PRE - REPORT ON ANALYSIS SALES PERFORMANCE OF AN ONLINE RETAIL

(Course: Strategic Decision Making with PowerBI)

Prepared By:

Anshika Kumari

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1. PROBLEM STATEMENT

The business faces significant challenges in optimizing its operations and driving revenue growth across various dimensions. The primary issues include identifying factors influencing sales growth or stagnation over time, segmenting customers based on preferences and purchase behavior, and analyzing product performance to highlight high-revenue categories and those requiring improvement.

The analysis should assist stakeholders in decision-making by highlighting:

- ♣ How revenue and profit are distributed across products and regions.
- Opportunities for customer segmentation and targeted strategies.
- Seasonal trends affecting sales and demand forecasting.
- Any anomalies such as returns, cancellations, or unusually high or low sales.

This project aims to provide a comprehensive dashboard in Power BI to visualize these challenges and deliver actionable insights for decision-making.

2. DATA REQUIREMENT

The analysis requires specific fields and data points:

- Sales Data:
 - **Invoice No**: For tracking individual transactions.
 - **Stock Code**: For identifying products.
 - **Description**: Product names to group and categorize items.
 - Quantity: To calculate sales volume.
 - Unit Price: To determine revenue and margins.
 - Invoice Date: For analysis of sales trends over time.
- Customer Data:
 - **CustomerID**: To identify repeat customers and segment users.
 - Country: To track geographic sales distribution.
- Revenue and Profit:
 - Computed fields like total sales and profit for further analysis.
 - **Total Revenue**: Revenue=Quantity × Unit Price

3. DATA COLLECTION

The dataset is sourced from the provided Excel sheet titled "Online Retail." Key details include:

Structure:

The dataset contains historical sales transactions with columns such as Invoice No, Stock Code, Description, Quantity, Unit Price, Invoice Date, CustomerID, and Country.

Timeframe:

The data spans multiple years enabling analysis of long-term trends and seasonality.

Customer and Product Insights:

The presence of CustomerID and Description allows for customer segmentation and product performance evaluation.

Geographic Sales Data:

The Country column facilitates regional analysis of sales distribution and contributions.

Potential Enhancements:

Missing cost-per-item or marketing data limits detailed profitability analysis. Integrating additional datasets, such as overhead costs or promotional details, could improve the insights.

4. DATA VALIDATION

Data validation is crucial to ensure the quality and accuracy of the dataset. The validation process will include:

Missing Values:

Check for null or missing values in critical columns such as Quantity, Unit Price, CustomerID, and Invoice Date.

Outlier Detection:

Identify and review extreme values in Quantity and Unit Price to detect potential data entry errors or anomalies.

Date Validation:

Ensure that all dates in Invoice Date fall within the expected timeframe.

Duplicate Records:

Check for duplicate transactions (based on Invoice No) and remove them to avoid double counting.

Negative or Zero Values:

Review transactions with negative or zero Quantity or Unit Price, which may indicate returns or canceled orders.

5. DATA CLEANING

Cleaning the data is essential to remove inconsistencies and prepare it for analysis. This process will involve:

Handling Missing Data:

Remove rows with missing or invalid CustomerID unless they are necessary for other analyses.

Standardizing Columns:

Rename columns for better clarity and format Invoice Date to a consistent datetime format.

Outlier Removal:

Exclude transactions with unrealistic values for Quantity or Unit Price.

Derived Columns:

Add calculated fields for Revenue, Profit, and AOV to support the analysis.

Grouping and Categorization:

Group products into broader categories for a high-level overview (e.g., technology, office supplies, etc.).

6. TOOLS

Microsoft Excel: For initial data inspection and cleaning and conducting some statistical checks.

Power BI: For interactive dashboards and visualization of trends, segmentation, and performance analysis.

7. DASHBOARD ANALYSIS

Sales Revenue Over Time:

- A line chart showing yearly revenue trends.
- Insights: Identifies periods of growth or decline in sales performance.

Product Categories:

- A bar chart ranking product categories by sales quantity.
- Insights: Highlights the best-selling product categories.

Geographic Analysis:

- A tree map showing sales contributions by region (e.g., West, East, Central, South).
- Insights: Compares performance across geographic locations.

Profit Margins by Category:

- A bar chart visualizing profit margins for different product categories.
- Insights: Pinpoints high-margin categories.

Sales by Segment:

- A pie chart dividing sales by customer segments (Consumer, Corporate, Home Office).
- Insights: Understands customer base composition.

Seasonal Trends:

- A heatmap of sales by month and day to reveal demand patterns.
- Use Invoice Date to detect peak seasons.

♣ Top Products by Region:

A tree map showing the best-selling products segmented by regions.

Returns and Cancellations:

• A bar chart tracking negative or zero Quantity transactions to understand refund patterns.

Customer Lifetime Value:

A histogram showing CLV distribution to identify high-value customers.

8. STORY TELLING

The final dashboard brings together key visualizations and insights, enabling a cohesive datadriven story for the stakeholders.

Sales Growth Over Time:

The Sales Revenue Over Timeline chart shows the company's year-over-year performance. It highlights periods of significant growth, such as product launches or successful marketing efforts, and periods of decline, indicating areas for improvement.

Best-Selling Products:

The Product Categories bar chart reveals which categories drive the most revenue. Highperforming items like Binders and Paper should be prioritized in stock management and promotions, while underperforming categories like Chairs could be improved or reconsidered.

Regional Performance:

The Geographic Analysis tree map emphasizes the sales contributions of regions, with the West region leading. Underperforming regions, such as the South, present opportunities for targeted marketing or operational improvements to enhance market penetration.

Profitability Insights:

The Profit Margins by Category bar chart highlight high-margin products like Technology, making them essential for strategic focus. Categories like Furniture, with lower margins, might benefit from cost optimization or adjusted pricing strategies to improve profitability.

Customer Segmentation:

The Sales by Segment pie chart shows the distribution of sales across Consumer, Corporate, and Home Office segments. This insight supports customized marketing strategies, with a focus on retaining high-value consumer customers and expanding the corporate client base.

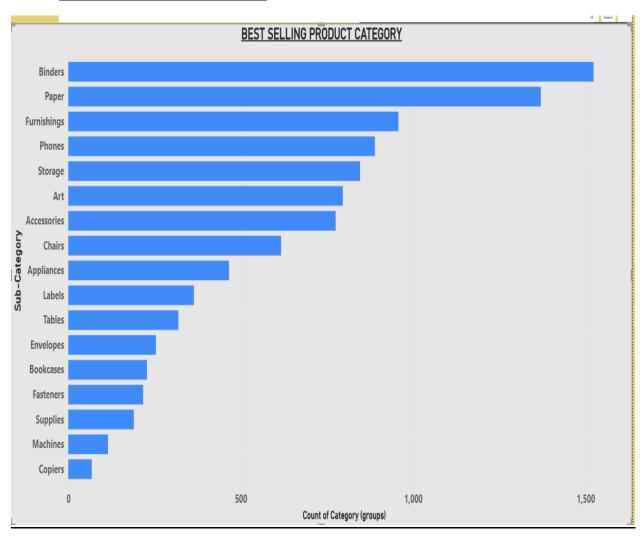
Seasonal and Predictive Analysis:

Seasonal heatmaps can identify peak periods like holidays or back-to-school seasons for demand planning. Sales forecasting using predictive analytics provides actionable insights to prepare for future growth, ensuring the company stays ahead of market trends.

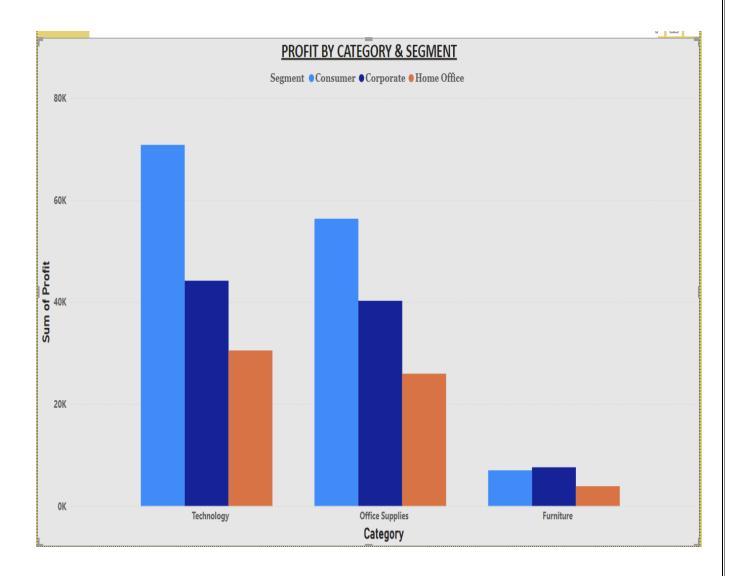
9. RECOMMENDATIONS

- ♣ To enhance the effectiveness of the analysis and decision-making, it is recommended to expand data collection by incorporating product costs, marketing campaign performance, and competitor pricing data, enabling a more comprehensive view of profitability and market positioning.
- Focus should be placed on high-margin products by optimizing inventory for these items, ensuring they are always available to maximize profitability.
- ♣ Analyzing returns and refunds can help uncover issues related to product quality or customer expectations, leading to targeted improvements.

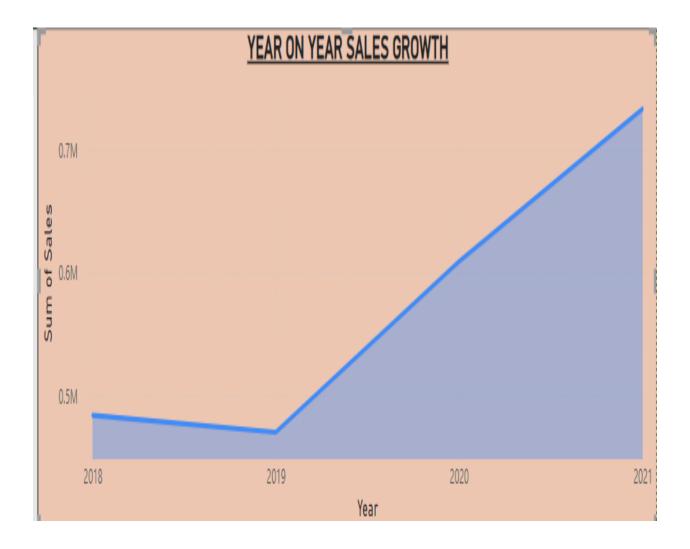
10. INSIGHTS OF EACH GRAPH



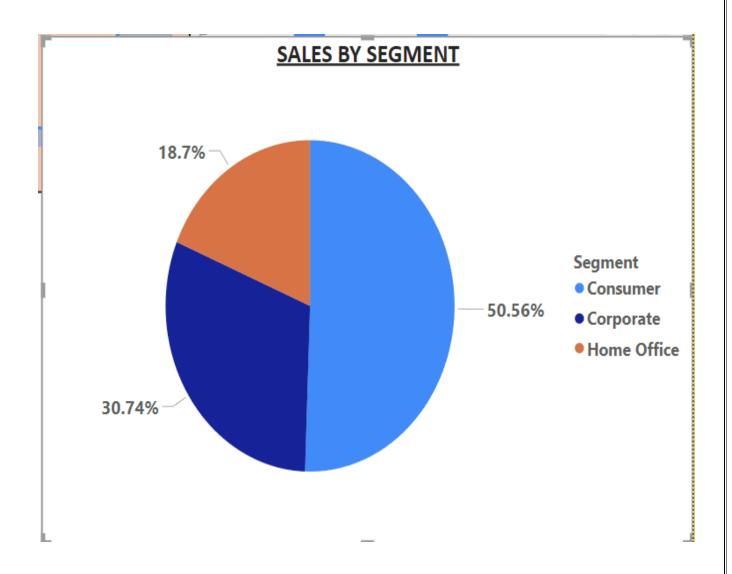
- Binders and Paper dominate: They are the top-selling categories, significantly outperforming others.
- Moderate to low presence: Most categories have a moderate number of groups, while a few have a lower presence.
- Category performance: Binders and Paper are top performers, while Furnishings, Phones, and Storage have notable presence.
- Potential implications: Prioritize inventory management for top sellers, optimize product range, and analyze customer preferences.
- Further analysis: Explore revenue analysis, seasonal trends, and customer segmentation to gain deeper insights.



- Technology is the most profitable category: It generates the highest profit across all segments, followed by Office Supplies.
- Consumer segment leads in profit: The Consumer segment consistently outperforms Corporate and Home Office in each category.
- Corporate segment has moderate profit: It shows moderate profit across all categories, but lags behind Consumer.
- Home Office segment has the lowest profit: It has the lowest profit in each category, indicating a smaller market share or lower profit margins.
- Furniture category has the lowest overall profit: Across all segments, Furniture generates the least profit compared to Technology and Office Supplies.



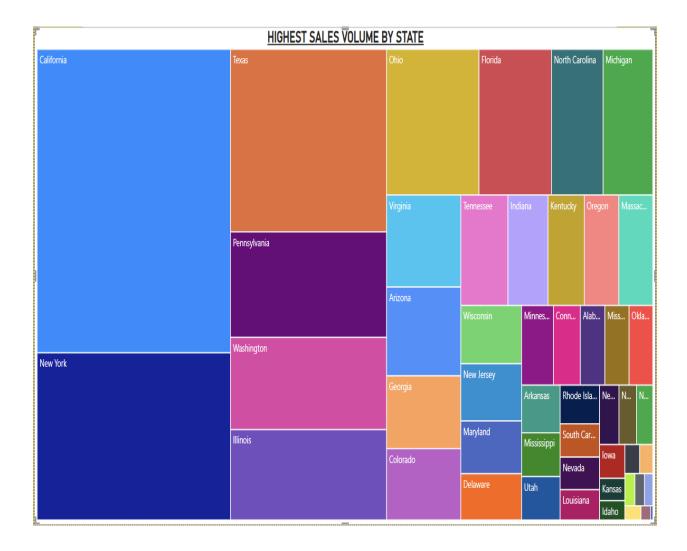
- Sales growth is positive: The chart shows a clear upward trend in sales from 2018 to 2021
- Slow growth in 2019: There was a slight decrease in sales from 2018 to 2019, indicating a period of stagnation.
- Strong growth in 2020 and 2021: Sales experienced a significant increase from 2019 to 2020 and continued to grow in 2021, indicating a period of rapid growth.
- 2021 is the peak year: The highest sales were achieved in 2021, marking the peak of the growth period.
- Overall, the company's sales performance shows a positive trajectory with a period of stagnation followed by strong growth.



- Consumer segment dominates: It holds the largest share of sales, accounting for 50.56%.
- Corporate and Home Office have smaller shares: The Corporate segment holds 30.74% and the Home Office segment has the smallest share at 18.7%.
- Consumer segment is twice as large as Home Office: The Consumer segment is significantly larger than the Home Office segment.
- Corporate segment is slightly larger than Home Office: The Corporate segment has a slightly larger share than the Home Office segment.
- Focus on Consumer: The company should prioritize strategies to maintain and potentially increase sales in the dominant Consumer segment.

REGIONAL PERFORMANCE West Central 725.46K East South 678.78K 391.72K

- West Region Leads: The West region has the highest performance with a score of 725.46K, significantly outperforming other regions.
- The East Region is Second: The East region follows closely with a score of 678.78K, solidifying its position as the second-best performing region.
- Central Region is Third: The Central region holds the third position with a score of 501.24K.
- South Region Lags Behind: The South region has the lowest performance with a score of 391.72K, indicating a need for improvement.
- Focus on West and East: The company should prioritize strategies to maintain and potentially improve performance in the top-performing West and East regions.



- California and Texas Dominate: California and Texas have significantly higher sales volumes compared to other states, indicating strong market presence in these regions.
- State-Wise Variation: There is a significant variation in sales volume across different states, highlighting regional differences in market demand.
- Mid-Tier States: States like Ohio, Florida, North Carolina, and Michigan have moderate sales volumes, contributing to a significant portion of the overall sales.
- Smaller States with Lower Sales: States like Delaware, Utah, Nevada, Kansas, Louisiana, and Idaho have the lowest sales volumes, suggesting a smaller market presence or lower demand in these regions.
- Regional Focus: The company should focus on maintaining and potentially increasing sales in top-performing states like California and Texas, while also exploring strategies to improve performance in states with lower sales.