1. Introduction

Multichannel is a business strategy in which retailers interact with potential buyers in several different ways**.** Multichannel sales refer to the practice by which companies interact with customers via multiple channels, both direct and indirect, in order to sell them goods and services. Companies use direct channels, or ones in which the company proactively reaches the customer – such as physical stores, catalogs or direct mail – or indirect ones in which they push content via websites or social media, also known as inbound marketing.

Some people define multichannel selling as a combination of brick and mortar, catalog and Internet activity. Others say multichannel selling can be defined as sales within the various online channels: single website, public marketplaces and shopping-comparison sites. It's all about moving beyond your website and exploring channels such as marketplaces, social media, and comparison shopping engines.

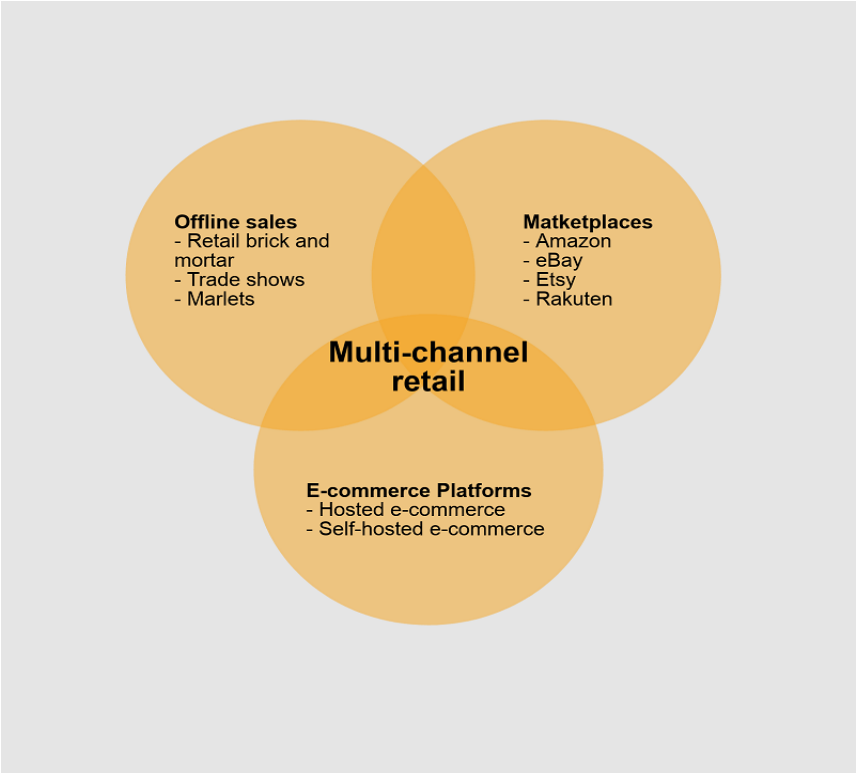


Figure 1: Multi-channel sales diagram

2. Types of channel

Each of these sales channels offers their own unique customers, market focus, marketing efforts and benefits (as well as challenges). Few popular channel are:

- Bricks and mortar (e.g. High street store)
- Catlog
- Online marketplaces (e.g. Amazon, eBay)
- Website and shopping cart (e.g. Shopify, Magneto and WooCommerce)
- Comparision website(e.g. Goolge)
- Social media (e.g. Facebook and Instagram)

3. Advantages of Multichannel sales

The advantages of adapting multichannel sales are as follows:

- Being where your customers shop
- Staying ahead of the competition
- Increasing your touch points
- Reaching new markets
- Combining efforts
- Expanding brand recognition

4. Latest Trend

Shoppers have now many sites to choose from, online and offline. A report by BigCommerce confirms that buyers across several age groups are shopping from multiple sales channels.

According to the survey of American shoppers:

- 74% shopped at large retailers.
- 54% shopped at ecommerce marketplaces.

- 44% shopped at web stores.
- 36% shopped at category-specific online retailers.

This data has shown that the channel loyalty has become the things of past.

5. Big Data in Multi-Channel Sales

Today's customers can, and often do, use multiple online and offline channels, and even multiple devices to browse, shop, and connect with brands. Each channel allows for data collection, providing big data, so that level of knowledge and information provide value for the brands.

As mentioned above, big data allows brands to capitalize on patterns and trends in customer behavior, but that is only part of it. By better understanding customers and their preferences, marketing experts can increase the relevancy of the content they send to their customers.

Maintaining relevance in the eyes of the customer not only increases sales, but keeps customers responding positively to marketing tactics. As a customer works through various points of the lifecycle, from first-time buyer, to active customer, to defecting customer, marketers can layer behavioral data over that information. Recent interactions, transactional value, abandoned carts, all of this information can be gathered and used to work in the brand's best interest, creating true omnichannel marketing strategies.

Using behavioral factors to plot a customer's position in their lifecycle, alongside the other predictive information big data provides, means marketers can segment customers in meaningful ways.

The most important thing marketers need to understand about using big data is the importance of focus. It is easy to get lost in the massive amounts of information available, so they must know what to look for.

6. Demonstration

6.1. Introduction

For the demonstration of use of data mining from large dataset, we have done **Geospatial Analysis** of data with geographical attributes. Geospatial analysis is a kind of pattern mining where the pattern of data is traced against the geographical location. For example, analysis of population density across the country can be done by geospatial analysis. The details of the dataset used, analysis made and result obtained are described in following subsections.

6.2. Dataset

The dataset for the demonstration is obtained from Kaggle, a popular website for dataset of machine learning and data mining. The dataset we used is "Geospatial Analysis of Brazilian E-Commerce" which is publicly available in kaggle from 2018, December. It is the dataset of sales of Brazilian E-Commerce site Olist.

Olist is a Brazilian E-Commerce site which has released a dataset with 100k orders between 2016 and 2018. Each order has some information about the customer and contains the first three digits of the customer zip code. Olist has also released a geolocation database that has 323k lat/lng coordinates.

The dataset constains 9 csv files as:

(1) Olist_customer_dataset.csv : This dataset has information about the customer and its location. We used it to identify unique customers in the orders dataset and to find the orders delivery location.

(2) Olist_geolocation_dataset.csv: This dataset has information Brazilian zip codes and its lat/lng coordinates. Use it to plot maps and find distances between sellers and customers.

(3) Olist_order_items_dataset.csv: This dataset includes data about the items purchased.

(4) Olist_order_payments_datasets.csv: This dataset includes data about the orders payment options.

(5) Olist_order_review_datasets.csv: This dataset includes data about the reviews made by the customers. After a customer purchases the product from Olist Store a seller gets notified to fulfill that order. Once the customer receives the product, or the estimated delivery date is due, the customer gets a satisfaction survey by email where he can give a note for the purchase experience and write down some comments.

(6) Olist_orders_datasets.csv: This is a core dataset which contains all information about orders made.

(7) Olist_products_dataset.csv: This dataset includes data about the products sold by Olist.

(8) Olist_sellers_dataset.csv: This dataset includes data about the sellers that fulfilled orders made at Olist.

(9) Product_category_name.csv: This translates the product_category_name in Portuguese to category name in english.

6.3. Objectives

- To visualize geospatial data on map
- To find the pattern in data and interpret it.

6.4. Tools and Methodology

The tools we used as a part of this demonstration are listed below:

- Programming language: Python3
- Libraries : holoviews, geoviews
- Platform: Jupyter notebook

We first extracted attributes of our interest. The attributes we extracted are delivery time, review score, delay, revenue, freight of each transactions and their respective latitude-longitude. The meaning of attributes are as follows:

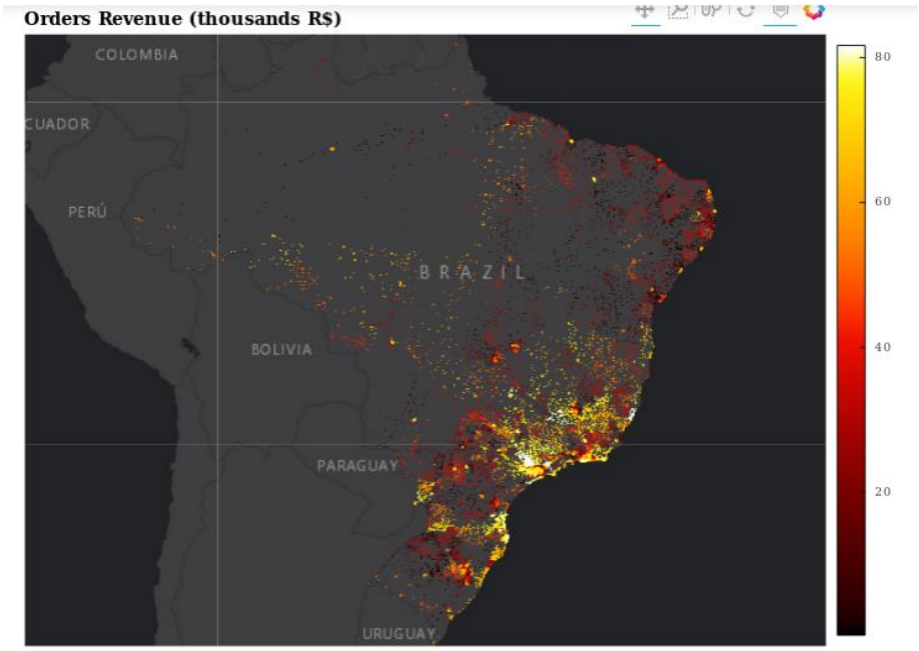
- Delivery Time: It is a time taken to deliver a product to customer and given in number of days.
- Review Score: It is a rating given by customer for each delivery of product out of 5.
- Delay: It is a Boolean attribute which indicate whether there is a delay in delivery.
- Revenue: It is the cost of product delivered.
- Freight: It is cost of transporting products.

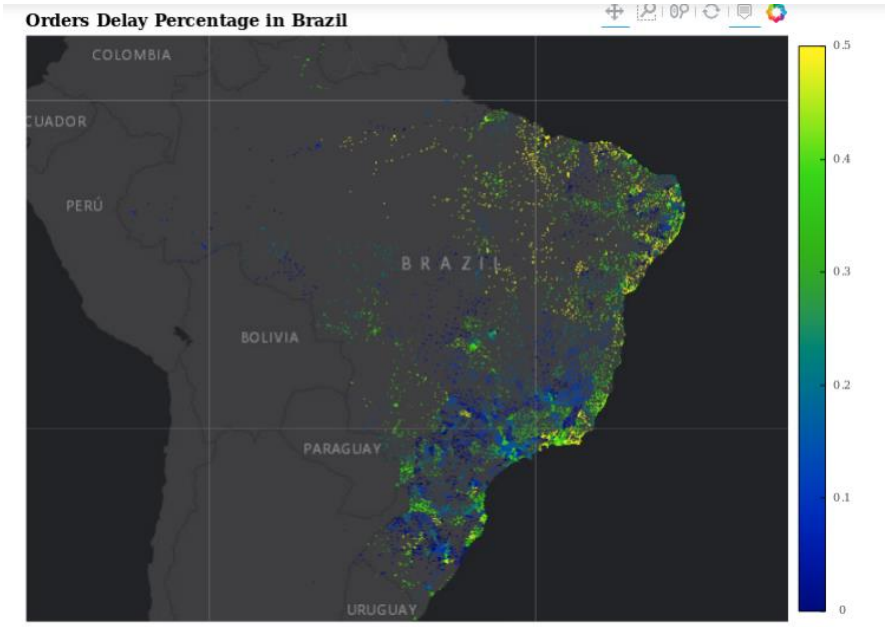
We extracted following information from given data

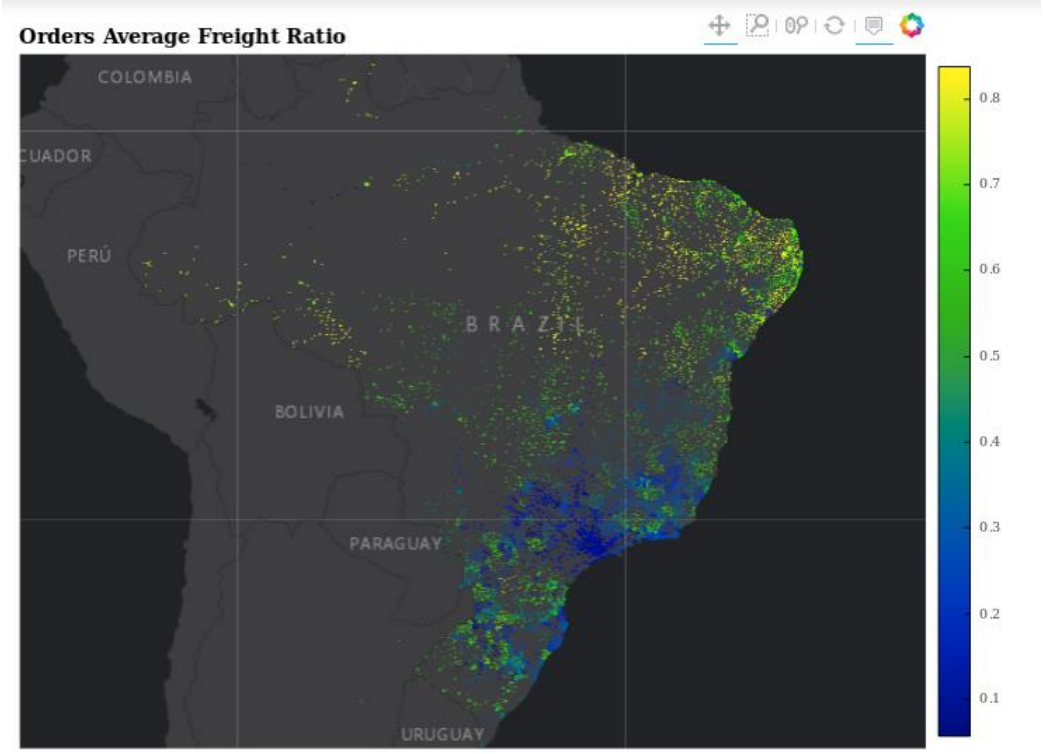
- Average delivery time: It is an average of delivered time for each zip-code area.
- Average review score: It is an average of review score for each zip-code area.
- Orders delay percentage: It is a percentage of orders delayed out of total orders for each zip-code area.
- Average ticket: It is an average sales amount per transaction for each zip-code area.
- Order revenue: It is the total revenue from each zip code area.
- Order average freight ratio: It is an average of ratio of transportation cost to sales amount.

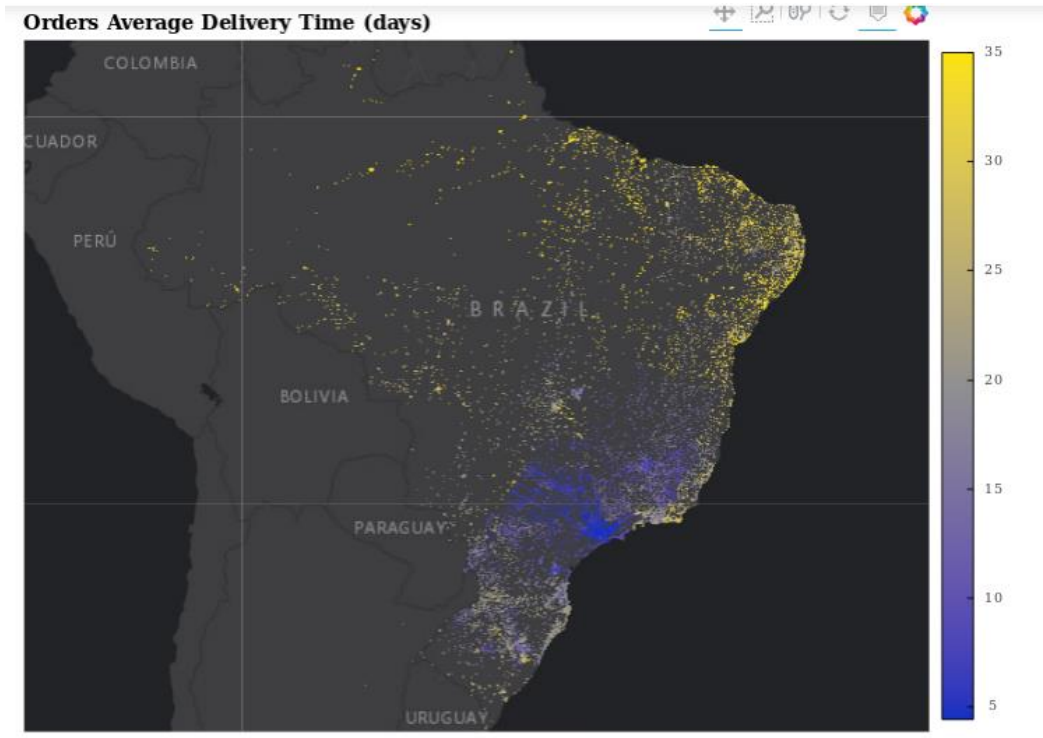
6.5. Result

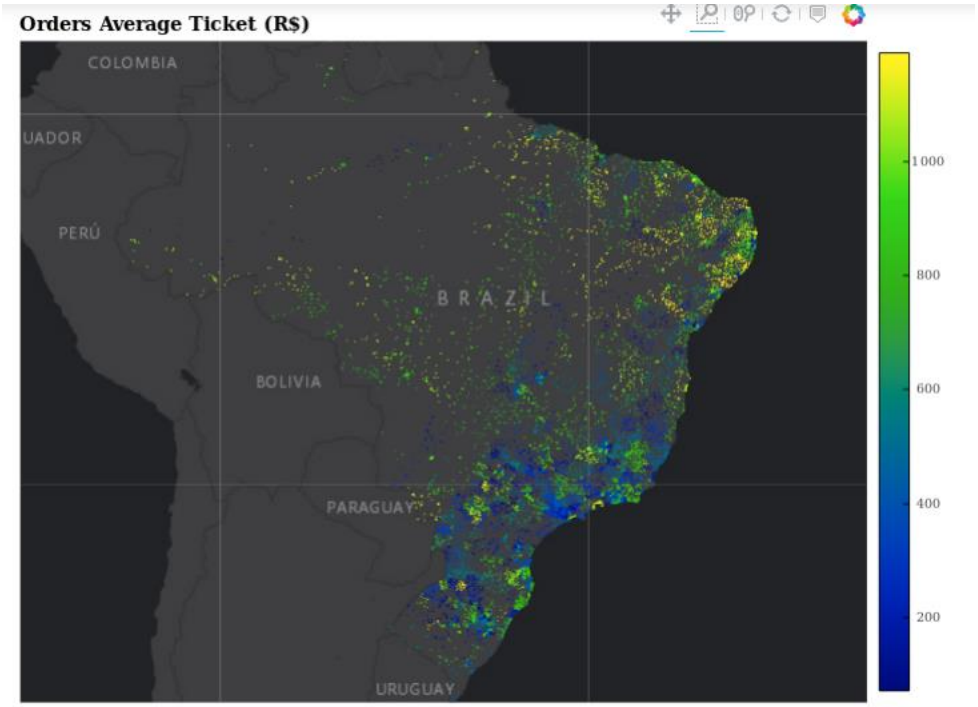
The result we obtained is represented in geospatial graph are as follows:

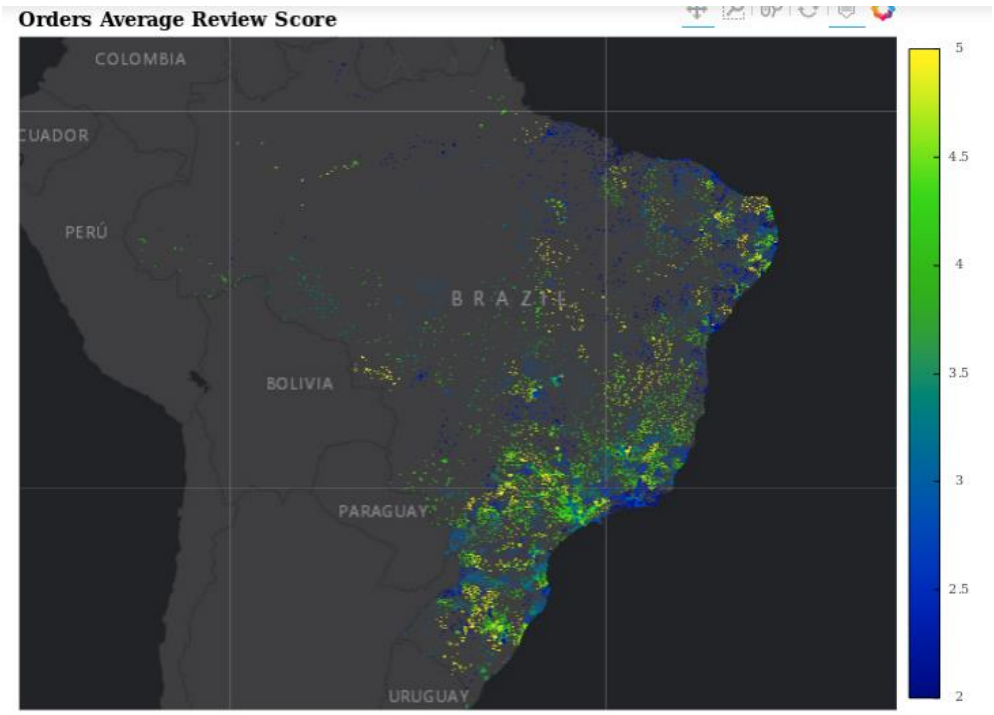





Orders Average Freight Ratio
COLOMBIA
ECUADOR
PERÚ
BRAZIL
BOLIVIA
PARAGUAY
URUGUAY
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1


Orders Average Delivery Time (days)
COLOMBIA
ECUADOR
PERÚ
BRAZIL
BOLIVIA
PARAGUAY
URUGUAY
35
30
25
20
15
10
5


Orders Average Ticket (R$)
COLOMBIA
UADOR
PERÚ
BRAZIL
BOLIVIA
PARAGUAY
URUGUAY
1000
800
600
400
200


Orders Average Review Score
COLOMBIA
CUADOR
PERÚ
BRAZIL
BOLIVIA
PARAGUAY
URUGUAY
5
4.5
4
3.5
3
2.5
2

6.6. Analysis

Order Average Ticket Plot:

Customers of the south and southeast regions of Brazil have lower average ticket, than their peers on north and northeast. This might happen because they have to pay more for freight.

Order Average Freight Ratio Plot:

We might find a freight ratio by dividing the freight value by the order value. This ratio indicates the percentage of the product price that a person had to pay just to get their order delivered. Higher freight ratios are very likely to discourage customers to complete a purchase. Due to logistics costs, we expect to see lower freight ratios in densely populated areas and are higher freight ratios on sparsely populated regions.

Average Delivery Time Plot:

Who lives in the north and northeast of Brazil has to bear with higher freight costs and has to wait longer to receive their purchase.

Order Revenue Plot:

Plotting the sum of products value grouped by zip code prefix we see that most of the revenue came from the Southeast and South regions of Brazil. It is also possible to see that large cities and capitals, where population is bigger, have larger participation on revenue.

Orders Average Review Score Plot:

Customers of Rio de Janeiro State and Northeast Region are more likely to give low scores on purchases

7. Conclusion

From above results, we can conclude that these patterns can help the company to take strategic decision, so that they can have benefit in market. Thus, this show that pattern mining from big data is important for business organization.

8. Reference

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