GROUP: E-Commerce Pastry Management   SUBJECT: Information Management I

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Report

We focused on extracting valuable business insights using a dataset containing over 100,000 records. To begin, we identified key performance indicators (KPIs) such as total sales, average order value, and product popularity. Using advanced SQL queries involving JOINs, aggregation, filtering, and date-based grouping, we analyzed the sales and customer behavior across different dimensions. One key query grouped order totals by month, showing noticeable spikes in sales during specific periods, such as December—indicating a strong seasonal trend. Another query revealed the top 10 best-selling products, highlighting those with high turnover that could benefit from further marketing and restocking strategies.

We further investigated customer behavior by computing average order values by user and undertaking a simple segmentation by simulated region and customer characteristic. This analysis showed that a small minority of users contributed disproportionately to overall revenue, supporting the potential benefit of targeted loyalty programs or segmentation-based marketing. Further, specific geographic areas evidenced lower order quantities, indicating promotional outreach or area campaigns opportunities. With product data, we investigated category-level trends over time by examining sales and found that various types of products fared differently in certain quarters—information supporting inventory planning and promotion timing.

To enhance analytical capabilities and support business intelligence tooling, we transformed our normalized schema into a denormalized star schema. This included one central fact table (sales_fact) and three dimension tables (customer_dimension, product_dimension, and date_dimension). The new schema simplified complex joins and improved query performance for aggregation tasks. We created this schema using SQL scripts and visualized it through dbdiagram.io. Based on our findings, we recommend dashboard components such as a monthly revenue line chart, a product sales bar chart, a customer segment pie chart, and a geographic heatmap. These insights and tools provide a strong foundation for informed decision-making and future expansion into dashboard-based reporting systems. To further enhance the analysis, consider incorporating predictive modeling techniques. For example, forecasting future sales based on historical data and seasonal trends could significantly improve inventory management and resource allocation. Additionally, exploring customer churn prediction models could proactively identify at-risk customers and allow for targeted retention strategies. These predictive capabilities, integrated with the existing dashboard, would provide a more comprehensive and proactive business intelligence solution.