Customer Behavior Analysis Dashboard

Complete End-to-End Business Analytics Project Report

1. Introduction

This report presents an end-to-end customer behavior analysis project using SQL and Power BI. The objective is to extract actionable business insights from customer transaction data and present them in a clear, decision-oriented dashboard suitable for managers and non-technical stakeholders.

2. Business Questions Addressed

Q1. What is the total revenue generated by male vs female customers?

Q2. Which customers used a discount but still spent more than the average purchase amount?

Q4. Compare the average purchase amounts between Standard and Express shipping.

Q5. Do subscribed customers spend more compared to non-subscribers?

Q6. Which 5 products have the highest percentage of purchases with discounts applied?

Q7. Segment customers into New, Returning, and Loyal customers.

Q8. What are the top 3 most purchased products within each category?

Q9. Are repeat buyers also likely to subscribe?

Q10. What is the revenue contribution of each age group?

3. SQL Analysis & Executed Queries

Q1. Revenue by Gender
```
SELECT gender, SUM(purchase_amount_(usd)) AS revenue
FROM customer_data
GROUP BY gender;
```

Q2. Customers using discount with above average spend
```
SELECT customer_id, purchase_amount_(usd)
FROM customer_data
WHERE discount_applied = 'Yes'
AND purchase_amount_(usd) >
    (SELECT AVG(purchase_amount_(usd)) FROM customer_data);
```

Q4. Average purchase by shipping type
```
SELECT shipping_type, AVG(purchase_amount_(usd)) AS avg_amount
FROM customer_data
WHERE shipping_type IN ('Standard','Express')
GROUP BY shipping_type;
```

Q5. Subscription comparison
```
SELECT subscription_status,
    COUNT(customer_id) AS total_customers,
    AVG(purchase_amount_(usd)) AS average_spend,
    SUM(purchase_amount_(usd)) AS total_revenue
FROM customer_data
GROUP BY subscription_status;
```

Q6. Top 5 products by discount rate
```
SELECT item_purchased,
ROUND(SUM(CASE WHEN discount_applied='Yes' THEN 1 ELSE 0 END)*100.0/COUNT(*),2) AS discount_rate
FROM customer_data
GROUP BY item_purchased
ORDER BY discount_rate DESC
LIMIT 5;
```

Q7. Customer segmentation
```
SELECT customer_segment, COUNT(*) AS number_of_customers
FROM customer_segments
GROUP BY customer_segment;
```

Q8. Top 3 products per category
```
WITH ranked_items AS (
SELECT category, item_purchased,
COUNT(*) AS total_orders,
ROW_NUMBER() OVER(PARTITION BY category ORDER BY COUNT(*) DESC) AS item_rank
FROM customer_data
GROUP BY category, item_purchased)
SELECT * FROM ranked_items WHERE item_rank <= 3;
```
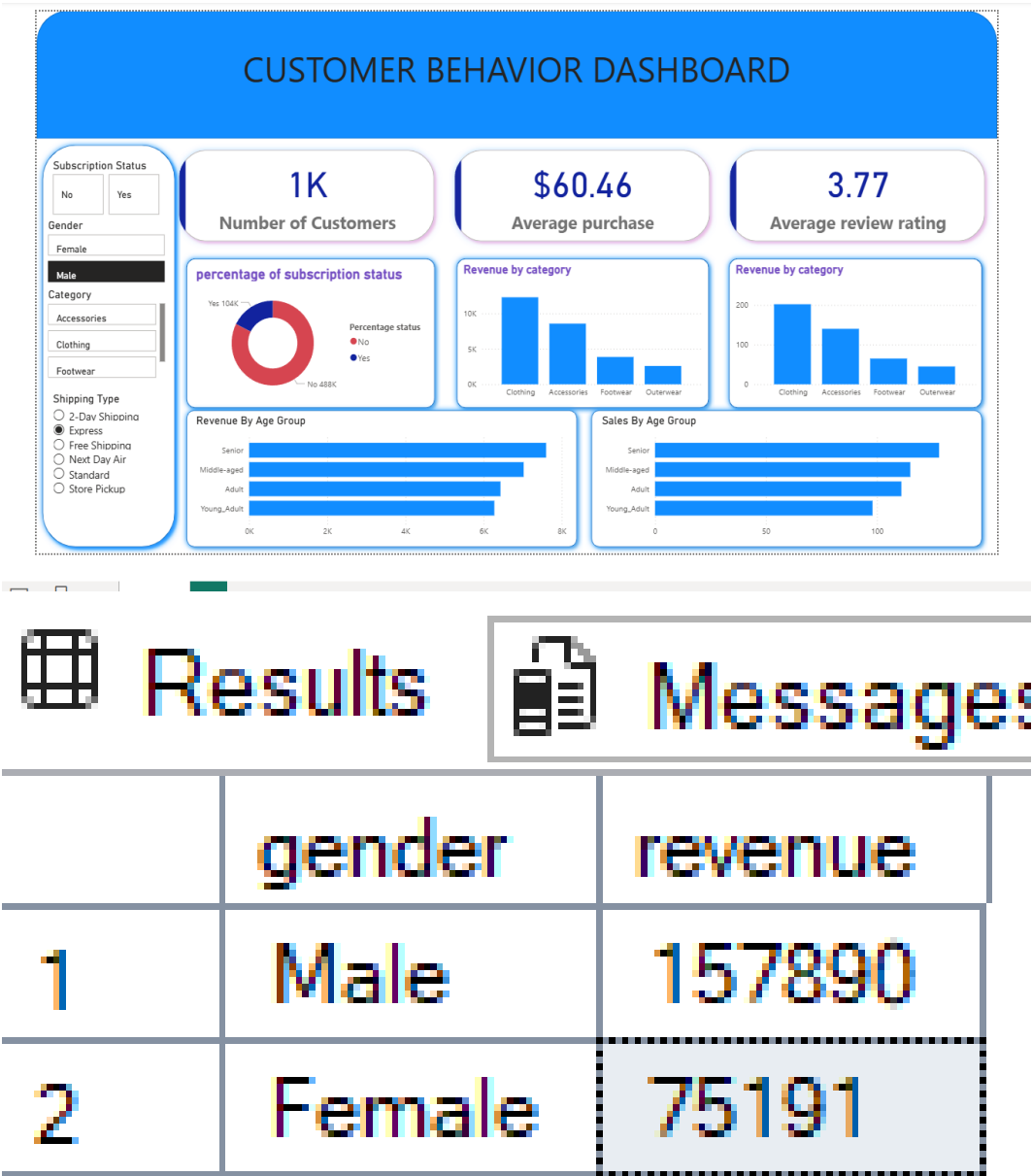
Q9. Repeat buyers & subscription
```
SELECT subscription_status, COUNT(customer_id) AS repeat_buyers
FROM customer_data
WHERE previous_purchases > 5
GROUP BY subscription_status;
```

Q10. Revenue by age group
```
SELECT age_group, SUM(purchase_amount_(usd)) AS total_revenue
FROM customer_data
GROUP BY age_group;
```

4. Dashboard & Query Output Evidence

CUSTOMER BEHAVIOR DASHBOARD

Subscription Status: No / Yes

Gender: Female / Male

Category: Accessories / Clothing / Footwear

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

	1K	$60.46	3.77
	Number of Customers	Average purchase	Average review rating

percentage of subscription status
- Yes 104K
- No 488K

Percentage status: No / Yes

Revenue by category — Clothing, Accessories, Footwear, Outerwear

Revenue by category — Clothing, Accessories, Footwear, Outerwear

Revenue By Age Group — Senior, Middle-aged, Adult, Young_Adult

Sales By Age Group — Senior, Middle-aged, Adult, Young_Adult

Results / Messages

	gender	revenue
1	Male	157890
2	Female	75191

	customer_id	purchase_amount_(usd)
1	2	64
2	3	73
3	4	90
4	7	85
5	9	97
6	12	68
7	13	72
8	16	81
9	20	90
10	22	62
11	24	88
12	29	94
13	32	79
14	33	67
15	35	91
16	37	69
17	40	60
18	41	76
19	43	100
20	44	69
21	52	59
22	55	94
23	57	73
24	58	64
25	60	79
26	62	68
27	64	79
28	65	83
29	67	94
30	70	70
31	74	85
32	76	85
33	79	91
34	80	96
35	81	72
36	82	96
37	86	95

	item_purchased	Average_rating
1	Gloves	3.86428571428572
2	Sandals	3.84125
3	Boots	3.8125
4	Hat	3.80649350649351
5	T-shirt	3.78299319727891

	shipping_type	avg_amount
1	Standard	58
2	Express	60

Results | **Messages**

	subscription_status	total_customers	average_spend	total_revenue
1	Yes	1053	59	62645
2	No	2847	59	170436

Results | **Messages**

	item_purchased	discount_rate
1	Hat	50
2	Coat	49
3	Sneakers	49
4	Sweater	48
5	Pants	47

Results | **Messages**

	Customer_segment	Number of customers
1	Returing	701
2	Loyal	3116
3	New	83

Results | Messages

	item_rank	category	item_purchased	total_orders
1	1	Accessories	Jewelry	171
2	2	Accessories	Belt	161
3	3	Accessories	Sunglasses	161
4	1	Clothing	Blouse	171
5	2	Clothing	Pants	171
6	3	Clothing	Shirt	169
7	1	Footwear	Sandals	160
8	2	Footwear	Shoes	150
9	3	Footwear	Sneakers	145
10	1	Outerwear	Jacket	163
11	2	Outerwear	Coat	161

Results | Messages

	age_group	total_revenue
1	Young_Adult	62143
2	Middle-aged	59197
3	Adult	55978
4	Senior	55763

Results | Messages

	subscription_status	repeat_buyers
1	Yes	958
2	No	2518

5. Conclusion

This project demonstrates a complete business analytics lifecycle: defining business questions, executing SQL-based analysis, validating results, and presenting insights through an interactive dashboard. The solution is practical, scalable, and suitable for real-world decision-making environments.