Analyzing eCommerce Business Performance with SQL

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Having about 2 years of experience in oil & gas exploration and HSE Officer, I am now concern into Data Science, Data Analytics and Business Intelligence after completing some bootcamp related to data. Highly skilled and motivated with a strong background in Geophysical Engineering, Machine Learning and Data Visualization. Proficient in extracting insights from complex datasets and transforming them into actionable recommendations for business improvement.

Overview

In today's highly competitive business landscape, analyzing the performance of an eCommerce business is critical to success and sustainable growth. This presentation will explore the importance of leveraging SQL (Structured Query Language) as a powerful tool for gaining actionable insights into eCommerce performance.

on this occasion, I will analyze the business performance of an eCommerce company, taking into account several business metrics, by reviewing customer growth, product quality, and type of payment.

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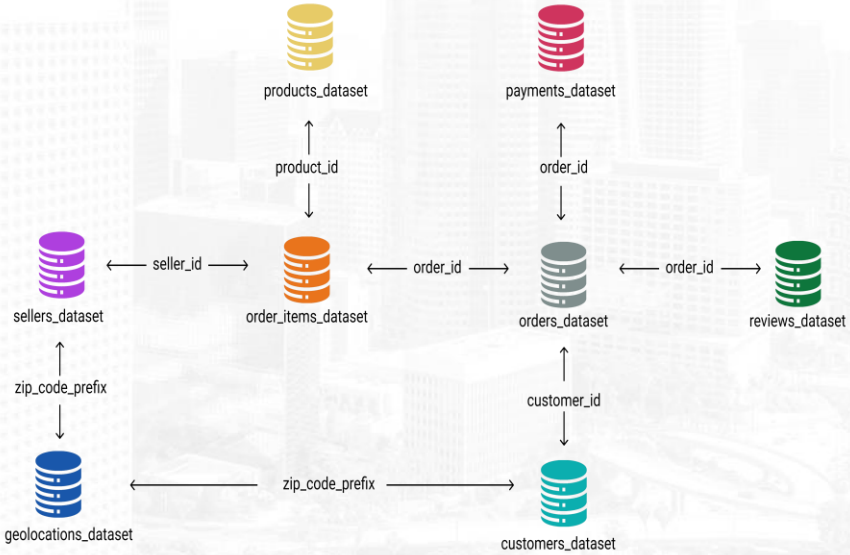
Data Preparation

Data Preparation

Before processing the data, the first step that needs to be done is to prepare the raw data so that it becomes structured data and is ready for processing. The datasets used in this project are 8 datasets which have a relationship with one another. Below are the steps for data preparation:

1. Create a new database and its tables for the data that has been prepared by paying attention to the data type of each column.
2. Importing csv data into the database by paying attention to the dataset storage path.
3. Create entity relationships between tables, based on the schema in Figure 1. Data Relationship.
4. Then export the Entity Relationship Diagram (ERD) in the form of an image by setting the data type and naming the columns between interconnected tables.

Figure 1. Data Relationship Schema



View or Download Schema here

Data Preparation

After making adjustments to the Primary Key (PK) and Foreign Key (FK), the following ERD results are generated as shown in figure 2.

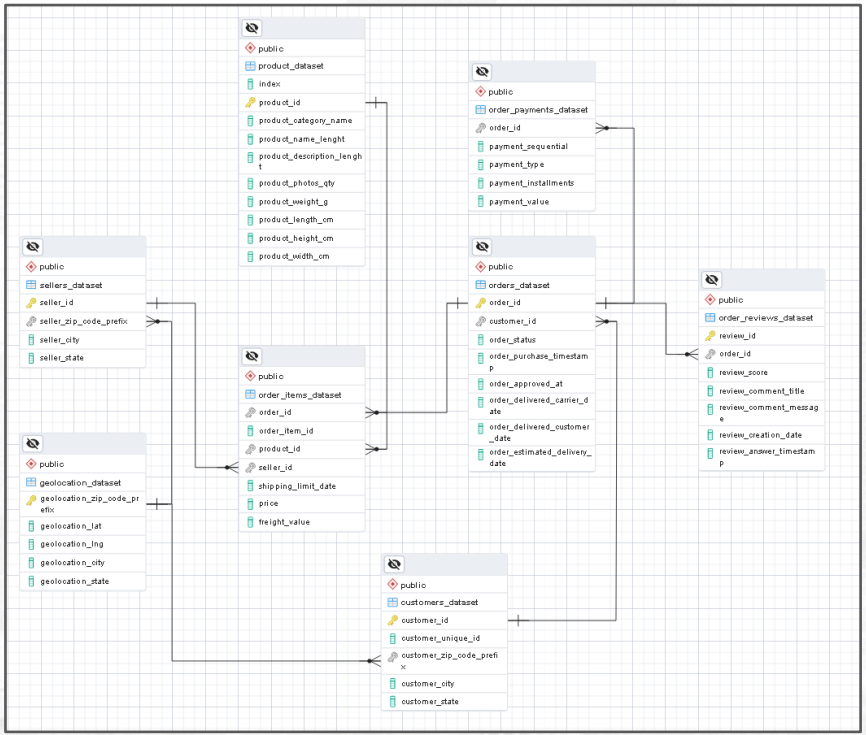


Figure 2. Entity Relationship Diagram (ERD)

View or Download ERD here
Query can be seen here

Annual Customer Activity Growth Analysis

In this project, various metrics are used to assess eCommerce business performance, mainly focusing on customer engagement and growth. The metrics used include the following:

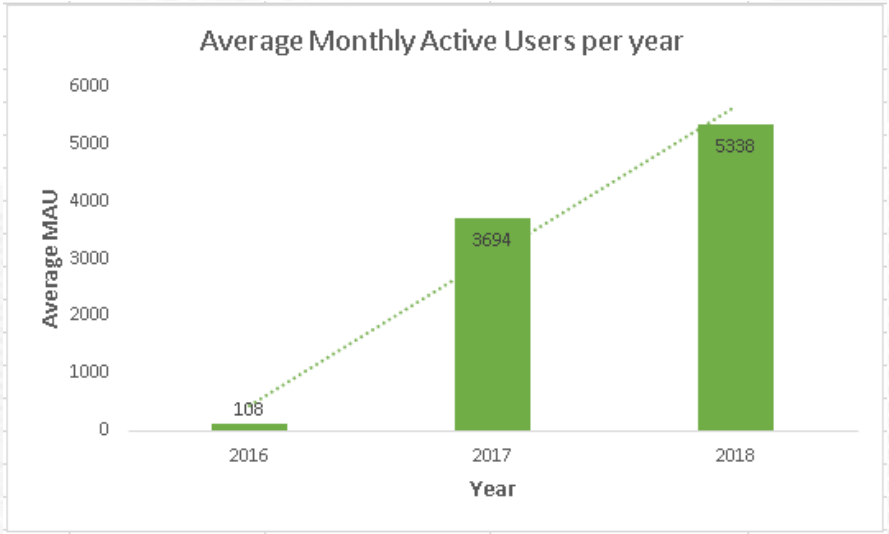
- **Average Monthly Active Users per year**
- **Number of New Customers per year**
- **Number of Customer Repeat Orders per year**
- **Average Frequency of Customers Orders per year**

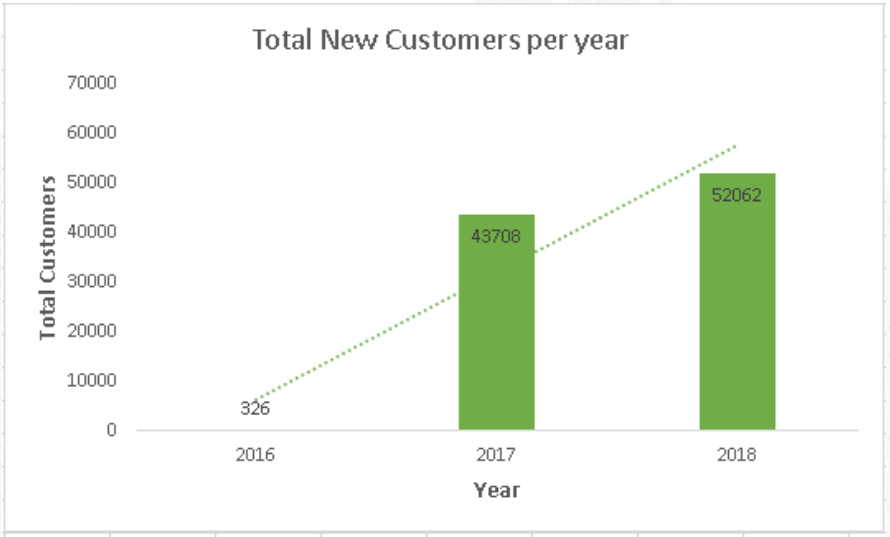
here is the query results table for each customer growth metric

	year double precision	avg_mau numeric	total_new_customer bigint	customer_repeat_order bigint	avg_frequency_order numeric
1	2016	108	326	3	1.009
2	2017	3694	43708	1256	1.032
3	2018	5338	52062	1167	1.024

Query can be seen here

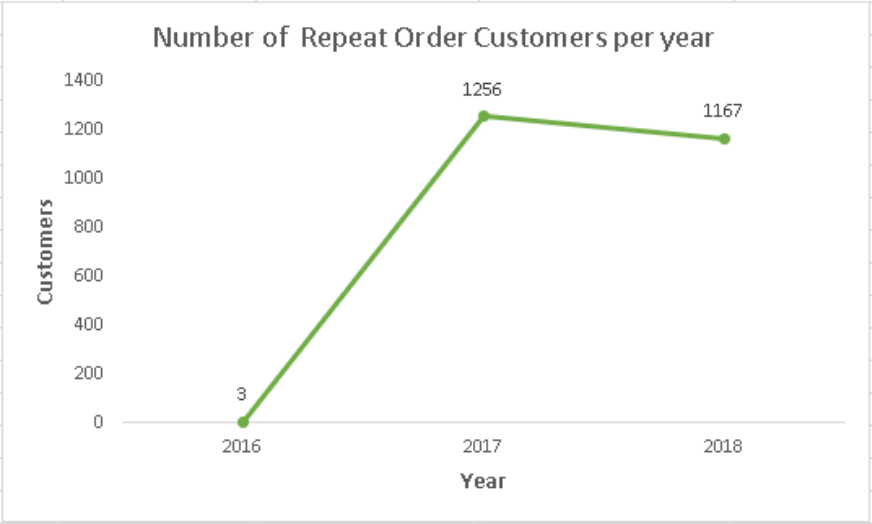
Annual Customer Activity Growth Analysis

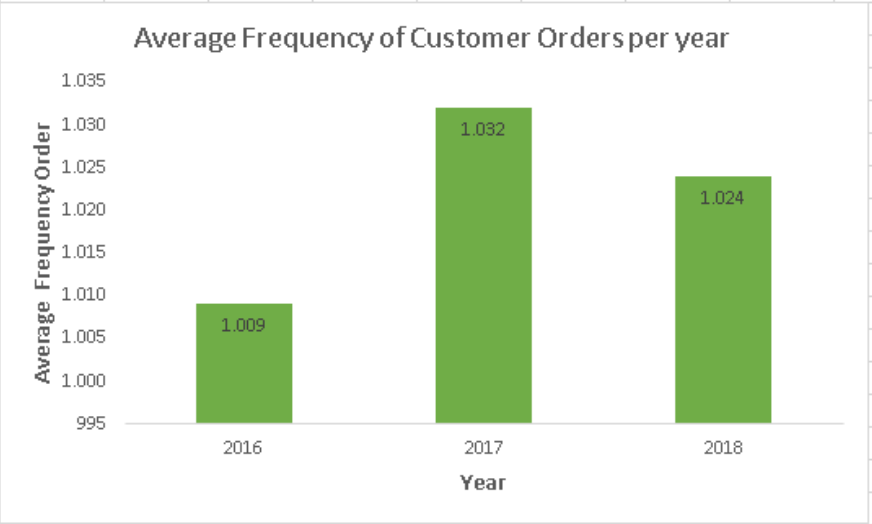




- The average monthly active user (MAU) has increased every year.
- The number of new customers has also increased from year to year. In line with MAU, new customers also experienced a rapid increase in 2017.

Annual Customer Activity Growth Analysis





- There was a fluctuating increase in repeat orders made by customers. It fluctuates annually. We saw an increase in the number of customers making repeat orders in 2017 and then decreased in 2018.
- The frequency of orders needs to be a concern because for three years it has not changed. This happens because the number of customers who repeat orders is still lacking. the average customer makes only 1 repeat order.

Annual Product Category Quality Analysis

The performance of an e-Commerce business is closely tied to the available products. Analyzing product quality in e-commerce provides valuable insights for making informed business decisions. Key metrics for assessing product quality on an annual basis are as follows:

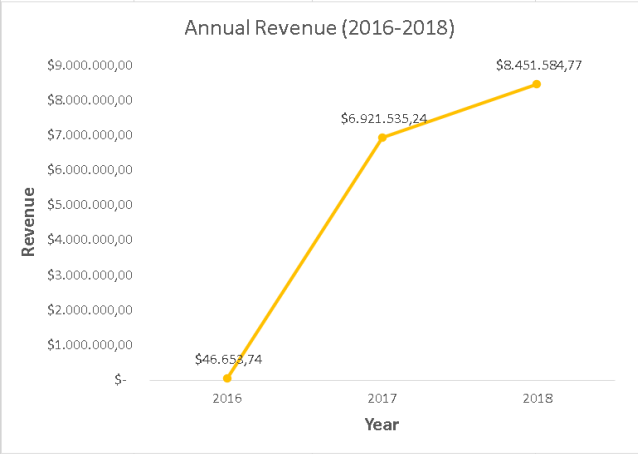
- Total annual revenue.
- Number of orders canceled per year.
- Product category generating the highest annual revenue.
- Product category with the highest number of canceled orders per year.

here is the query results table for each the metrics above:

	year double precision	annual_revenue numeric	top_product_category character varying	total_revenue_top_product numeric	annual_canceled_order bigint	top_canceled_product character varying	total_top_canceled_product bigint
1	2016	46653.74	furniture_decor	6899.35	26	toys	3
2	2017	6921535.24	bed_bath_table	580949.20	265	sports_leisure	25
3	2018	8451584.77	health_beauty	866810.34	334	health_beauty	27

Query can be seen here

Annual Product Category Quality Analysis



Annual revenue increased by 17994.61% from 2016 to 2018, where in 2017 there was a significant increase.

Orders canceled annually have also increased. This can be caused by various factors such as delivery errors, out of stock, or changes in customer preferences.

Annual Product Category Quality Analysis

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Best Selling Product Category

	2016	2017	2018
			
	Furniture_decor	**Bed_bath_table**	**Health_beauty**
Revenue	$ 6899.35	$ 580949.2	$ 866810.34

Most Canceled product Category

2016	2017	2018
		
Toys	**Sport_leisure**	**Health_beauty**
3 Items	25 Items	27 Items

Best-Selling Product Categories always change every year, as well as the revenue generated increases every year.

Product categories with the most cancellations also change every year. However, in 2018 the products that were canceled the most and became best sellers were in the same category (Health _Beauty).

Analysis of Annual Payment Type Usage

E-commerce businesses usually provide payment systems on an open payment basis, offering customers a variety of payment options. Analyzing the performance of existing payment types can yield valuable insights for forging stronger strategic partnerships with payment service providers. This project involved analyzing several key metrics related to the use of payment types, as outlined below:

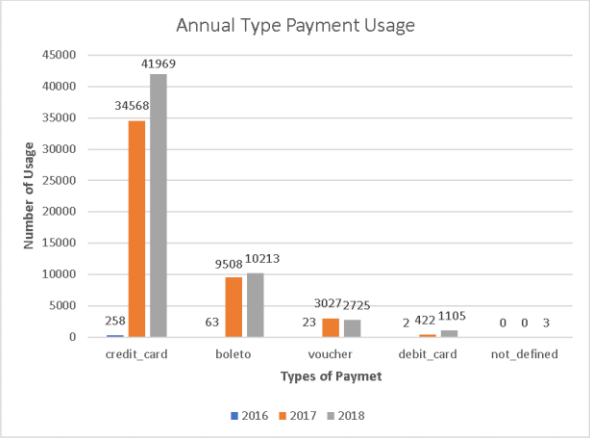
1. The total number of payment type users
2. Annual count of payment type users

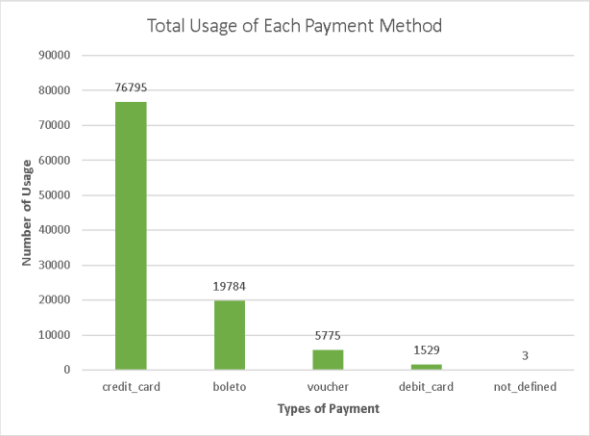
By examining these metrics, we can gain a deeper understanding of customers' payment preferences and behavior, enabling companies to make informed decisions to improve payment services and optimize the overall customer experience.

	payment_type character varying	2016 numeric	2017 numeric	2018 numeric	sum_payment_type_usage numeric
1	credit_card	258	34568	41969	76795
2	boleto	63	9508	10213	19784
3	voucher	23	3027	2725	5775
4	debit_card	2	422	1105	1529
5	not_defined	0	0	3	3

Check Query here

Analysis of Annual Payment Type Usage





- Overall, the most frequently used payment method is a Credit Card. Second place Boleto, third Voucher and fourth Debit Card.

- All types of payments have increased from year to year. However, the use of vouchers has decreased in 2018. To increase the use of vouchers as a payment method, companies can create a system that gives vouchers to customers every time they make a purchase or reach a certain target. This can improve customer retention and encourage further voucher usage.