

# Power BI Project Report: Ecommerce Sales & Shipping Analysis

## Executive Summary

This Power BI dashboard project delivers an end-to-end analysis of ecommerce sales, customer behavior, product performance, shipping costs, and profitability across the United States. The solution empowers stakeholders to explore data by region, state, and product, optimize product selection, and develop cost-effective shipping and inventory strategies.

## Project Objectives

- Analyze total sales, profit, and shipping costs across states and regions.
- Identify the most profitable products and categories.
- Visualize customer distribution, purchase quantity, and lifetime value (LTV) by state.
- Reveal opportunities for shipping savings and operational optimization.
- Enable data-driven product, pricing, and inventory decisions.

## Data Overview

- Source: US ecommerce transaction records (24,404 rows).
- Metrics: Invoice counts, customer IDs, product descriptions/categories, quantity, sales, profit, shipping costs, state, region.
- Visuals: Geographical maps, bar/column charts, tables, profit margin graphs, market basket and quantity analyses.

## Methodology

- Data cleaning: Filtered invalid/missing customer & sales records; standardized categories and product names.
- DAX Calculations: Created custom KPIs for profit, LTV, quantity averages, shipping analysis, and category breakdowns.
- Visual Storytelling: Designed interactive visuals for granular product drill-downs, regional exploration, and scenario (“what-if”) testing.

## Key Analytical Results & Insights

### 1. Customer Distribution & LTV by State

24404

Total\_Rows

24404

Count of Invoice No

State	Count of Customer ID
Alabama	41
Alaska	11
Arizona	94
Arkansas	17
California	598
Colorado	86
Connecticut	55
Delaware	17
District of Columbia	12
Florida	343
Georgia	109
Hawaii	12
Idaho	28
Illinois	192
Indiana	82
Iowa	32
Kansas	36
Kentucky	50
Louisiana	41
Maine	22
Maryland	98
Massachusetts	129
Michigan	88
Minnesota	75
Mississippi	21
Missouri	64
Montana	15
Nebraska	19
Nevada	36
New Hampshire	24
New Jersey	163
New Mexico	26
Total	4372

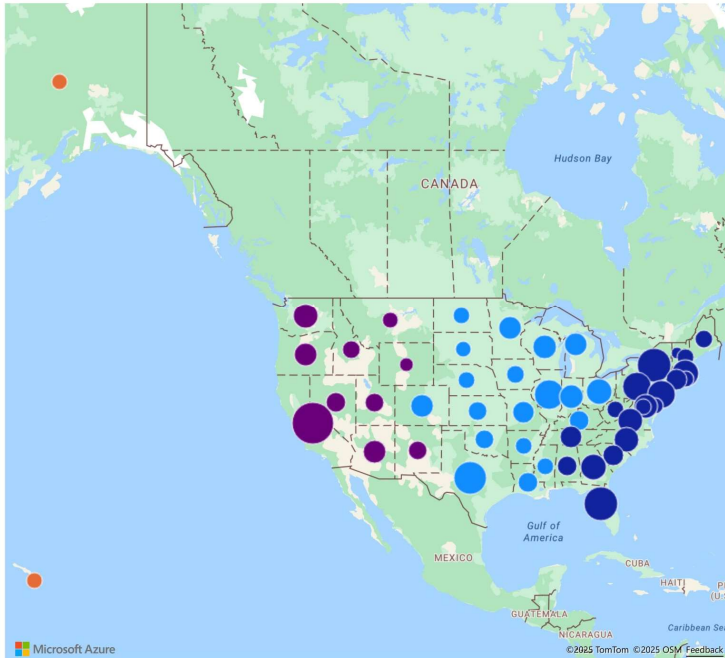
- Total unique customers: 4,372, spread across all US states.
- Top states for customer count: California, Florida, Illinois, New Jersey, and Massachusetts.

- LTV leaders: North Dakota, Delaware, Nevada, Massachusetts, Louisiana, New Mexico.

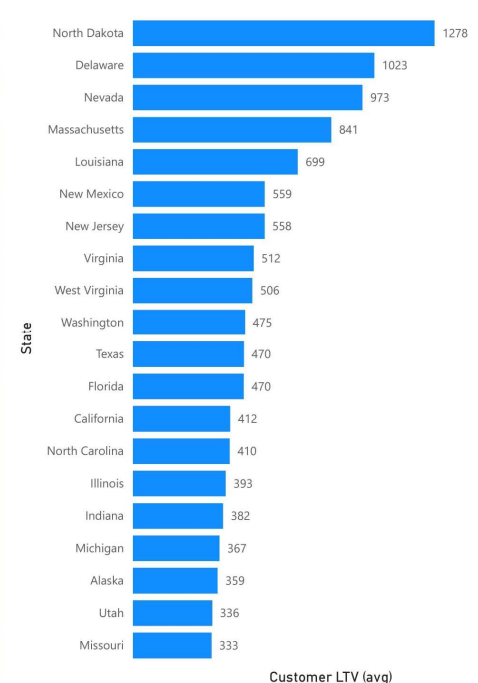
## 2. Regional Breakdown & Average Product Quantities

Total Customers by Region and State

Region ● Central ● East ● Other ● West



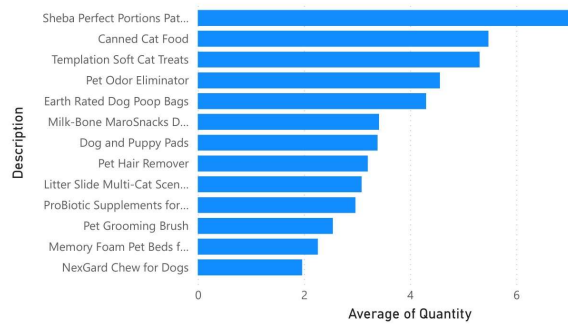
Customer LTV (avg) by State



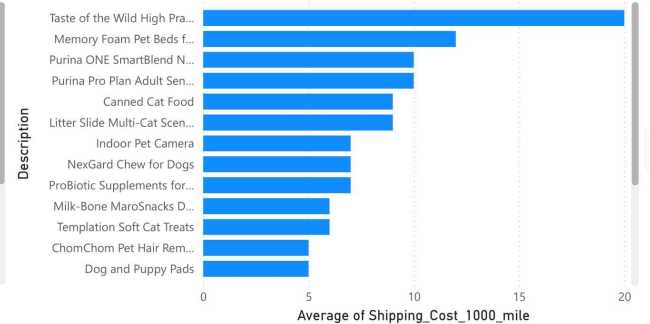
- Sales and customer numbers can be explored by region (Central, East, West, Other).
- Key product categories by quantity: Pet Food, Cleaning Supplies, Disposables lead with highest average purchases per transaction.

### 3. Product & Shipping Cost Analysis

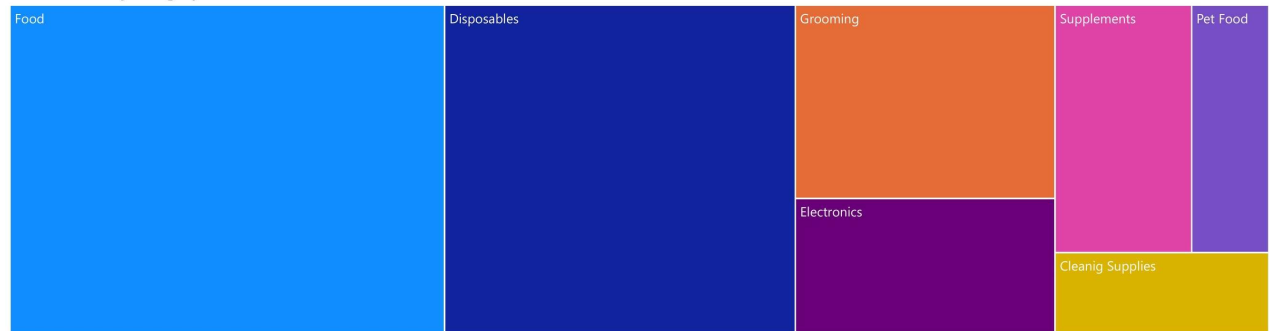
Average of Quantity by Description



Average of Shipping\_Cost\_1000\_mile by Description



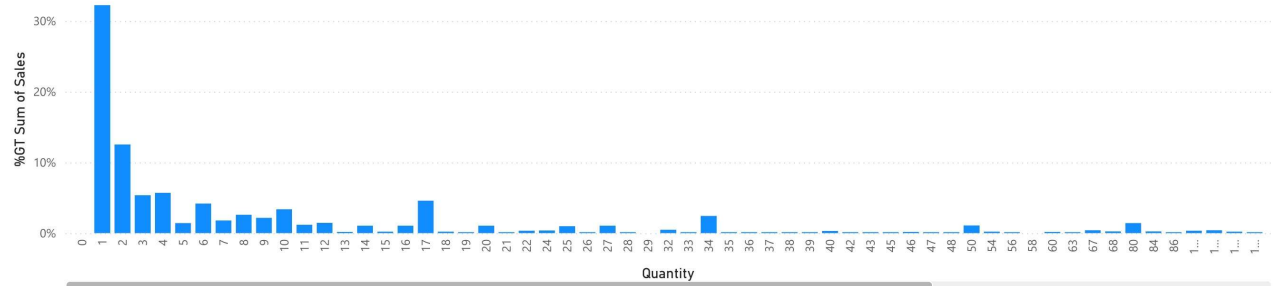
Sum of Sales by Category



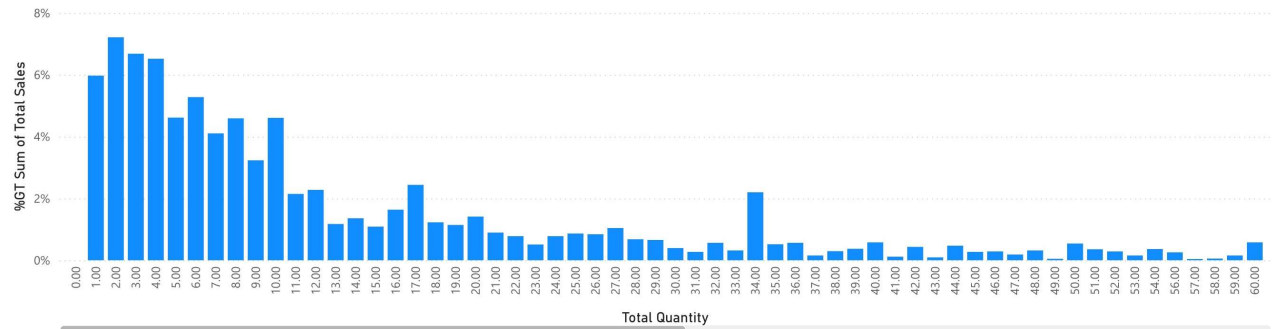
- “Taste of the Wild High Prairie” and “Memory Foam Pet Beds” drive highest average shipping costs across the nation.
- Product-level exploration enables identification of items contributing most to logistics expense.

## 4. Category and Sales Performance

%GT Sum of Sales by Quantity

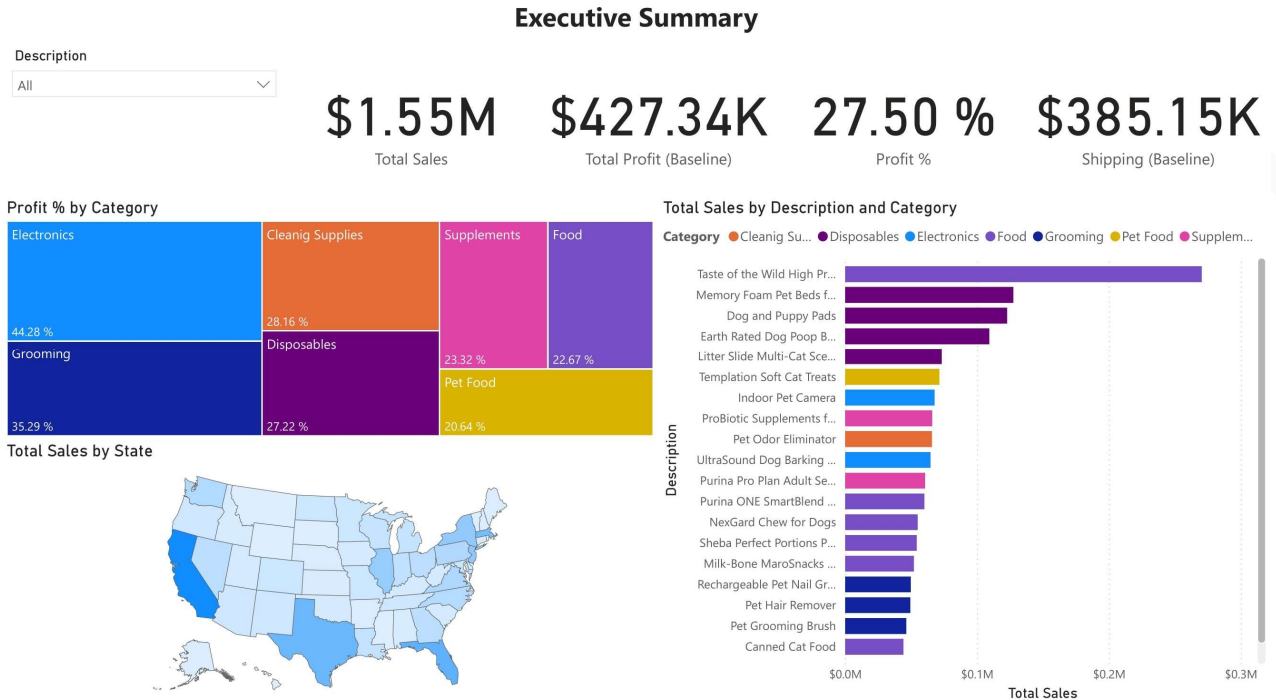


%GT Sum of Total Sales by Total Quantity



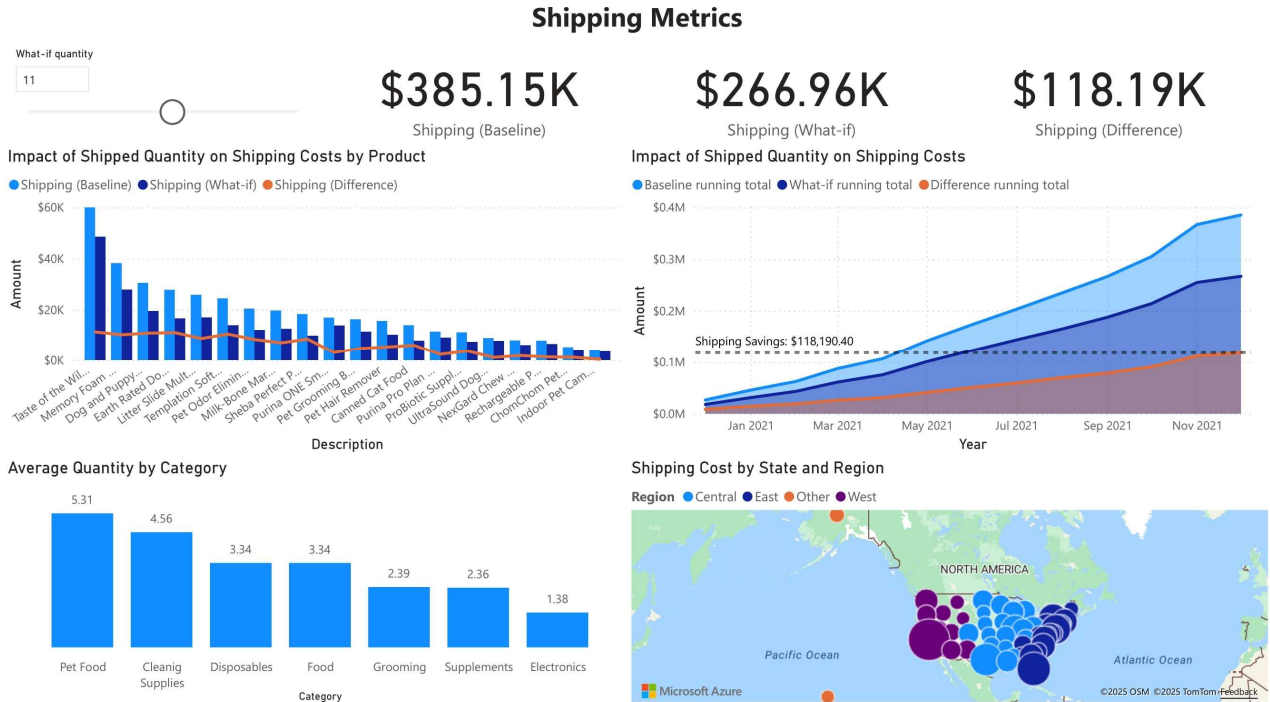
- Strongest product categories by sales: Pet Food, Cleaning Supplies, Disposables, Grooming, Supplements, Electronics.
- % of total sales and purchase quantity reveals both high-volume and high-margin items.

## 5. State-Level Sales & Profitability



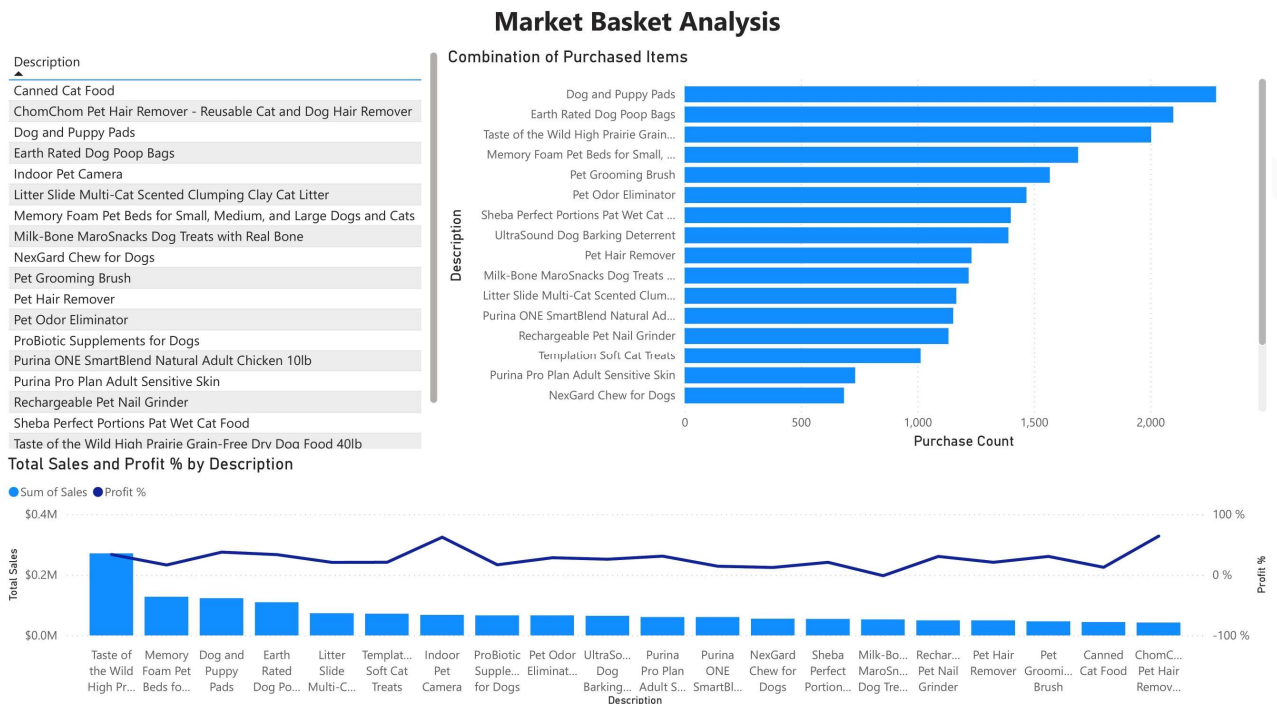
- Total Sales: \$427.34K | Total Profit (Baseline): \$1.55M | Profit Margin: 27.5%
- DC, CA, NY, FL, TX lead the country in dollar sales.
- Profit % is highest in Electronics and Grooming, with consistent performance in Cleaning Supplies and Food.

## 6. What-If Shipping Cost Scenario Analysis



- What-if scenario: adjusting shipped quantity delivers shipping savings of \$118,190.40.
- Yearly shipping trends visualized—shows how operational changes can compress logistics costs.

## 7. Market Basket & Item Analysis



- Basket analysis: “Dog and Puppy Pads,” “Poop Bags,” “Cat Food,” “Pet Beds” are purchased most frequently together.
- Product-level breakdown: shows profitability and purchase count for inventory prioritization.

## Technical Implementation

- Advanced DAX measures for customer LTV, profit%, per-state and per-category KPIs, and what-if shipment scenarios.
- Model uses multiple related tables and custom columns for slicing product, time, and region.
- Interactive filters: users can explore by category, region, specific product, or time window.



## **Recommendations & Business Value**

- Focus marketing/resources on high-LTV states for growth and customer retention.
- Prioritize inventory for most profitable and high-frequency items.
- Use what-if shipping analysis to renegotiate rates, consolidate shipments, and optimize costs.
- Tailor product offerings by top category and region based on demand signals.

## **Conclusion**

This Ecommerce Analysis dashboard demonstrates how advanced analytics and business intelligence tools convert raw transaction data into actionable insights that drive sales, profitability, and operational efficiency for online retail.