Customer Behavior Analysis - Business Report

Prepared for: Portfolio

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Executive Summary

This report summarizes exploratory analysis performed on the 'customer_behavior' dataset. It highlights revenue and behavioural insights across gender, subscription status, shipping types, product popularity, discount effects, and customer segmentation. Visual placeholders are included where Power BI or notebook screenshots should be pasted.

Objectives & Data Overview

Objectives:

- Compare revenue and spending patterns across gender and age groups.
- Understand impact of discounts and subscription status on spend.
- Identify top products and product-category leaders.
- Segment customers by loyalty and examine their revenue contribution.
- Produce clear recommendations for marketing and product strategy.

Process & Methodology

1. Data ingestion: loaded the customer_behavior table from the provided SQL dump into a working analysis environment.
2. Data cleaning:

A) Handled missing values, cast data types (e.g., review_rating to numeric)

B) Created derived fields such as 'age_group' and 'previous_purchases' segments.

```
labels = ["Young Adult","Adult","Middle-aged","Senior"]
df['age_group'] = pd.qcut(df['age'],q=4,labels = labels)

df[['age','age_group']].head()
```

	age	age_group
0	55	Middle-aged
1	19	Young Adult
2	50	Middle-aged
3	21	Young Adult
4	45	Middle-aged

3. Exploratory analysis: executed SQL queries to compute revenue by groups, average spend, discount rates, and product ranks.

4. Visualization: built Power BI visuals (bar charts, stacked bars, pie charts, and Slicers) to support each finding — placeholders are below for these visuals.

5. Interpretation & recommendations: synthesized findings into tactical recommendations for marketing, product, and operations.

Analysis & Key Findings

Revenue by Gender

Key insight: Compare total revenue generated by male vs female customers.

gender text	sum numeric
1 Female	75191
2 Male	157890

Discount users who spent above average

Key insight: Identify customers who used a discount but still spent >= average purchase amount.

	customer_id bigint	purchase_amount bigint
1	2	64
2	3	73
3	4	90
4	7	85
5	9	97

Total rows: 839   Query complete 00:00:

Top 5 products by average review rating

Key insight: Products with highest customer satisfaction. Useful for promoting high-review items.

|	item_purchased text	round numeric
1	Gloves	3.86
2	Sandals	3.84
3	Boots	3.82
4	Hat	3.80
5	Skirt	3.78

Average purchase - Standard vs Express shipping

Key insight: Compare average purchase amounts between Standard and Express shipping; evaluate whether shipping choice correlates with higher cart values.

	shipping_type text	round numeric
1	Standard	58.46
2	Express	60.48

Subscribers vs Non-Subscribers

Key insight: Subscribed customers vs non-subscribers - average spend, total revenue and count. Useful for retention ROI analysis.

% of Subscription Status by Customers

Yes 27%

No 73%
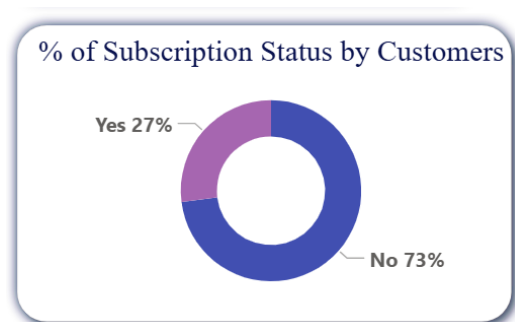
	subscription_status text	total_customers bigint	avg_spend numeric	total_revenue numeric
1	Yes	1053	59.49	62645.00
2	No	2847	59.87	170436.00

Products with highest discount purchase rate

Key insight: Products with highest % of purchases where discount was applied, consider margin impact and discount strategy.

|	item_purchased text	discount_rate numeric
1	Hat	50.00
2	Sneakers	49.00
3	Coat	49.00
4	Sweater	48.00
5	Pants	47.00

Customer segmentation (New / Returning / Loyal)

Key insight: Distribution of customers across New, Returning, and Loyal buckets and how much revenue each bucket generates.

	customer_segment text	Number Of Customers bigint
1	Loyal	3116
2	New	83
3	Returning	701

Top 3 products per category

Key insight: Top-sellers within each category - prioritize inventory and cross-sell bundles accordingly.
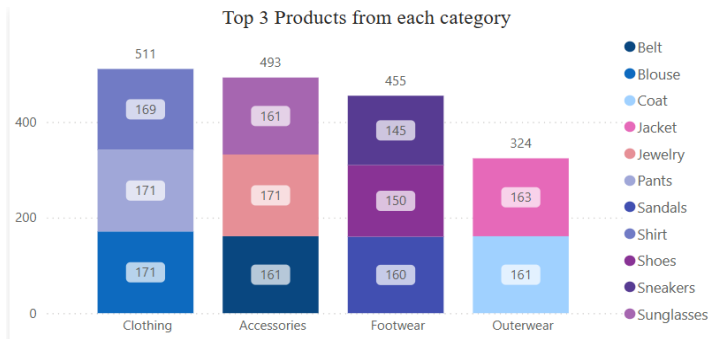
Repeat buyers and subscription correlation
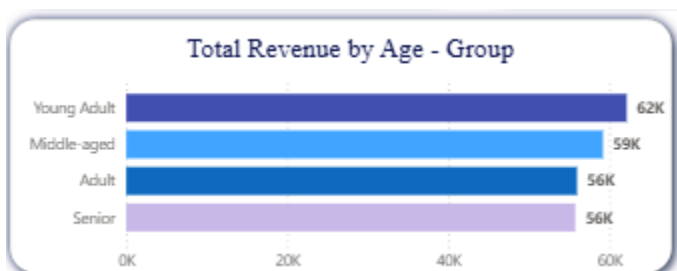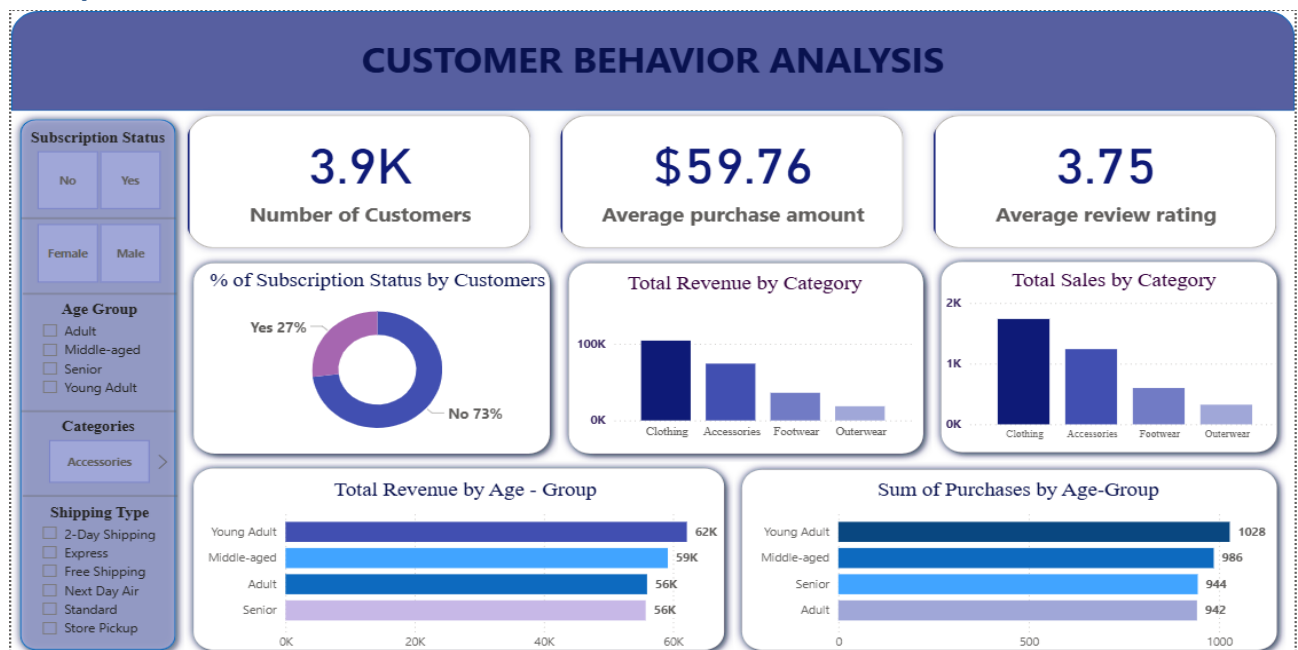
Key insight: Are repeat buyers (>5 previous purchases) likely to be subscribers? This influences subscription marketing.

	subscription_status text	repeat_customer bigint
1	No	2518
2	Yes	958

Revenue by Age Group

Key insight: Which age groups contribute most to revenue - target marketing and product selection based on high-value age groups.

Complete Power BI Dashboard

CUSTOMER BEHAVIOR ANALYSIS

Subscription Status: No | Yes | Female | Male

Age Group: Adult, Middle-aged, Senior, Young Adult

Categories: Accessories

Shipping Type: 2-Day Shipping, Express, Free Shipping, Next Day Air, Standard, Store Pickup

3.9K — Number of Customers

$59.76 — Average purchase amount

3.75 — Average review rating

% of Subscription Status by Customers: Yes 27%, No 73%

Total Revenue by Category: Clothing, Accessories, Footwear, Outerwear

Total Sales by Category: Clothing, Accessories, Footwear, Outerwear

Total Revenue by Age - Group: Young Adult 62K, Middle-aged 59K, Adult 56K, Senior 56K

Sum of Purchases by Age-Group: Young Adult 1028, Middle-aged 986, Senior 944, Adult 942

Conclusions & Recommendations

Short-term actions:

- Focus promotions on high-review, high-margin products.
- Reassess discounts for products with high discount rate to protect margins, use targeted coupons instead of blanket discounts.
- Incentivize subscription sign-ups among high LTV cohorts (age groups and repeat buyers) using tailored offers.

Mid-term actions:

- Expand loyalty program benefits for 'Returning' and 'Loyal' segments to lift retention.
- Use shipping preference insights to explore premium-shipping upsell experiments.

Long-term:

- Build an attribution model to quantify the lift from discounts and subscriptions.
- Integrate product review signals into merchandising and recommendation engines.