Data-Driven Analysis of Supply Trends and Economic Indicators

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Introduction

- This project focuses on analyzing supply composition, asset valuation trends, and economic activity through e-way bills.
- Using Tableau, the goal is to derive insights from visual analytics and assess the economic landscape, especially around the COVID-19 period.

Objective

- Analyze annual and percentage composition of different supply types.
- Study the fluctuation in asset values over time.
- Track and interpret trends in e-way bill generation.
- Evaluate the impact of COVID-19 using daily economic indicators.
- Present all findings using interactive Tableau dashboards.

Dataset Description

- The data source is a federated dataset integrating multiple economic indicators.
- Includes:
  - Supply type distribution (annual and percentage)
  - Asset value data (over several years)
  - Daily economic activity linked to COVID-19
  - Volume and value of e-way bills

Data Cleaning & Preprocessing

- Missing values were cleaned or interpolated as needed.
- Dates were formatted uniformly for time series charts.

- Fields were derived for easier comparison (e.g., percentages, moving averages).
- Outliers and sudden spikes were smoothed using calculated fields like 7-day moving averages.

Questions

1. How Has the Volume & Value of Supplies Changed Over Time?

The Tableau visualizations tracking the value of assets over the years and the number of e-way bills clearly show that both volume and value have generally increased over time, aside from sharp declines during the COVID-19 pandemic. Post-2021, both metrics recovered, indicating resilience and gradual economic stabilization. The asset value charts especially highlight upward trends with brief stagnation or dips during uncertain economic periods.

2. What Is the Balance Between Incoming vs. Outgoing Supplies?

The “Annual Supply Composition by Type” and “Supply-Type Percentage” dashboards provide insights into this balance. A consistent pattern of predominance in outgoing (interstate outward and intrastate outward) supplies suggests a stronger export-driven logistics flow. Incoming supply types, although present, contribute a smaller share, possibly reflecting regional supply-chain dependencies or consumption patterns in Meghalaya.

3. How Do Different Supply Types Compare in Transaction Efficiency?

Efficiency can be inferred by comparing volume (number of e-way bills) with the value of assets across supply types. Supply types with higher value but fewer e-way bills likely represent more efficient (high-value-per-transaction) operations. The dashboards indicate that some types like “interstate outward” carry higher values with relatively moderate transaction volume, suggesting efficiency. Conversely, “intrastate inward” appears frequent but lower in value, implying smaller, more numerous transactions.

4. How Efficient Are Meghalaya’s Supply Chains?

Meghalaya’s supply chain efficiency is reflected in the quick rebound of e-way bill activity after COVID disruptions, as shown in the daily and 7-day average charts. Despite being a geographically challenging state, the steady growth in asset value and quick recovery post-lockdowns suggest operational robustness. However, the relatively lower proportion of incoming supplies may point to dependency on external sources, offering room for localized production enhancement**s.**

Key Dashboards & Visualizations

Annual Supply Composition by Type

- Shows supply type distribution by year.

- Helps identify which supply types grew or declined.

Supply-type Percentage

- Visualizes relative proportions of supply types.
- Useful for category-wise comparison.

Daily Values vs 7-Day Moving Average

- Compares raw daily values with smoothed 7-day averages.
- Useful to analyze COVID-19-related economic changes.

Highest Value of Assets

- Highlights peak asset value periods.
- Helps track when the economic activity reached its highest.

Value of Assets by Years

- Year-on-year bar/line chart showing changes in asset values.
- Allows for trend detection across years.

Number of E-Way Bills

- Represents logistics or transportation activity.
- Used as an economic activity indicator.

COVID-19 Analysis

- Special dashboard focusing on pandemic periods.
- Cross-maps economic metrics with pandemic timelines.

Insights & Analysis

- Supply types have shown significant changes, likely influenced by policy and market conditions.
- Asset values showed general growth with minor dips during economic uncertainty.
- E-way bills dropped sharply during COVID lockdowns but recovered post-pandemic.
- Moving averages gave a clearer view of trends during volatile periods, especially in 2020–2021.

Conclusion

- Tableau helped transform complex datasets into meaningful insights.
- Clear correlations were observed between supply behavior and external events like COVID-19.
- E-way bill trends effectively mirrored national-level economic activity.
- The dashboards can be useful for both policymakers and business stakeholders.

Recommendations

- Stakeholders should regularly monitor supply-type changes for strategic planning.
- Businesses can align their asset allocation based on annual value trends.
- E-way bill tracking can act as a real-time economic health indicator.