

Project Title Supply Chain Delay Analysis Project

Executive Summary

This project analyzes supply chain delivery delays using transactional logistics data from a global supplier. By leveraging SQL and Power BI, I explored trends across mode of shipping, delay durations, and carrier performance. The findings reveal consistent bottlenecks, mode of shipment inefficiencies, and opportunities to optimize shipping timelines. A Power BI dashboard was created to help the operations team monitor and resolve delivery issues proactively.

Project Objective

To understand the root causes and patterns of delivery delays in the supply chain process, identify the most affected routes and regions, and provide actionable recommendations for reducing overall delivery time.

Business Questions

- What percentage of shipments are delivered on time vs. late?
- Which shipping modes are more reliable for on-time delivery?
- Is there a link between product importance and delivery punctuality?
- How do late deliveries correlate with discounts and customer ratings?
- What is the scale and nature of the delay issue overall?
- Which carriers have the highest and lowest delivery reliability?

Tools & Technologies

- Excel: Initial data cleaning,
- SQL (MySQL): Querying and data exploration
- Power BI: Interactive dashboard for visualization

Dataset Information

- Source: Simulated dataset from Kaggle – Supply Chain Delivery Data
- Size: Over 10,000 records, 12 columns
- Key columns:
- warehouse code, mode of shipment, cost of product, weight in grams, customer rating, arrival on time, customer call times, discount, product importance.

Data Cleaning Process

Performed in Excel and SQL:

- Removed null values
- Filtered out negative delivery time(data entry error)

■ Check for Null

```
SELECT
    SUM(CASE WHEN ID IS NULL THEN 1 ELSE 0 END) AS Null_ID,
    SUM(CASE WHEN Warehouse_block IS NULL THEN 1 ELSE 0 END) AS Null_Warehouse_block,
    SUM(CASE WHEN Mode_of_Shipment IS NULL THEN 1 ELSE 0 END) AS
Null_Mode_of_Shipment,
    SUM(CASE WHEN Customer_care_calls IS NULL THEN 1 ELSE 0 END) AS
Null_Customer_care_calls,
    SUM(CASE WHEN Customer_rating IS NULL THEN 1 ELSE 0 END) AS Null_Customer_rating,
    SUM(CASE WHEN Cost_of_the_Product IS NULL THEN 1 ELSE 0 END) AS
Null_Cost_of_the_Product,
    SUM(CASE WHEN Prior_Purchases IS NULL THEN 1 ELSE 0 END) AS Null_Prior_Purchases,
    SUM(CASE WHEN Product_importance IS NULL THEN 1 ELSE 0 END) AS
Null_Product_Importance,
    SUM(CASE WHEN Gender IS NULL THEN 1 ELSE 0 END) AS Null_Gender,
    SUM(CASE WHEN Discount_offered IS NULL THEN 1 ELSE 0 END) AS
Null_Discount_offered,
    SUM(CASE WHEN Weight_in_gms IS NULL THEN 1 ELSE 0 END) AS Null_Weight_in_gms,
    SUM(CASE WHEN "Reached.on.Time_Y.N" IS NULL THEN 1 ELSE 0 END) AS
"Null_Reached.on.Time_Y.N"
From work_supply;
```

■ Remove Row with negative delivery time(data entry error)

```
Select *
From work_supply
where datediff(customer_care_calls, cost_of_the_Product, Weight_in_gms)< 0;
```

- Standardized inconsistent entries in Shipping_Mode columns
- Converted date columns to proper datetime formats

Exploratory Data Analysis (EDA)

Key findings from SQL-based analysis:

- Overall Shipment Performance
- Warehouse Block Performance
- Mode of Shipment VS Delivery Timeliness

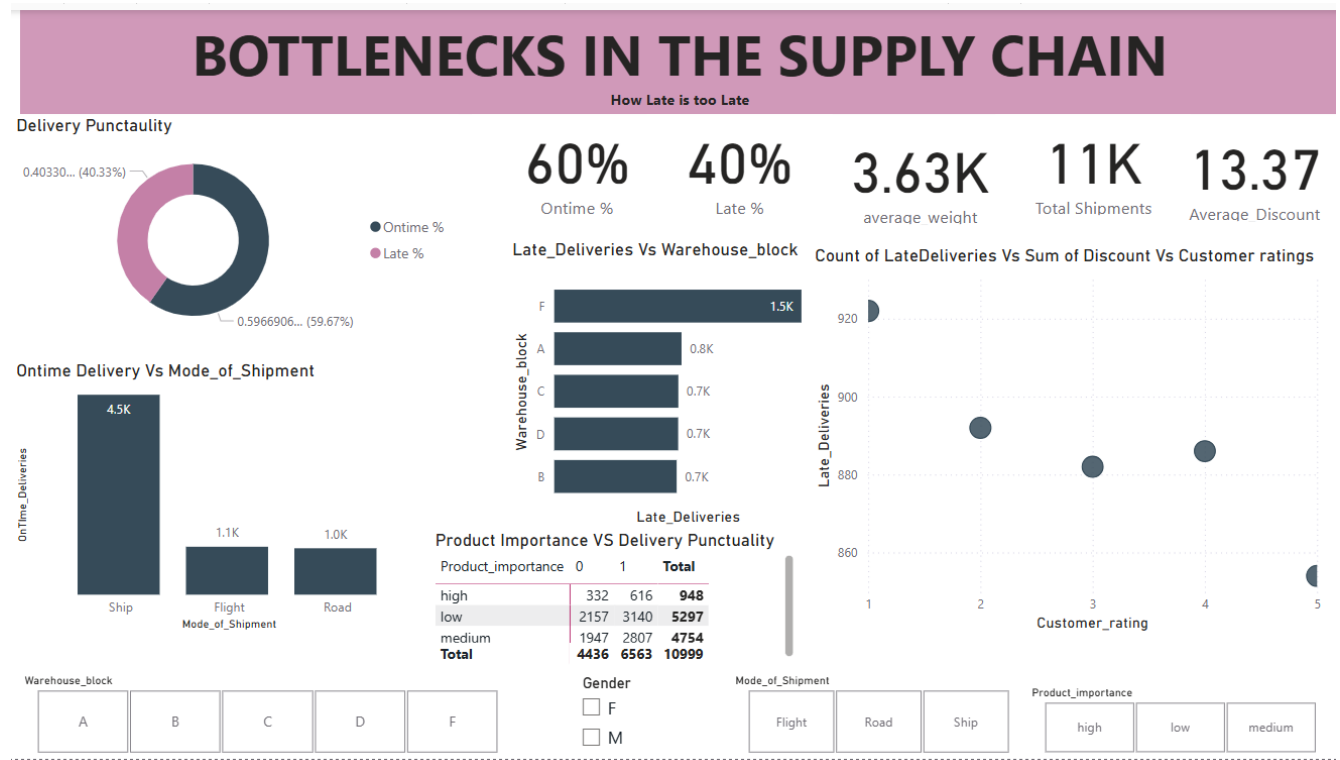
- Customer Rating VS On Time Delivery
- Product Importance VS Late Deliveries
- Weight VS Late Deliveries to Check if heavier products are delayed more
- Discount Offered VS On-Time Delivery Grouped discount into buckets for easier analysis

Note : Link to SQL Queries for the above EDA is attached below this report

Dashboard or Visual Output

Created a Power BI dashboard with:

- Product importance Vs Delivery Punctuality
- Delay rate by shipping mode and carrier
- Warehouse Delay Rate
- Summary cards: % Delayed, Avg Discount, Total Shipment, Avg Weight



Key Insights

- Road Shipments are the slowest while ship(sea) is the fastest
- Warehouse F is underperforming
- Late Deliveries increase with higher discounts and gets lowest ratings

Project Links

GitHub Repository:

<https://github.com/Deejarh-ops/Deejerh.github.io/blob/main/exploratory%20supply%20chain%20analysis.sql>