**🎯 Logistics Case Study**

Hello,  
I’m going to walk you through the full process I followed to clean, process, and analyze e-commerce logistics datasets using Power BI. The goal was to assess key operational KPIs and derive actionable insights from real-world delivery data.

**🔹 1. Data Loading and Initial Checks**

* I began by importing the **Orders**, **Deliveries**, and **Products** tables into Power BI.
* Then I reviewed and corrected **data types** for all columns (dates, Booleans, text, etc.).
* A relationship model was built using:
  + Orders[OrderID] → Deliveries[OrderID]
  + Orders[ProductID] → Products[ProductID]

**🔹 2. Calendar Table Creation**

* I built a dynamic **Calendar table** to manage time-based analysis.
* Extracted fields like Year, Month Number, Month Name, Quarter, and Day.

**🔹 3. Data Cleaning and Validation Logic**

To ensure logical consistency between Orders and Deliveries, I created several calculated columns using DAX:

**✅ Key Logic Columns:**

1. **Delivery Before Order** → Flag when delivery date < order date
2. **Expected Date Before Order** → Flag when promised date < order date
3. **Delivered = 0 but has Delivery Date** → Flag delivery marked undelivered incorrectly
4. **Delivered = 1 but Shipped = 0** → Logically invalid, delivery happened without shipment
5. **IsValid** → Master flag that consolidates all invalid cases
6. **ConfirmedShipped & CorrectedDelivered** → Adjusted status flags based on confirmation and delivery date logic

I also created **CleanDeliveryDate** and **CleanExpectedDate** using the business assumption that:

* Delivery should happen **5 days** after the order date
* Expected delivery should be **7 days** after the order date

**🔹 4. KPI Calculation Using DAX**

**Core KPIs:**

- Order Confirmation Rate = Confirmed Orders / Total Orders

- Ship Rate = Shipped Orders / Confirmed Orders

- Delivery Rate = Delivered Orders / Shipped Orders

- Delivery On Time % = On-Time Delivered / Delivered

**Extended KPIs:**

- Late Delivery Rate = Late Delivered / Delivered

- Cancelled Orders Count

- Total Orders

- Total Customers (distinct)

**🔹 5. Data Insights Discovered**

From our cleaned and processed data:

* **Order Confirmation Rate** was 95%, which is quite strong. Most orders are getting confirmed, showing minimal rejection at the confirmation stage.
* **Ship Rate** was 99% overall after cleaning our delivery dates. Nearly all confirmed orders are being shipped, showing high logistics responsiveness.
* **Delivery Rate** was 86% overall after cleaning out our delivery dates, but 100% among valid records.
* **On-Time Rate** was only ~64%. Late **Delivery Rate** was only ~36% and this after setting a new logical date range
* **490 orders** had **expected delivery dates set before the order date**, and **456 deliveries occurred before the order was even placed**, indicating a critical data entry flaw.
* **144 deliveries were completed**, but the Delivered flag was still set to 0, potentially misleading business stakeholders.
* **41 deliveries** occurred where the Shipped flag was still 0, which shouldn't be possible.
* Customers using the **Call Center** may be more traditional or higher value, as the Call Center accounts for the highest share of both orders (351) and deliveries (286). However, both the app and website exhibit strong engagement, albeit with slightly lower delivery rates.
* **Electronics category alone contributes 39.3% of all orders**, Which Implies higher value and logistics sensitivity.
* The order and delivery volumes peak was in Month 5 (May).
* The **wallet** is the most common payment method (345) used, and cash on delivery (329) and card (326) are nearly identical.

**✅ Final Outcome**

This project helped transform messy, real-world logistics data into a **clean, valid, insightful, and interactive Power BI report.** The use of a Power BI dashboard provides an end-to-end operational analysis of an e-commerce platform's order and delivery performance. It enables key stakeholders to monitor customer orders, supplier contributions, shipping logistics, delivery accuracy, and late delivery rates.