REPORT ON DATA ANALYSIS CAPSTONE PROJECT

Project Title: Insights into E-Commerce Sales: Analyzing Trends, Customer Behavior, and Revenue Patterns

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Executive Summary

This report provides a detailed analysis of e-commerce sales data to determine trends, customer behavior, and revenue patterns. The findings aim to support strategic decision-making and business growth. By leveraging data visualization tools and analytical techniques, key insights were identified to support strategic initiatives.

Project Objectives:

1. Analyze sales data to identify trends and patterns.

2. Perform customer segmentation based on purchasing behavior.

3. Develop visualizations to communicate findings effectively.

4. Provide actionable insights for business growth and decision-making.

Data Overview

Datasets Used

1. Order Details: This dataset contains detailed information on orders, including order ID, order price, profits, quantities, and product categories and sub-categories.

2. List of Orders: Provides additional details on orders. The information includes order ID, Date of order, customer details and geographic locations.

3. Employees England: Contains information on employees, potentially for performance analysis.

4. Sales Target: This dataset contains sales target amount and date for each product category.

Data Cleaning

Data Cleaning Steps

- Column names and formats were standardized for consistency.

- Datasets were merged for comprehensive analysis using Python and Power BI.

- Missing values and inconsistencies were addressed during integration.

Visualizations

- **Yearly Revenue Trend:**

  - Line graph showing seasonal fluctuations and overall decline in revenue.

- **Profitability by Category and Sub-Category:**

  - Bar chart highlighting profitable and loss-making categories and sub-categories.

- **High-Value Customers:**

    - Horizontal bar chart depicting order quantities across customers.

- **Top-Performing Categories:**

    - Stacked bar chart showcasing order amounts across sub-categories within each order category.

- **Regional Opportunities:**

    - Clustered bar chart identifying revenue contributions by city.

Steps Taken in the Analysis

1. **Data Cleaning:**

    - Ensured consistency in data formatting.
    - Combined datasets to create a unified view.

2. **Exploratory Data Analysis (EDA):**

    - Conducted trend analysis to identify revenue and profit patterns.
    - Segmented customers and regions for targeted insights.

3. **Data Visualization:**

    - Created charts in Power BI to communicate findings effectively.

4. **Data Interpretation:**

    - Interpreted visualizations to propose actionable recommendations.

Data Analysis Findings

1. **Sales Trends Analysis**

- Revenue Trends: Monthly revenue analysis revealed peaks during certain months, indicating seasonality.

2. **Category Performance**

- Categories like Clothing and Electronics had high profit margins, while Furniture had a low profit margin.

- Sub-categories like Printers and Bookcases are highly profitable, while categories like Tables and Electronic Games are incurring losses. This indicates a need to reassess strategies for underperforming sub-categories.

3. **Customer Insights**

- High-value customers were identified based on purchasing behavior.: Customers like Abhishek, Priyanka, and Yaanvi are driving significant sales. This highlights an

opportunity to target and retain such high-value customers through loyalty programs or personalized marketing campaigns.

4. Geographic Analysis

- The Regional Opportunities chart identifies cities like Indore and Mumbai as major sales hubs, providing actionable insights for regional marketing strategies.

Recommendations

1. Optimize Inventory: Focus on promoting Clothing and Electronics categories as they are the most profitable and should be prioritized for marketing and sales efforts.

2. Increase Inventory for Top-Performing Sub-Categories: Ensure sufficient stock for high-demand sub-categories like Printers and Bookcases to meet customer demand.

3. Enhance Marketing: Target underperforming categories and sub-categories with tailored marketing.

4. Customer Retention: Develop loyalty programs for high-value customers, to encourage repeat purchases.

5. Regional Expansion: Enhance marketing efforts and supply chain operations in high-performing cities (Indore, Mumbai) and Explore opportunities in low-sales regions to grow market share.

Conclusion

This analysis provides a comprehensive view of e-commerce sales performance, offering insights into customer behavior, regional opportunities, and category profitability. By implementing the recommendations outlined, the business can achieve sustainable growth and improve decision-making processes.

Appendix

- **Tools Used:** Power BI, Python

- **Data Source:** https://www.kaggle.com/datasets/benroshan/ecommerce-data