Analyzing eCommerce Business Performance with SQL
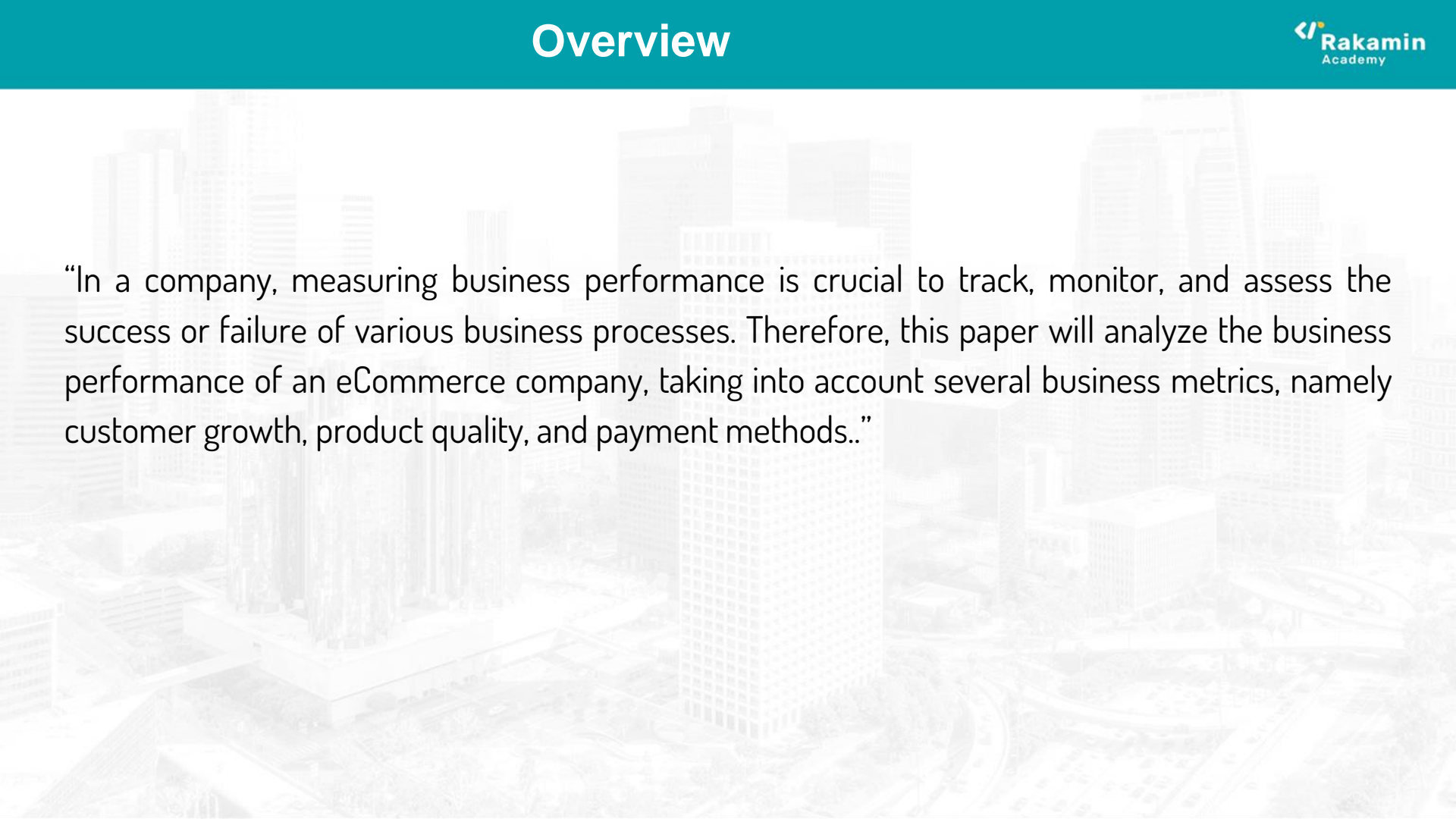
Rakamin Academy

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Passionate and skilled Data Scientist with expertise in Python, SQL, and data visualization. Proven ability to thrive in diverse team settings, demonstrating adaptability and strong problem-solving skills. Committed to advancing the field of data science by leveraging technology for positive change through insightful analysis and innovative solutions.

"In a company, measuring business performance is crucial to track, monitor, and assess the success or failure of various business processes. Therefore, this paper will analyze the business performance of an eCommerce company, taking into account several business metrics, namely customer growth, product quality, and payment methods.."

Data Preparation

1. Create Database and Tables
   - Create an e-commerce database using PgAdmin by executing the 'CREATE DATABASE' command.
   - Create tables in the e-commerce database by executing 'CREATE TABLE' queries, and also specify the table names, data types, and primary keys.
   - List Tables: customer, geolocation, order_items, order_payment, order_review, orders, product, seller
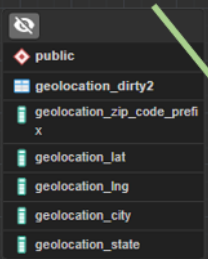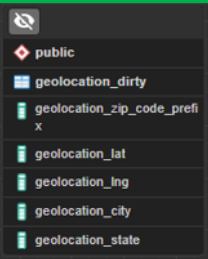2. Import Data
   - Import data .csv into tables by using query 'COPY'
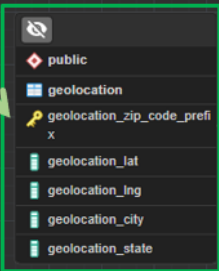3. Pre-cleaning Data
   - In order to clean the geolocation data, the process involves dropping duplicate rows, normalising city names by handling special characters, and input new geolocation information provided by both customers and sellers.

Query selengkapnya dapat dilihat disini

Before Cleaning

After Cleaning

4. Create Entity Relationship Diagram (ERD)

- Create ERD base by the Primary key and Foreign key for each table. The relationship between the keys is connected by specifying the Constraint name.

Lihat atau Download ERD disini

Overview:

The growth in the number of customers is a reflection of the effectiveness of sales. That's why customer growth is the primary goal for e-commerce companies. In this section, we will analyze various metrics related to customer activity, including active users, new customers, repeat order customers, and order frequency for each year.

year double precision	avg_monthly_active_user numeric	new_customer bigint	repeat_customer bigint	avg_num_order numeric
2016	108	326	3	1.01
2017	3694	43708	1256	1.03
2018	5338	52062	1167	1.02

Query selengkapnya dapat dilihat disini

1. Average Monthly Active User (MAU) per year

year double precision 🔒	avg_monthly_active_user 🔒 numeric
2016	108
2017	3694
2018	5338

2. Total New Customer per year

year double precision 🔒	new_customer 🔒 bigint
2016	326
2017	43708
2018	52062

Monthly Active User & New Customer
In the last 3 years, both monthly users and new customers have increased.

Measure Names
- Avg Monthly Active User
- New Customer

52,062
43,708
5,338
3,694
326
108

2015   2016   2017   2018   2019
Year

Observation:
- Monthly Active User in each year is increasing
- This indicates that e-commerce success is closely tied to fostering strong engagement to capture customer interest, as evidenced by a rise in the average number of active customers. Additionally, effective brand promotion plays a crucial role in attracting new customers to initiate orders. Furthermore, the availability of promotions or vouchers for new customers may also enhance their interest and engagement.

Query selengkapnya dapat dilihat disini

3. Yearly repeat order customers

year double precision 🔒	repeat_customer bigint 🔒
2016	3
2017	1256
2018	1167

4. Average order frequency for each year

year double precision 🔒	avg_num_order numeric 🔒
2016	1.01
2017	1.03
2018	1.02

Increase repeat costumer
In 2017-2018, there was a rising trend, but in 2018, there was a slight decrease.

Measure Names
■ Repeat Customer
■ Avg Num Order
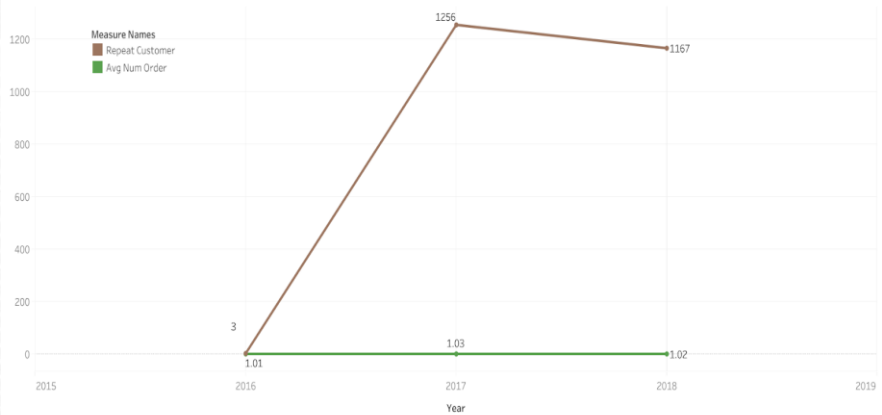
Observation:
- There was an increase in repeat orders in 2017, but there was a decline in 2018 by approximately 100 customers.
- Based on the average number of orders, it's evident that the majority of individuals placed orders only once over the past three years.

Query selengkapnya dapat dilihat disini

Annual Product Category Quality Analysis

Overview:

The assessment of product category quality is an essential aspect of evaluating the overall performance of an eCommerce company. Ensuring high-quality products within various categories not only impacts customer satisfaction but also influences brand reputation and profitability.

year double precision	top_product_revenue character varying	top_revenue double precision	total_revenue_year double precision	top_product_canceled character varying	top_num_cancel bigint	total_cancel_year bigint
2016	furniture_decor	6899.350000000001	46653.74000000004	toys	3	26
2017	bed_bath_table	580949.200000002	6921535.239999719	sports_leisure	25	265
2018	health_beauty	866810.339999998	8451584.769999959	health_beauty	27	334

Query selengkapnya dapat dilihat disini

# Annual Product Category Quality Analysis

1. Total revenue per year

year double precision 🔒	revenue double precision 🔒
2016	46653.74000000004
2017	6921535.239999719
2018	8451584.769999959

2. Total cancel order per year

year double precision 🔒	total_cancel bigint 🔒
2016	26
2017	265
2018	334

Total Revenue & Total Cancel Order
Each year, the increase in revenue corresponds to the increase in canceled orders

Measure Names
- Total Revenue Year
- Total Cancel Year

8,451,585
6,921,535
46,654
26
265
334
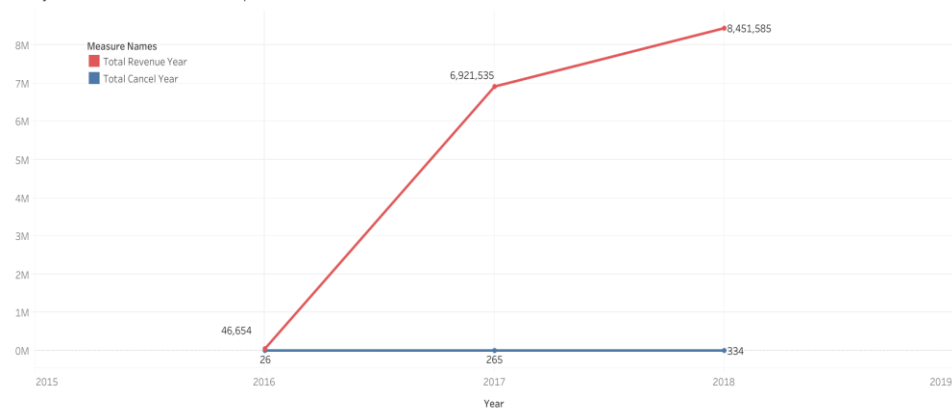
Year

Observation:
- The company experienced consistent annual revenue growth, although there was a decline in repeat orders between 2017 and 2018, likely due to a significant surge in new customer each year.
- While there was a rise in canceled orders between 2016 and 2018, it's important to note that the numbers remained relatively modest. To prevent a potential increase in cancellations in the upcoming year, it would be beneficial to gather additional data on the reasons behind these cancellations.

Query selengkapnya dapat dilihat disini

3. Top product category by revenue per year

year double precision	product_category_name character varying	revenue double precision
2016	furniture_decor	6899.350000000001
2017	bed_bath_table	580949.200000002
2018	health_beauty	866810.339999998

4. Top canceled category product by total cancel per year

year double precision	product_category_name character varying	total_cancel bigint
2016	toys	3
2017	sports_leisure	25
2018	health_beauty	27
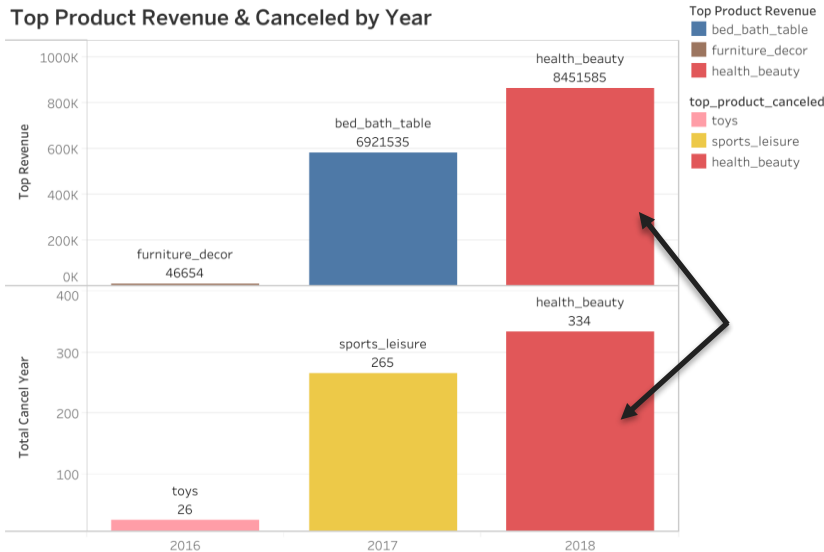
Observation:
- Each year, the leading product categories in terms of revenue and cancellations tend to shift, underscoring the ever-changing landscape of consumer choices.
- An intriguing anomaly arose in 2018 when the Health Beauty category occupied the top spot for both revenue generation and cancellation rates. This anomaly can likely be attributed to the exceptionally high volume of orders placed within the health and beauty categories during that particular year.

Query selengkapnya dapat dilihat disini

Analysis of Annual Payment Type Usage

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Overview:

Understanding the impact of payment methods on customer behavior and income is essential for effective financial analysis. In the eCommerce, providing a versatile and open payment system is crucial. This analysis will delve into the performance of each payment method used over the year, offering valuable insights for strategic collaborations with payment providers. These insights aim to enhance customer satisfaction and optimize revenue generation, ensuring a thriving eCommerce business.

payment_type character varying	num_of_usage bigint
credit_card	76795
boleto	19784
voucher	5775
debit_card	1529
not_defined	3

payment_type character varying	year_2016 numeric	year_2017 numeric	year_2018 numeric
credit_card	258	34568	41969
boleto	63	9508	10213
voucher	23	3027	2725
debit_card	2	422	1105
not_defined	0	0	3

Query selengkapnya dapat dilihat disini

1. Total usage of each type of payment all time

payment_type 🔒 character varying	num_of_usage 🔒 bigint
credit_card	76795
boleto	19784
voucher	5775
debit_card	1529
not_defined	3

Payment Type Used for All Time
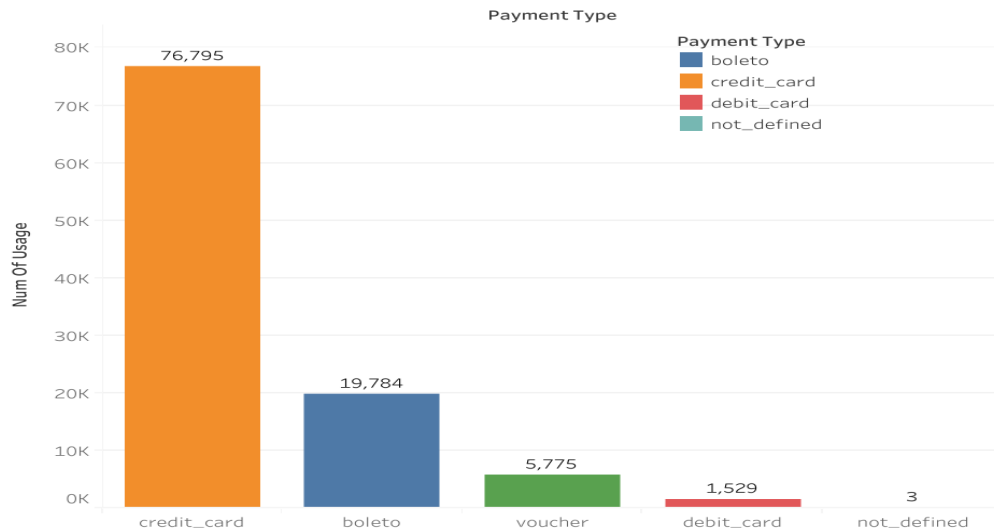
Observation:
- Due to the widespread use of credit cards among customers, companies can establish partnerships with credit card providers to create more appealing promotions.
- It is essential to conduct in-depth analyses of customer behavior related to credit card usage, including the preferred credit card types and common product categories purchased with credit cards.
- Recognizing the popularity of credit cards, businesses can design targeted bonuses and promotions tailored to the most preferred payment methods, including credit cards, boleto, and vouchers.

Query selengkapnya dapat dilihat disini

2. Payment Type Usage Each Year

payment_type character varying 🔒	year_2016 numeric 🔒	year_2017 numeric 🔒	year_2018 numeric 🔒
credit_card	258	34568	41969
boleto	63	9508	10213
voucher	23	3027	2725
debit_card	2	422	1105
not_defined	0	0	3

Payment Type Usage Each Year
Credit cards continue to dominate as the primary choice for payments, with consistently rising usage each year.

Payment Type
- boleto
- credit_card
- debit_card
- not_defined
- voucher
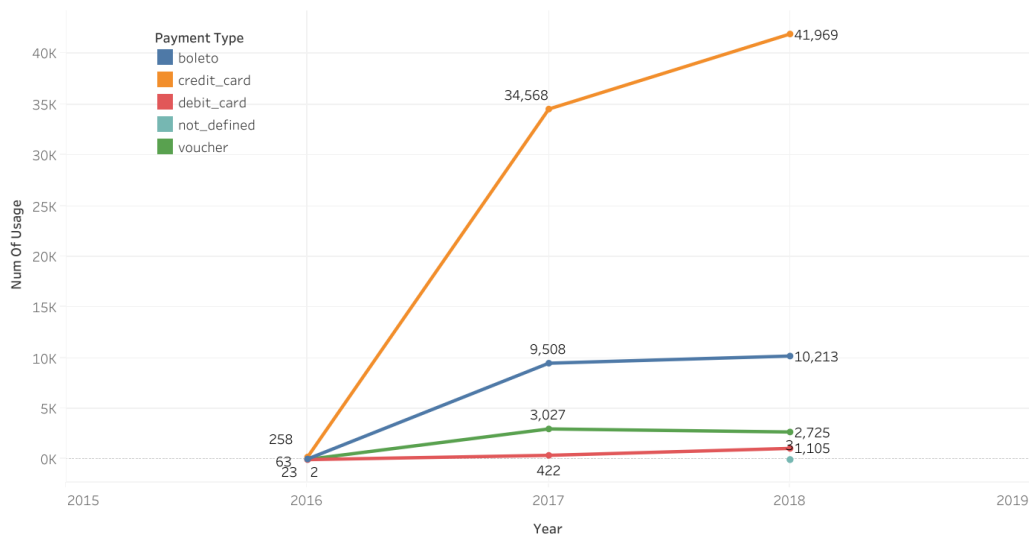
Observation:
- Each payment type has shown a consistent annual increase in usage.
- Notably, voucher-based payments experienced a decline in 2018, potentially attributed to a decrease in voucher-related promotions.

Query selengkapnya dapat dilihat disini

Summary

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- Customer activity displayed positive trends from 2016 to 2018, with more new customers and increased Monthly Active Users (MAU). However, repeat customer orders remained stagnant, and on average, each customer placed only one order.
- When examining product categories, we consistently observed a yearly increase in the company's total revenue. Interestingly, the categories with the highest cancellations and the best-selling categories changed annually. The health and beauty category stood out as both the most sold and the most canceled.
- Different payment methods saw significant growth year by year. Credit cards were the most frequently used payment method from 2016 to 2018, while voucher-based payments declined in 2018.

Query selengkapnya dapat dilihat disini