Northwind SQL Analytics Project

Problem Statement

In retail and distribution, data drives strategic decisions — from identifying top customers and high-performing products to monitoring employee productivity and operational bottlenecks.

The Northwind database simulates a realistic business environment, including customer orders, product sales, shipping timelines, and employee activities. Raw data alone is insufficient; actionable insights require careful SQL analysis and visualization.

Project Objectives

- **Derive insights into revenue distribution, product performance, employee productivity and supplier contributions.**

- **Identify growth/opportunity areas and inefficiencies (e.g., slow shipping, inactive customers/products).**

- **Use SQL techniques (CTEs, Window Functions, Views).**

- **Build an Excel Dashboard for stakeholders to visualize key insights.**

Key Business Questions

1. Who are the top revenue-generating customers?

2. Which suppliers contribute the most to product volume?

3. Which employees drive the highest sales?

4. Which employees process the most orders?

5. How efficient are our shippers?

6. What are the monthly sales trends for 1997?

7. Which countries generate the highest average order value?

8. Which products were never ordered?

9. Which customers had no orders in 1997?

10. Revenue distribution by product category.

11. Top-selling employees by year.

12. Returning customers and time between orders.

13. Product sales trends (month-over-month).

14. Products sold only once per order.

15. Product revenue percentile rankings.

16. Employees' first order handled.

17. Customer revenue quartiles.

18. Product quantity percentile ranking.

19. Yearly cumulative sales growth.

The first 7 questions were visualized in the dashboard; the remaining demonstrate SQL proficiency.

Data Analysis & Methodology

- **Data Sources:** Orders, Order Details, Customers, Suppliers, Employees, Shippers, Products tables in the Northwind Database.

- **SQL Techniques Used:**

  - Joins to consolidate data across multiple tables.

  - Aggregations (SUM, AVG, COUNT) for key metrics.

  - Window functions for ranking, cumulative totals, and percentiles.

  - CTEs for modular and readable queries.

- **Excel Dashboarding:**

  - Pivot tables and charts to visualize results.

  - Slicers for filtering by employees.

  - Conditional formatting to highlight key insights.

Dashboard Analysis – Key Insights

1. Revenue & Customer Overview:

- Total revenue of $1.27M was generated from 830 orders across 89 customers, with an average order value of $1,525.

2. Employee Performance:

- Margaret Peacock leads in both yearly sales and total orders, showing consistent top performance across all three years (1996–1998).

- Janet Leverling follows closely, highlighting strong revenue contribution.

3. Supplier Performance:

- Plutzer, Pavlova, and Specialty Biscuits supply the highest quantities (≈ 4,000 units each), making them essential trade partners.

4. Shipping Efficiency:

- Federal Shipping is the most efficient shipper with an average delivery time of 7.47 days, outperforming Speedy Express (8.57) and United Package (9.23).

- Prioritizing Federal Shipping could improve delivery reliability.

5. Customer Insights:

- QUICK-Stop, Ernst Handel, and Save-a-lot Markets are top revenue-generating customers — valuable targets for retention and upselling initiatives.

6. Geographical Insights:

- Austria, Ireland, and the USA show the highest average order values, suggesting these are high-potential markets for strategic investment.

7. Sales Trend:

-1997 sales show steady monthly performance with strong peaks in October and December, indicating seasonal demand patterns.

Recommendations Based on Dashboard Analysis

1. **Revenue & Customer Recommendations**

- Focus on **high-value customers** like QUICK-Stop, Ernst Handel, and Save-a-lot Markets for **retention strategies and upselling opportunities**, as they generate the most revenue.

- Encourage **repeat orders and loyalty programs** to maintain steady revenue from existing customers.

2. **Employee Performance Recommendations**

- Recognize and reward **top performers** like Margaret Peacock and Janet Leverling to maintain motivation and performance consistency.

- Consider using top employees to **mentor others** or replicate their successful sales strategies across the team.

3. **Supplier Performance Recommendations**

- Maintain strong relationships with **key suppliers** such as Plutzer, Pavlova, and Specialty Biscuits, as they contribute the highest quantities to inventory.

- Explore **bulk deals or strategic partnerships** with these suppliers to secure favorable pricing and ensure supply continuity.

4. **Shipping Efficiency Recommendations**

- Prioritize **Federal Shipping** for high-value or time-sensitive orders due to its faster delivery times.

- Review shipping contracts and processes for **Speedy Express and United Package** to identify areas to improve delivery performance.

5. **Geographical & Market Recommendations**

- Focus marketing and sales strategies in **Austria, Ireland, and the USA**, as these regions show the highest average order values.

- Consider targeted campaigns, promotions, or product bundles in these markets to maximize revenue per order.

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6. **Sales Trend & Seasonal Recommendations**

- Prepare inventory and marketing plans around **October and December peaks** to capitalize on seasonal demand.

- Implement **promotional campaigns or limited-time offers** during these months to drive additional sales.

Tools & Technologies Used

- PostgreSQL – querying and analyzing Northwind data

- SQL Window Functions & CTEs – dynamic, modular analysis

- Excel – pivot tables, charts, slicers for dashboards

- Northwind Traders Dataset – simulated business dataset