Olist Store Review Score Analysis and Customer Segmentation

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Problem
Formulation

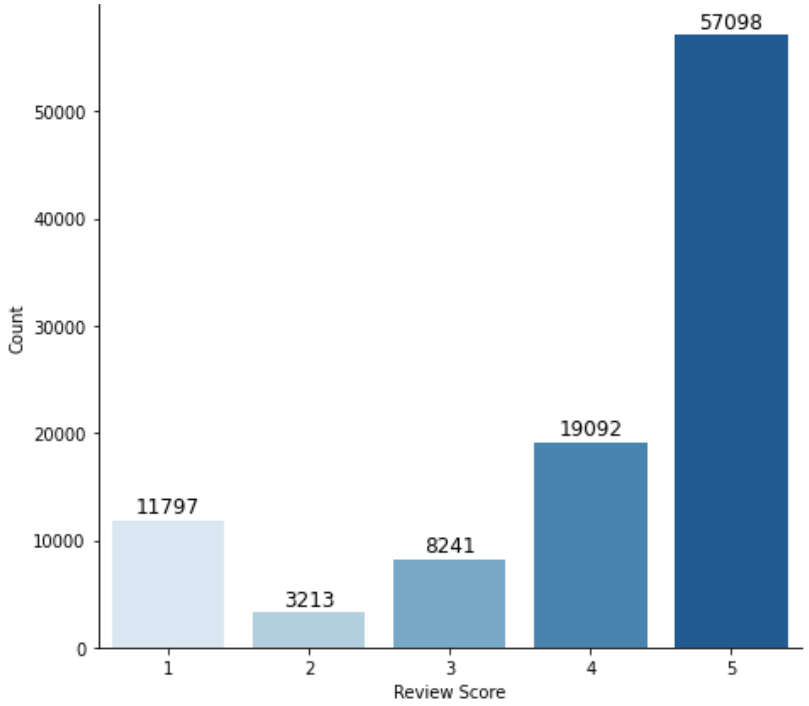
Business Problem

Business Primary Objective

Increase

PROFIT

Olist Store Review Score



Customer Rating

4.1

(99441)

Background

Why review score is important ?

01 Influence customer's decision

02 Strengthen company's credibility

03 Feedback for the company

Why targeted advertising strategy is important?

5.3

times higher click-through rate [1]

10 %

increased sales [2]

Customer segmentation is needed for targeted advertising

[1] European Parliamentary Research Service, 2020, *Digital Service Act: European Added Value Assessment*
[2] Shepherd S. (2020). The powerful potential of personalisation in digital marketing.

Problem Statement

01

What makes a low or high **review score**?

02

What **type of customers** are using the Olist Store?

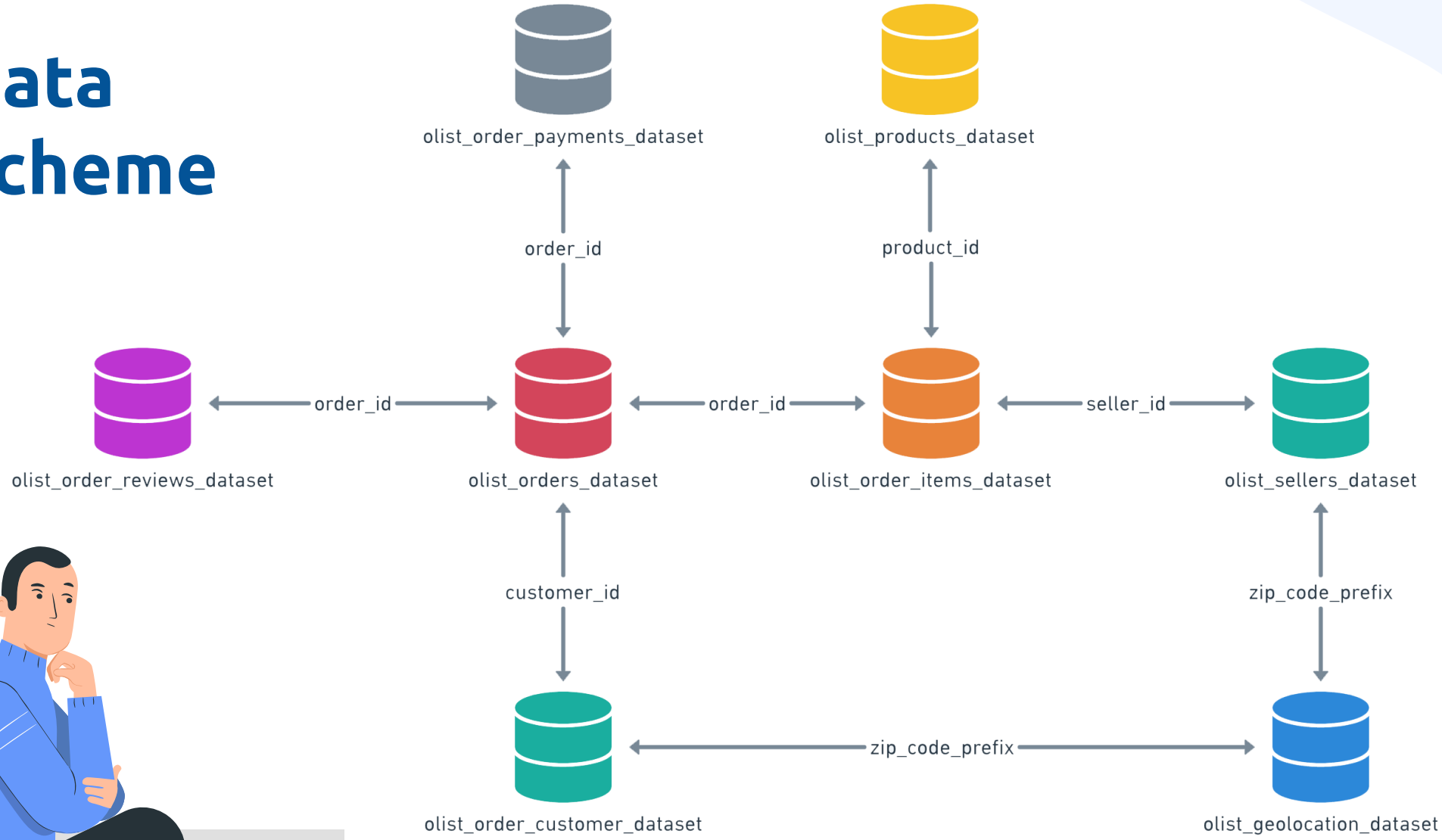

Data Understanding
& Merging

The Datasets

There are 9 datasets used in this project, which can be downloaded from Kaggle.

- Customer: data about customer's information and location
- Geolocation: data about Brazilian zip codes and its lat/lng coordinates
- Order Items: data about item purchased for each order
- Order Payments: data about payment options for each order
- Order Reviews: data about reviews made by the customers
- Orders: data about orders information
- Products: data about product specification
- Sellers: data about the sellers that fulfilled orders
- Product Translations: include product's English translation

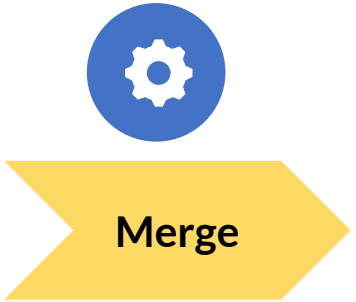
Data Scheme


olist_order_payments_dataset
olist_products_dataset
order_id
product_id
olist_order_reviews_dataset
order_id
olist_orders_dataset
order_id
olist_order_items_dataset
seller_id
olist_sellers_dataset
customer_id
zip_code_prefix
olist_order_customer_dataset
zip_code_prefix
olist_geolocation_dataset

Data Merging

Datasets Shape

Dataset	Rows	Columns
customers	99.441	5
geo	1.000.163	5
order_items	112.650	7
order_payments	103.886	5
order_reviews	100.000	7
orders	99.441	8
products	32.951	9
sellers	3.095	4



df_merged

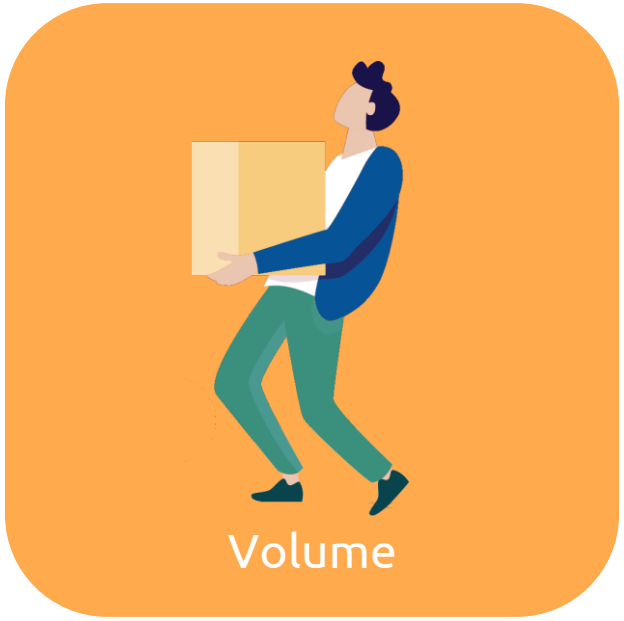
Shape	Value
Rows	117.601
Columns	38

Feature Engineering

Added 3 new features:

The time difference between the actual and estimated delivery date

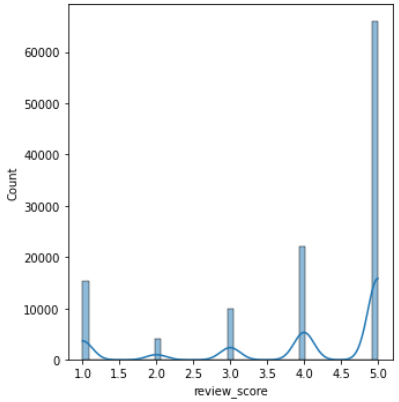
Time needed to process an order

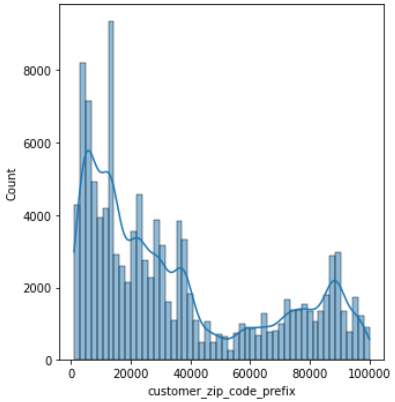


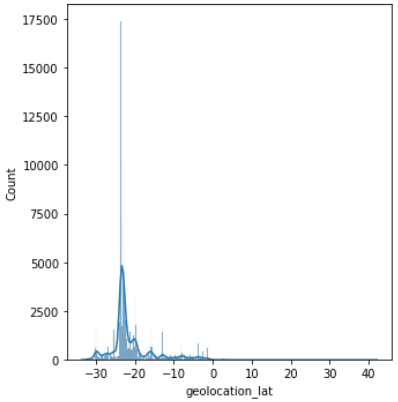
The volume of the product

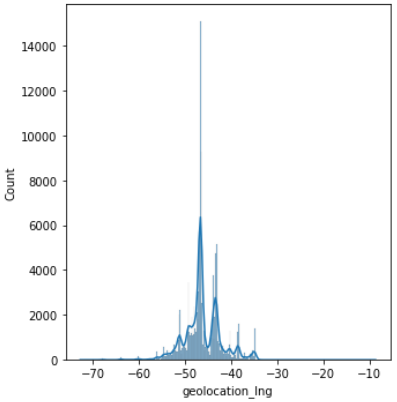
EDA & Review Score Analysis

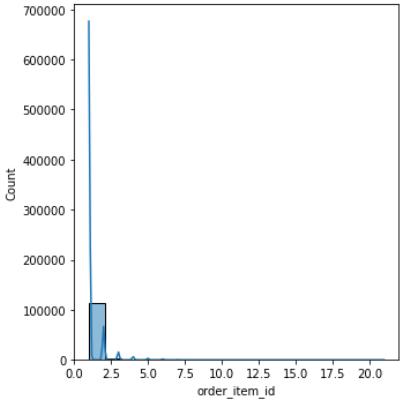
Numerical Data Distribution

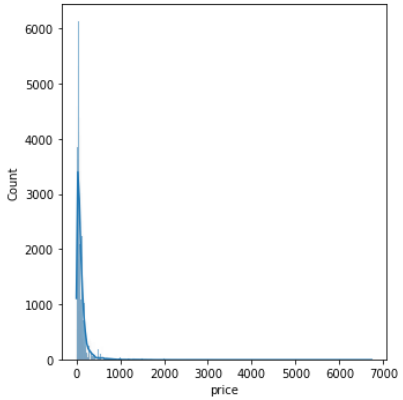


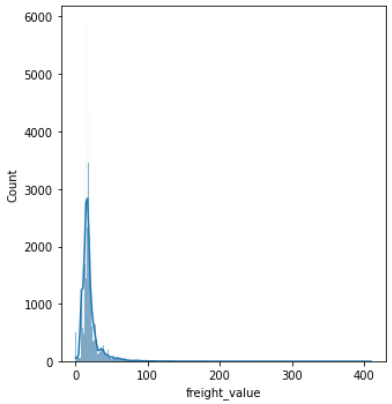


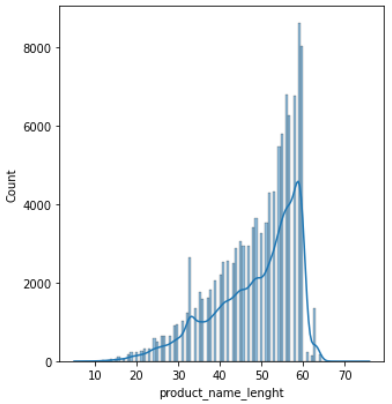


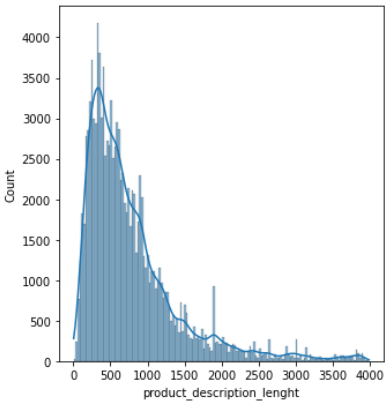


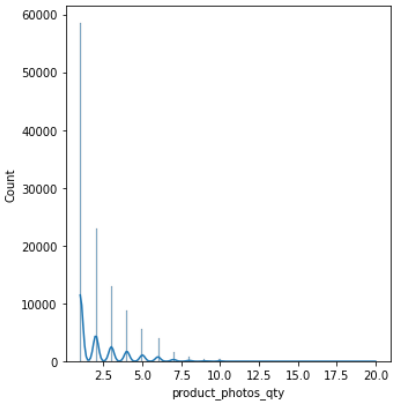


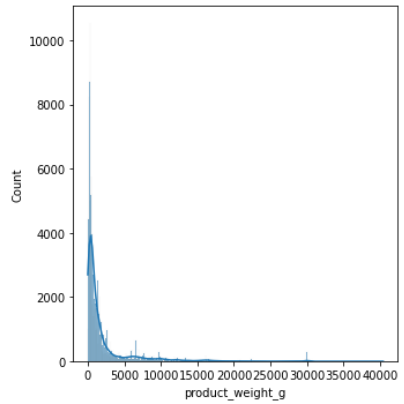


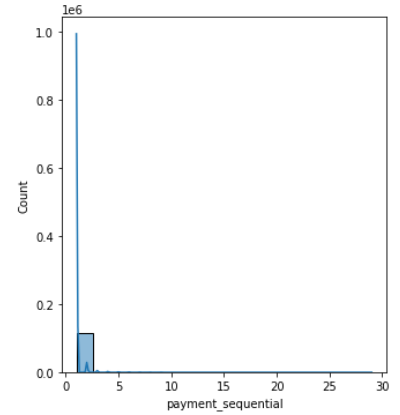


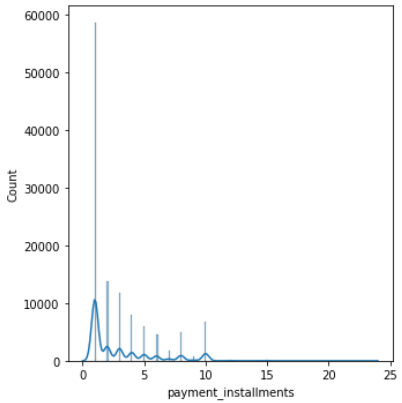


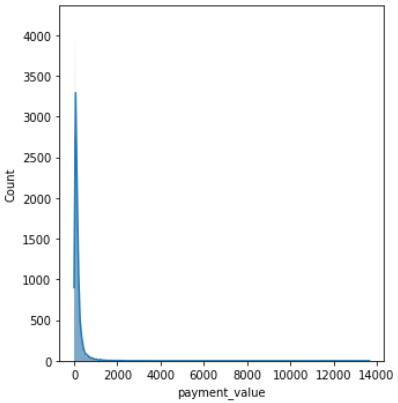


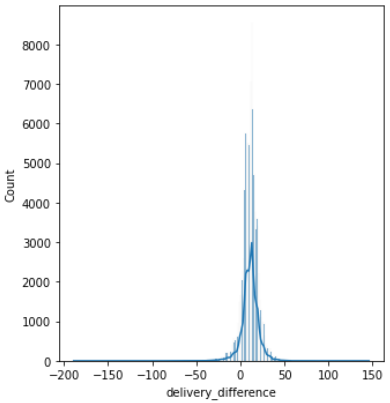


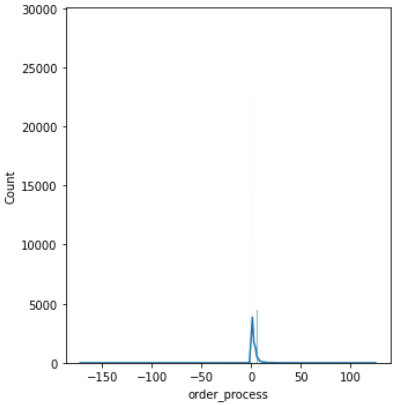


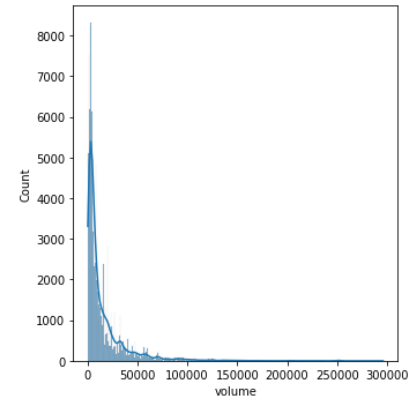




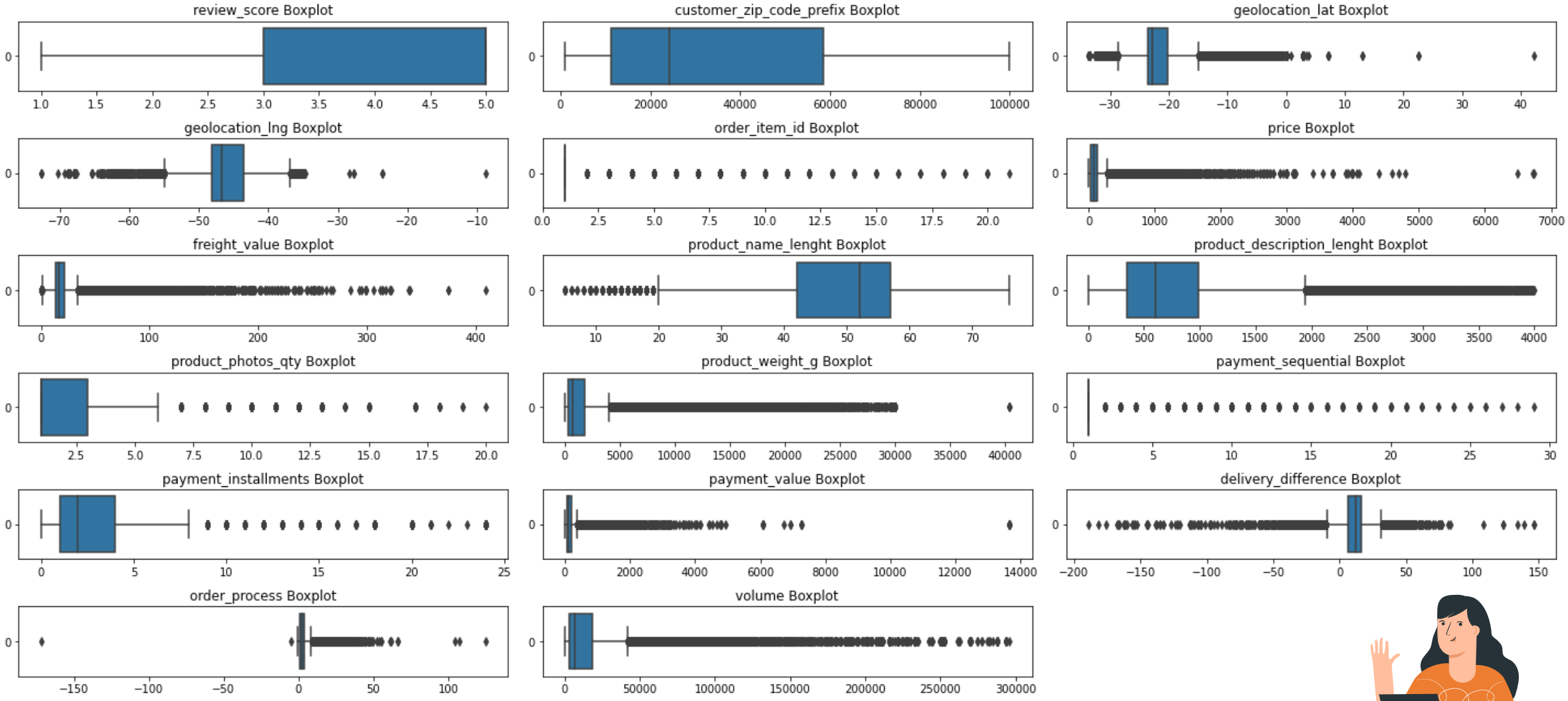




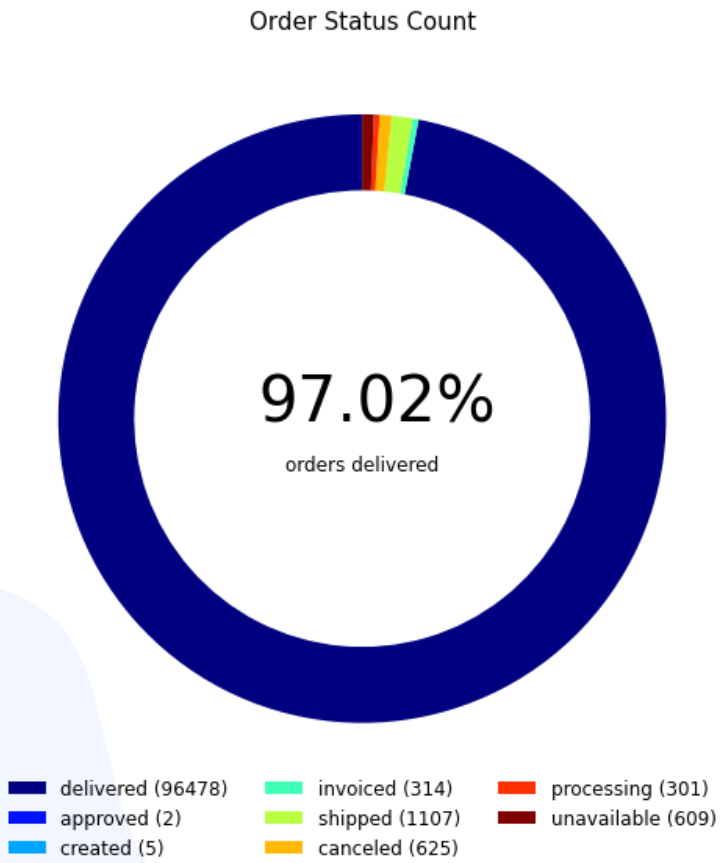


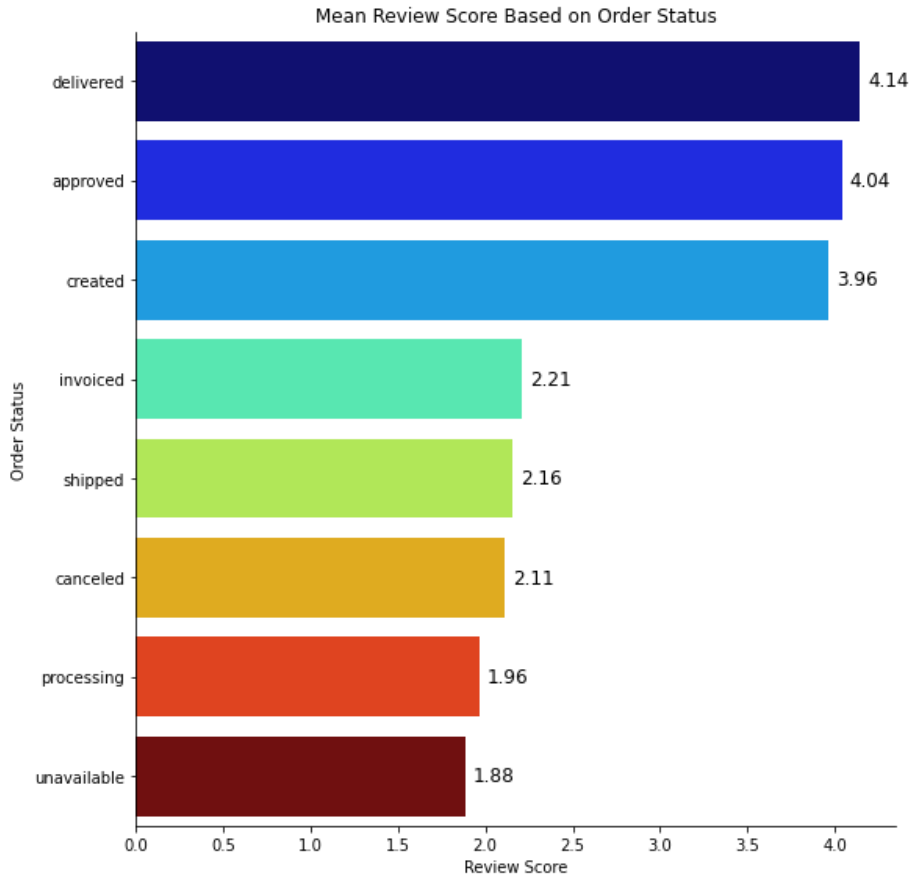


Numerical Data Boxplot



Review Score Based On Order Status





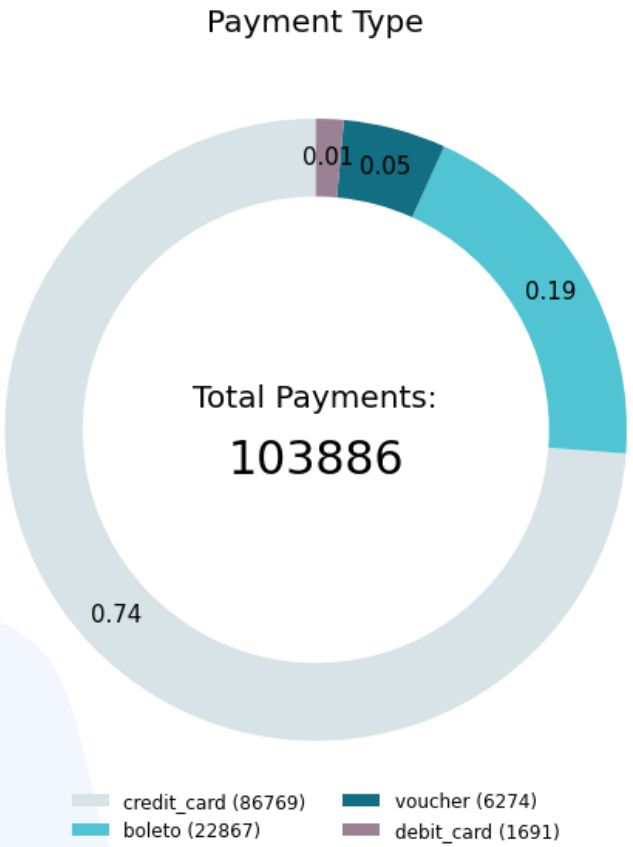
*review score is calculated using the weighted rating

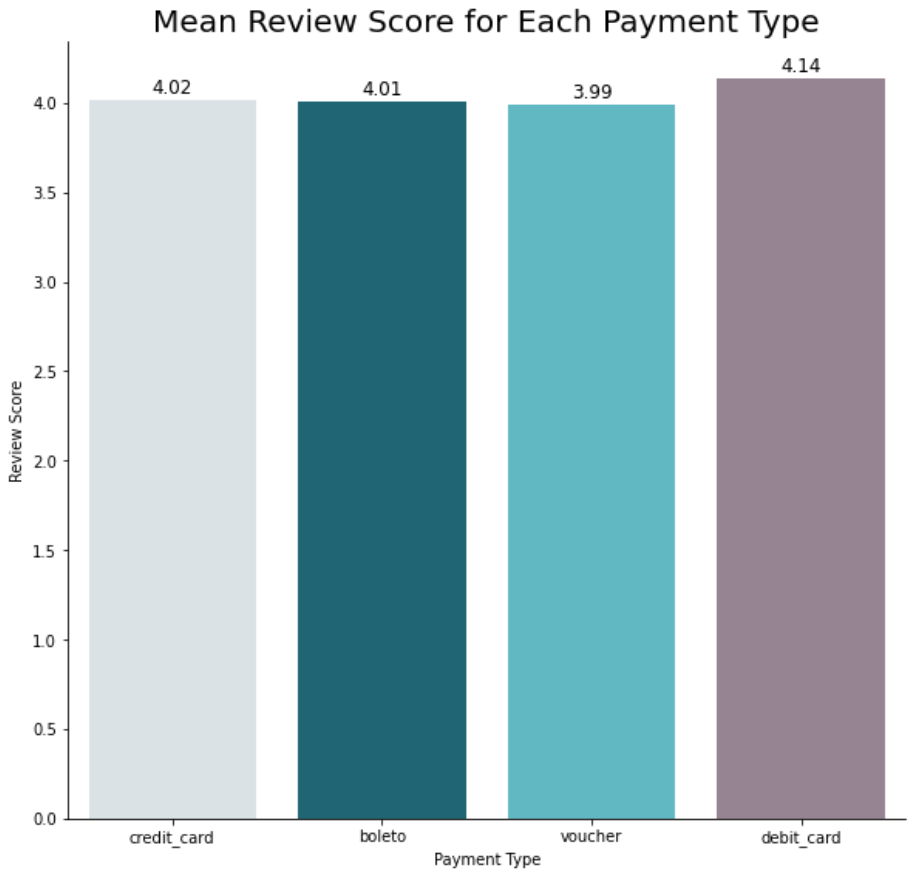
Our Recommendations

Undelivered orders tend to have a bad review score

Thus, we suggested to add a title (for example fast sellers, trusted sellers, or top-rated sellers) to fast and reliable sellers in order to reduce the amount of cancelled or a "long time to process" orders (undelivered orders)

Review Score Based On Payment Type





*review score is calculated using the weighted rating

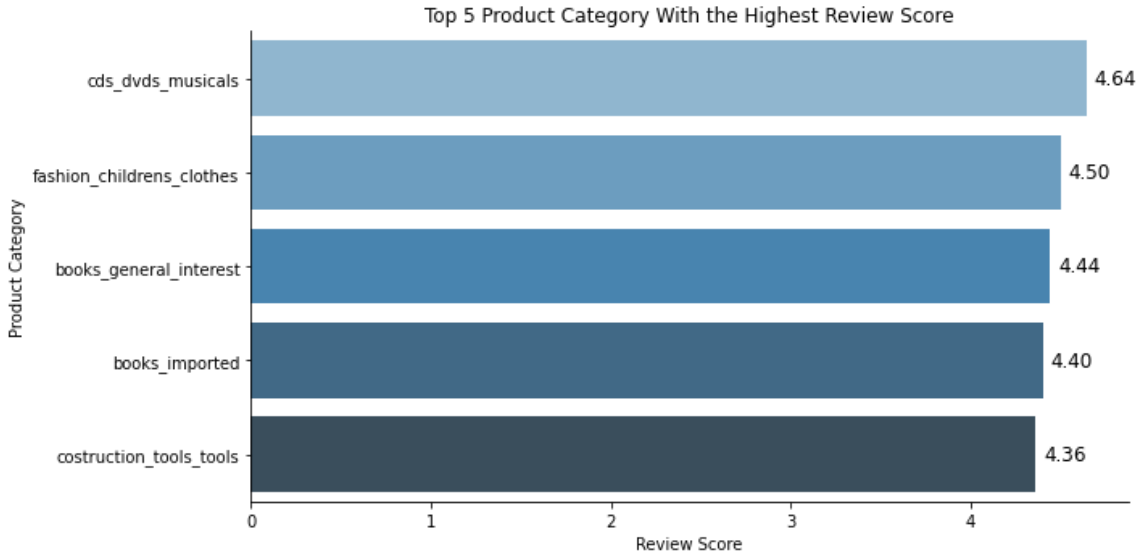
Our Recommendations

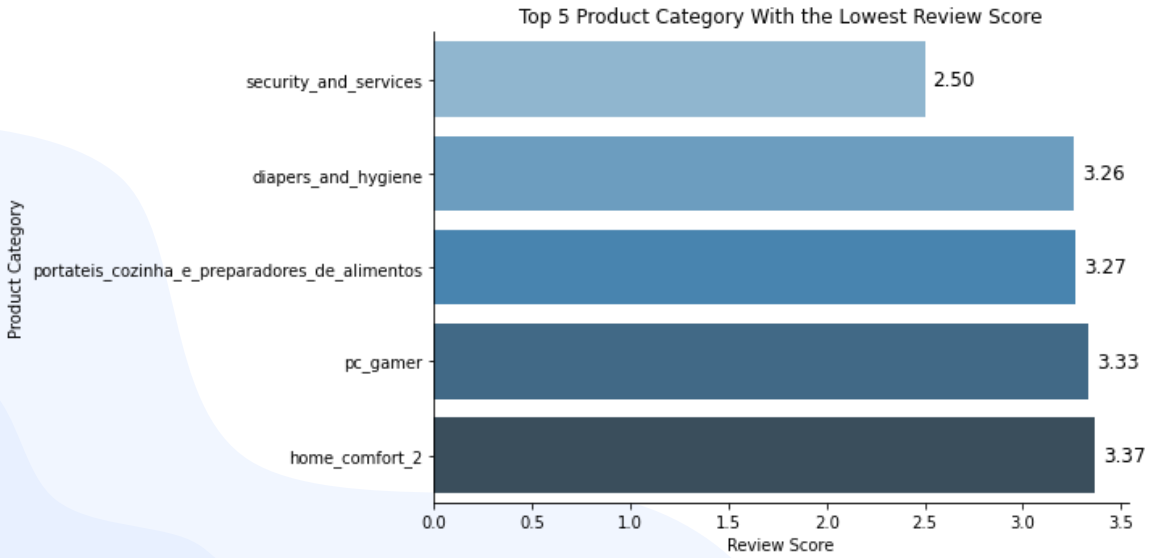
Majority of the customer use credit card as a way to pay.

Thus, we suggest to:

- Give some promo when the payment type used is credit card
- Encourage the customers to also pay with debit card since it is highly rated by the customer

Product Review Score

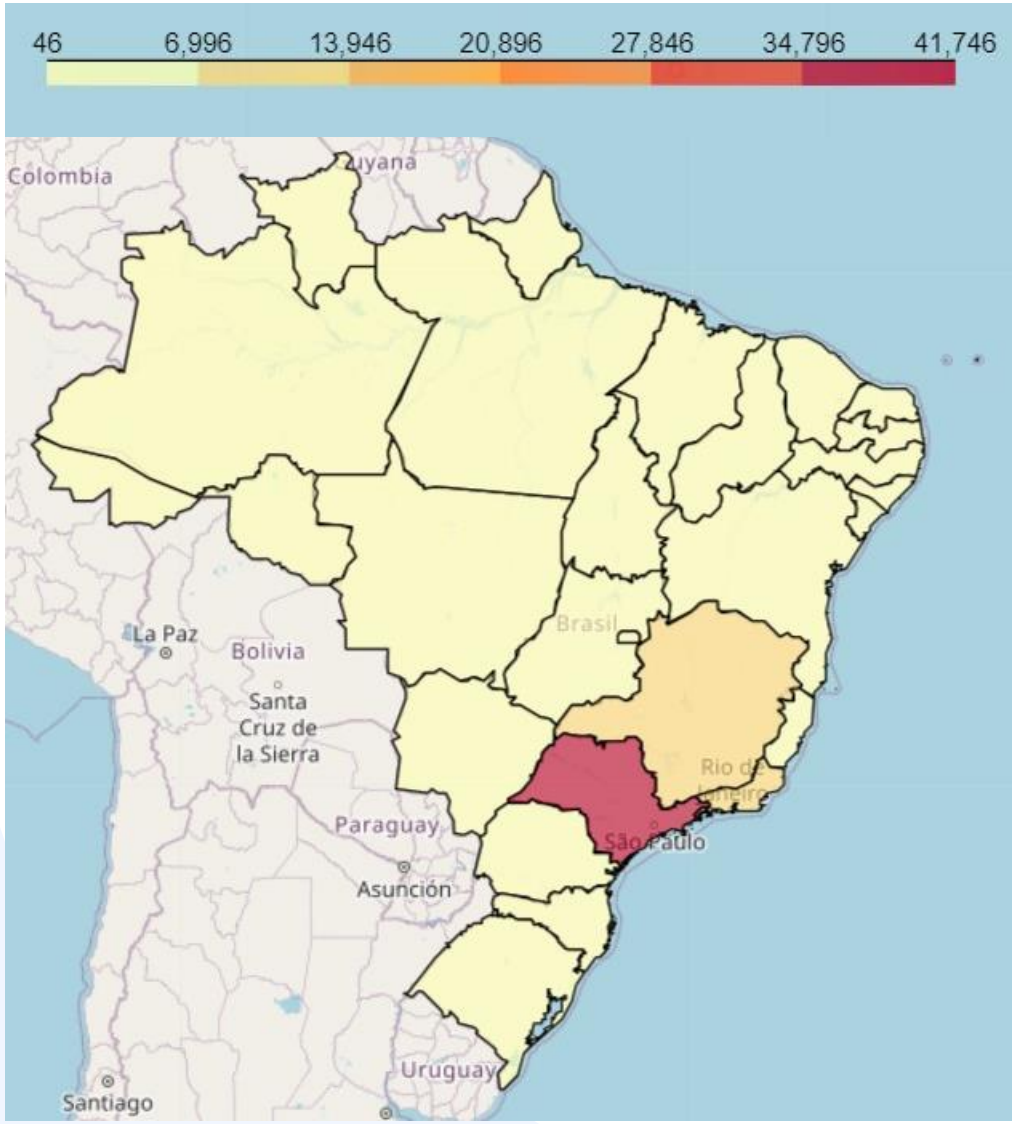


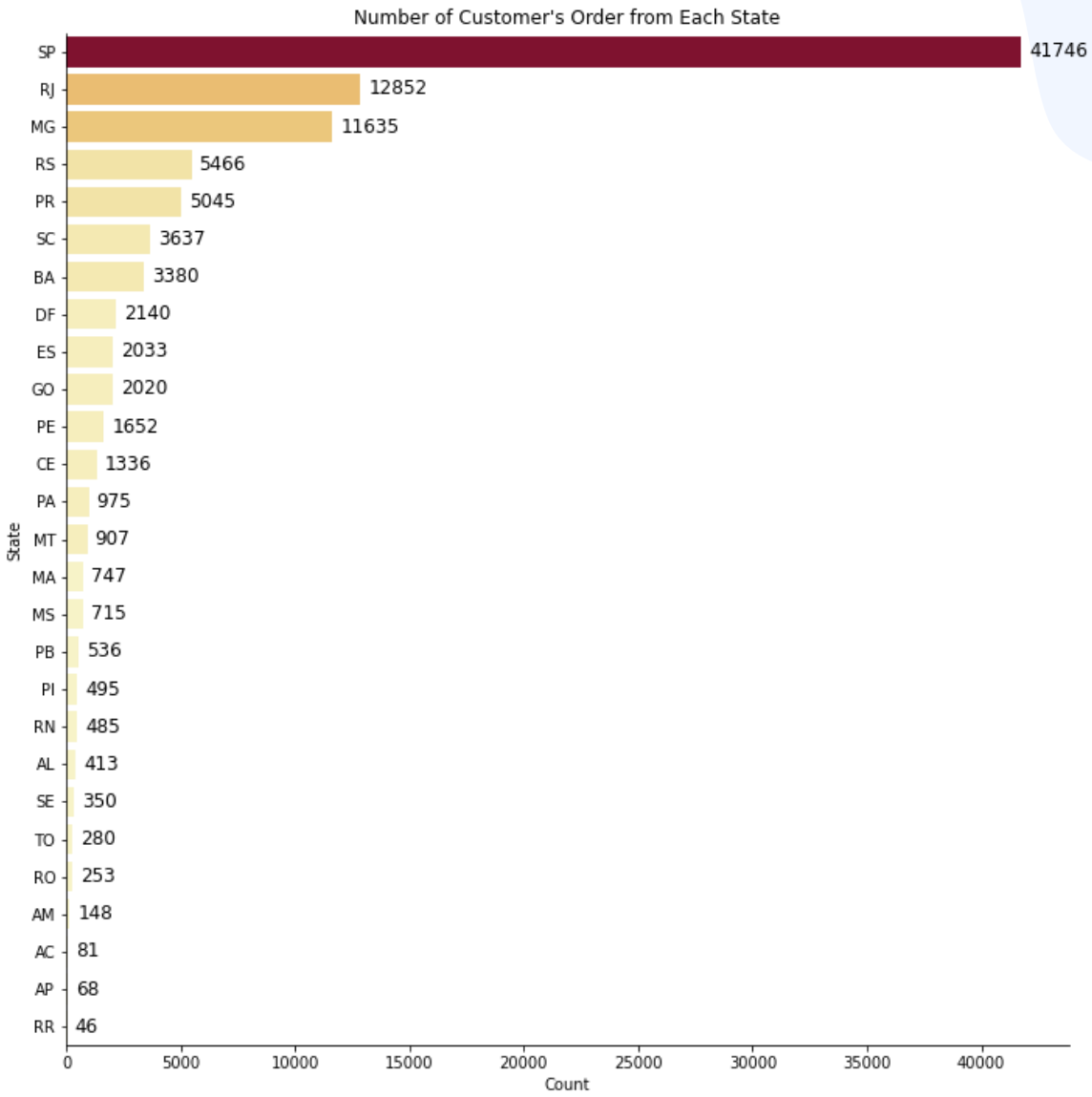


Our Recommendations

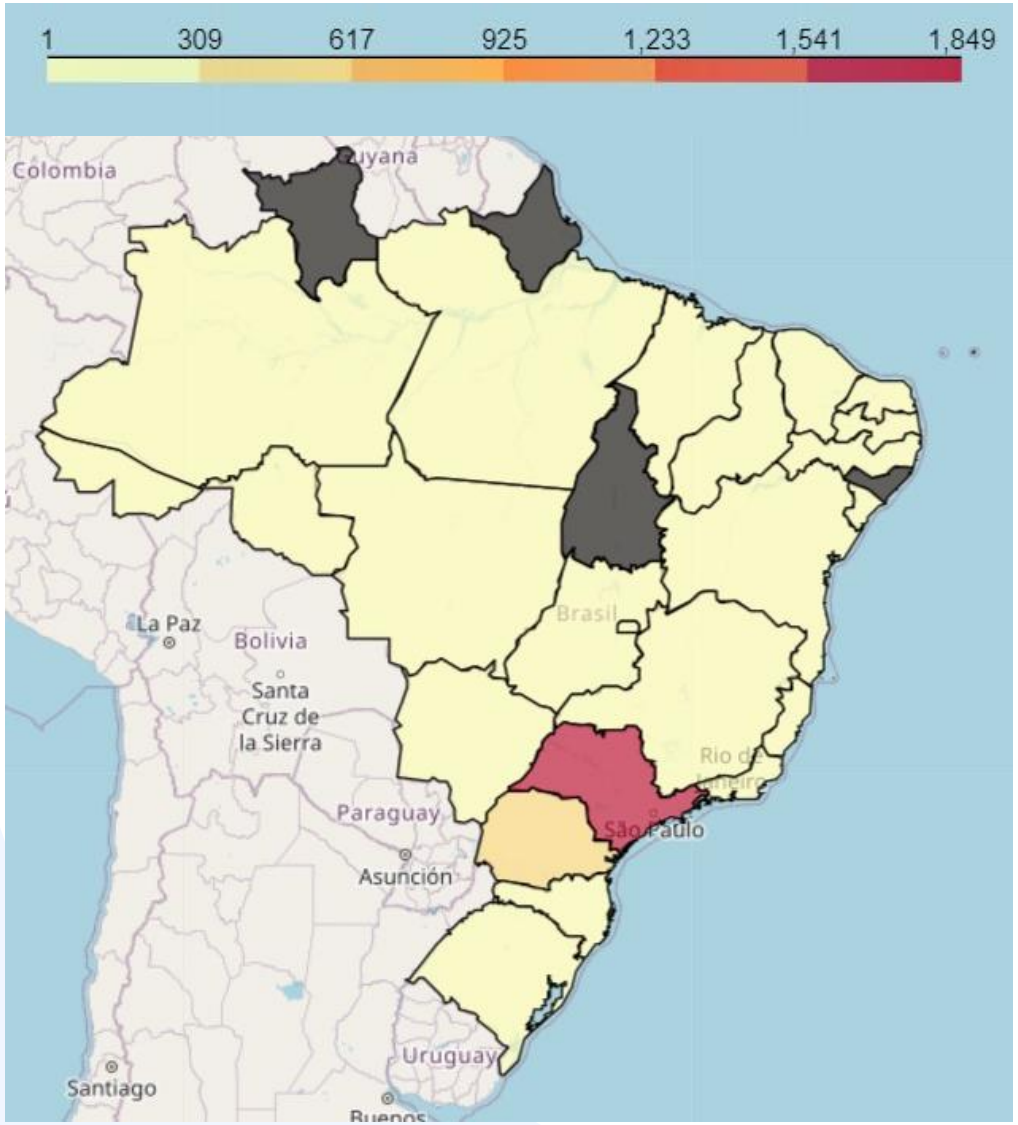
- Create more ads and recommendations in the Olist Store about the highly rated product category
- Perform further analysis to investigate why the poorly rated product category is rated that way

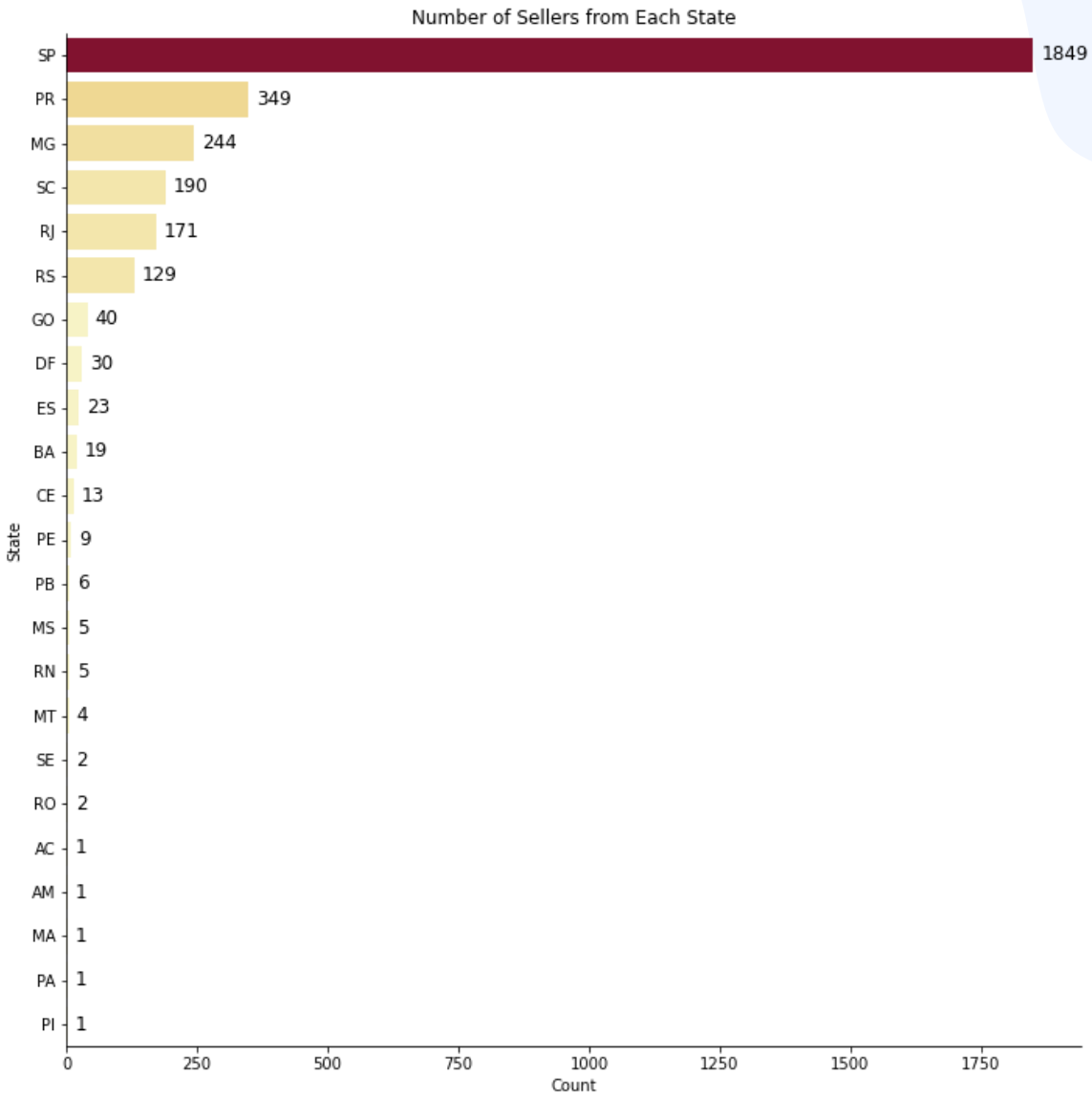
Customer Distribution



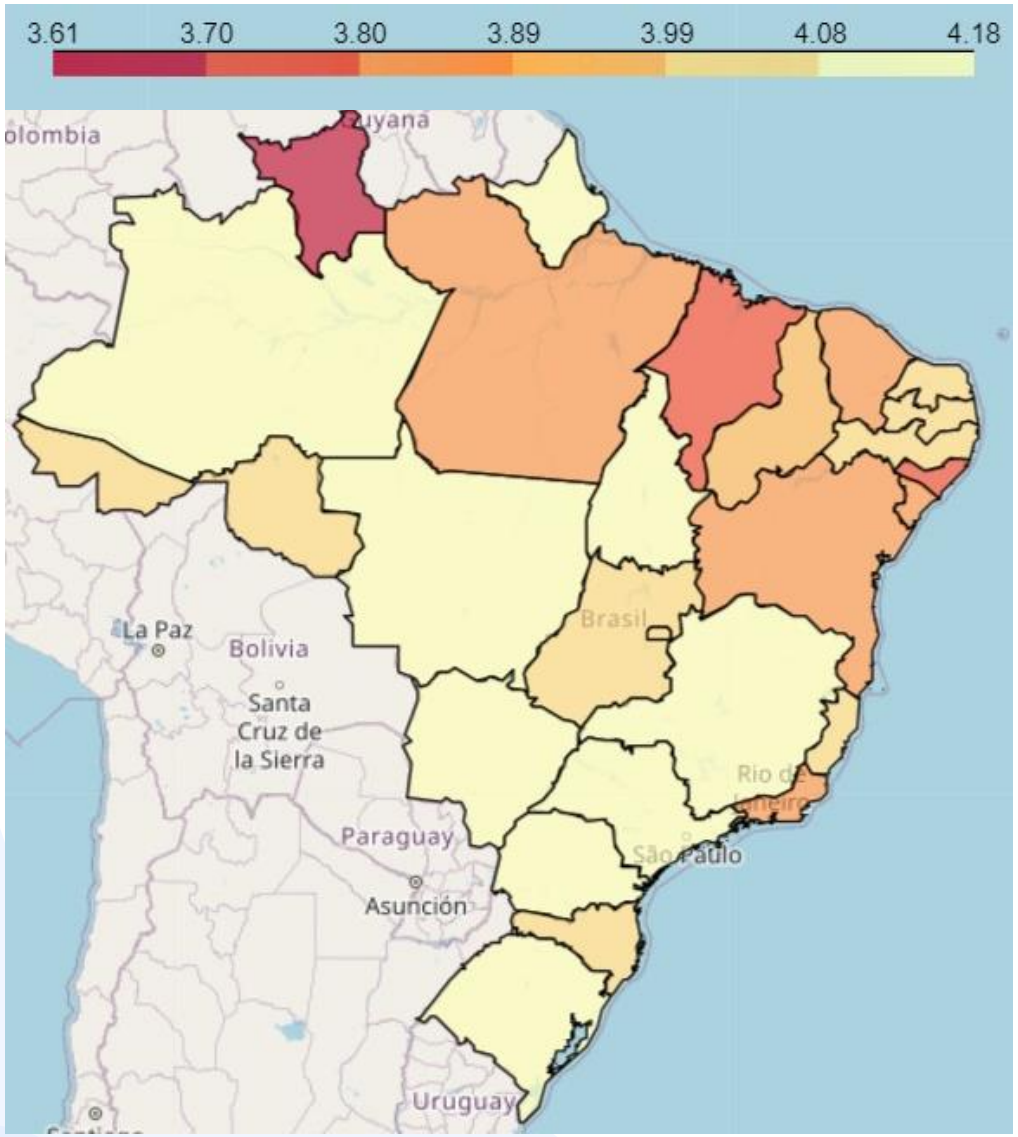


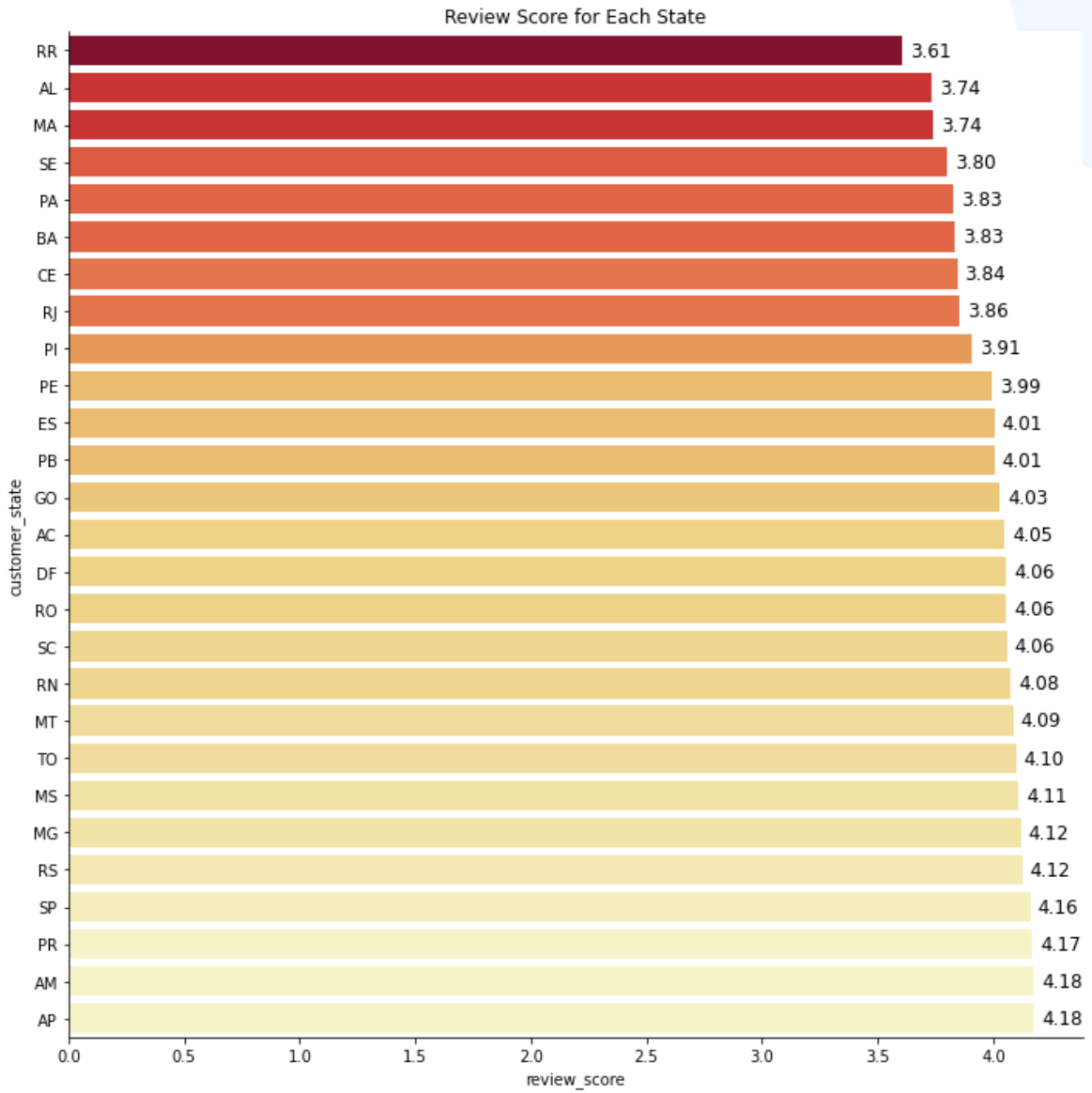
Seller Distribution



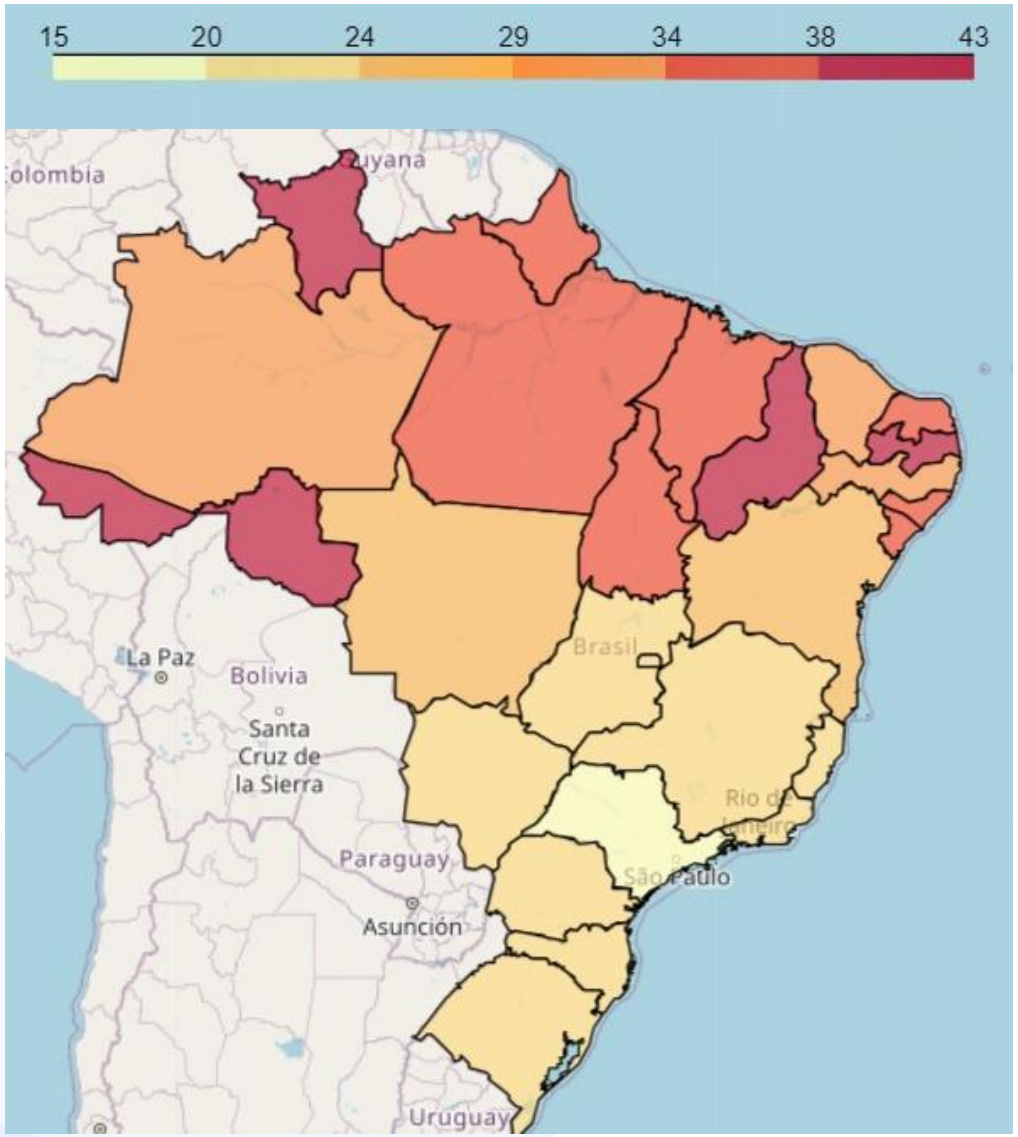


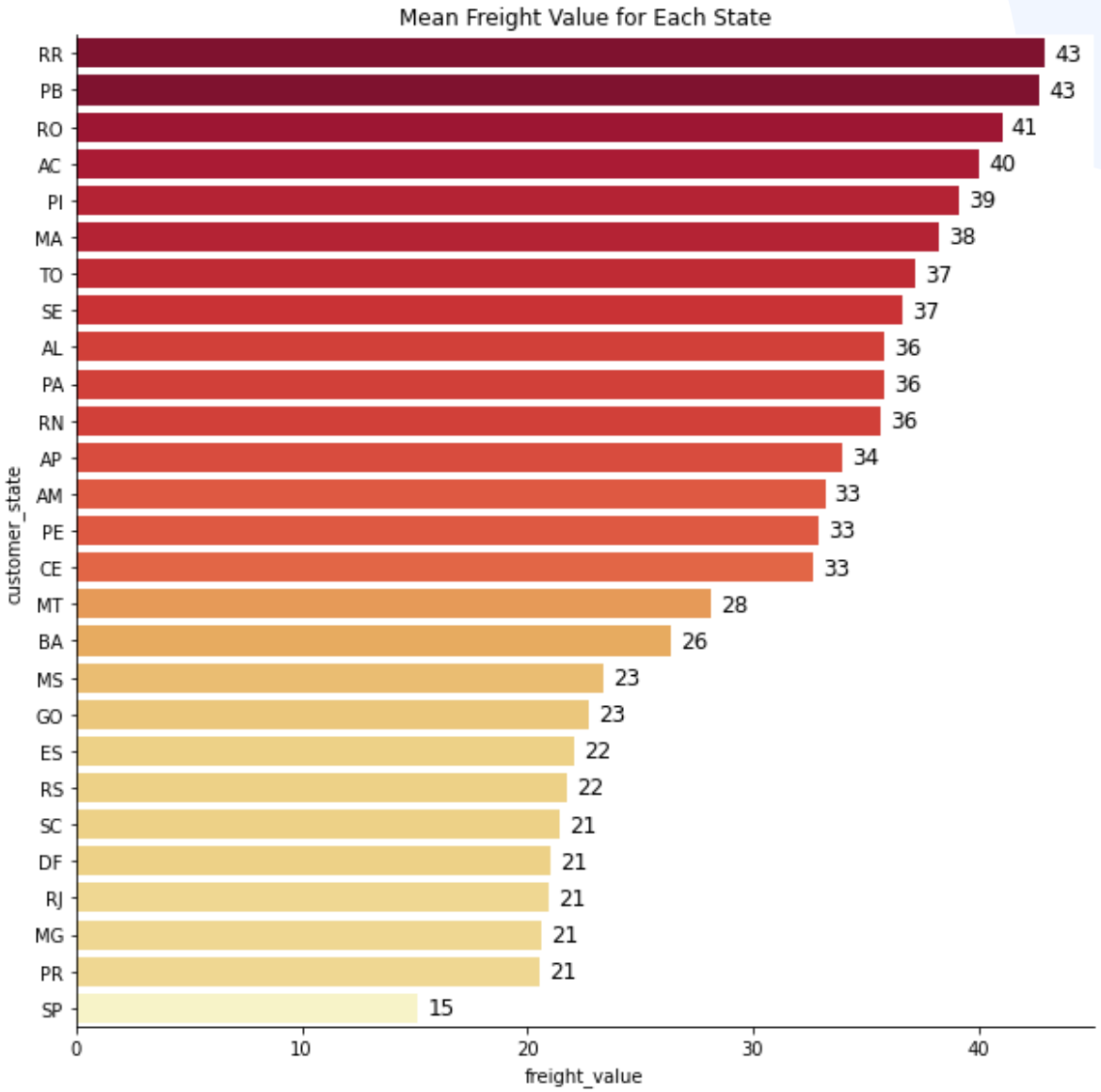
Review Score from Each State





Average Freight Price from Each State





Geolocation Review Score

The customers from the northern side of Brazil tend to give a lower review score than the customers from the southern side of Brazil

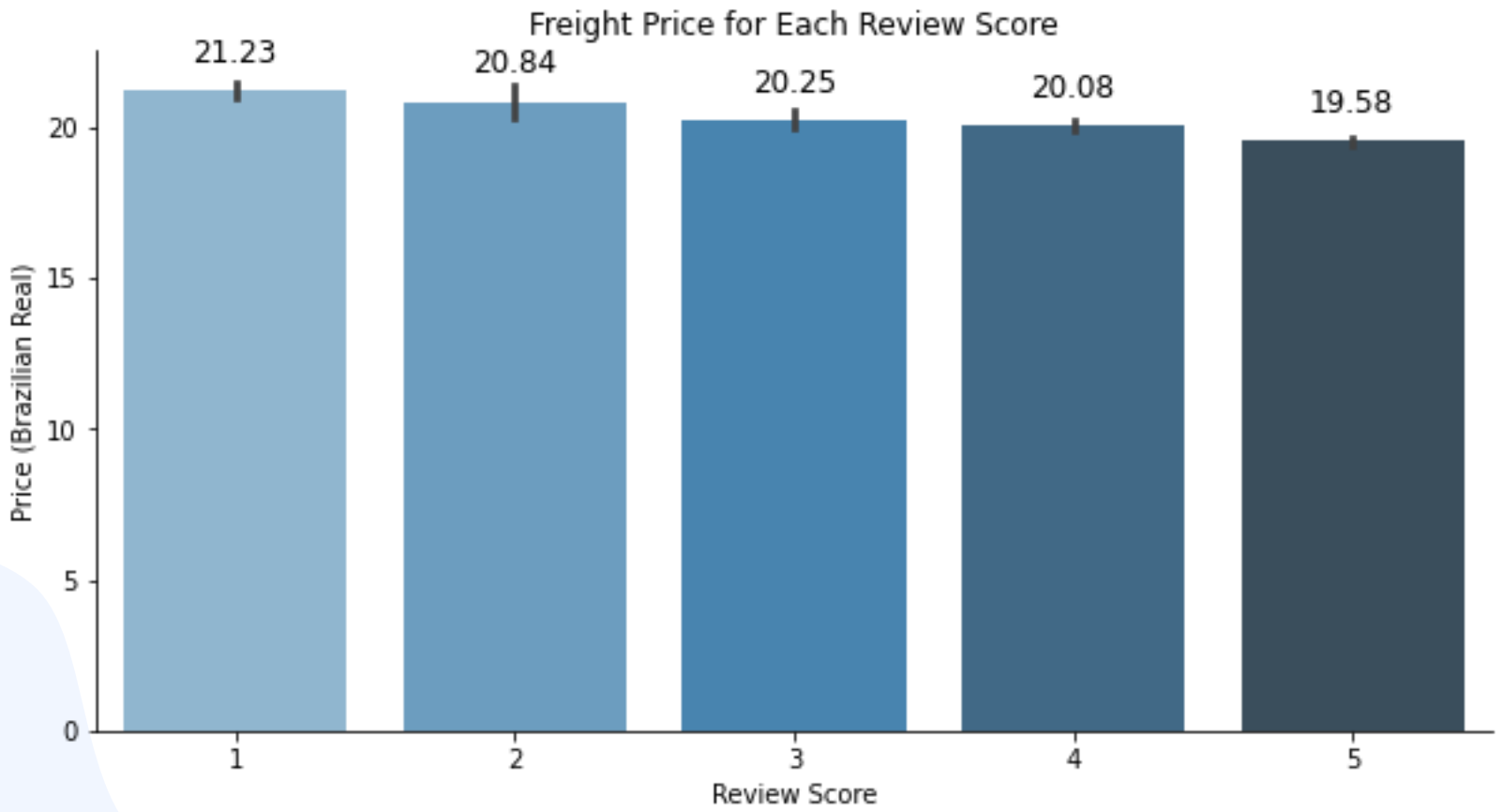
The customers from the northern side of Brazil tend to pay higher for freight price than the customers from the southern side of Brazil

Majority of the sellers are in the southern side of Brazil

Our Recommendations

Encourage sellers from the north Brazil that hasn't use the Olist Store to use it so that freight price can be minimized

Average Freight for Each Review Score



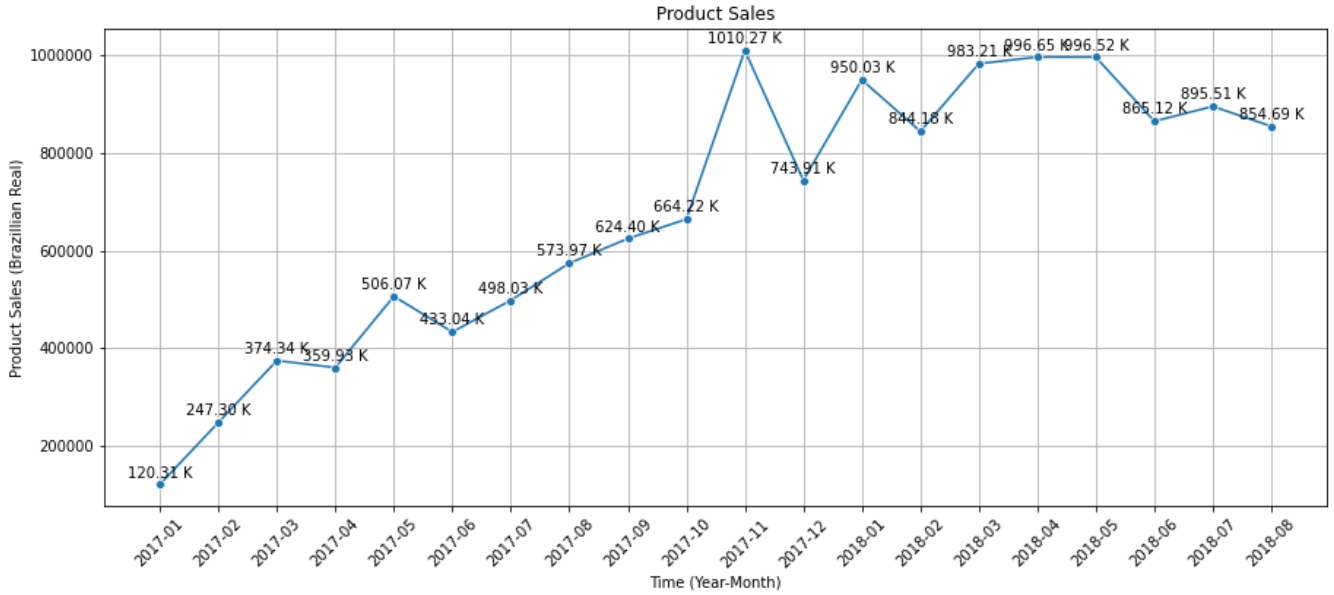
Our Recommendations

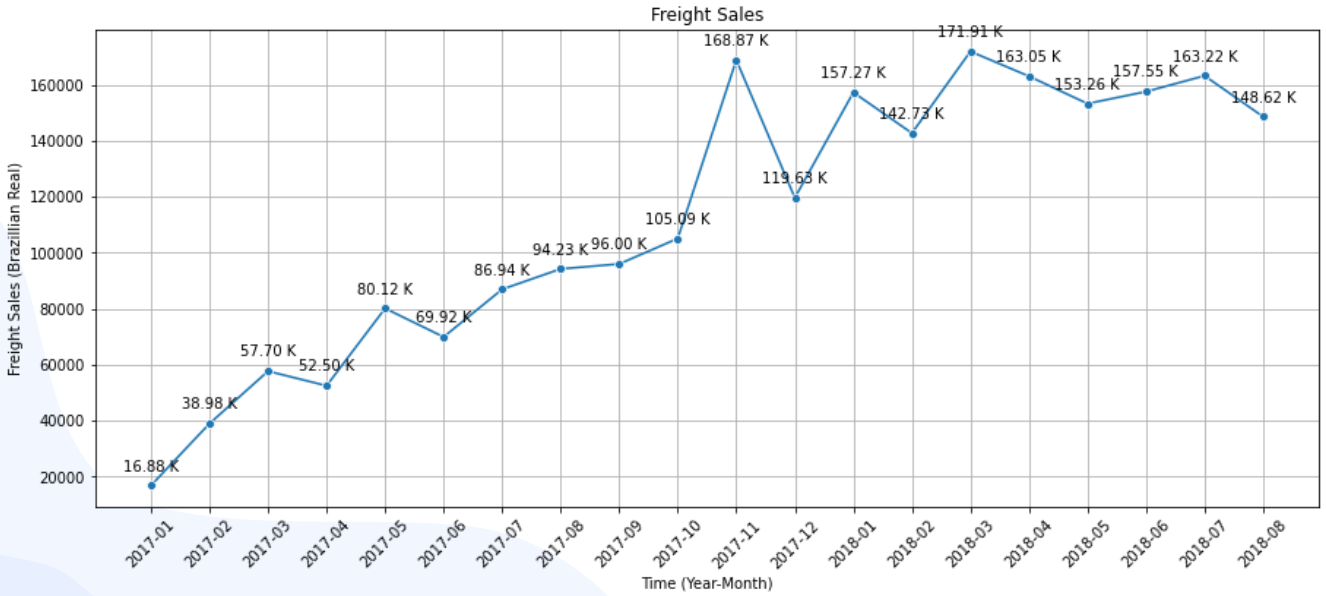
Here we see a trend where lower freight price tend to have a higher review score.

Thus, we suggest to:

- Partner with a better logistic company to reduce the freight price
- Give a promo about the freight price.

Sales Over Time



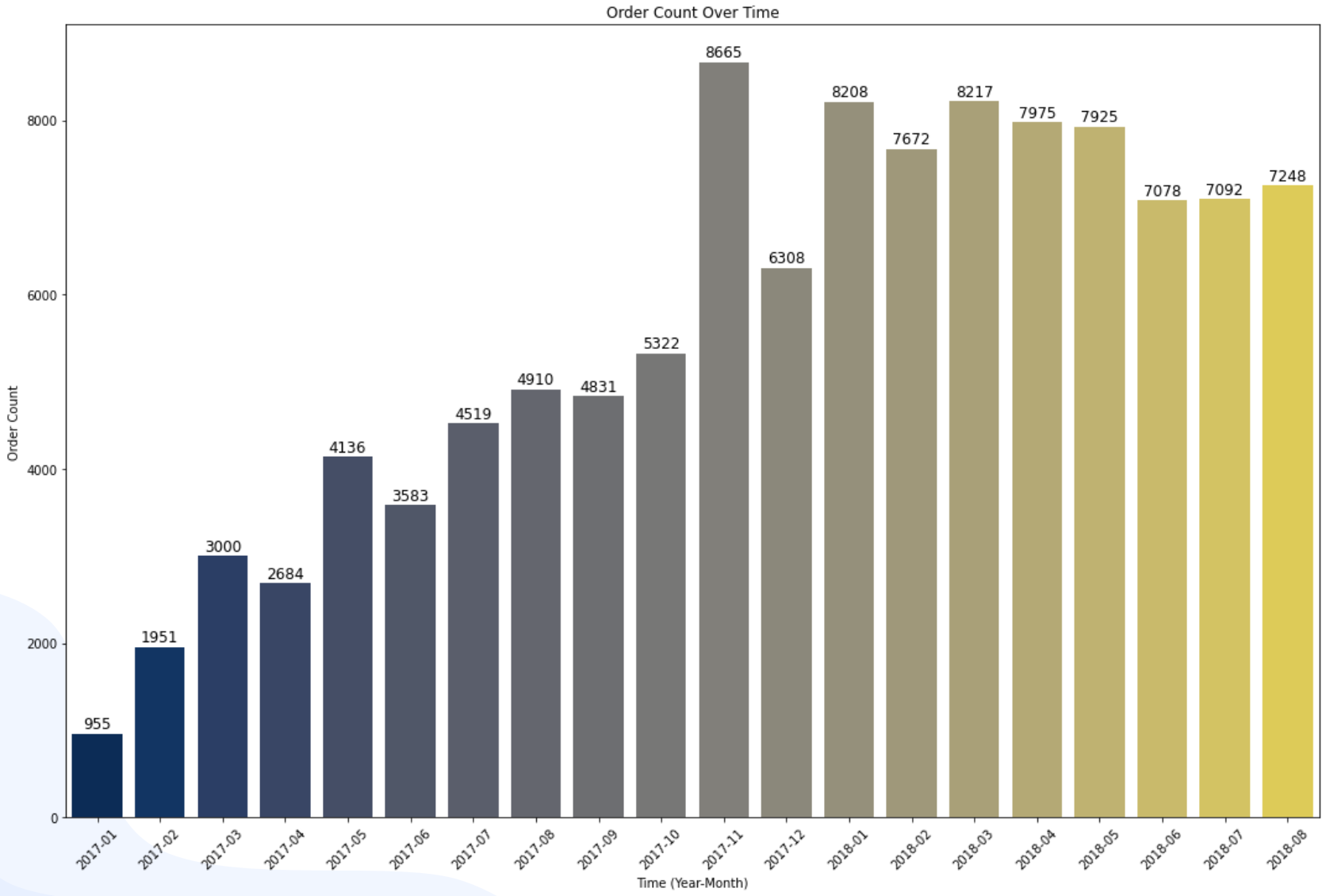


Findings

- There is a growing trend in product sales with its peak of 1.01 million Brazilian Real is achieved on November 2017.
- There is also a growing trend of freight sales with its peak of 171.9 K Brazilian Real is achieved on March 2018.

Thus, it is recommended to apply business strategy that was applied on November 2017 and March 2018.

Orders Over Time



Findings

Same as product sales, there is a growing trend in number of order with peak order of 8665 orders a month is achieved on November 2017.

Thus, it is also advised to apply business strategy that was applied on November 2017.

Delivery Difference Based on Review Score

Our Recommendations

Based on the graph, better delivery performance (order delivered faster than estimated) leads to higher review score.

Thus, we suggested to partner with a better logistic company to increase delivery performance in order to reduce delivery delays.

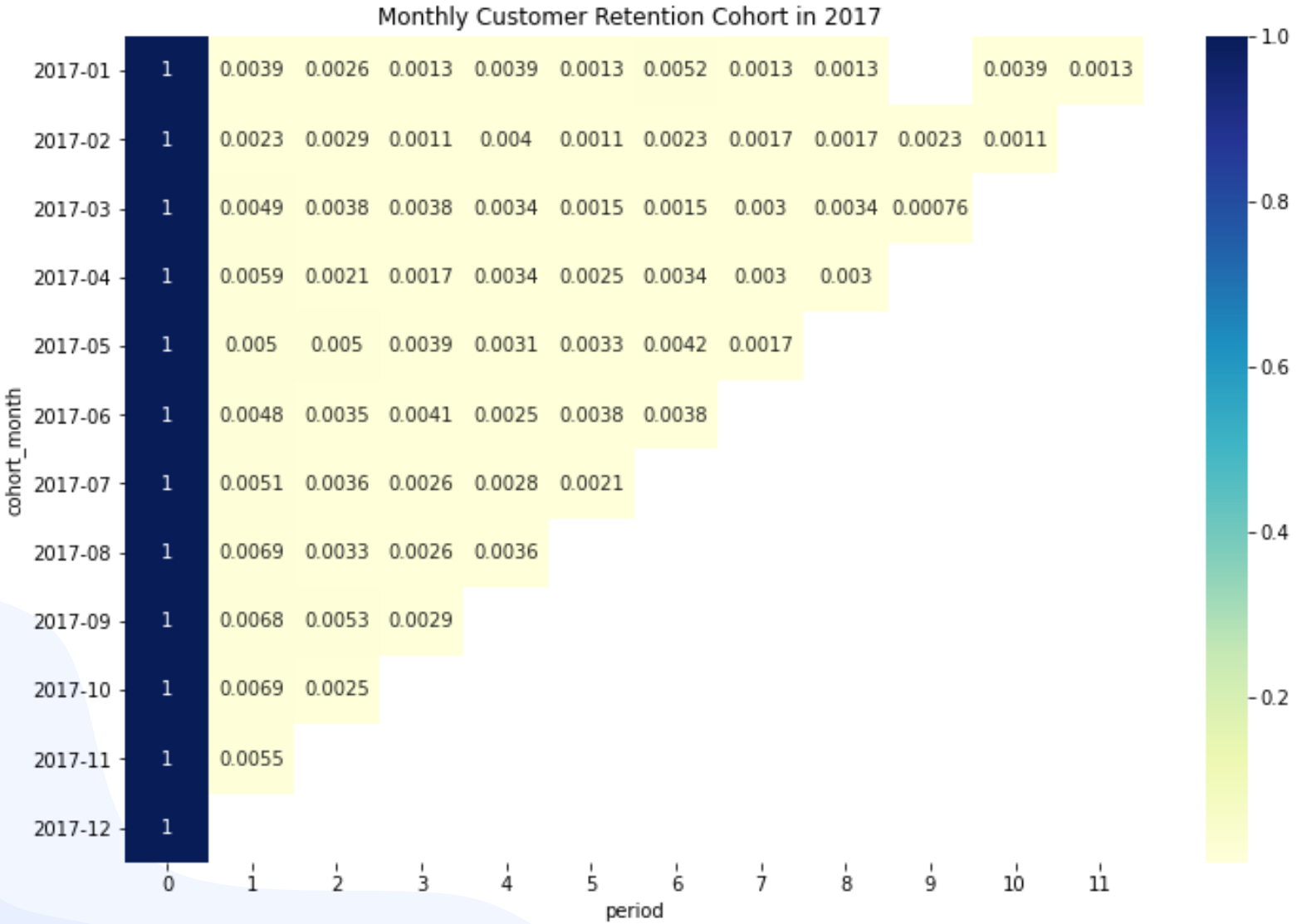
Order Processing Time Based on Review Score

Our Recommendations

As we can see from the above graph, the lower the amount of time needed to process an order, the higher the review score given.

Thus, we suggested to create a new ordering systems that is more faster and reliable in order to reduce the order processing time.

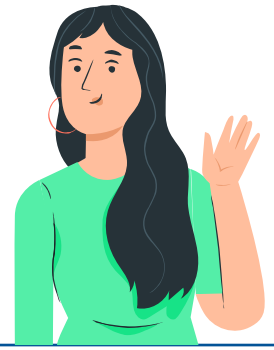
Cohort Retention in 2017



Our Recommendations

Here, we can see that the retention rate in 2017 is very small. Thus, we suggested to:

- Create an event or promo for a returning customers
- Create loyalty program for customers
- Create a personalized buying experience
- Send promotions to the customers via email
- Give a great promo for the customer on their birthday




Customer
Segmentation

Preprocessing

01

Drop Categorical and Irrelevant Features

Here, we drop the categorical features since all of the categorical features is irrelevant to the clustering purpose. We also drop irrelevant features like zip code, latitude and longitude.

02

Fill Missing Values

For the missing values, we decided to impute all missing values with the median since the distribution is not normal.

03

Scaling

The numerical data on the dataset contains a lot of outlier. Thus, to reduce the effect of the outliers, we will use Robust Scaler to scale the features.

PCA (Principal Component Analysis)

Component	Explained Variance (%)
0	46.900984
1	19.110638
2	6.907825
3	5.818597
4	4.362501
5	3.707702
6	3.391827
7	2.896662
8	2.717454
9	2.376757
10	1.809053

The preprocessed dataset contains 11 features and 117601 rows

It may be space and time consuming to process the dataset

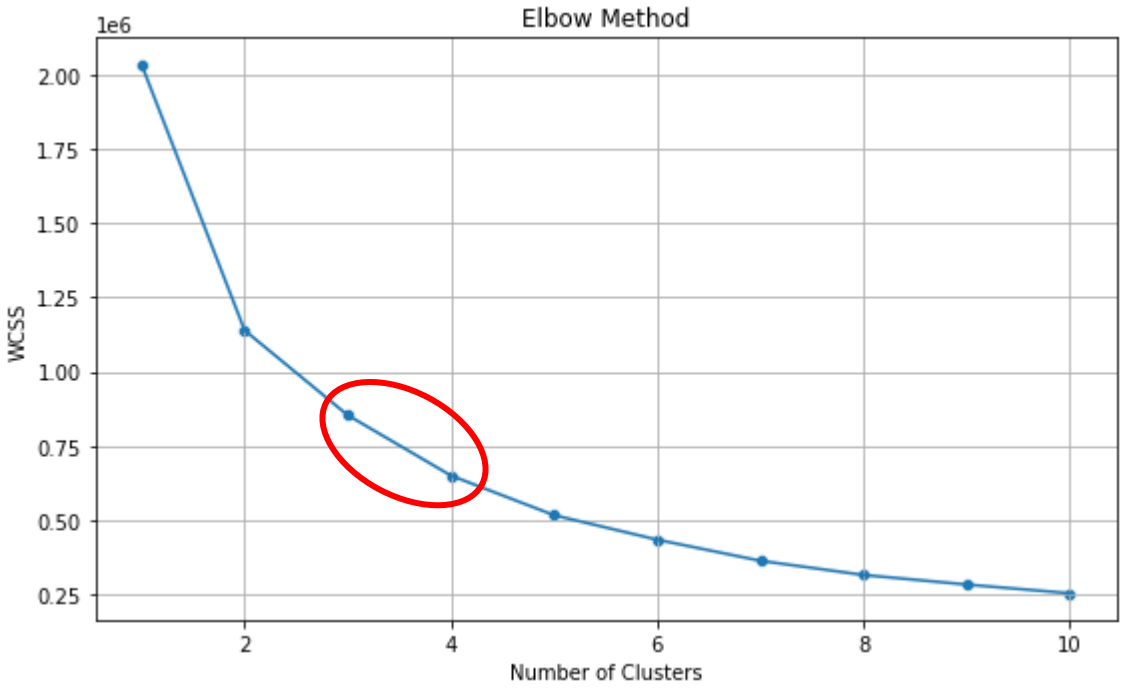
There may also be redundant features in the dataset

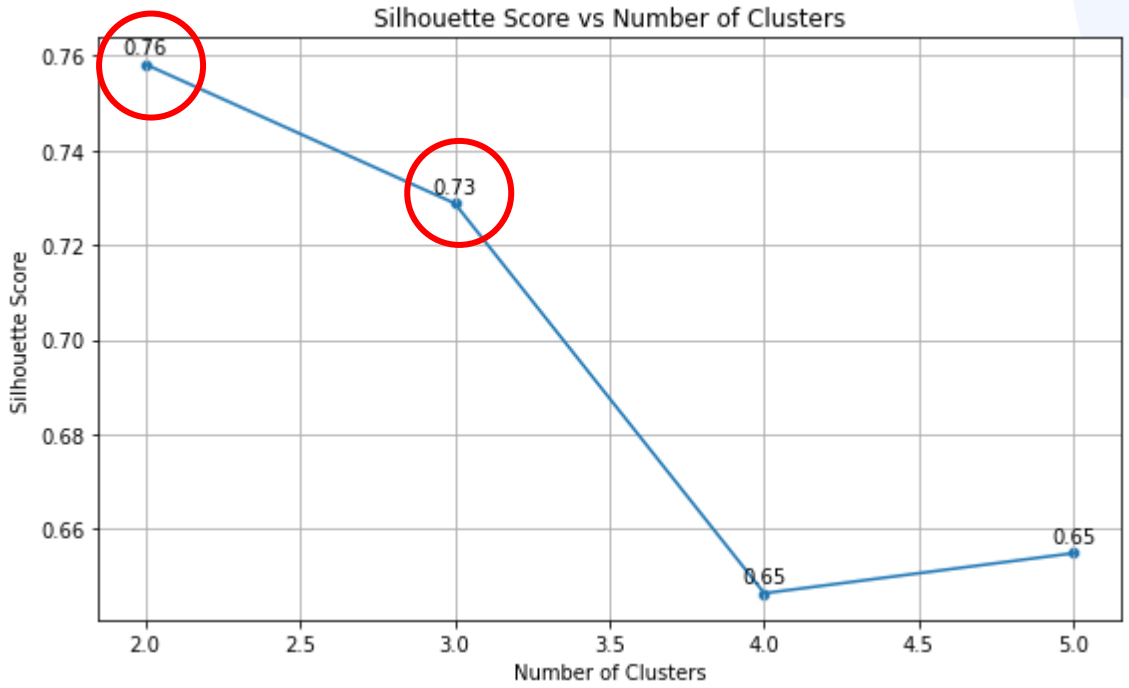
Need dimensionality reduction

From the result, we chose 2 principal components to perform PCA because the combined explained variance is high enough (66,01 %).

K-Means Clustering

Choosing Optimal Number of Cluster



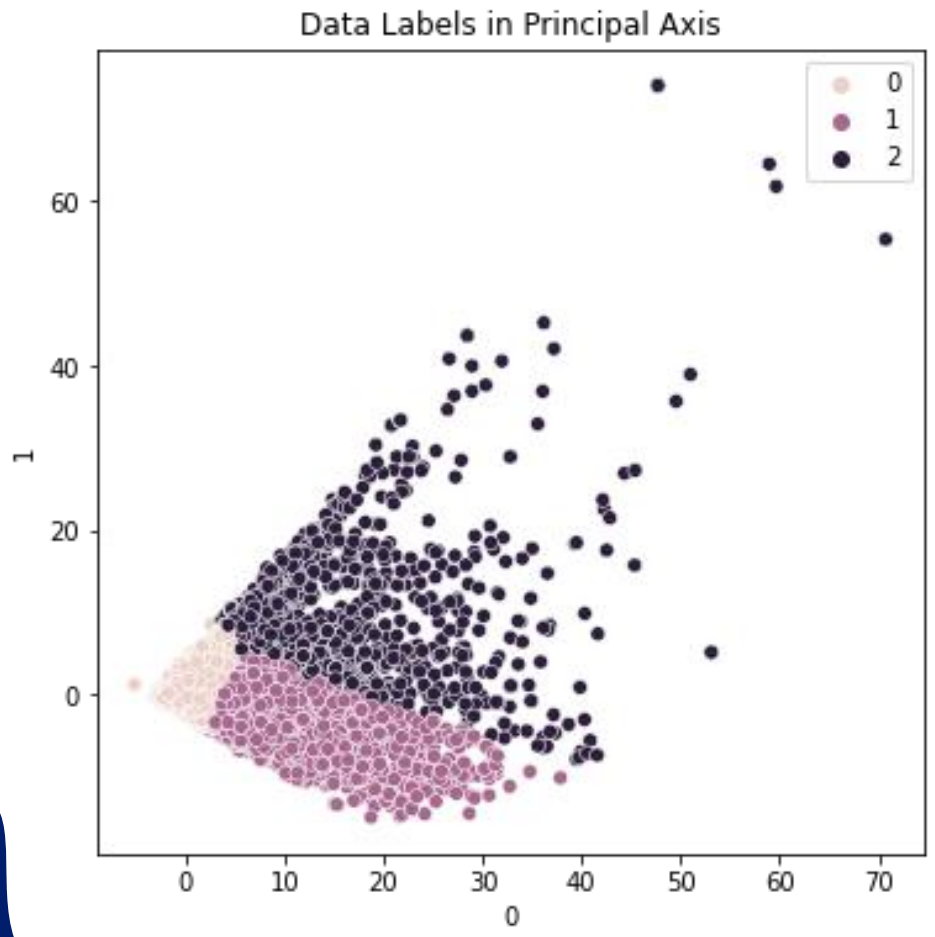


Based on the Elbow Method, the optimal number of cluster is 3 or 4

Based on the Silhouette Score, the optimal number of cluster is 2 or 3

Thus, we chose **3** as the optimal number of cluster

Customer Segmentation



Label	Price (R$)	Freight (R$)	Product Weight (g)	Product Volume (cm^3)	Payment Installments
0	94.61	17.10	1145.44	10295.60	2.77
1	222.26	46.16	11794.36	65785.58	4.19
2	1137.27	53.33	7041.60	43946.85	6.24

Based on the characteristic above, there are 3 types of customer:

Cheap Product Buyers

Customer who bought cheap products

Heavy Product Buyers

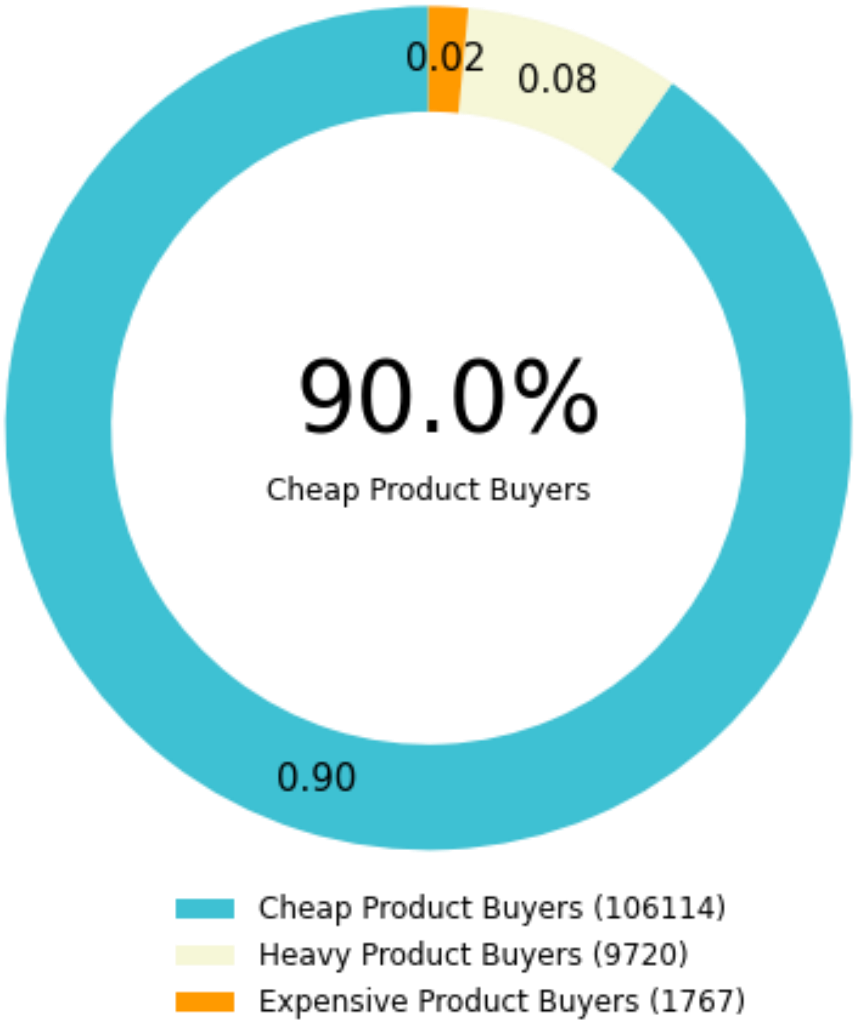
Customer who bought large and heavy products

Expensive Product Buyers

Customer who bought expensive products

Customer Segmentation

Customer Class Proportions



We can also see what type of product does each type of customer so that we can create a more targeted ads about the corresponding product to each type of customer.

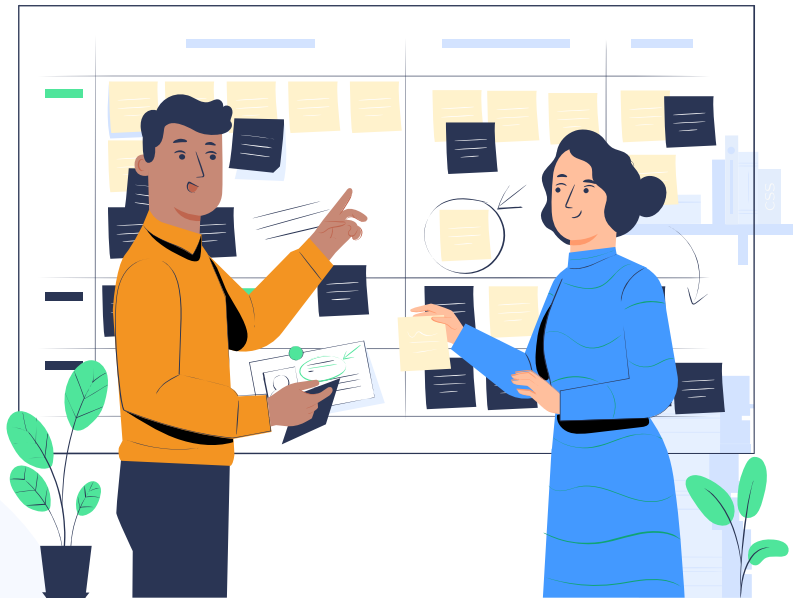
	Cheap Product Buyers	Heavy Product Buyers	Expensive Product Buyers
1	Bed, bath, & table	Office furniture	Watches and gifts
2	Health & beauty	Housewares	Computers
3	Sports & leisure	Furniture & decorations	Computer accessories
4	Furniture & decorations	Bed, bath, & table	Health & beauty
5	Computer accessories	Garden tools	Automotive

Conclusions & Recommendations

What Makes a Low or High Review Score?

Based on the Review Score Analysis, these are the aspects that affect the review score given by the customers:

- Order status
- Geographical location
- Freight price
- Delivery difference
- Order processing time



Our Recommendations

- Give title to fast and reliable sellers in order to reduce the number of undelivered orders (cancelled, processing, unavailable)
- Encourage sellers from the north Brazil that hasn't use the Olist Store to use it so that freight price can be minimized
- Partner with a better logistic company to increase delivery performance (reduce delivery delays) and reduce freight price
- Giving a promo about the freight price could also help to increase review score, since people tend to be happy when the freight price is low
- Create a faster and more reliable ordering systems in order to reduce the time needed to process an order

Customer Segmentation

We can divide the customer into 3 categories, which are:

- Cheap product buyers
- Heavy product buyers
- Expensive product buyers

Our Recommendations

Cheap Product Buyers

- Give more ads about the most bought products for this type of customer
- Bundle products to reduce recurring pain points (such that customer can purchase multiple items in one swoop)

Heavy Product Buyers

- Give more ads about the most bought products for this type of customer
- Colaborate with local or international banks to provide zero interest installment
- Partner with logistic company that specifically great at transporting large items

Expensive Product Buyers

- Give more ads about the most bought products for this type of customer
- Colaborate with local or international banks to provide zero interest installment
- Give certain discount or promo whenever the purchase price exceeded certain value

Future Works Suggestions

01

Use K-Modes algorithm to include categorical data as features

02

Use other types of clustering algorithm (hierarchical or density-based clustering) and compare it with K-Means (centroid based)

External Sources and References

Dataset :

https://www.kaggle.com/olistbr/brazilian-ecommerce?datasetId=55151&sortBy=voteCount

Brazil GeoJson:

https://www.kaggle.com/thiagobodruk/brazil-geojson

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Thank You