**Analysis, Visualization and Recommendations.**

**Characteristics of Each Cluster:**

* **Cluster 0:** Represents customers with medium sales and profit, preferring standard shipping modes.
* **Cluster 1:** Represents high-value customers with high sales and profit, often choosing premium shipping options.
* **Cluster 2:** Represents cost-sensitive customers with low sales and profit, frequently opting for higher discounts and lower shipping costs.

**Visualizations:**

* **Scatter Plot:** Visualizing clusters based on Sales and Profit.
* **Bar Charts:** Distribution of Ship Mode, Product Category, and Order Priority across clusters.

**Insights and Recommendations**

**Interpretation of Clusters:**

* **Cluster 0: Average Buyers**
  + **Characteristics:**
    - Medium sales and profit.
    - Prefer standard shipping modes.
    - Mix of product categories.
    - Balanced order priority.
    - Diverse customer segments.
  + **Insights:**
    - Customers in this cluster are consistent buyers with a balanced purchase pattern.
    - They are not overly price-sensitive but are not high spenders either.
  + **Recommendations:**
    - Implement standard promotions and regular engagement strategies.
    - Focus on maintaining their satisfaction with consistent quality and service.
* **Cluster 1: High-Value Customers**
  + **Characteristics:**
    - High sales and profit.
    - Often choose premium shipping options.
    - More inclined towards high-value product categories.
    - High order priority.
    - Include both consumer and corporate segments.
  + **Insights:**
    - These are the most profitable customers.
    - They value speed and quality in shipping and product offerings.
  + **Recommendations:**
    - Prioritize these high-value customers for loyalty programs, exclusive offers, and premium services.
    - Personalized marketing and exceptional customer service can enhance their loyalty.
* **Cluster 2: Cost-Sensitive Customers**
  + **Characteristics:**
    - Low sales and profit.
    - Frequently opt for higher discounts and lower shipping costs.
    - Tend to choose economy shipping modes.
    - Often purchase lower-value products.
    - Predominantly consumer segment.
  + **Insights:**
    - This segment is highly price-sensitive.
    - They respond well to discounts and cost-saving deals.
  + **Recommendations:**
    - Design targeted promotions emphasizing discounts and value-for-money offerings.
    - Highlight cost savings and affordable options to attract and retain these customers.

**Business Recommendations:**

* **Tailored Marketing:**
  + Customize marketing campaigns based on cluster characteristics to maximize effectiveness and ROI (Return on Investment).
* **Product Offering:**
  + Adjust product offerings and pricing strategies to meet the needs of each customer segment.
* **Customer Retention:**
  + Implement loyalty programs and personalized services for high-value customers to enhance retention and satisfaction.
* **Promotional Strategies:**
  + Design targeted promotions for price-sensitive customers to drive sales without significantly impacting profit margins.

**Enhance Visualizations:**

* Use advanced visualization libraries like Plotly for interactive charts to better communicate insights and engage stakeholders.

**Conclusion:**

Based on the customer segmentation analysis using K-Means clustering, we identified three distinct customer segments. Below is a summary of each cluster's characteristics and the insights derived from the analysis:

* **Cluster 0: Average Buyers**
  + **Characteristics:**
    - Medium sales and profit.
    - Prefer standard shipping modes.
    - Mix of product categories.
    - Balanced order priority.
    - Diverse customer segments.
  + **Insights:**
    - Customers in this cluster are consistent buyers with a balanced purchase pattern.
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* **Cluster 1: High-Value Customers**
  + **Characteristics:**
    - High sales and profit.
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    - More inclined towards high-value product categories.
    - High order priority.
    - Include both consumer and corporate segments.
  + **Insights:**
    - These are the most profitable customers.
    - They value speed and quality in shipping and product offerings.
* **Cluster 2: Cost-Sensitive Customers**
  + **Characteristics:**
    - Low sales and profit.
    - Frequently opt for higher discounts and lower shipping costs.
    - Tend to choose economy shipping modes.
    - Often purchase lower-value products.
    - Predominantly consumer segment.
  + **Insights:**
    - This segment is highly price-sensitive.
    - They respond well to discounts and cost-saving deals.

**Recommendations:**

* **Tailored Marketing Strategies**
  + **Cluster 0:** Implement standard promotions and regular engagement strategies. Focus on maintaining their satisfaction with consistent quality and service.
  + **Cluster 1:** Prioritize these high-value customers for loyalty programs, exclusive offers, and premium services. Personalized marketing and exceptional customer service can enhance their loyalty.
  + **Cluster 2:** Design targeted promotions emphasizing discounts and value-for-money offerings. Highlight cost savings and affordable options to attract and retain these customers.
* **Product Offerings**
  + **Cluster 0:** Maintain a wide range of product offerings to cater to their diverse needs.
  + **Cluster 1:** Focus on premium and high-value products. Consider bundling products and offering exclusive items.
  + **Cluster 2:** Emphasize budget-friendly and essential products. Provide frequent discounts and bundled deals to increase their purchase frequency.
* **Customer Retention**
  + **Cluster 0:** Regularly collect feedback to ensure customer satisfaction and identify areas for improvement.
  + **Cluster 1:** Implement a VIP customer program to reward high spenders and encourage repeat purchases.
  + **Cluster 2:** Use targeted email campaigns with special offers to keep these customers engaged and encourage them to buy more frequently.