University of Niagara Falls Canada

Master of Data Analytics (Spring 2025)

Spring 2025 Advanced Data Visualization (CPSC-600-1)

Advanced Data Visualization Problems Assignment Part 2

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Advanced Data Visualization Problems Assignment Part 2

Interactive Dashboard Design

1.0 Objective

This analysis intends to build an interactive dashboard that provides rich understanding into global sales, profit margins, shipping performance, and product metrics. The dashboard allows users to:

- Measure key business KPIs, such as profit, sales, delivery speed, and customer actions.
- Explore sales trends and delivery times by region and time.
- Segment or filter by product category, delivery status, region, and year.
- Identify which sub-categories are driving profitability, along with the customers driving them.

2.0 Data Import & Exploration
- After uploading the data into Tableau Sets parameters and calculated fields were used.
- data structure explore columns included: Order Date, Ship Date, region, category, sub-category, profit, sales, discount, shipping cost, and customer name.
- developing customers patterns was easily accomplished through sales parameters, and in turn led to values sales filter by setting it through parameters.
- profit by order, sales by customer, and customer and profit ratio were calculated as derived fields by way of the calculated fields.

Profit	Sales	Profit Ratio	Avg. Delivery Duration (Days)	Avg. Discount	Avg. Shipping Cost	Profit per Order	Sale per Customer	Quantity	Total Order
$1,449,640	$12,575,574	11.5%	4	14.4%	$26	$58	$15,818	177,479	24,834

3.0 Apply Complex Filters & Sorting

Filters Implemented:

- Category Filter: Furniture, Office Supplies, Technology.

- Delivery Status Filter: Delayed, On-Time (based on calculated fields comparing Ship Date and Delivery Date).

- Region Filter: Supports multiple selections like EMEA, APAC, NA, etc.

  - Year Filter: Extracted from Order Date to enable filtering by year (2011–2015).

Category
- ☑ (All)
- ☑ Furniture
- ☑ Office Supplies
- ☑ Technology

Delivery Status
- ☑ (All)
- ☑ Delayed
- ☑ On Time

Region

(Multiple values) ▾

Metric Selector

Sales ▾

Year of Ship Date
- ☑ (All)
- ☑ 2011
- ☑ 2012
- ☑ 2013
- ☑ 2014
- ☑ 2015

3.1 Map shows: The delivery duration varies significantly across regions

Actionable Insight:

- There are many variances in time to delivery and there are some states even in the same Greater area, that have perpetual longer average time to delivery intervals (4 to 6 days) mainly, in South America, parts of Africa, and Eastern Europe. In contrast, there is a quicker delivery time response in Japan, United States, and Australia (mostly 3 to 4 day time frame).
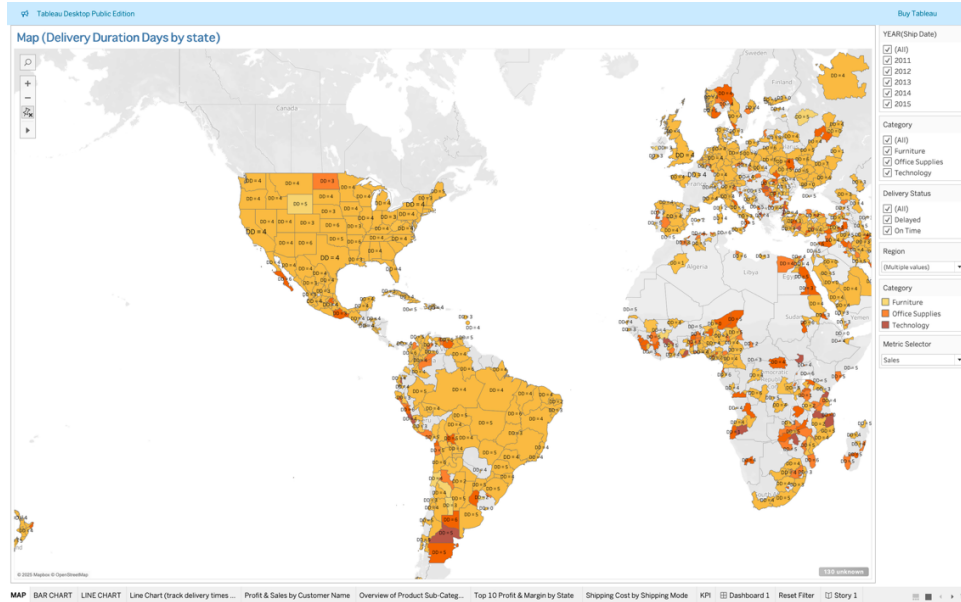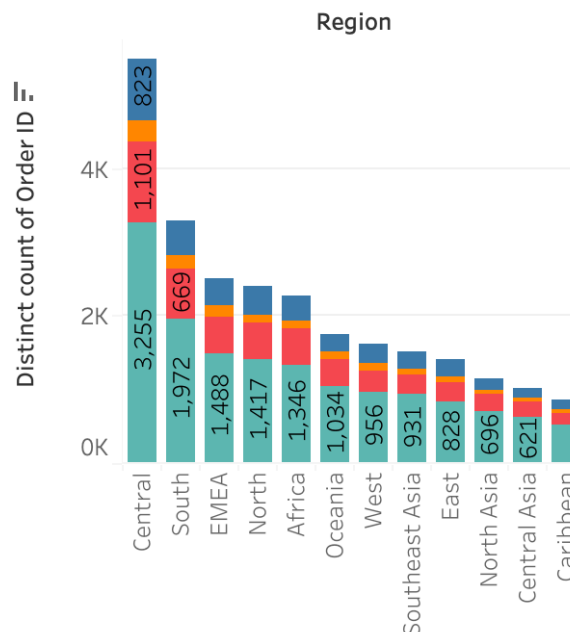
3.2 Bar Chart :

Actionable Insight:

o   The Central region is the highest region in shipment volume, with over 5,000+ unique orders and using mostly Standard Class and Second Class. The regions with the lowest shipment volume are Caribbean, Central Asia, and North Asia.

**3.4 Line Chart : Track Delivery Times over Month**

Actionable Insight:

Average delivery time is generally stable month to month but varies widely based on shipping method. Here are shipping method delivery time trends:

- Standard Class: ~5 days — consistently the slowest ship method.
- Second Class: ~3.2-3.4 days — moderate delivery time.
- First Class: ~2.2 days — quick and stable delivery time.
- Same Day: <0.5 days — consistently the fastest, almost as if to deliver immediately.

Monthly observations:

- Only a slight dip in Standard and First Class delivery times in July and October, likely a byproduct of working towards an optimized operation during our peak season during these months or a downturn in package demand.
- Same Day delivery times maintained a consistent near-zero variation - likely related to the controls surrounding the Same Day delivery process.

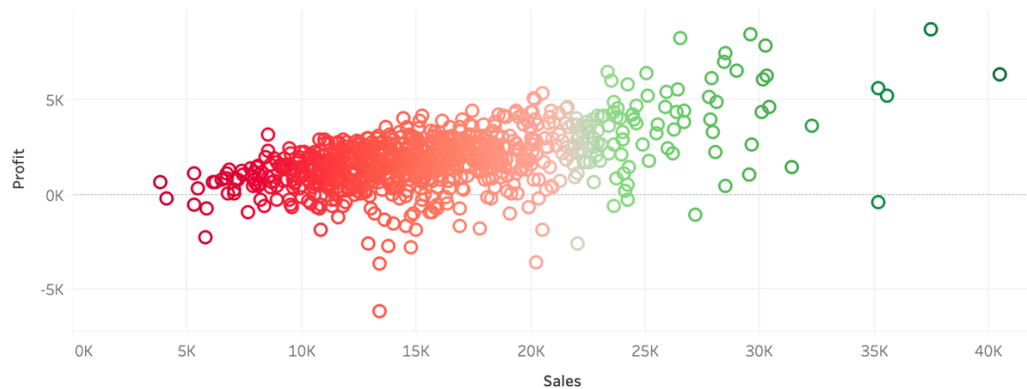## Line Chart (track delivery times over Month)
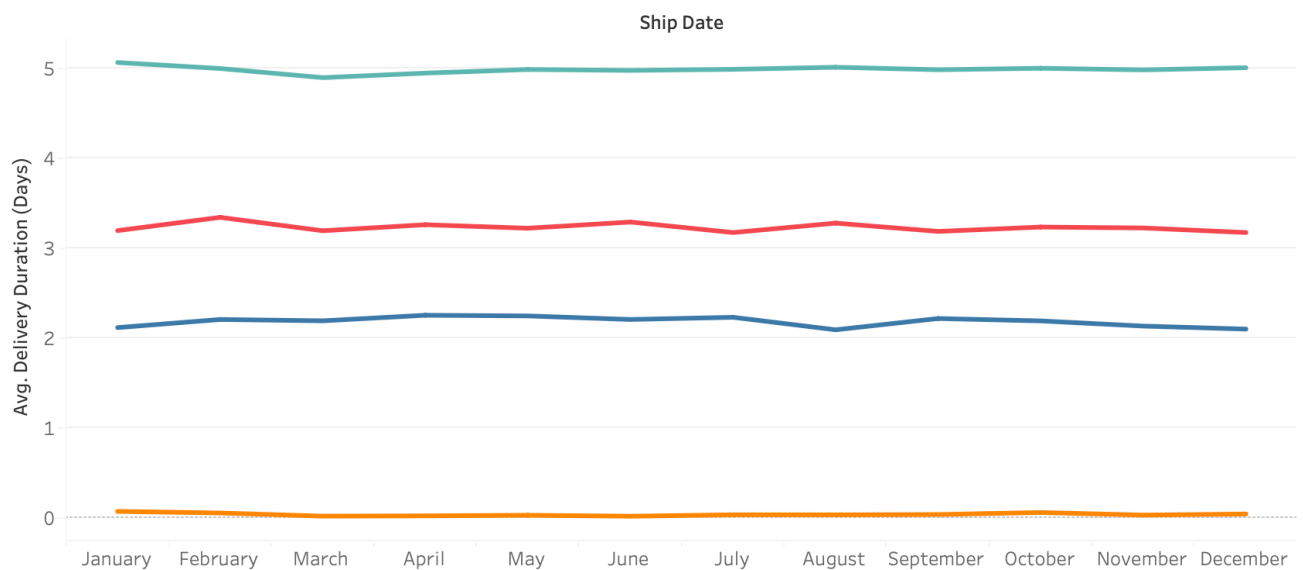
4.0 Advanced Visualizations

4.1 Scatter Plot

- Sales Scatter Plot (Sales vs. Profit) color-coded by profit margin and sorted to highlight high-value customers.

Profit & Sales by Customer Name

4.2 Table shows Overview of Product sub-categories

- The product sub-categories show varying performance in terms of sales, profit, and effciency

Overview of Product Sub-Category

| Sub-Category	Sales	Profit	Profit Ratio	Total Order	Quantity	Avg. Discou..
Accessories	744,764	128,331	17%	2,871	10,904	12%
Appliances	1,003,124	139,447	14%	1,671	6,048	14%
Art	367,972	57,041	16%	4,312	16,172	12%
Binders	458,822	71,664	16%	5,335	21,297	18%
Bookcases	1,460,838	160,582	11%	2,271	8,278	15%
Chairs	1,498,478	139,540	9%	3,175	12,312	16%
Copiers	1,501,971	255,904	17%	2,109	7,425	12%
Envelopes	170,337	29,430	17%	2,300	8,355	13%
Fasteners	82,763	11,385	14%	2,286	8,355	14%
Furnishings	384,770	46,854	12%	2,950	11,205	15%
Labels	72,982	14,881	20%	2,437	9,273	12%
Machines	774,786	58,260	8%	1,409	4,881	17%
Paper	242,772	58,834	24%	3,217	12,768	11%
Phones	1,696,739	214,037	13%	3,115	11,824	15%
Storage	1,116,499	105,549	9%	4,488	16,799	14%
Supplies	241,765	22,286	9%	2,266	8,502	13%
Tables	756,193	-64,384	-9%	834	3,081	29%

4.3 Pie Chart

- Technology is the top-performing category, generating the highest profit ($656K, 13.91%), followed by Office Supplies ($510K, 13.59%). In contrast, Furniture, alhough a major product line, yields the lowest overall profit ($282K, 6.89%)

Profit & Margin by Product Category
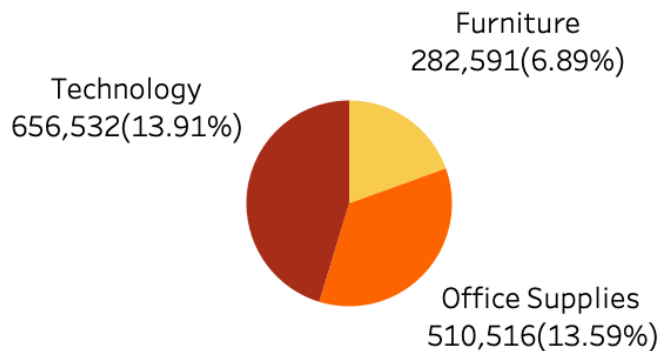
4.4 Bar Chart Shows Standard Class incurs the highest shipping cost ($612,479)—nearly double that of Second Class ($311,424) and First Class ($306,169). Surprisingly, Same Day shipping, despite being the fastest mode, has the lowest cost ($115,343).

Shipping Cost by Shipping Mode
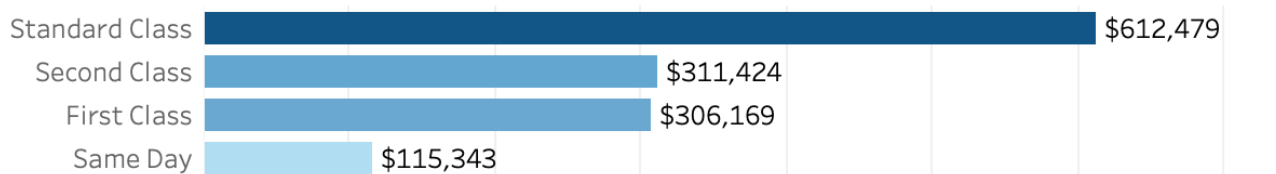
5.0 Recommendations

1. **Optimize Shipping Performance in High-Delay Regions**
- Focus operational improvements in South America, Africa, and Eastern Europe, where delivery durations exceed 4-6 days.
- Partner with regional logistics providers or establish local distribution centers to reduce delivery times.

2. **Strengthen Presence in Low-Volume Regions**
- Regions like Caribbean, Central Asia, and North Asia show the lowest shipment volumes. Target these regions with marketing and sales campaigns to expand market penetration.

3. **Encourage Fast Shipping Modes in High-Value Orders**
- Promote First Class and Same Day shipping in regions with high profit margins and customer value to enhance customer satisfaction and loyalty.

4. **Invest in Top-Performing Sub-Categories**
- Allocate more resources and marketing efforts toward Phones, Copiers, and Accessories, which deliver the highest sales and profit performance.

5. **Reevaluate or Phase Out Low-Profit Items**
- Consider pricing strategy adjustments or product line reviews for Tables, Labels, and Storage, which show either negative or low profitability despite moderate order volumes.

6.0 Conclusion

This dashboard-driven analysis provided a comprehensive view of the company's global sales and operational performance. Using interactive Tableau visualizations and advanced analytics techniques, we identified:

- Key geographic patterns in delivery delays and shipment efficiency.

- Regional shipment disparities and market opportunities.

- Strong and weak areas across product categories and sub-categories.

- The importance of shipping strategy and profitability optimization.

The insights and visualizations developed not only support data-informed decision making but also pave the way for strategic planning in logistics, product management, and customer engagement. With continued refinement and integration of real-time data, this dashboard can evolve into a powerful tool for continuous performance monitoring and actionable intelligence.

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