E-Commerce Insights: Delivery Efficiency and Customer Behavior 📦

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Background

E-commerce businesses thrive on seamless logistics and a deep understanding of customer trends. This project explores delivery performance and customer behavior to optimize order fulfillment and enhance user satisfaction.

🕐 **What are the average delivery times, and what delays occur?**

🌐 **How do regional differences impact delivery and customer preferences?**

🛍 **Which product categories and customer behaviors dominate the market?**

🏷 **What payment methods are most preferred?**

Data

The dataset, sourced from Kaggle, provides detailed insights into e-commerce operations, covering aspects such as delivery times, product categories, customer locations, payment methods, and order statuses.

Data curation was conducted to clean the dataset by handling missing values and ensuring consistency across critical variables. This refined dataset serves as the basis for exploring delivery performance, customer behavior, and logistical trends.

- **Rows/Columns**: ~89,316 rows across multiple datasets
- **Details**:
  - Orders, Products, Payments, and Customer Locations
 - Delivery times and statuses, pricing, and product categories

Tools

In this project, Python is utilized within a Jupyter Notebook to perform data cleaning, curation, and exploratory data analysis. Tableau is then employed to create an interactive dashboard that visually represents the key findings and trends uncovered in the dataset.
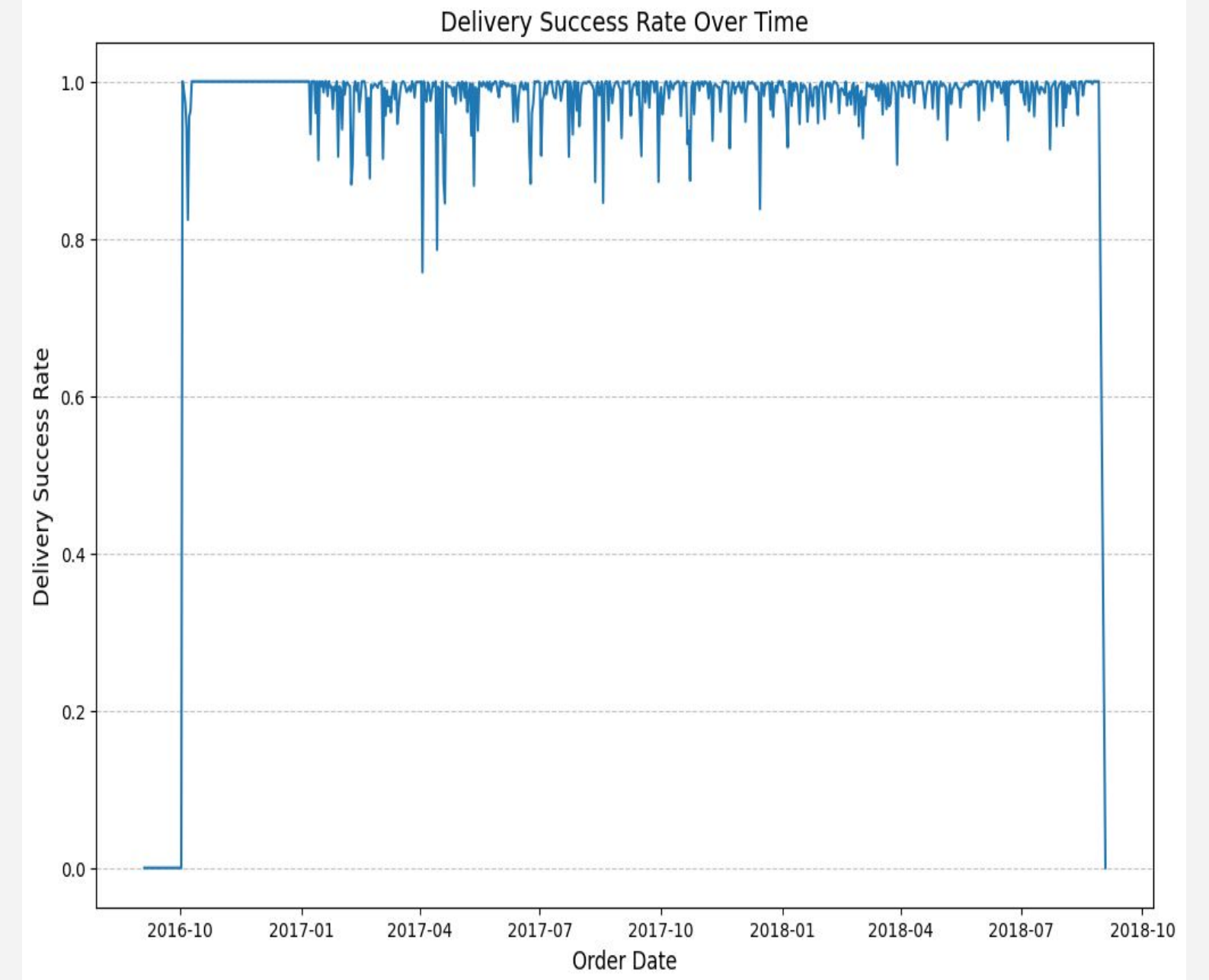
Exploratory Data Analysis (EDA)
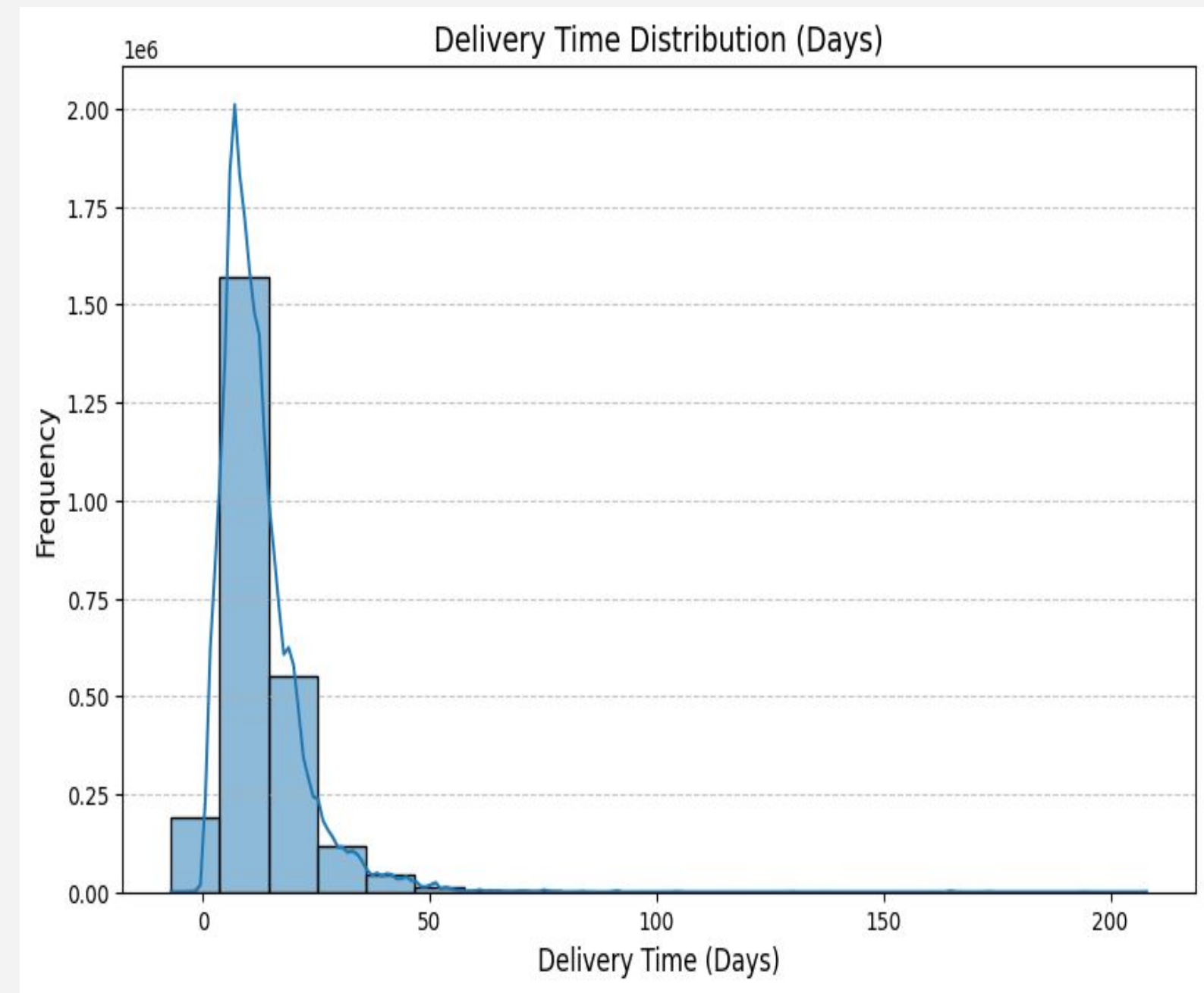
[1]Delivery Time Distribution: Most orders are delivered within 5–15 days, though some outliers exceed 50 days, indicating logistical inefficiencies.
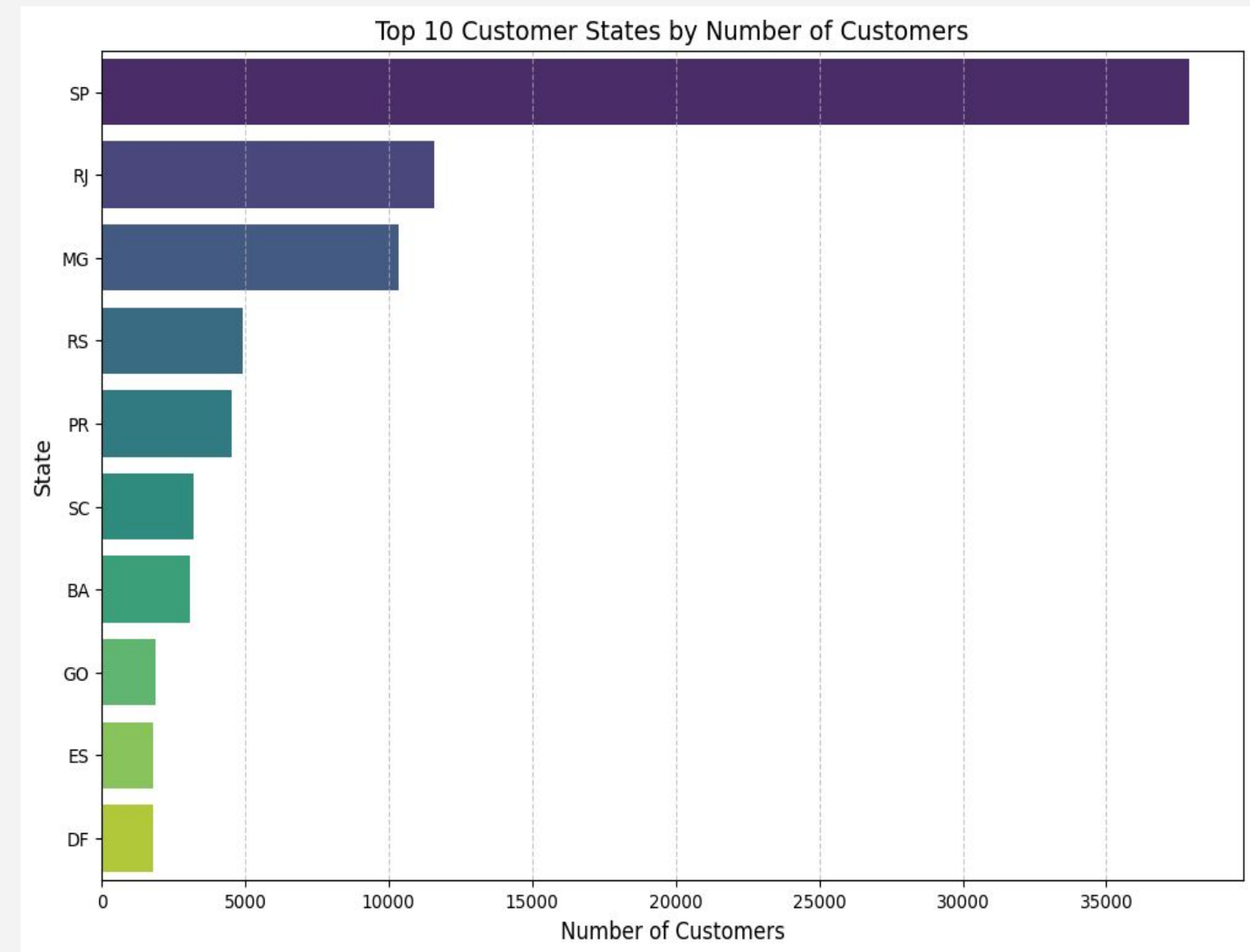

[2]Top 10 Customer States: São Paulo dominates with the highest number of customers, showcasing a strong e-commerce presence.


[3]Delivery Success Rate Over Time: Success rates remain consistently high (~97%), with minor regional dips indicating occasional challenges.


[4]Order Frequency Over Time: Seasonal spikes, particularly in late 2017, demonstrate increased demand during holiday seasons.
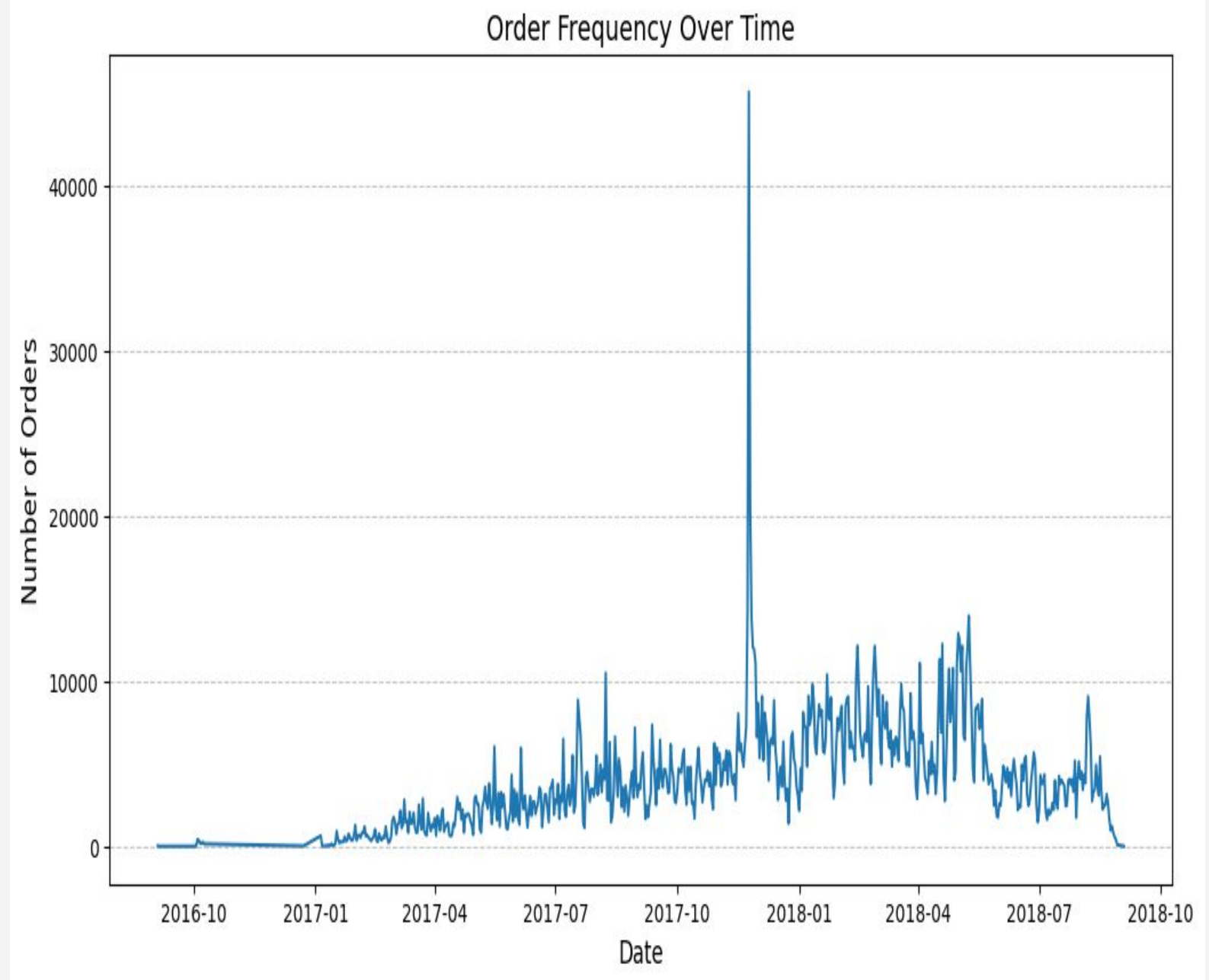

[5]Top Product Categories: Toys lead as the most purchased category, followed by Health & Beauty, reflecting strong consumer demand.
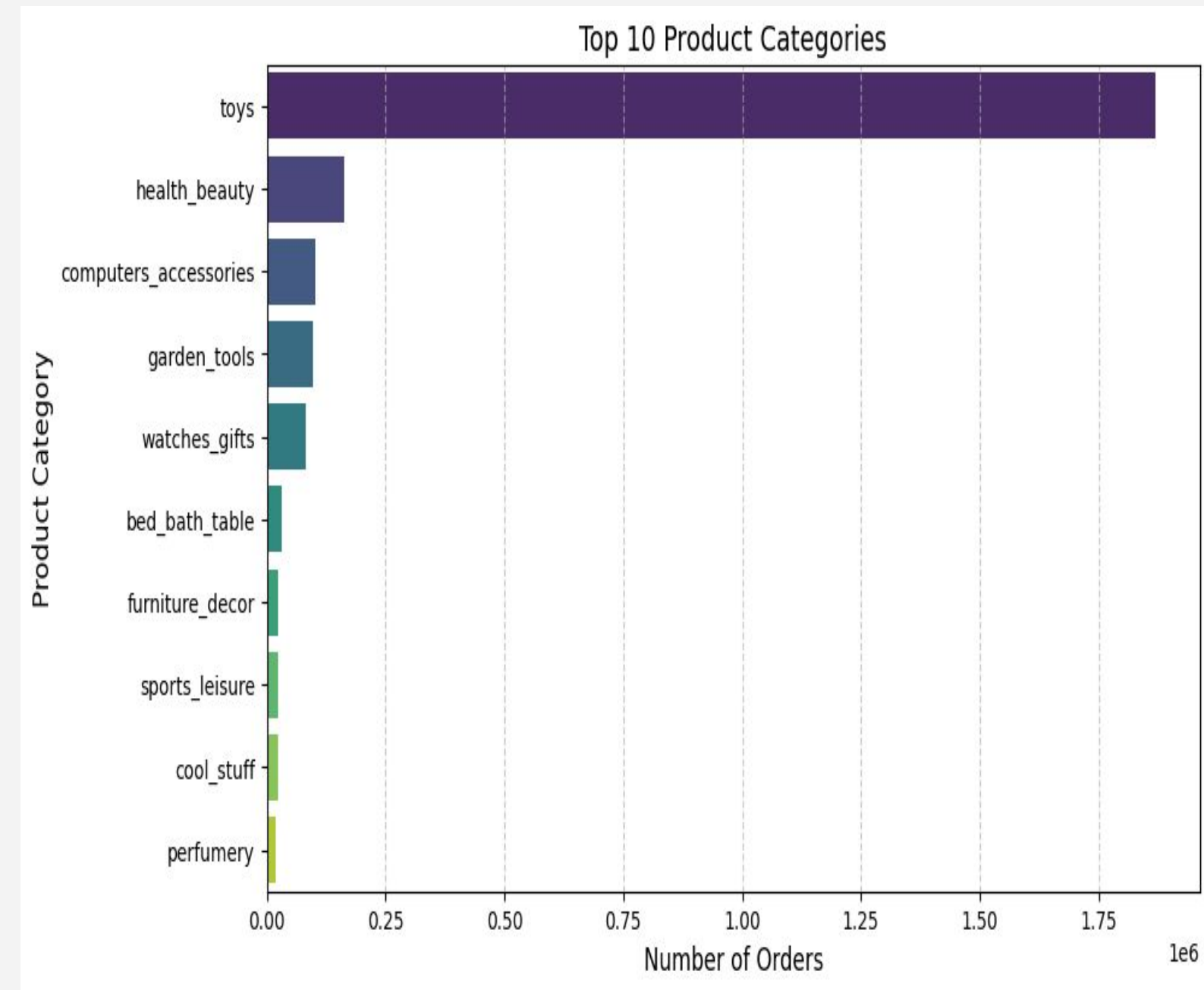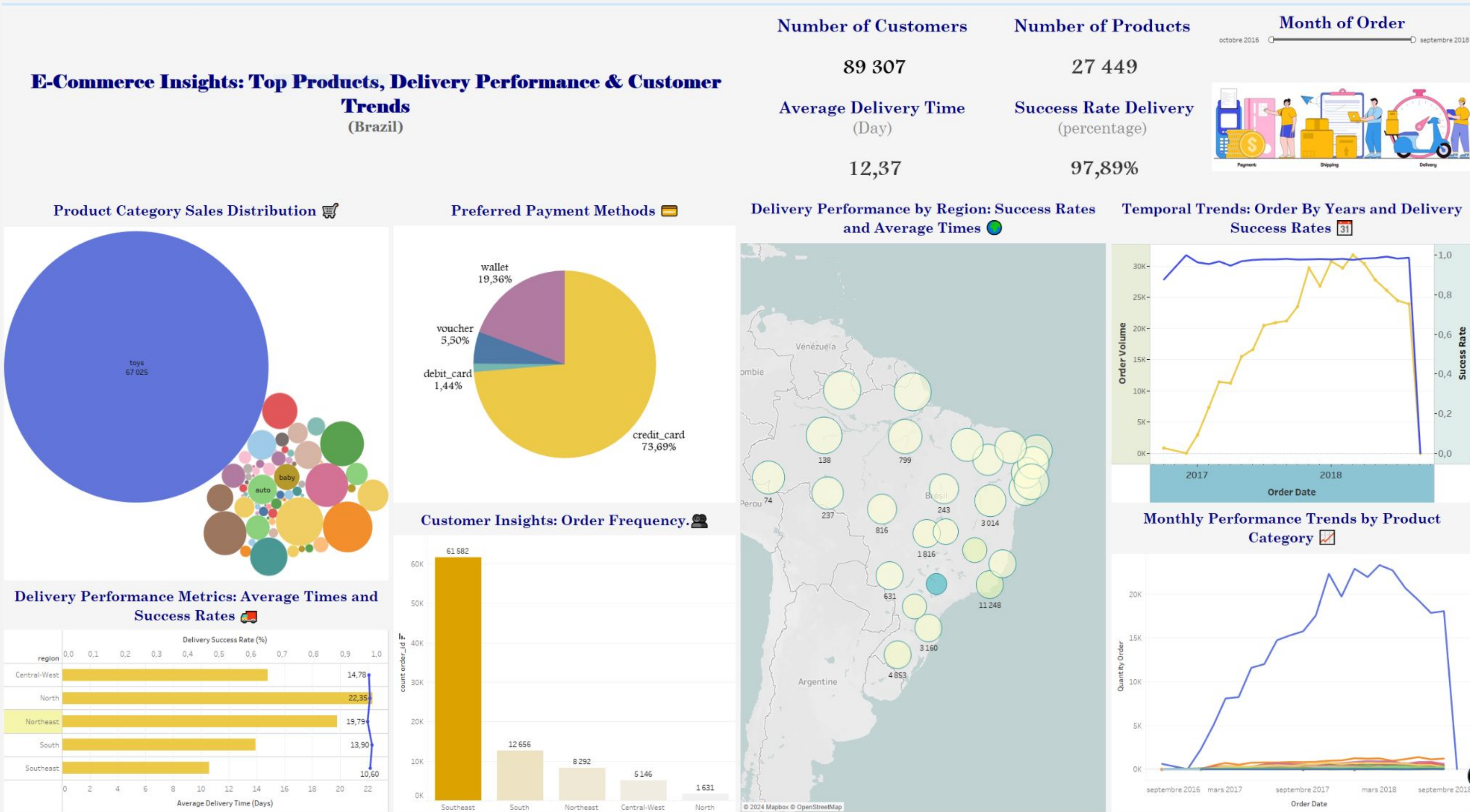

[6]Average Delivery Time by Product Category: Categories like Diapers & Hygiene experience the longest delays, averaging 30 days, highlighting supply chain challenges
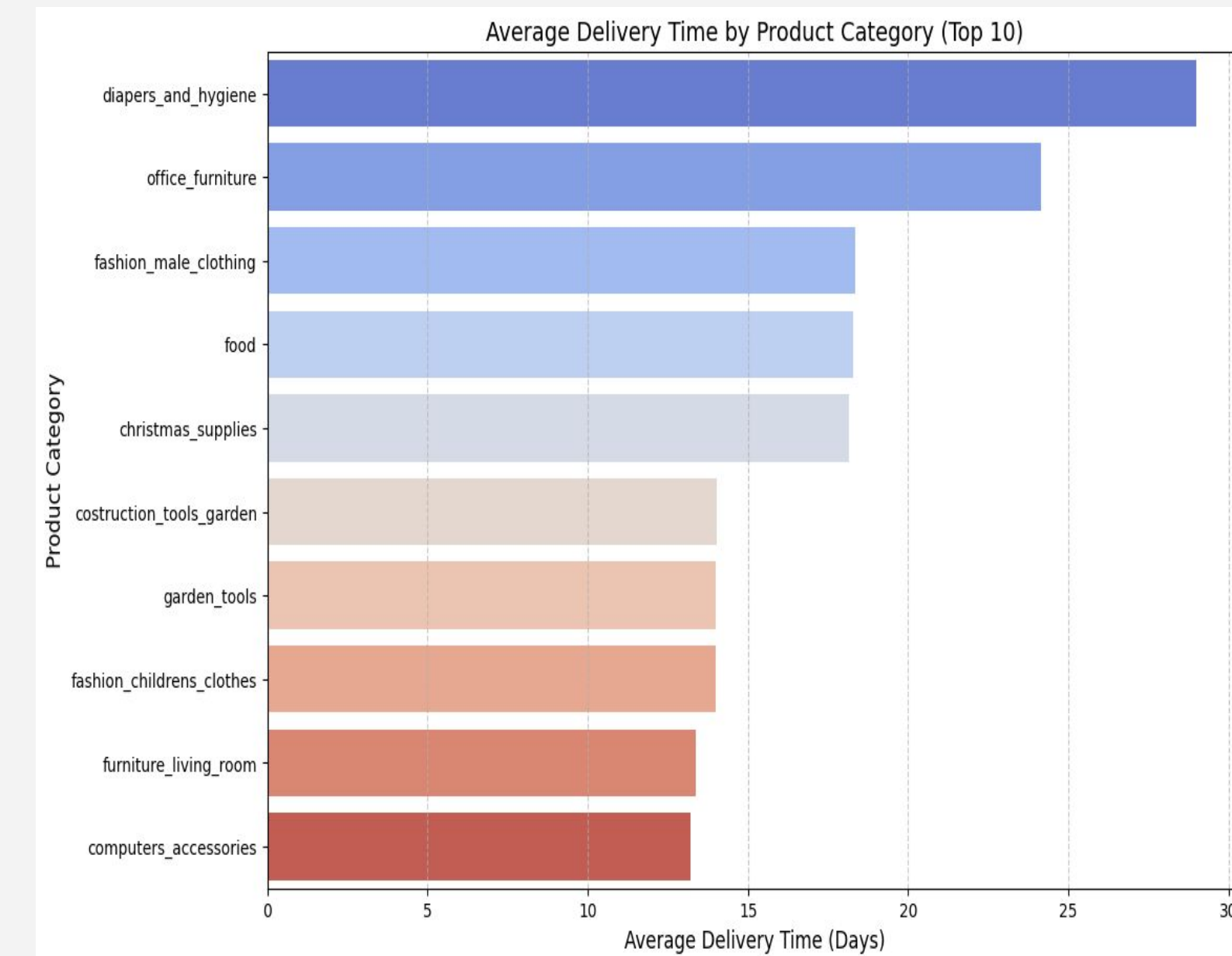
[7]Payment Method Distribution: Credit cards dominate as the preferred payment method, accounting for 73.69% of transactions.
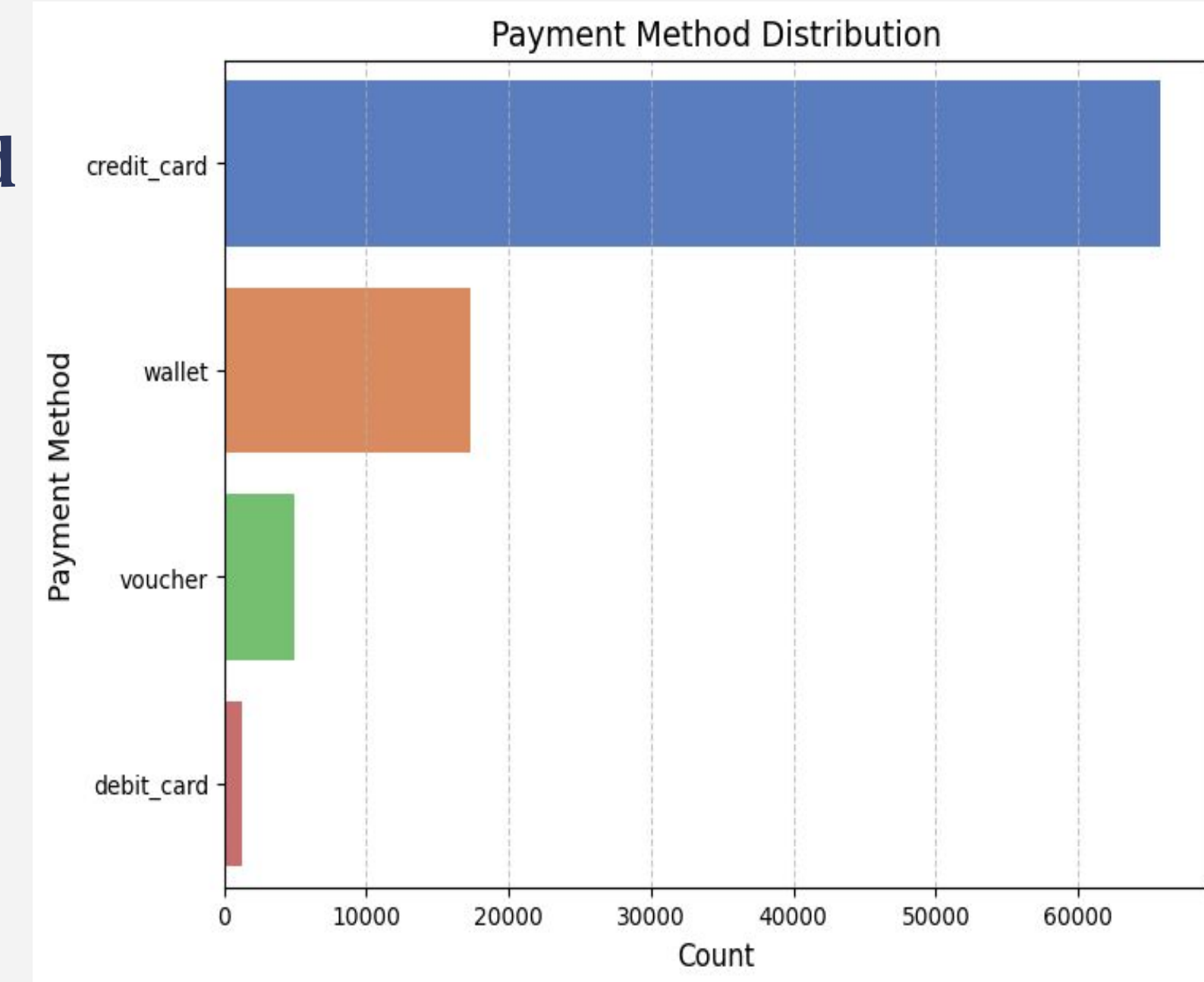
Dashboard

[8]The interactive **Dashboard** was designed to highlight key insights into e-commerce operations, including delivery efficiency, customer behavior, and product trends. It visualizes metrics such as delivery success rates, average delivery times, top product categories, regional performance, and payment preferences, providing a comprehensive overview for strategic decision-making.

Conclusion

The analysis highlights key areas for improvement and opportunities in the e-commerce sector. Significant delivery delays, particularly in remote regions and for specific product categories like Diapers & Hygiene, point to inefficiencies in the supply chain that require immediate attention. São Paulo emerges as the dominant hub for e-commerce activity, reflecting the region's strong infrastructure, while other areas, especially remote states, face challenges that need targeted solutions. Credit cards remain the most preferred payment method, although wallets show potential for growth, suggesting an opportunity to diversify payment options. Seasonal spikes, especially during late 2017, emphasize the importance of aligning inventory and logistics with demand fluctuations to maintain efficient operations and high customer satisfaction. Addressing these issues can lead to enhanced delivery performance, better customer experiences, and overall growth in the e-commerce landscape.