Summer MGMT 59000: AI-Assisted Big Data Analytics in the Cloud

Assignment 1: Analyzing the Superstore

Group: Data Ninjas 3

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Problem Statement

Executive Summary

To improve business performance and guide smarter decisions, the organization will take a closer look at how sales, customer habits, product outcomes, and regional operations influence growth. It will study sales trends over time to identify revenue drivers and seasonal peaks. At the same time, it will analyze customer segments, purchasing behaviors, and loyalty factors. The business will also review product and category performance, pinpoint profitability levers, and assess pricing impacts. Finally, it will evaluate regional performance and operational efficiency to uncover areas that support or hinder success; sharpening strategic focus for future growth.

Sales & Revenue Analyst

Michael Yudanin

Focus Questions:

- What drives sales performance across different dimensions?

- Which factors most impact revenue generation?
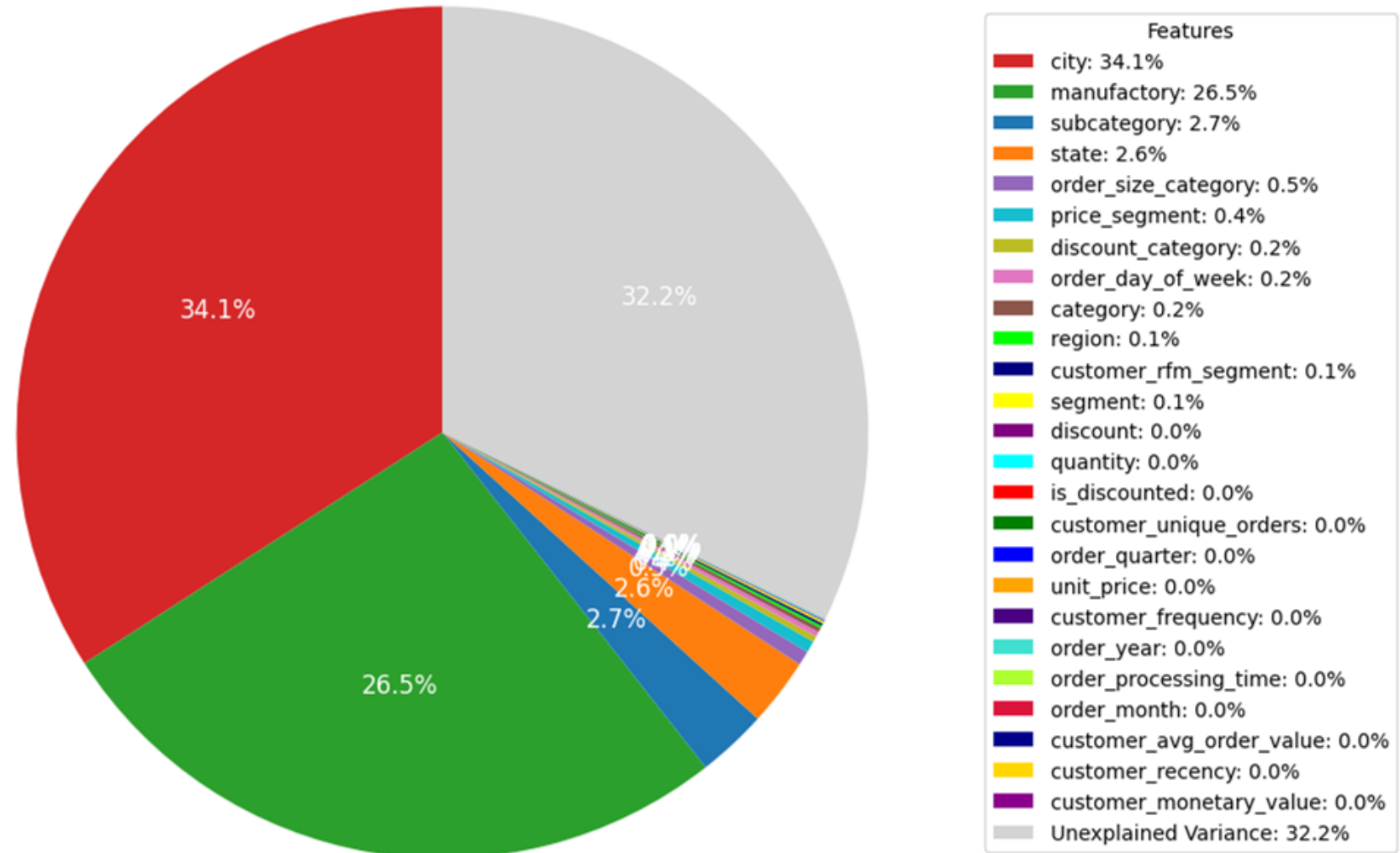
- Where are the growth opportunities?
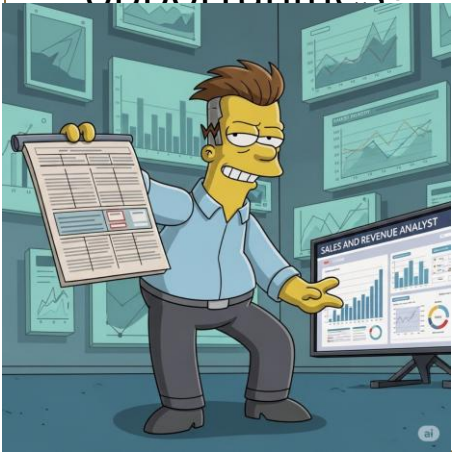
Analysis:

- Sales trends over time with seasonality

- Revenue drivers and correlations

- Predictive factors for high-sales periods

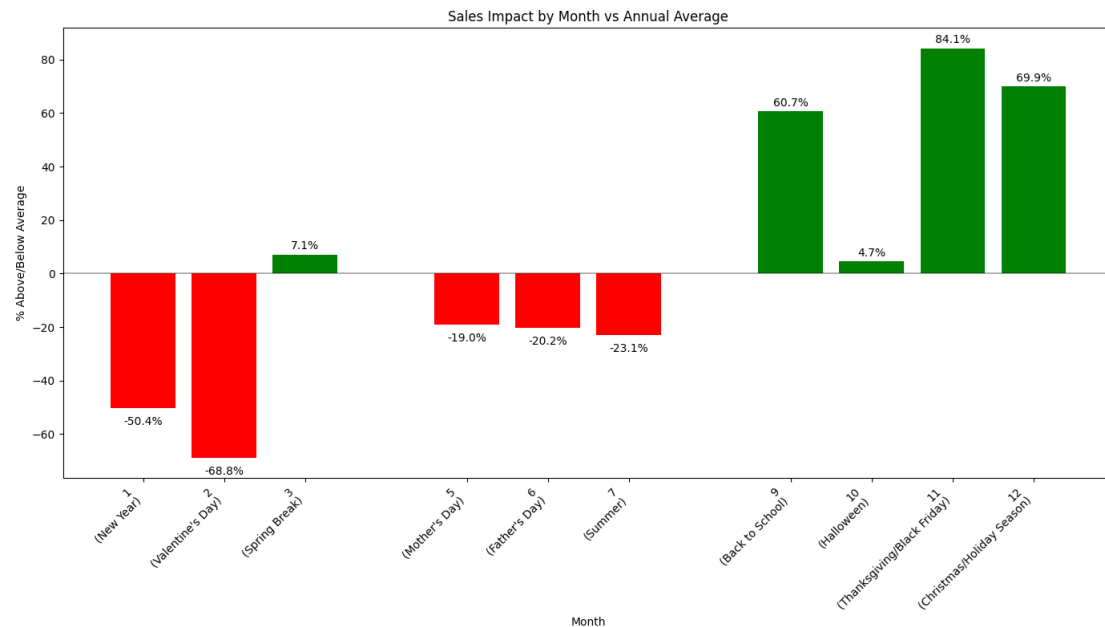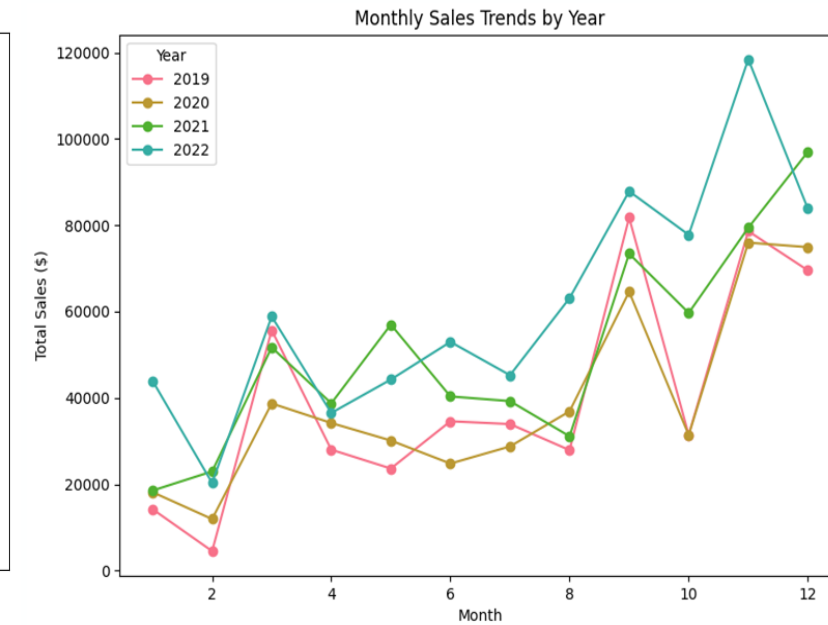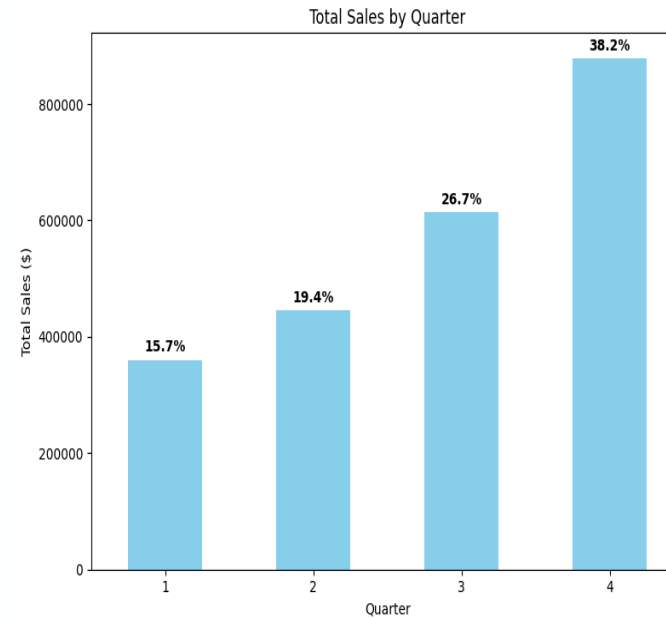**PURDUE** UNIVERSITY®

Factors driving sales performance

Linear Regression analysis show two factors impacting sales:

- **City**

- **Manufacture**

Features
- city: 34.1%
- manufactory: 26.5%
- subcategory: 2.7%
- state: 2.6%
- order_size_category: 0.5%
- price_segment: 0.4%
- discount_category: 0.2%
- order_day_of_week: 0.2%
- category: 0.2%
- region: 0.1%
- customer_rfm_segment: 0.1%
- segment: 0.1%
- discount: 0.0%
- quantity: 0.0%
- is_discounted: 0.0%
- customer_unique_orders: 0.0%
- order_quarter: 0.0%
- unit_price: 0.0%
- customer_frequency: 0.0%
- order_year: 0.0%
- order_processing_time: 0.0%
- order_month: 0.0%
- customer_avg_order_value: 0.0%
- customer_recency: 0.0%
- customer_monetary_value: 0.0%
- Unexplained Variance: 32.2%

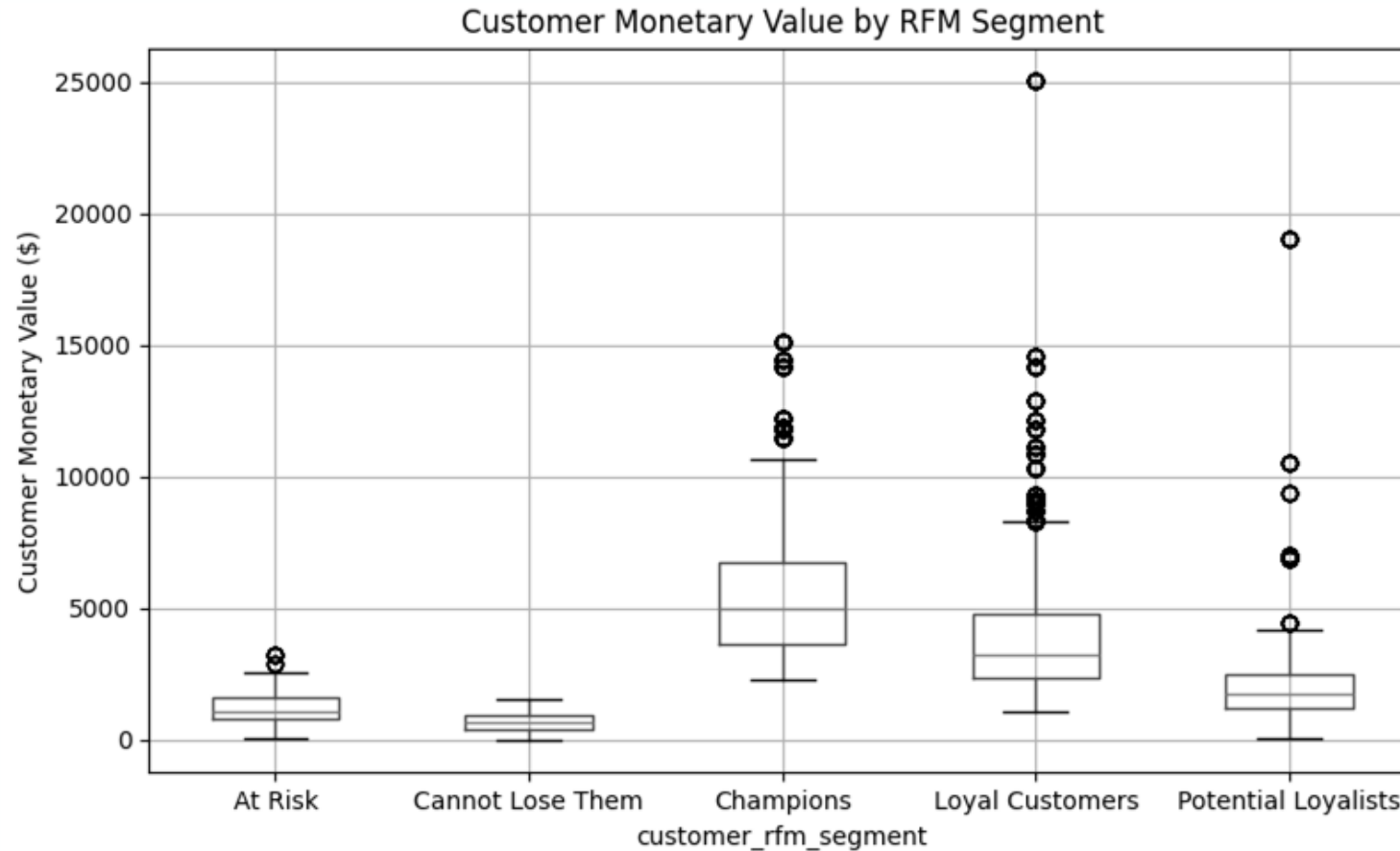# Seasonality

- Q4 brings more sales

- The trend persists over the years

- The difference is not significant at the <0.05 level (p=0.073308)
- Further research is recommended

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Champion customers contribute more

Customer Monetary Value by RFM Segment

Growth opportunities

- ❖ Leverage **Sales Trends** - Utilize the identified sales peaks
  - ➢ November, December, March are sales peaks
  - ➢ Despite non-significant results, acting on this will not hurt
  - ➢ Focus strategic marketing campaigns and inventory management for Q4.
- ❖ Target **High-Value Customers and Regions**
  - ➢ Focus sales and marketing efforts on the 'Consumer' segment and regions like the 'West' and 'East' which show strong sales performance.
- ❖ Focus on high-value **Cities**
  - ➢ City has an important impact on sales and profits.
  - ➢ Focus on high-value cities to tap into additional potential.
- ❖ Focus on high-value **Products**:
  - ➢ Manufactury has an important impact on sales and profits.
  - ➢ Optimize procurement and focus on high-value products.

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Customer Behavior Analyst

Yuxiao Wang

Focus Questions:

- Who are our most valuable customers?

- What patterns exist in customer purchasing?

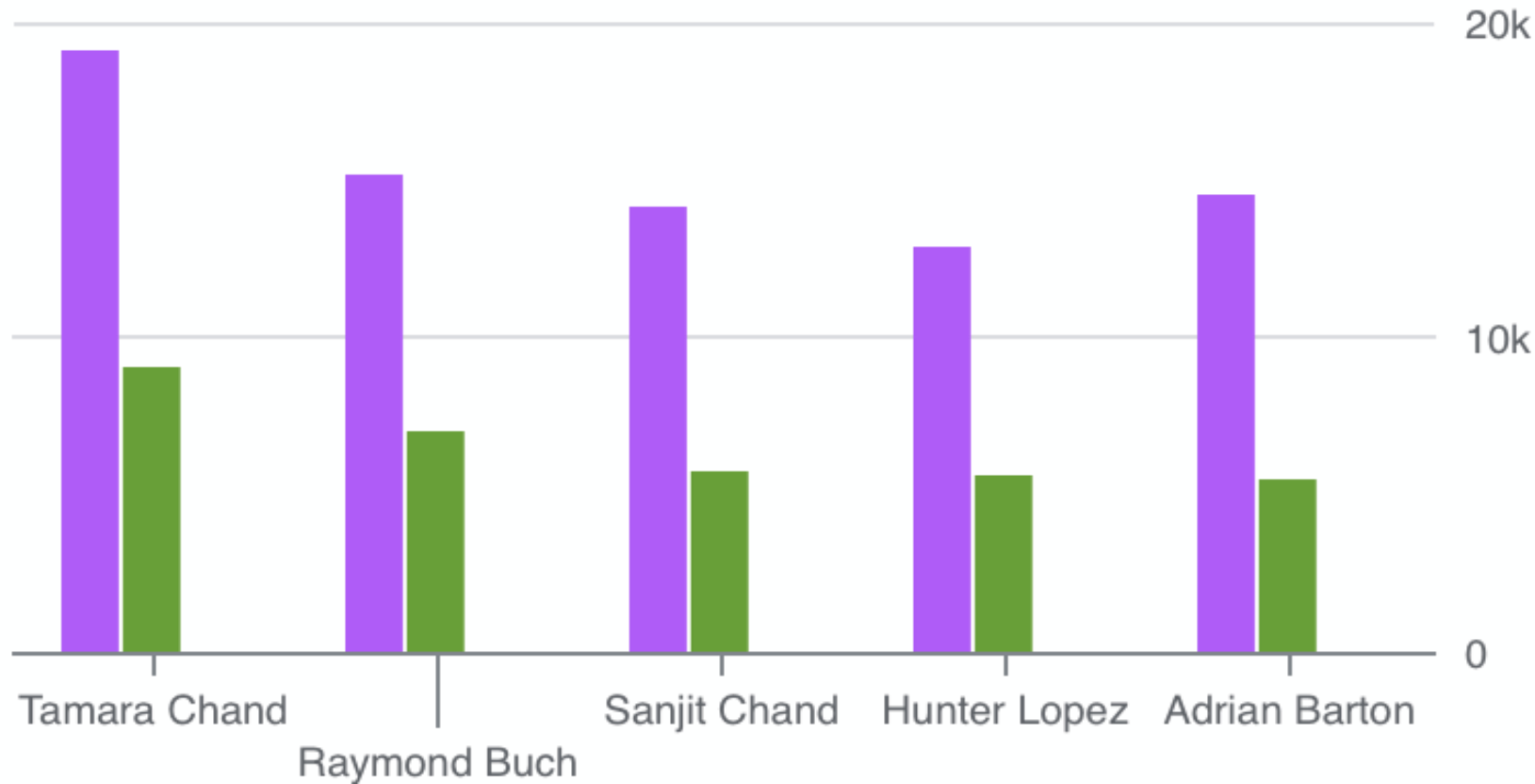- How can we improve customer retention?

Analysis:

- Customer segmentation and profiling

- Purchase pattern analysis

- Customer lifetime value indicators

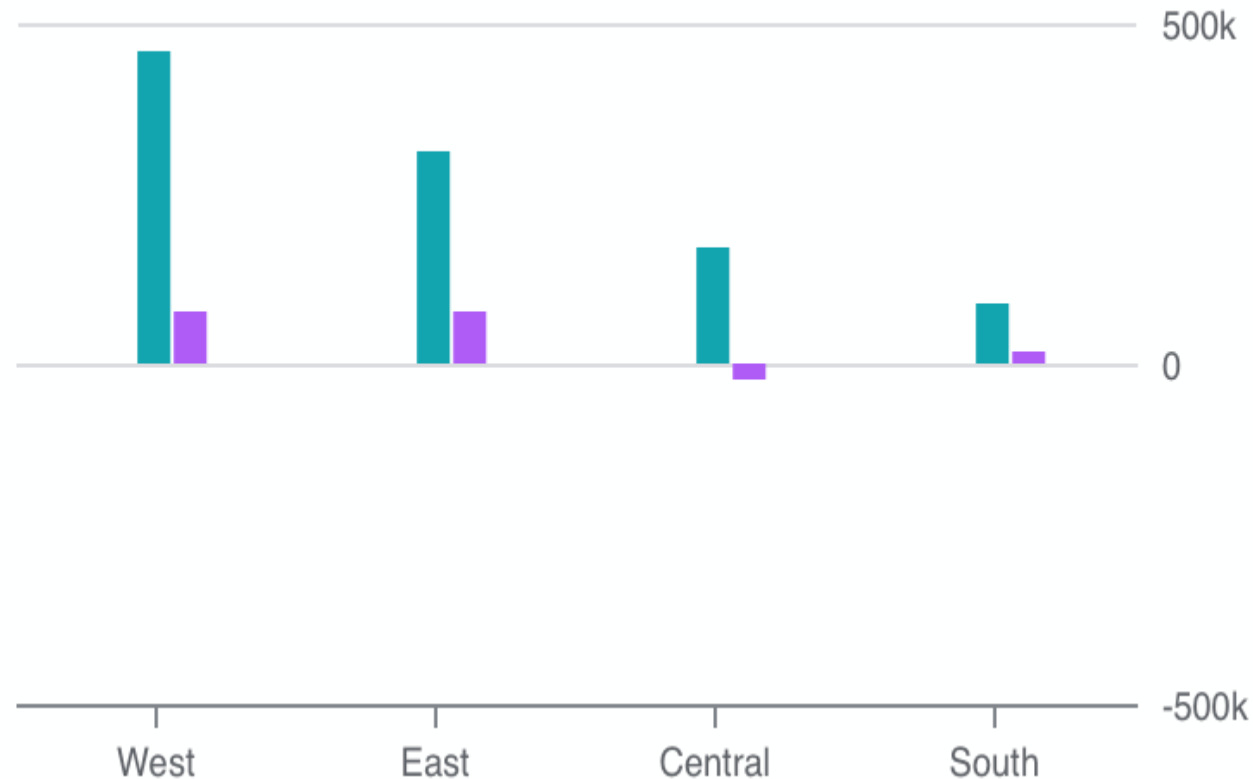# Customer Behavior Analyst

MVP (Most Value Prospect)

total_sales, total_profit, number_of_orders by customer
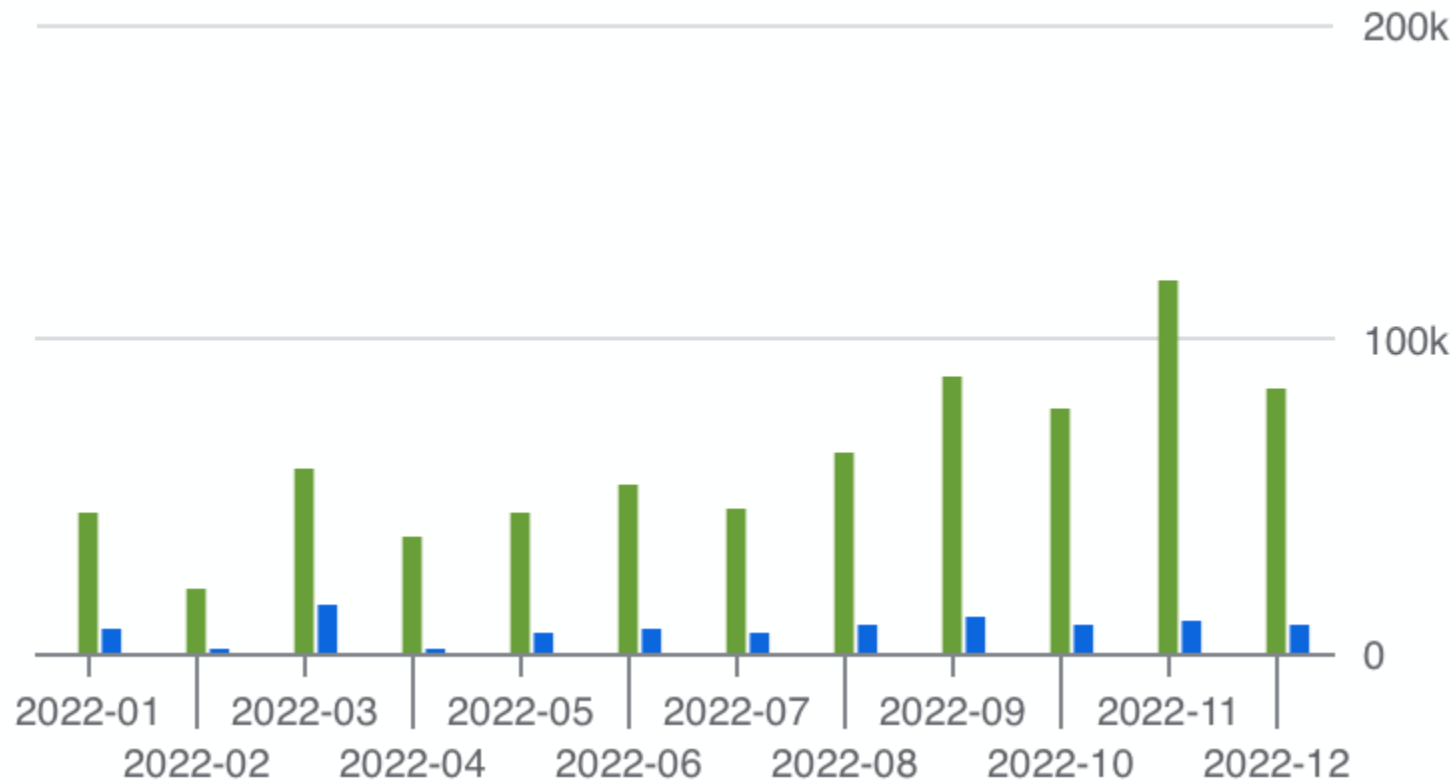
Customer Behavior Analyst

Customer Segmentation

unique_customers_in_location, total_orders_in_locati

| | West | East | Central | South |

500k

0

-500k

Customer Behavior Analyst

Seasonal pattern

total_orders, monthly_sales, monthly_profit by order_

Regional/Operational Analyst

Kyasha Williams

Member D: Regional/Operational Analyst

Focus Questions:

- How does performance vary by location?

- What operational factors impact success?

- Where should we expand or consolidate?

Analysis:

- Regional performance metrics

- Shipping and operational efficiency
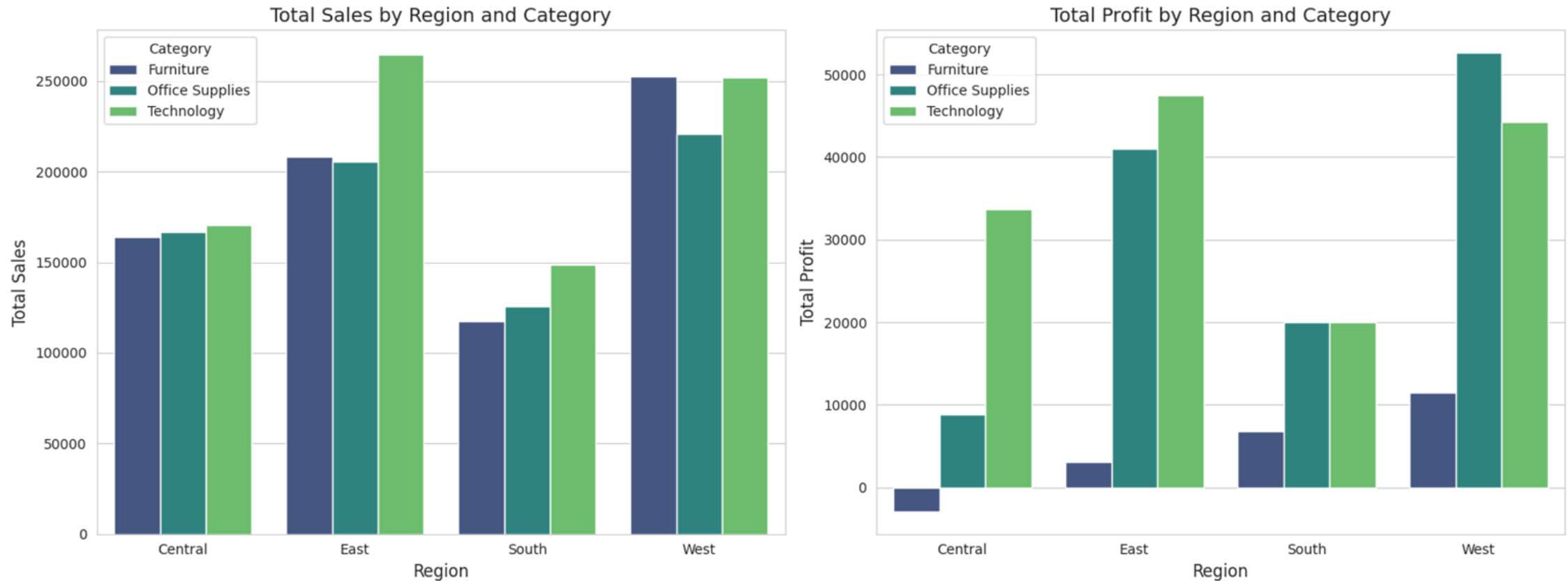
- Market opportunity identification

Regional/Operational Analyst
Kyasha Williams

Regional Performance Metrics

Regional and Category Performance Analysis
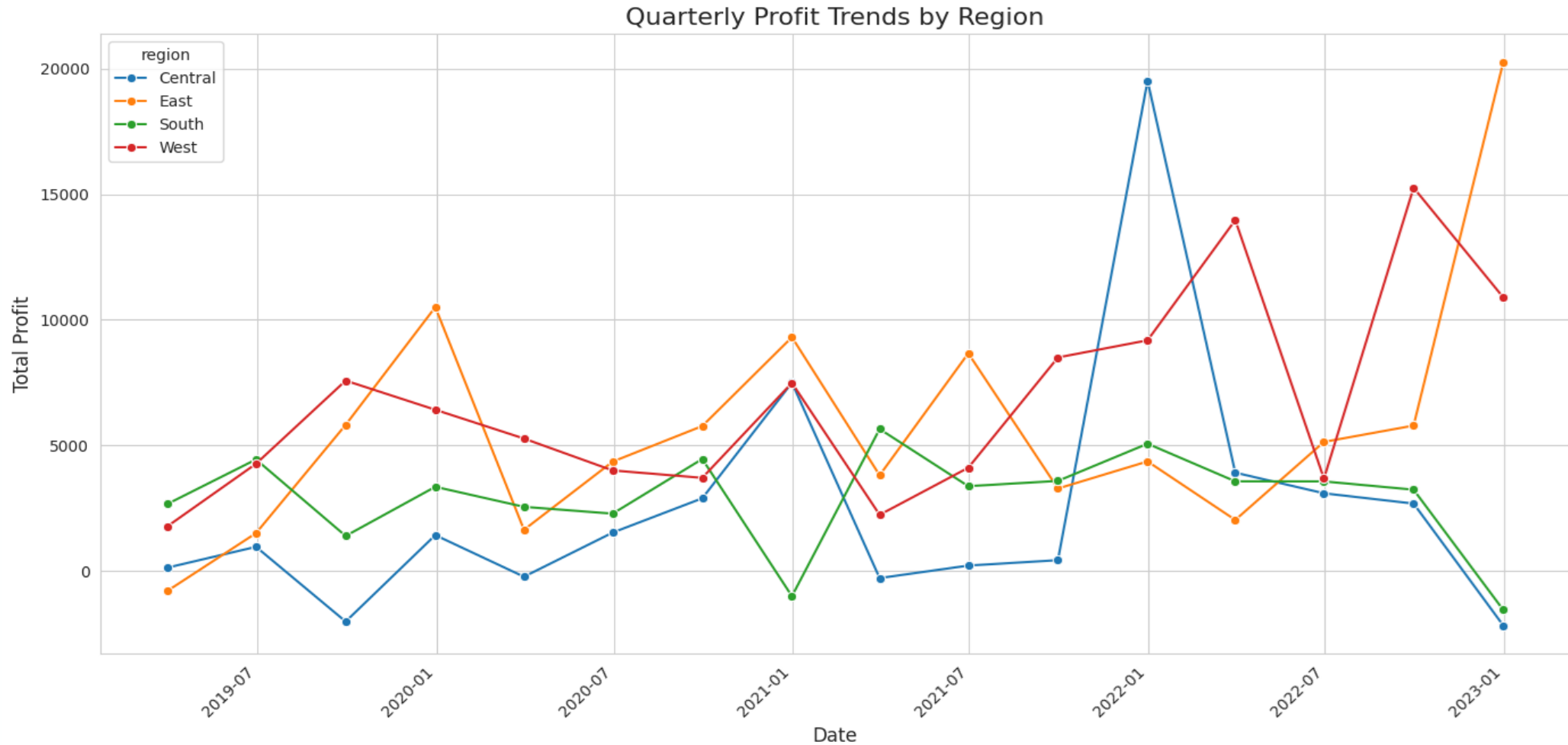
Regional/Operational Analyst

Kyasha Williams

Shipping and Operational Efficiency

Discount vs. Shipping Time

Regional/Operational Analyst

Kyasha Williams

Expansion and Consolidation

Quarterly Profit Trends by Region

Product Performance Analyst
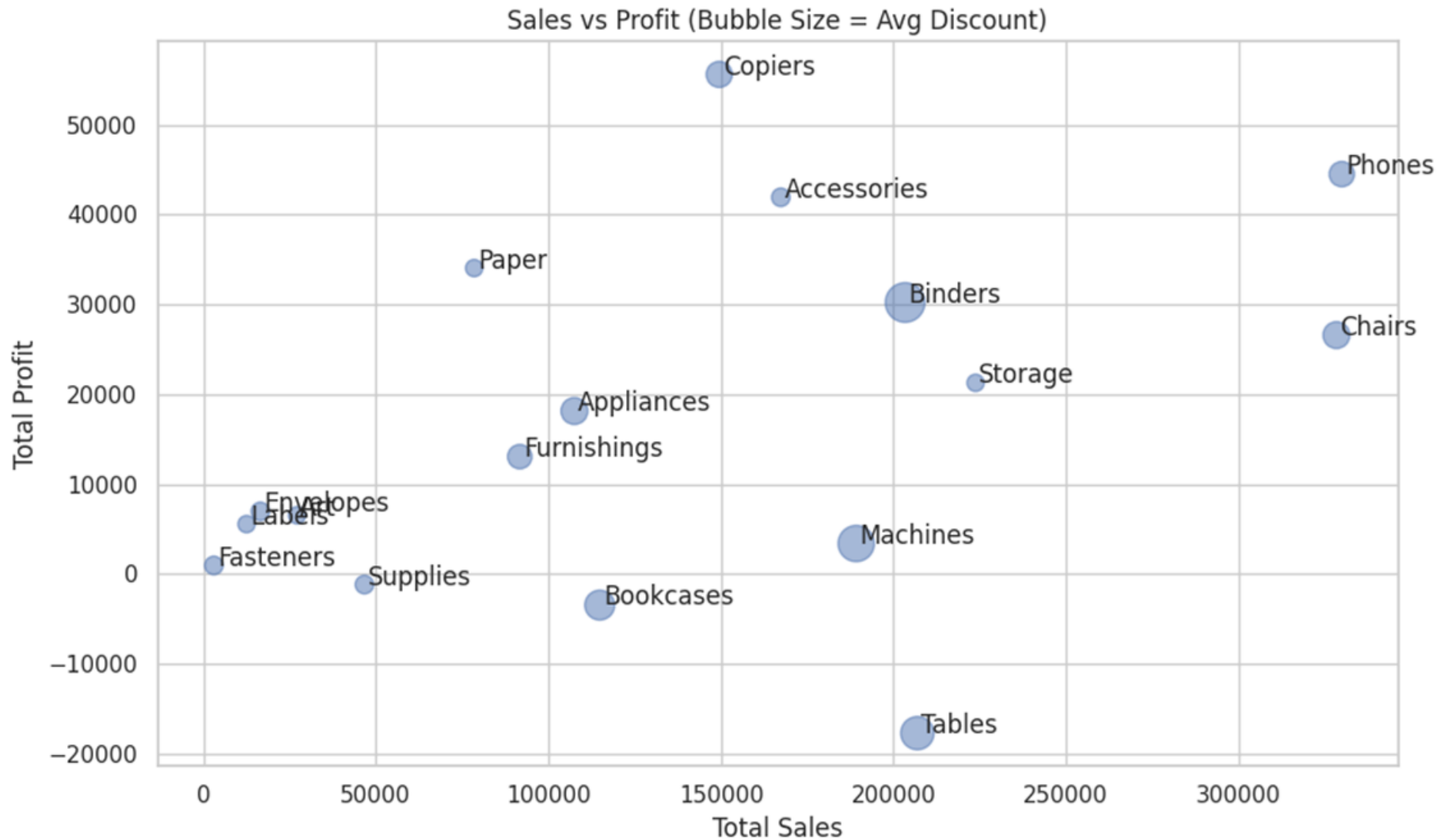
James Fazecas

Focus Questions:

- Which products/categories perform best?

- What drives product profitability?
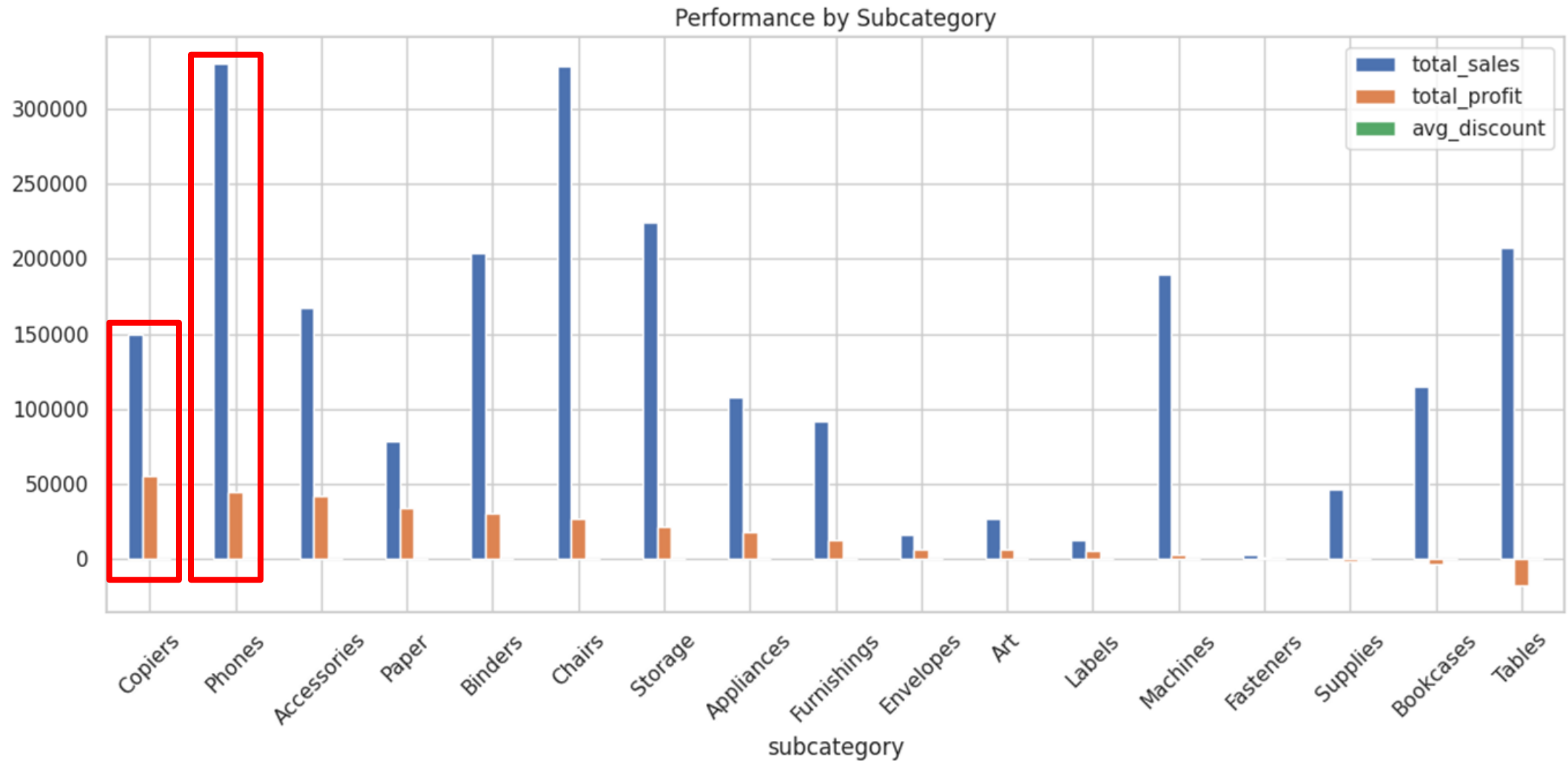
- Where should we focus product strategy?

Analysis:

- Product profitability analysis

- Category performance comparison

- Discount impact on product success

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Sales vs Profit (Bubble = Discount)

Sales vs Profit (Bubble Size = Avg Discount)

Performance Summary by Subcategory

Performance by Subcategory

Top Three Recommendations

1. Implement Regional Pricing Strategy

Deploy region-specific pricing models that reduce discounting in underperforming markets while maintaining competitive pricing in high-value regions. Eliminate aggressive discounting on Tables and Bookcases; instead, focus on margin preservation through value-based pricing.

2. Concentrate Investment in High-ROI Geographic Markets

Reallocate marketing budget and inventory investment to prioritize West and East regions, specifically targeting cities identified as high-impact drivers. Reduce expansion investments in Central and South regions until profitability improves.

3. Develop a Champion Customer Retention Program

Create a comprehensive retention strategy for Champion customers, including dedicated account management, priority shipping, and exclusive product access. Implement predictive analytics to identify potential Champions among Loyal Customers and Potential Loyalists.

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Expected Impact

- 15% increase in Central/South margins

- 25% improvement in West/East market share

- 90% Champion customer retention rate

- Eliminate negative-margin subcategories

- 20% improvement in overall profit margins

Thank You!