

# Final Report: Factory Performance and Shipping Efficiency Analysis

## 1. Objective and Visualization Approach

Our objective was to analyze factory performance and shipping efficiency to identify logistical bottlenecks and regional sales imbalances. We developed a comprehensive Tableau dashboard integrating maps, histograms, scatter plots, heatmap, pie charts, and Pareto charts. Each visualization was tied to a key business concern, such as average shipping distance, geographic customer concentration, or sales consistency across factories.

Each chart was carefully selected to support the core business questions:

- **How can we reduce shipping costs?**
- **How can we maximize sales coverage?**
- **How can we identify inconsistent sales patterns across factories?**

For example:

- **Maps** clarify geographic reach and regional distribution;
- **Histograms** display distribution patterns of shipping distances and order volumes;
- **Scatter plots** reveal relationships between shipping cost and revenue;
- **Heatmaps** highlight sales performance intensity across states and factories. This visual structure ensures that insights align directly with operational strategy.
- **Pie charts** visualize the proportion of sales or complaints by region or channel;
- **Pareto charts** help prioritize high-performing products.

## 2. Calculated Fields

We created several calculated fields to enable deeper insights and cleaner visualizations:

- **Region Highlight:** Region = [Select Region] — used to visually highlight the selected region in the pie chart without filtering out the others.
- **Sales Variability:** STDEV([Monthly Sales]) — used to assess sales consistency across products.
- **Average Monthly Sales:** AVG([Monthly Sales]) — used to evaluate performance in the sales consistency scatter plot.
- **Running Sales:** RUNNING\_SUM(SUM([Sales])) — used in the Pareto chart to calculate cumulative sales.
- **Running % of Total:** SUM([Sales]) / TOTAL(SUM([Sales])) — calculates each region or product's contribution to total sales.
- **Shipping Distance (Miles):** Calculated from coordinates to evaluate fulfillment distance.

### 3. Parameters

We created the following parameter to improve interactivity:

- **Select Region**
  - Type: String
  - Allowable Values: List (Atlantic, Gulf, Interior, Pacific)
  - Usage: Paired with Region Highlight calculated field to dynamically highlight the selected region in the pie chart without removing context. This allows users to focus on a specific region while maintaining visibility of others.

### 4. Level of Detail and Table Calculations

- Used aggregate and table calculations to control granularity, such as averaging shipping distances by factory and calculating sales variability by product.
- Created a Pareto chart with **running sum** and **% of total** table calculations to show cumulative contribution of top-selling candies.

- Applied average reference lines and trend lines in scatter plots for enhanced interpretation.

## 5. Dashboard Interactivity

We implemented **dashboard actions** to enhance user interactivity. Specifically:

- **Highlight Actions:** Selecting a region on the map highlights corresponding states and regions in other charts, helping users visually trace geographic relationships.
- **Filter Actions:** Clicking on the customer location map dynamically filters the heatmap to show only relevant sales distribution. This allows decision-makers to drill into regional performance without switching views.
- **Parameter Control:** Pie chart uses a parameter to dynamically highlight a selected region while showing overall distribution.

These actions were configured using Tableau’s “Add Action” feature, with the “Select” option enabled to trigger filtering or highlighting based on user interaction.

## 6. Recommendations

- **Optimize shipping efficiency:** Factories like Lot’s O’ Nuts show longer average shipping distances; customer reassignment should be considered to reduce cost.
- **Balance factory workloads:** Some factories are underutilized in certain states—route rebalancing is recommended.
- **Strategic expansion:** Use heatmap insights to identify underserved regions and plan new facility locations.
- **Monitor sales consistency:** Use scatter plots to identify products with erratic sales that may need further promotion or analysis.

## 7. Conclusion

Our visualizations provided actionable insights into shipping logistics and sales performance. By incorporating calculated fields, parameters, and dashboard actions, we created an interactive and insightful tool for strategic planning. Future improvements could include real-time data integration and performance forecasting models.