **Supply Chain Re-allocation:** Shift inventory from the "Zombie Stores" identified in Figure 3 (Thane) to the "Anchor Stores" identified in Figure 4.

3. **Performance Improvement Plan (PIP):** The "Crasher" stores (e.g., Linking Road Br) have trended down for 3 consecutive months. Immediate intervention is required.

*** End of Report ***