Global E-commercial Entity Specialized in Electronic Products

Introduction:

The company, a global e-commerce entity specialized in electronic products, seeks to deepen its understanding of customer behaviors and preferences to enhance its strategic marketing efforts, optimize its product offerings, and ultimately boost customer satisfaction and sales. Despite having access to a rich database of customer interactions and transactions, the company has yet to fully exploit this data to extract actionable insights.

Problem:

We will develop and implement data-driven methodologies to optimize inventory management and pricing strategies by identifying emerging trends in customer preferences. The goal is to increase the company's revenue by 20% within the next year.

Data Wrangling:
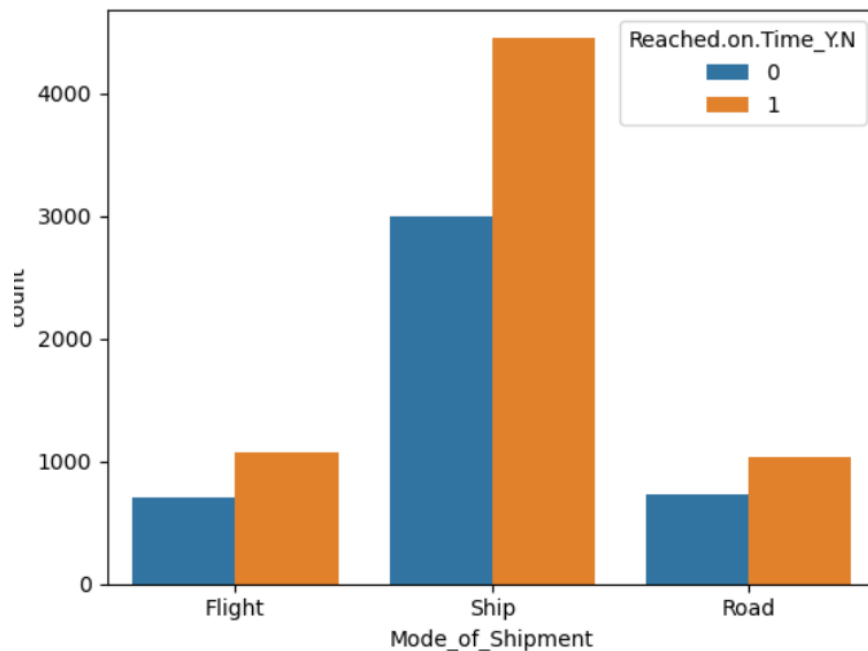
NOTE Reached on time: It is the target variable, where 1 Indicates that the product has NOT reached on time and 0 indicates it has reached on time.

Based on the graph we can conclude that air flight is shipping faster than ship and road. While analyzing we will have to keep in mind that shipping via ship or road can affect Circumstances like weather, transportation

issues, or customs delays can sometimes affect delivery times.

Next, we analyzed warehouse block to demonstrate which block is efficient and will accelerate the shipment methods.
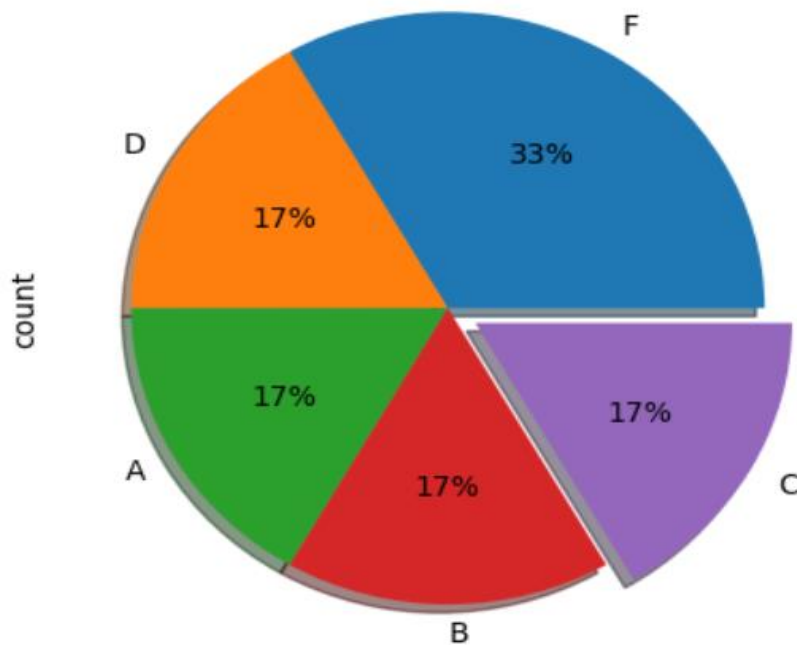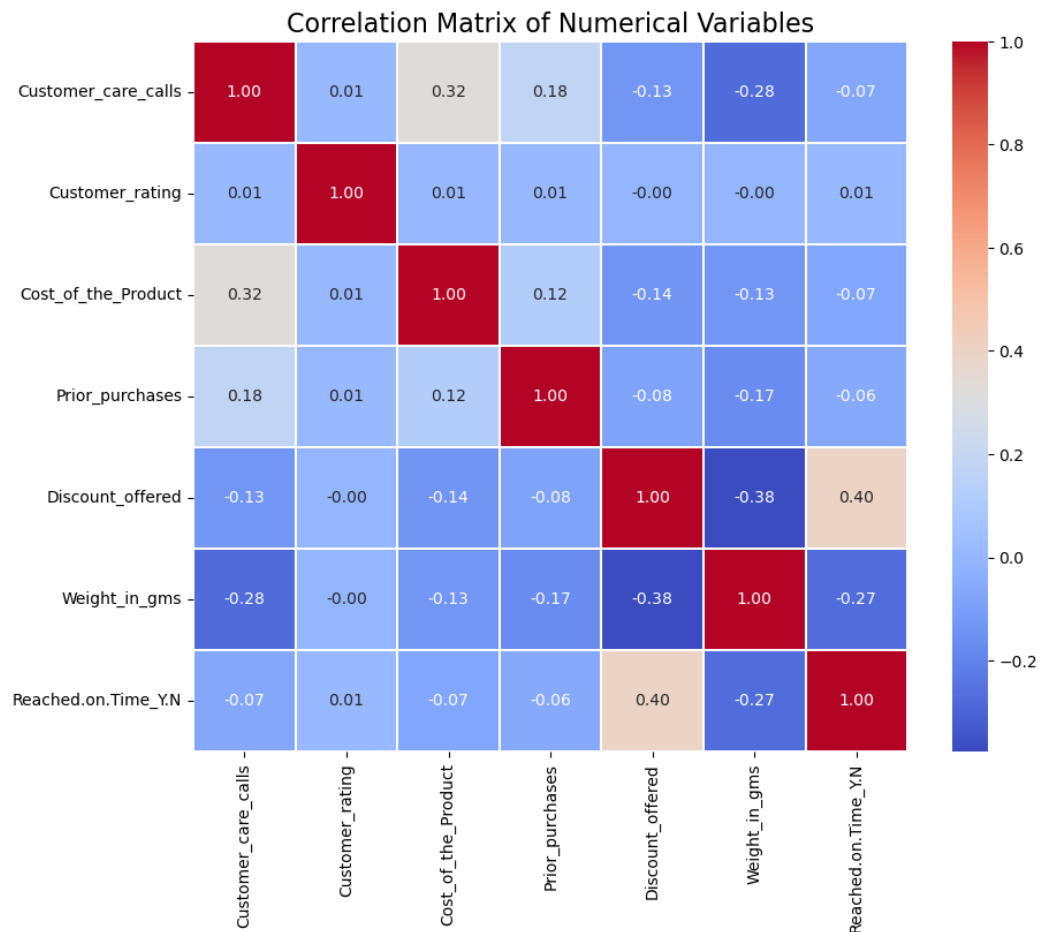

Based on pie chart we can conclude that F distribution has optimizing efficiency and accessibility, this strategy enhances the movement of goods, minimizes picking and packing durations, and elevates the overall performance of warehouse operations.
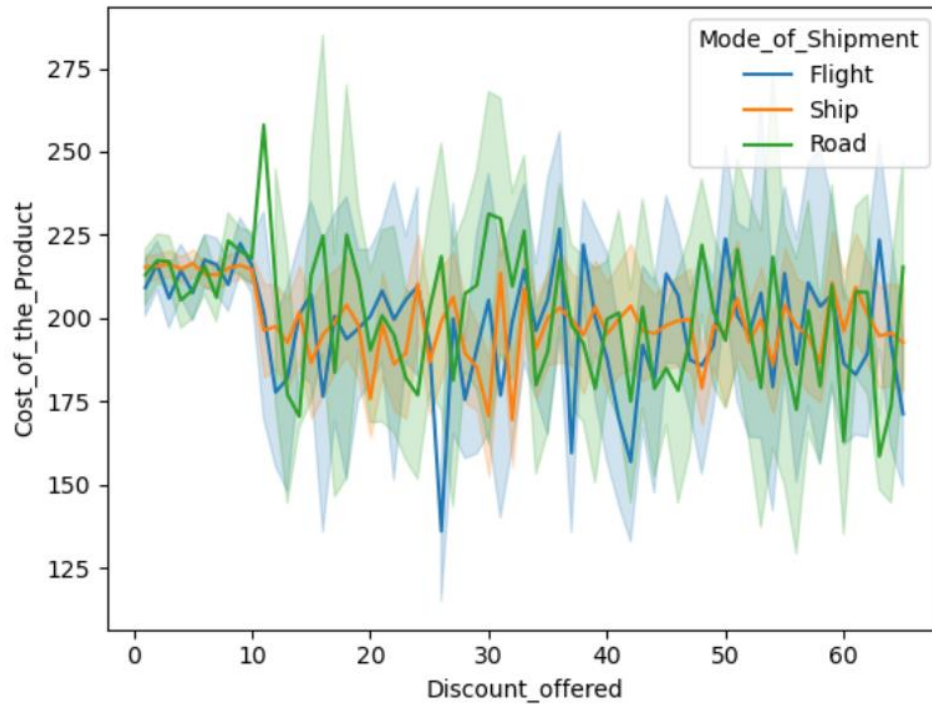
Certain shipping methods may incur higher costs due to factors like expedited service, insurance, or special handling needs. Consequently, businesses might transfer these extra expenses to customers, influencing the final price of the product. Moreover, customers are often prepared to pay a premium for products with quicker delivery options, especially if discounts applied make the overall cost more accessible.

Exploratory Data Analysis:

In order to find trends and patterns in data we need to explore and analyze the data. For further analysis we scaled numeric data and calculated Principal Cumulative Analysis (PCA). I created a heatmap to understand the relationships between variables. Based on the map we can conclude that there is a positive relationship between the discount_offered and reached on time products.

Correlation Matrix of Numerical Variables

	Customer_care_calls	Customer_rating	Cost_of_the_Product	Prior_purchases	Discount_offered	Weight_in_gms	Reached.on.Time_Y.N
Customer_care_calls	1.00	0.01	0.32	0.18	-0.13	-0.28	-0.07
Customer_rating	0.01	1.00	0.01	0.01	-0.00	-0.00	0.01
Cost_of_the_Product	0.32	0.01	1.00	0.12	-0.14	-0.13	-0.07
Prior_purchases	0.18	0.01	0.12	1.00	-0.08	-0.17	-0.06
Discount_offered	-0.13	-0.00	-0.14	-0.08	1.00	-0.38	0.40
Weight_in_gms	-0.28	-0.00	-0.13	-0.17	-0.38	1.00	-0.27
Reached.on.Time_Y.N	-0.07	0.01	-0.07	-0.06	0.40	-0.27	1.00

Modeling Selection

The target variable was whether the product was reached on time or not. Applied label encoding method to convert the data to categorical data. For further analysis scaled data and transformed it.

I tested four different machine learning classification models: Logistic Regression, Gradient Boosting classifier, random forest and decision tree. The metric I focused on while choosing the machine was precision. I wanted my model to predict whether the product was reached on time or not. Most variables performed best with the decision tree classifier. I was able to improve the model slightly more to 91% precision. Tuning the hyperparameters on decision tree classifier reduced the accuracy of the model.

Conclusion:

The importance of the products in a shipment can influence shipping decisions and potential discounts on shipping costs. Businesses must strike a balance between meeting customer expectations, maintaining profitability, and managing shipping expenses when determining discounts in the context of product shipments.

Shipping by sea is an efficient method for transporting large quantities of goods over long distances. It is commonly used in international trade, facilitating the movement of goods between continents and the transport

of bulk cargo. Given the volume and distance involved, most products are shipped by sea. Efficient product shipment is crucial for maintaining customer satisfaction, as delays or mishandling can lead to unhappy customers.

The mode of transportation plays a significant role in delivery times. For long distances, air freight is faster than shipping by sea. However, factors such as weather, transportation issues, or customs delays can impact road transportation for short-distance deliveries. Therefore, flexibility is essential when setting delivery expectations.