E-commerce Delivery Delay Analysis & Performance Optimization

1. Industry & Organization Description

Industry

The project is situated in the **e-commerce industry**, a highly competitive and fast-growing sector where customer satisfaction, delivery speed, and operational efficiency are critical success factors.

Organization Description

The organization is a **medium-to-large online retail company** selling a wide range of consumer products through its e-commerce platform. The company operates across multiple regions and relies on different shipping modes and logistics partners to deliver products to customers.

The organization collects large volumes of transactional data related to:

- Customers
- Orders
- Products
- Payments
- Shipping and delivery

This data is stored in operational systems and can be leveraged for **Business Intelligence (BI)** and **data-driven decision making**.

2. Business Problem

One of the main challenges faced by the organization is **delivery delay**. Late deliveries negatively impact:

- Customer satisfaction and trust
- Brand reputation
- Operational costs (refunds, reshipping, customer support)
- Long-term customer retention

Despite having access to large amounts of data, the company lacks clear insights into:

- Why delays occur
- Which factors contribute most to late deliveries
- Which customers, regions, products, or shipping modes are most affected

The dataset includes a **delivery label** that classifies orders as:

- Early delivery
- On-time delivery
- Delayed delivery

This allows the company to analyze delivery performance and identify patterns related to delays.

3. Project Objectives

The main objectives of this project are:

- To analyze delivery performance across orders
- To identify key factors causing delivery delays
- To measure the business impact of delayed deliveries
- To support management decisions through KPIs and dashboards

This project will help the organization improve logistics efficiency, reduce delays, and enhance customer experience.

4. Analytical Questions

The following analytical questions will guide the analysis:

1. What percentage of orders are delayed, on-time, or early?
2. Which regions experience the highest delivery delay rates?
3. Which shipping modes result in the most delays?
4. Are certain product categories more prone to delivery delays?
5. Do high-value orders experience more delays than low-value orders?
6. How does delivery delay impact profit per order?
7. Which customer segments are most affected by late deliveries?
8. Is there a relationship between payment type and delivery delay?

9. How do delays vary over time (by month or season)?
10. What is the average shipping time for delayed vs on-time orders?
11. Which cities or states generate the highest number of delayed orders?

5. Key Performance Indicators (KPIs)

The following KPIs will be used to evaluate delivery performance:

1. **Delivery Delay Rate (%)**
   (Number of delayed orders / Total orders)
2. **On-Time Delivery Rate (%)**
3. **Early Delivery Rate (%)**
4. **Average Delivery Time (Days)**
5. **Average Profit per Delayed Order**
6. **Revenue from Delayed Orders**
7. **Delay Rate by Shipping Mode**
8. **Delay Rate by Region**
9. **Customer Impact Rate**
   (Number of customers affected by delays / Total customers)

6. Expected Business Value

By completing this project, the organization will:

- Gain visibility into delivery performance
- Identify root causes of delivery delays
- Optimize shipping strategies and logistics planning
- Improve customer satisfaction and retention
- Support data-driven operational decisions

7. Conclusion

This use case demonstrates how transactional e-commerce data can be transformed into actionable insights using Business Intelligence techniques. By focusing on delivery delays, the project addresses a real and impactful business problem while providing measurable KPIs and clear analytical directions.