CASE REPORT

A GEOSPATIAL ANALYSIS ON OLIST'S E-COMMERCE PERFORMANCE

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Introduction

E-commerce has revolutionized the retail industry, offering businesses unprecedented opportunities to access wider audiences. In this highly competitive environment, Olist, a leading Brazilian e-commerce platform, empowers small and medium-sized businesses to compete on a national scale. This report leverages Olist's rich dataset to analyze critical operational challenges and identify growth opportunities. Using geospatial analysis, we will examine regional disparities in order volume, payment preferences, and delivery performance. The report is structured around three pivotal business questions, aiming to provide actionable strategies that enhance Olist's operational efficiency, customer satisfaction, and revenue growth.

Background on Olist

Founded in 2015 and headquartered in São Paulo, Olist connects small and medium-sized businesses with a nationwide customer base. Acting as a marketplace, it provides merchants with tools for inventory management, order tracking, and marketing, while customers enjoy a seamless shopping experience, including support for returns and refunds. Olist democratizes access to e-commerce, empowering smaller businesses to thrive in Brazil's growing online retail market. With over 7,000 merchants and substantial funding, Olist plays a crucial role in shaping the country's e-commerce ecosystem.

Exploratory Data Analysis

Before addressing specific business questions, it is essential to explore the dataset and uncover key trends. This exploratory data analysis (EDA) lays the groundwork for identifying patterns and insights related to customer behavior and operational dynamics. To maintain relevance, we began by researching common challenges faced by e-commerce companies, including customer retention and satisfaction, product performance, operational efficiency, and revenue growth. These challenges shaped the guiding question for our EDA: **What underlying patterns and relationships can be uncovered in Olist's dataset to better understand customer behavior, product performance, and operational efficiency?**

To answer our guiding question, we conducted a thorough exploratory data analysis (EDA) using Olist's dataset. This dataset, sourced from Kaggle, contains information on about 100,000 orders from 2016 to 2018 across multiple marketplaces in Brazil. It includes various dimensions such as order status, payment details, customer location, product attributes, and customer reviews. To build a comprehensive data model, we merged these tables based on unique identifiers, ensuring consistency and accuracy (See Appendix for schema).

The dataset required cleaning to ensure accuracy and consistency. Null values in critical columns, such as Payment Value, Orders, Payment Types among others, were removed, and data type was properly reassigned in Tableau.

[View Visualizations in Tableau Public by clicking here]

Key findings and what they mean for our Analysis:

- 2016 has minimal records, leading to an incomplete representation of Olist's operations. Therefore, the bulk of our analysis focuses on 2017 and 2018, where data is more robust and meaningful.
- The distribution of order statuses reveals that the majority of orders are successfully delivered, with only a small fraction falling into categories such as "canceled" or "unavailable. Therefore, we will filter these two statuses throughout our analysis.
- We will exclude transactions labeled as "undefined" to ensure the analysis focuses solely on valid payment methods. This refinement helps to provide actionable insights into optimizing payment strategies.

Main Business Questions

Building on insights gained from our EDA, we formulated the central business question that will guide this report:

How can Olist leverage geospatial insights to optimize operational efficiency, enhance customer satisfaction, and drive revenue growth by addressing regional disparities in order volume, payment preferences, and delivery performance?

By addressing this question, the report seeks to deliver actionable recommendations that align with Olist's mission to democratize e-commerce and foster business growth across Brazil. To achieve this, the analysis is organized around **three sub-questions**, each focusing on a critical operational dimension, providing a structured approach to answering the overarching business question.

Geospatial Analysis

This section aims to provide a comprehensive geospatial analysis of Olist's e-commerce performance across Brazil, focusing on key metrics such as order volume, revenue, payment preferences, customer sentiment, and delivery performance to uncover actionable insights.

Business question 1: How do total order volume, **revenue (payment value)**, **and seller distribution vary across Brazilian states and cities over time for the most popular product category and what strategies can be implemented to optimize market penetration and drive revenue growth in underperforming areas ?**

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Description:

This **dual geospatial visualization** showcases the **count and distribution of orders**, **total revenue**, and **seller distribution** across Brazil for 2018**,** focusing on the Top 20 product categories (Click here to visualize). The **left map** highlights the distribution of orders by state and city, with color intensity and size representing order volume and labels indicating each state's share of total orders**.** The **right map** shows individual order locations**,** where the size and color (saturation) of each point represent the sum of payment values**,** providing a detailed view of revenue distribution**.** Additionally, the distribution **of active sellers** is displayed, offering insights into their concentration and impact on regional sales performance. By observing the **color saturation** on the map, we can easily identify the **top-performing** and **least-performing** states and cities in terms of order volume. Other filters include **order status** (excluding canceled orders) and valid geolocation data for reliability**.** The **year filter** allows trend analysis for 2016, 2017, and 2018**.**

- **Why Top 20?** We are conducting our geospatial analysis with the **top 20 product categories** because they account for the majority of Olist's revenue, providing more focused and actionable insights. Specifically, the total revenue generated from all 74 product categories is **$16,217,683**, while the top 20 categories alone contribute **$13,614,889**, representing approximately **84%** of the total revenue. This highlights that the remaining 54 categories contribute only **16%** of the revenue, meaning their impact on overall performance is minimal.
- **Why Payment Value and not Price?** We use **Payment Value** instead of **Price** for revenue analysis because it offers a more accurate representation of Olist's total revenue. While **Price** reflects only the product's base cost, Payment Value might include shipping fees, payment processing charges, installment interest, and discounts or promotions, providing a comprehensive view of actual revenue and enabling a more accurate assessment of financial performance.

Key Insights:

1. **Order Volume and Revenue Analysis:**

For the Top 20 Product Categories, **88,853 orders** were placed on the Olist platform across all years, accounting for **86.29%** of all orders across all product categories. Consequently, this analysis calculates the percentage of orders per state relative to this 86.29%, ensuring insights accurately reflect the filtered dataset. Across all product categories over three years, Olist generated **$16M** in total revenue. In 2018 alone, the revenue derived from this analysis is **$8,608,886**, closely aligning with Olist's officially reported revenue of approximately **$8.5M**, underscoring the accuracy of using summed payment values for revenue analysis. For the Top 20 Product Categories, the total payment value is **$13,337,113**, representing **83.4%** of total revenue across all categories. Given this significant contribution, the payment value from the Top 20 categories will serve as the basis for total revenue in the rest of the analysis.

State Level of Analysis:

- **High-Performing States:** São Paulo (SP) leads both in order volume and revenue, with **20,044 orders** (20% of total) and **$2,802,580** in revenue, solidifying its position as Olist's primary market. Rio de Janeiro (RJ) and Minas Gerais (MG) follow with **5,580 orders** (5.61%) and **$877,854**, and **5,271 orders** (5.30%) and **$845,409** in revenue, respectively. Despite Olist's headquarters in Curitiba, Paraná (PR), the state posted a modest **2,326 orders** (2.34%) and **$280,817** in revenue. Meanwhile, Rio Grande do Sul (RS) added **$376,402**, underscoring the southeastern region's dominance in both metrics. In other words, high performance is concentrated in a few states.
- **Underperforming States:** States like Acre (AC), Roraima (RR), Amapá (AP), Amazonas (AM), and Rondônia (RO) recorded minimal contributions in 2018, with **21**, **23**, **35**, **57**, and **90 orders**, respectively, each representing less than **3%** of total orders. Their revenue was equally low: Acre (AC) generated **$6,979**, Amapá (AP) **$6,376**, and Roraima (RR) **$6,201**, while Tocantins (TO) and Amazonas (AM) each contributed less than **$23,000**. These figures highlight challenges such as sparse populations, limited digital infrastructure, and logistical difficulties in accessing these areas.
- **Interpretation:** The population density map of Brazil illustrates a strong link between high population density and both order volume and revenue. Southeastern states capitalize on larger customer bases and superior infrastructure. Conversely, sparsely populated northern and central-western states struggle to achieve similar performance levels, underscoring the critical role of population and infrastructure in market success. Moreover, cultural factors and regional spending power might also play roles, indicating that strategies for market penetration need to account for these differences.

City Level of Analysis:

- **High-Performing Cities:** São Paulo city leads with **7,658 orders** in 2018, generating **$1,054,259** in revenue, reinforcing its role as both a city and state powerhouse in Olist's ecosystem. Rio de Janeiro (RJ) follows with **2,950 orders** and **$459,914**, while Belo Horizonte (MG) contributes **1,348 orders** and **$201,413**, highlighting strong urban demand. Other key contributors include Brasília (DF) with **$108,347** and Curitiba (PR), Olist's headquarters, with **$101,683**. These cities drive a substantial share of their states' total order volumes and revenues, benefiting from larger populations, better infrastructure, and strong digital adoption.
- **Underperforming Cities:** Conversely, cities in underperforming states like Boa Vista (RR), Macapá (AP), Porto Velho (RO), Palmas (TO), and Rio Branco (AC) record minimal order volumes and negligible revenue, reflecting their limited role in Olist's overall performance. Some cities, such as Jaciara (MT), Amaturá (AM), and Novo Machado (RS), each generate less than **$500**, underscoring the challenges of low e-commerce adoption, logistical barriers, and lower economic activity.
- **Interpretation:** The revenue distribution mirrors the order trends, with high-performing cities in leading states driving the majority of total revenue. Urban centers with affluent populations and better digital infrastructure outperform their counterparts, highlighting the importance of targeted strategies to boost e-commerce activity in underperforming areas.

2. <u>Sellers Distribution:</u>

Seller distribution across Brazil reveals key regional disparities:

- The seller distribution across Brazil in 2018 demonstrates a concentration in key states, mirroring patterns seen in order and revenue volumes. São Paulo (SP) hosts the highest number of sellers at **1,673**, emphasizing its role as a central hub for Olist's operations. Rio de Janeiro (RJ) and Minas Gerais (MG) follow with **1,090** and **1,083** sellers, respectively, indicating strong seller representation in these high-demand regions. Southern states like Rio Grande do Sul (RS) and Paraná (PR) also perform well, with **743** and **727** sellers, further underscoring the economic vitality of the southeastern and southern regions.
- In contrast, northern and less populous states such as Roraima (RR), Amapá (AP), and Acre (AC) display minimal seller presence, each hosting fewer than **30 sellers**. These figures reflect the logistical challenges and limited e-commerce infrastructure in these areas, which contribute to their lower market penetration.
- Overall, the distribution of sellers aligns closely with regional demand and economic activity, highlighting areas of opportunity for expanding seller networks in underrepresented states.

3. **Trend over time:**

- **In 2016:** The platform registered only **463 orders** for the Top 20 Product Categories. This could be attributed to either Olist's early operations, as it launched in 2015, or incomplete data coverage. Limited market presence during this period resulted in negligible contributions from most states and cities, with only sparse order activity visible.
- **In 2017:** A significant shift occurred, with orders surging to **75,303**—an extraordinary **16,000% increase** from 2016. This exponential growth likely stemmed from Olist's aggressive expansion strategy, enhanced seller onboarding, and broader customer adoption. High-performing regions like São Paulo (SP) and Rio de Janeiro (RJ) were instrumental in driving this growth.
- **In 2018:** Growth momentum continued, with total orders rising to **88,853**, marking an **18% year-over-year increase** from 2017. Although the distribution of orders remained consistent—dominated by the southeastern states—this rise signifies the platform's growing acceptance nationwide. Alongside increased order volumes, the total revenue for 2018 reached **$8.6M**, aligning closely with Olist's officially reported revenue of **$8.5M**. High-performing cities like São Paulo and Rio de Janeiro remained central to revenue generation, while underperforming regions, contributed minimally.
- **Key Takeaways:** Olist's rapid scaling from 2016 to 2018 highlights its ability to penetrate Brazil's e-commerce market effectively. However, the data also reveals persistent regional disparities, emphasizing the need for targeted growth strategies in underperforming states and cities to unlock further market potential.

Conclusion 1:

With regards to the analysis of order volume, revenue distribution, seller concentration, and trends over time, it is clear that Olist has experienced rapid growth since its inception. The platform has firmly established its presence in Brazil's southeastern states, where dense populations, advanced logistics, and strong digital adoption drive the majority of orders and revenue. These regions consistently outperform, with São Paulo alone contributing 20% of total orders and over $2.8M in revenue. Meanwhile, underperforming northern and central-western states contribute minimally due to sparse populations, limited seller networks, and logistical challenges. Over time, Olist has demonstrated its ability to scale effectively, with a dramatic increase in order volumes and revenue between 2016 and 2018.

Actionable Recommendation 1:

Given these findings, optimizing market penetration in low-performing regions while sustaining performance in top-performing areas is critical. For high-performing states, Olist should focus on maintaining its competitive edge through enhanced customer loyalty programs, faster delivery

options, and expanding product variety to meet evolving demand. In underperforming regions, addressing barriers like poor logistics and limited seller presence through the recommendations provided will be key to unlocking new growth opportunities. This dual approach ensures both market sustainability in core regions and potential growth in underserved areas.

Business Question 2: How do payment preferences (Credit card, Boleto, Voucher and Credit Card) and associated customers volumes vary across Brazilian states for Olist customers in 2018, and how can these trends be leveraged to optimize payment options and enhance customer satisfaction?

[View Visualization in Tableau Public by clicking here]

Description:

These geospatial pie charts illustrate the **distribution of payment types** for Olist across Brazil in 2018, showing the proportion of different payment methods in each state. **Color** represents the specific payment type (**credit card, boleto, debit card, and voucher)**, while the **size** of the pie charts indicates the **count of customers**. Details are displayed for geolocation states from the **Olist Geolocation Dataset**. The view is filtered to include only **valid payment types**, with a **payment type filter** applied to remove **null** and **not defined** values for more accurate data representation. Non-null latitude and longitude values are also included to enhance geospatial reliability. Additionally, the **time filter** allows users to analyze payment trends across different years, while the **count slider** enables a focused view of states with varying payment volumes.

Key Insights:

- **Credit Card Dominance in Payment Methods:** Credit cards are the leading payment method across most states in Brazil with a total of **41,736** payments. São Paulo (SP) recorded **18,443 credit card transactions** in 2018, contributing over **$2,689,088** in payment value. Similarly, **Minas Gerais (MG)** and **Rio de Janeiro (RJ)** exhibit strong preferences for credit card payments, with **4,813** and **5,936** transactions, respectively, generating nearly **$797,962** and **$869,872** in revenue. This trend highlights widespread access to and trust in credit cards for online purchases.

- **Boleto as the Second Most Popular Method:** Boleto record a total of **10,195 payments**, making them the second most used payment type after credit cards. Notably, **São Paulo (SP)**, **Minas Gerais (MG)**, and **Rio de Janeiro (RJ)** contribute **4,507 (44.2%)**, **1,181 (11.6%)**, and **1,031 (10.1%)** of these transactions, respectively, highlighting their continued importance in Brazil's payment landscape. Boletos are favored by customers without credit cards or those who avoid them for online purchases. Acting as bank vouchers, they provide a simple and inclusive solution for unbanked populations.

- **Limited Use of Alternative Payment Methods:** Despite the dominance of credit cards, alternative payment methods like **vouchers** and **debit cards** are still used, though they represent a much smaller total count of **3,027** payments, making them far less significant overall. These methods remain more visible in states like **São Paulo, Rio de Janeiro, and Minas Gerais** but account for only minor portions of the total transactions, reflecting limited demand compared to primary payment types.

- **Variation in Customers Volume by States:** The size of the pie charts, representing customer count, aligns closely with transaction volume and economic activity. Southeastern states lead, with São Paulo (SP) accounting for **33.5%** of all Olist customers. Rio de Janeiro (RJ) and Minas Gerais (MG) follow with **10.8%** and **9.5%**, respectively. Northern states like Acre (AC) and Roraima (RR) exhibit minimal customer counts, reflecting lower transaction volumes and economic activity, which aligns with their smaller population densities and weaker e-commerce infrastructure.

- **Evolution of Payment Methods (2016–2018):** Transaction volumes surged from **346 in 2016** to **47,435 in 2017**, reaching **55,890 in 2018**. Early data gaps in voucher and credit card usage likely stem from limited adoption or incomplete reporting in 2016. However, the introduction and steady growth of these payment types by 2017 underscore their increasing relevance. The expansion of all payment types highlights Olist's success in catering to diverse customer preferences.

Conclusion 2:

The analysis reveals significant regional differences in payment preferences and customer volumes for Olist in 2018. **Credit cards** dominate in economically strong southeastern states like São Paulo, Rio de Janeiro, and Minas Gerais, which also lead in customer count and revenue. **Boletos**, the second most popular method, play a vital role in providing payment accessibility for unbanked customers. In contrast, **vouchers and debit cards** show limited adoption, reflecting their niche use. The growth in transaction volumes—from **346 in 2016** to **55,890 in 2018**—highlights Olist's expanding reach and the increasing adoption of diverse payment options. However, disparities persist, with northern states contributing minimally due to lower population densities.

Set of Actionable Recommendations 2:

- **Expand Payment Accessibility in Low-Performing Regions**: Partner with **local digital wallet providers** and **prepaid card services** to introduce accessible payment solutions in underbanked states like Acre and Roraima. Implement **mobile-friendly payment options** and offer incentives such as small transaction discounts for using alternative methods like debit cards and vouchers, bridging financial gaps and boosting e-commerce participation.

- **Optimize Credit Card Usage Through Targeted Promotions**: Collaborate with major credit card companies/banks in high-performing regions like São Paulo and Rio de Janeiro to introduce exclusive cashback, rewards, and installment options. Use targeted campaigns to emphasize the security, convenience, and perks of credit cards, ensuring continued loyalty while driving higher adoption in regions where usage could improve.
- **Develop Region-Specific Payment Strategies**: To promote the most popular payment methods in each area. For states where boleto are widely used, highlight their simplicity and accessibility. In credit card-dominant areas, focus on building trust and expanding usage in lower-income segments through digital literacy initiatives and customer workshops to enhance overall payment experience.

Business question 3: How do customer satisfaction (measured by review scores) and delivery performance (measured by late delivery percentages) vary across different States in Brazil from 2017 to 2018, and to what extent are late deliveries and Payment value correlated with lower customer sentiment ? Additionally, how can these insights be used to optimize delivery operations and improve customer experience in regions with lower performance ?

[View Visualization in Tableau Public by clicking here]

Description:

This geospatial visualization provides a detailed analysis of **customer satisfaction** (through sentiment analysis) and **delivery performance** in Brazil over time. The left map categorizes customer feedback as negative, neutral, or positive, with details displayed for geolocation cities. The right map highlights the **average review score** through color intensity and the **average payment value** through marker size, offering insights at the state level. The bottom map focuses on delivery performance, using color to represent the **percentage of late deliveries** by state. The view is filtered to include all sentiment categories, ensuring a comprehensive analysis of customer feedback, payment trends, and delivery efficiency across the country.

Key Insights:

1. **Sentiment Analysis – Left Scatter Plot:**

In our sentiment analysis, customer reviews were scored from 1 to 5, with scores above 3 classified as **positive**, below 3 as **negative**, and exactly 3 as **neutral**. This classification enabled a focused analysis of sentiment trends by year and across cities.

- In **2018**, **30,779 reviews** were recorded, compared to **25,592** in **2017**, accounting for **59.92%** of the **51,364 reviews** collected over three years. Positive reviews dominated, comprising **77% (23,696)**, reflecting widespread customer satisfaction and strong

performance. This marks a **20.6% increase** from **19,640 positive reviews** in 2017. Negative reviews accounted for **15% (4,625)** in 2018, up from **3,715** in 2017—a **24.5% increase**—indicating persistent dissatisfaction in areas like delivery delays, product quality, or customer service. Neutral reviews stood at **8% (2,458)** in 2018, compared to **2,237** in 2017, reflecting a **9.9% increase** and signaling average experiences without strong sentiments.

- This sentiment breakdown highlights that most customers were satisfied with Olist's service, as **positive reviews were significantly higher** in both **2017** and **2018**. Besides, The **average review score across all states** increased from **3.955 in 2017** to **4.005 in 2018**, reflecting a positive trend. This improvement suggests that Olist has made strides in enhancing customer satisfaction, indicating successful efforts in key areas such as product quality, service, or delivery. However, the presence of negative and neutral reviews reveals areas for improvement, particularly in addressing recurring pain points. Among other factors, these negative reviews could be tied to delivery performance. The next section will explore this potential correlation.

2. **Delivery Performances – Right Choropleth**

The analysis of the **percentage of late deliveries** across Brazilian states, using saturation to identify the highest and lowest delays revealed significant regional disparities in delivery performance, with distinct trends over time (2017-2018):

- **Northern and Northeastern Regions**: States in the North and Northeast, such as **Amazonas (AM)** and **Pará (PA)**, face consistent logistical challenges. In **Pará**, late deliveries surged from **7.37% in 2017** to **17.17% in 2018**, resulting in a sharp decline in the average review score from **4.173** to **3.697**, despite an increase in payment value from **209.5 to 222.1**. In contrast, **Amazonas** showed resilience, with late deliveries rising moderately from **2.67% to 5.48%**, while review scores improved from **3.933 to 4.261**, indicating better performance in areas beyond delivery. Similarly, **Bahia (BA)** saw late deliveries jump from **10.78% in 2017** to **15.83% in 2018**, accompanied by a drop in review scores from **3.891** to **3.767**.

- **Southern and Southeastern Region**: Economically strong states like **São Paulo (SP)** and **Minas Gerais (MG)** demonstrated mixed results. **São Paulo** saw late deliveries increase from **4.46% to 6.67%**, yet review scores slightly improved from **4.157 to 4.179**, suggesting that customers appreciated other aspects, such as product quality or service. Conversely, **Rio de Janeiro (RJ)** experienced a rise in late deliveries from **11.18% to 14.76%**, with review scores dropping from **3.881 to 3.821**, indicating growing dissatisfaction. In the South, **Rio Grande do Sul (RS)** saw late deliveries increase from **6.15% to 7.84%**, with a slight decrease in review scores from **4.178** to **4.146**.

3. Correlation between Late Deliveries and Negative Customer Sentiment

By filtering for **negative** and **neutral** sentiments (review scores ranging from 1 to 3), we identified a strong correlation between late delivery rates and customer satisfaction. States with higher late delivery rates consistently show lower average review scores, particularly evident in the following States like **Acre (AC who** recorded a late delivery rate of **3.57% in 2017**, with an average review score of **1.833**. By 2018, the late delivery rate surged to **11.84%**, and the average review score dropped significantly to **1.750**, indicating growing dissatisfaction as delays increased. **Alagoas (AL)**: AL faced a similar trend, with late deliveries jumping from **12.32%** in 2017 to **26.71%** in 2018. Consequently, the average review score fell from **1.833** to **1.750**, reinforcing the negative impact of delays on customer sentiment.

However, exceptions like **Amazonas** and **Pernambuco** show that factors such as customer service and product quality can mitigate the impact of delivery delays. Amazonas, despite an increase in late deliveries, improved its review score significantly 1.750 to **1.800**, highlighting that other aspects of the customer experience can compensate for delays.

4. Correlation between Payment Value and Negative Customer Sentiment

In analyzing the relationship between **price** and **customer satisfaction**, the data reveals no significant correlation. Across all states and years, the size of the markers, representing the **average payment value**, remains relatively consistent, regardless of variations in review scores. This consistency suggests that **price** does not play a significant role in influencing customer satisfaction for Olist.

Even in states with low review scores due to late deliveries or other factors, the average payment value shows minimal fluctuation. Customers appear to maintain their spending habits regardless of their sentiment, indicating that dissatisfaction is more likely driven by service-related issues, such as delivery performance or product quality, rather than pricing.

Conclusion 3:

The analysis reveals significant regional and temporal differences in customer satisfaction and delivery performance for Olist. From 2017 to 2018, customer sentiment showed an overall positive trend, with 77% of reviews in 2018 being positive, reflecting strong performance. However, the rise in negative reviews (24.5%) highlights ongoing challenges, particularly related to delivery delays. Delivery performance varied widely across regions. States like Pará and Alagoas in the North and Northeast faced high late delivery rates—17.17% and 26.71% in 2018—leading to notable declines in customer satisfaction. Meanwhile, São Paulo maintained relatively lower late delivery rates (6.67%) and steady satisfaction, demonstrating better service resilience. Two key findings stand out. First, there is a **strong negative correlation between late delivery rates and customer satisfaction**: states with higher late delivery percentages consistently report lower

review scores. For example, Alagoas saw its review score drop as late deliveries surged. Second, **payment value apparently shows no significant correlation with customer satisfaction**. Despite variations in review scores, average payment values remained stable, indicating that dissatisfaction is driven more by service issues than pricing.

Set of Actionable Recommendations 3:

- **Optimize Delivery Logistics in High-Delay Regions:** Olist must focus on states with the highest late delivery rates, such as Pará, Alagoas, and Bahia and Partner with local logistics providers and invest in infrastructure improvements like regional warehouses to reduce delivery times. Implementing real-time tracking systems could also provide customers with accurate delivery estimates and proactive communication in case of delays.

- **Leverage Customer Feedback for Service Improvements:** Olist can use sentiment analysis to identify specific pain points in low-scoring states. It means implementing post-delivery surveys focusing on these regions to gain deeper insights. The company can use the feedback to train customer service teams and develop tailored solutions, such as offering faster resolution for complaints or compensation for late deliveries.

- **Strengthen Non-Delivery Service Areas in Resilient States**: Olist should capitalize on states like Amazonas and São Paulo, where customers showed tolerance for delays. The strategy is to enhance loyalty programs and promote value-added services such as exclusive deals, personalized recommendations, and extended return policies. This can reinforce positive sentiment and drive repeat purchases even in the face of occasional delivery challenges.

Final Conclusion

This report explores Olist's performance across three core dimensions: market penetration, payment preferences, and customer sentiment. The geospatial analysis reveals critical regional disparities in order volume and revenue, with southeastern states like São Paulo, Rio de Janeiro, and Minas Gerais consistently outperforming others due to larger populations, better infrastructure, and higher e-commerce adoption rates. In contrast, underperforming northern and northeastern states face logistical challenges and limited seller presence, which constrain their growth.

Payment preferences also exhibit regional nuances, with credit cards dominating high-performing states and boletos providing critical accessibility for unbanked populations. Despite this, alternative payment methods like vouchers and debit cards show minimal impact. Over time, the increased adoption of diverse payment options signals Olist's success in catering to various customer needs.

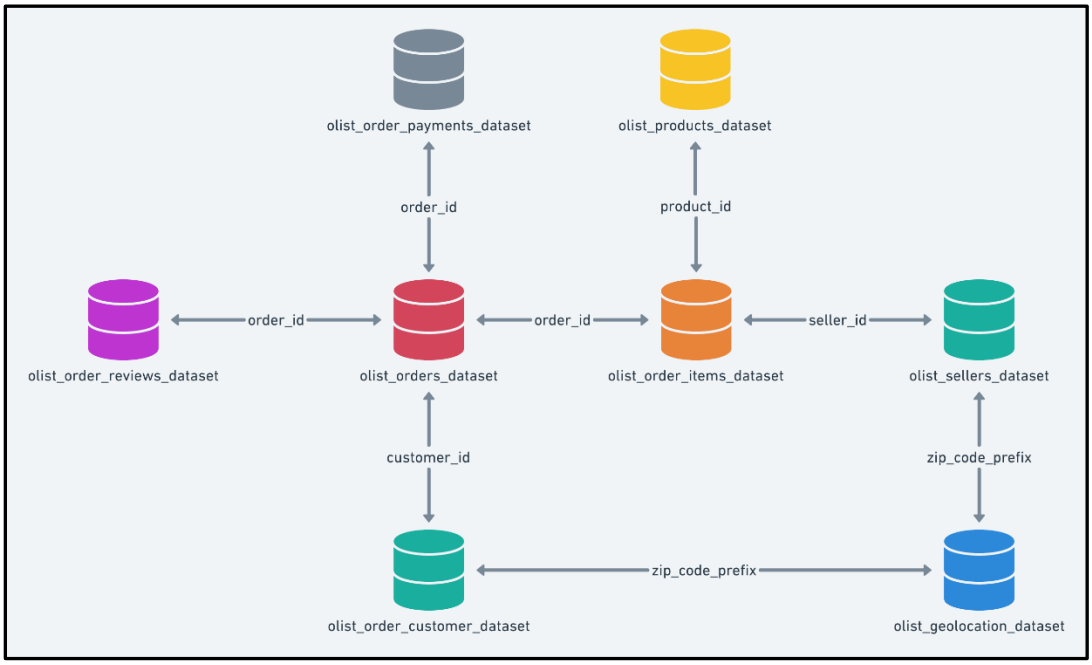
Customer satisfaction, as measured by review scores, highlights the importance of delivery performance. A strong correlation between high late delivery rates and lower review scores underscores delivery as a key pain point. States like Pará and Alagoas experienced sharp declines in customer sentiment due to increased delays, while states like Amazonas demonstrated resilience, showing that factors like product quality and customer service can offset logistical challenges. Conversely, payment value showed no significant correlation with customer sentiment, indicating that service-related factors, rather than price, drive customer satisfaction. These findings emphasize the need for a balanced approach: sustaining growth in top-performing regions while addressing the barriers in underperforming areas.

Immediate Next Steps for Olist

To capitalize on these insights, Olist should implement the following immediate actions:

1. **Optimize Logistics in High-Delay Regions**: Focus on regions like Pará and Alagoas with the highest late delivery rates. Partner with local logistics providers, establish regional warehouses, and implement real-time tracking to enhance delivery speed and reliability.
2. **Enhance Payment Accessibility in Low-Performing Areas**: Introduce mobile-friendly payment solutions and collaborate with local digital wallets or prepaid services in underbanked regions. This will improve payment accessibility and e-commerce adoption.
3. **Leverage Data-Driven Customer Feedback**: Implement advanced sentiment analysis tools to gain deeper insights into customer pain points. Use this data to improve service quality, particularly in low-performing states, and tailor loyalty programs in high-performing regions to sustain customer satisfaction.

Appendix



Olist Data Model