E-Commerce API Sales Analysis

1. Introduction

1.1 Problem Statement

E-commerce businesses need to understand customer behavior, product performance, and sales trends to optimize their operations. This project aims to analyze an E-Commerce sales data to gain insights into customer purchasing patterns, product popularity, geographic trends, sales strategies, inventory management, and customer satisfaction.

1.2 Objectives

The key objectives of this analysis are:

- To identify top-selling products and their categories.

- To analyze customer purchasing behavior.

- To evaluate sales trends over time.

- To examine customer location distribution.

- To provide actionable insights for business decision-making.

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2. Dataset Overview

The dataset used in this analysis contains transactional e-commerce API data from Fakestoreapi.com and it consists of three key tables:

1. Products Table: Contains product details such as name, category, price, and rating.

2. Carts Table: Includes transaction details like purchase date, product quantity, and user ID.

3. Users Table: Stores customer information such as location, email, and demographic details.

Key relationships:

- Carts.products.productId links to products.Product_id.

- Carts.userId links to users.id.

3. Methodology

The methodology followed in this analysis includes the following steps:

1. Data Collection: Extracting E-commerce API data from fakestoreapi.com.

2. Data Cleaning & Processing: Correcting data types, creating key Measures (DAX) and normalizing information.

3. Data Modeling: Establishing relationships between tables in Power BI.

4. Data Analysis & Visualization: Creating reports and dashboards to extract insights.

5. Interpretation & Recommendations: Drawing conclusions and suggesting actionable business strategies.

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4. Data Processing

4.1 Data Cleaning

- Standardized price and rating formats.

- Ensured date fields were in the correct format.

- Merged tables using relational keys (e.g., Product ID, User ID).

4.2 Data Transformation

- Created new calculated columns for total revenue, order count, and average ratings.

- Extracted time-based insights from the purchase date (year, month, weekday trends).

- Categorized customer locations for geographical distribution analysis.

4.3 Analysis Approach

- Sales Trend Analysis: Evaluating sales volume over time.

- Customer Segmentation: Categorizing customers based on location.

- Product Performance Analysis: Identifying top-selling and underperforming products.

- Geospatial Analysis: Mapping customer locations.

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5. key Insights & Findings

5.1 Sales Performance

Top-Selling Products & Categories:

- The **Men's Clothing and Jewelry** categories generate the highest revenue.
- Some **Electronics and Women's Clothing** items have low sales, indicating a need for better marketing or pricing strategies

Revenue Contribution:

- A few high-performing products contribute significantly to total sales , while many products have low demand.

Sales Trends Over Time:

- January showed **higher sales volume**, indicating possible seasonal trends.
- There was a drop in sales by March.

5.2 Geographic Insights

Customer Distribution:

- Kilcoole and San Antonio has the Most customers, while other regions have lower customers.
- Most sales come from **specific high-performing locations**, while other regions have lower sales.

5.3 Customer Behavior

Average Order Value (AOV):

- Customers tend to buy multiple products in one order, but some product categories have **low cart value**.

Pricing & Rating Impact

- Products with higher ratings sell more like the fjallraven backpack, showing customer trust in quality.

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6. Visualization & Dashboarding

Power BI dashboards include:

- **Sales Overview**: Total revenue, top products, category-wise sales and Pricing & Rating Impact.

- **Customer Insights**: Purchase frequency, average order value, and segmentation.

- **Geographical Analysis**: Doughnut chart of customer locations and regional sales trends.

- **Time-Based Trends**: Monthly and daily sales performance.

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7. Recommendations & Business Insights

7.1 Customer Engagement & Retention

- Loyalty Programs: Implement discounts for repeat customers to increase retention.

- Personalized Marketing: Use customer purchase history to recommend similar products.

- Cart Abandonment Strategy: Send reminders and offer incentives for incomplete purchases.

7.2 Inventory & Product Strategy

- Restock Popular Items: Ensure adequate stock for high-demand products, particularly in Men's clothing and Jewelry.

- Discount Slow-moving Products: Offer promotions on underperforming products to clear inventory, such as Women's Clothing.

- Optimize Pricing: Adjust pricing based on customer demand and competitor analysis.

7.3 Marketing & Sales Strategy

- Geographical Targeting: Invest in marketing in high-concentration customer locations like kilcoole and San Antonio.

- Category-focused Campaigns: Boost advertising for low-performing categories like Women's Clothing.

- Influencer & Affiliate Marketing: Leverage social media promotions for all products.

- Pricing & Rating Impact: Products with higher ratings sell more, showing customer trust in quality. Encourage customer reviews and improve product quality.

7.4 Operational Improvements

- Improve Delivery & Logistics: Optimize shipping routes based on customer locations.

- Enhance Customer Support: Address common customer complaints to improve service satisfaction.

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8. Conclusion

This analysis provides a comprehensive view of E-commerce sales and customer behavior. The insights generated can help businesses make data-driven decisions to improve sales performance and customer engagement. Future enhancements could include deeper machine learning-driven predictions and sentiment analysis from customer reviews.

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Date: 3|15|2025