E-Commerce Cohort Analysis (2024–2025)

Understanding customer acquisition, retention, and repeat behavior
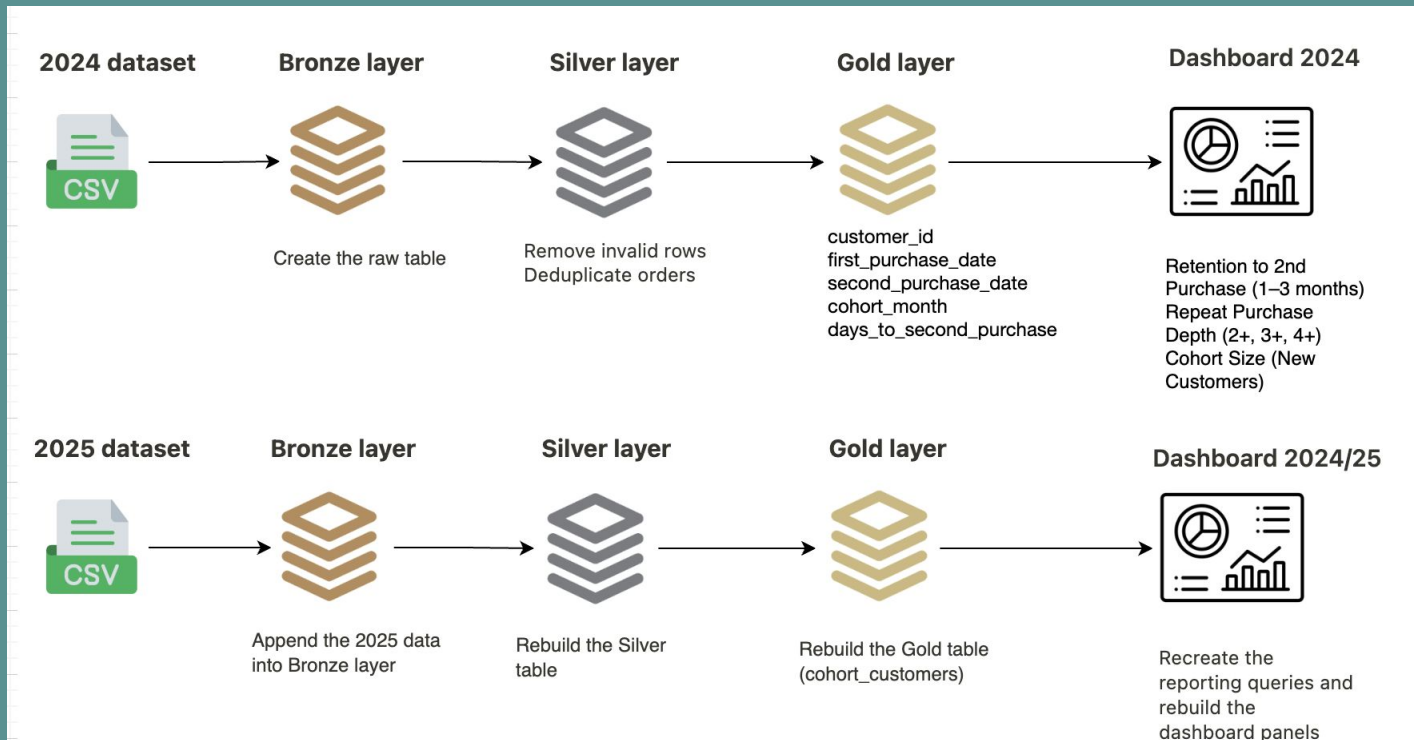
Project Objective

- Analyze customer behavior using cohort analysis.

- Understand:

  - Acquisition trends;

  - Retention to second purchase;

  - Repeat purchase depth.

- Evaluate how metrics change after new data (2025) arrives.
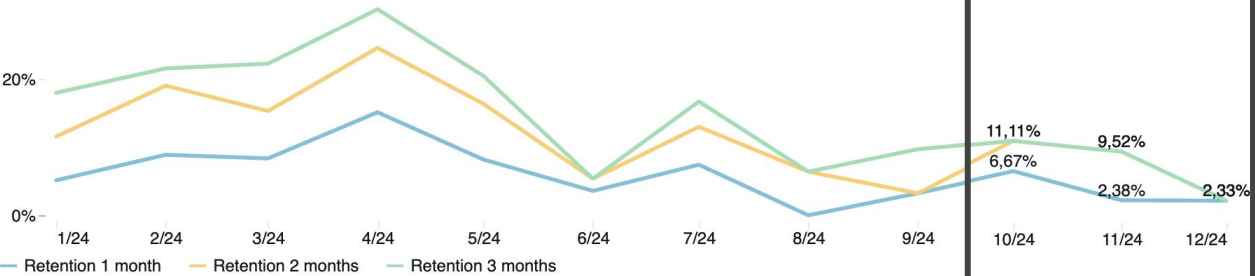
Data pipeline

2024 dataset	Bronze layer	Silver layer	Gold layer	Dashboard 2024

Create the raw table

Remove invalid rows
Deduplicate orders

customer_id
first_purchase_date
second_purchase_date
cohort_month
days_to_second_purchase

Retention to 2nd
Purchase (1–3 months)
Repeat Purchase
Depth (2+, 3+, 4+)
Cohort Size (New
Customers)

2025 dataset	Bronze layer	Silver layer	Gold layer	Dashboard 2024/25

Append the 2025 data
into Bronze layer

Rebuild the Silver
table

Rebuild the Gold table
(cohort_customers)

Recreate the
reporting queries and
rebuild the
dashboard panels

Retention to 2nd Purchase (1–3 months)

Initial state (2024 data only)

Retention to 2nd Purchase (1–3 months)

- Retention 1 month
- Retention 2 months
- Retention 3 months

- Retention peak in April 2024, and then follow a downward trend,

- Retention metrics for Nov and Dec 2024 are **inconclusive**, as customers did not yet have enough time to complete a second purchase

- The apparent decline is driven by **cohort immaturity**, not by a real drop in customer behavior

Updated state (2024 + 2025 data)

Retention to 2nd Purchase (1–3 months)

- Retention 1 month
- Retention 2 months
- Retention 3 months

- The inclusion of early 2025 data **updates the last cohorts of 2024**, providing a complete observation window.

- Retention rates for late 2024 cohorts increase once customers have sufficient time to make a second purchase.

- This confirms that earlier conclusions were affected by **right-censoring**, not by performance degradation.

Recommendation

Strengthen early post-purchase engagement to accelerate the second purchase within the first 1–3 months.
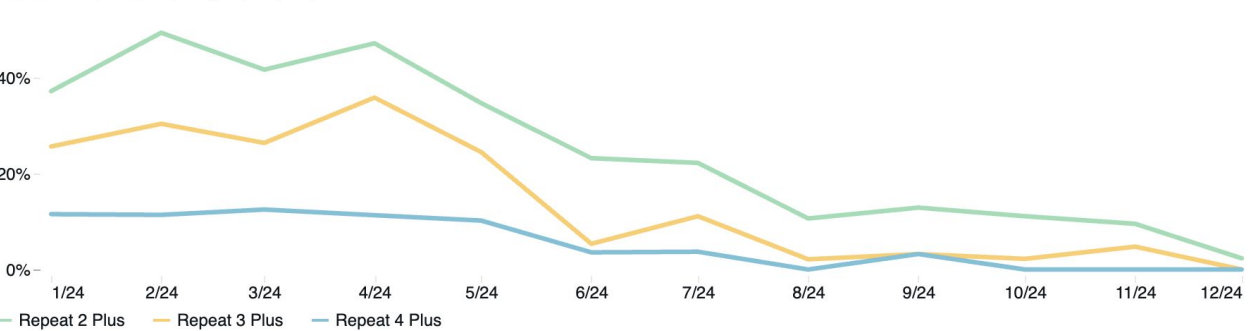
This can include targeted follow-up emails, personalized product recommendations, or time-bound incentives shortly after the first purchase.

Repeat Purchase Depth (2+, 3+, 4+)
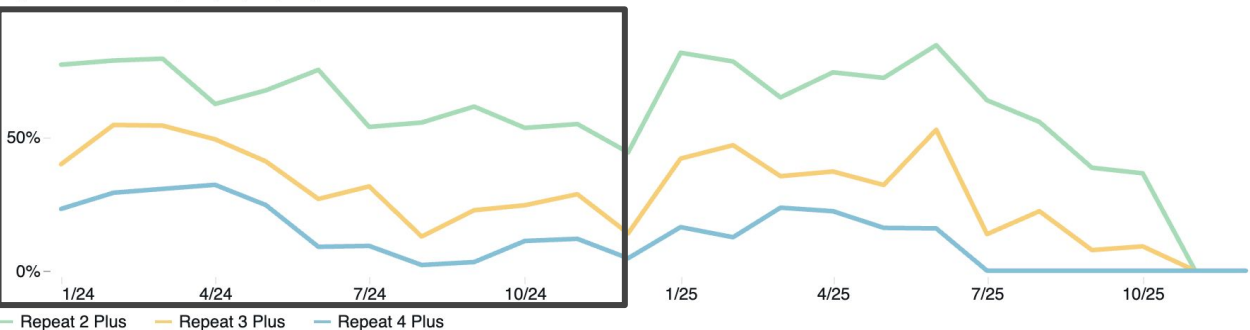
Initial state (2024 data only)

Repeat Purchase Depth (2+, 3+, 4+)

Legend: Repeat 2 Plus, Repeat 3 Plus, Repeat 4 Plus

- Early 2024 cohorts show the **highest repeat purchase depth**, especially for 2+ and 3+ orders.

- The apparent decline in late-2024 cohorts is mainly due to **cohort maturity**, not reduced customer engagement.

Updated state (2024 + 2025 data)

Repeat Purchase Depth (2+, 3+, 4+)

Legend: Repeat 2 Plus, Repeat 3 Plus, Repeat 4 Plus

- After adding 2025 data, **repeat depth for late-2024 cohorts increases**, confirming delayed repeat behavior.

- **Deep repeat (4+ orders) remains limited** and concentrated in a smaller group of highly engaged customers.

Recommendation

Focus on accelerating the transition from first to second and third purchase, while selectively nurturing high-potential customers toward deep loyalty (4+ purchases).
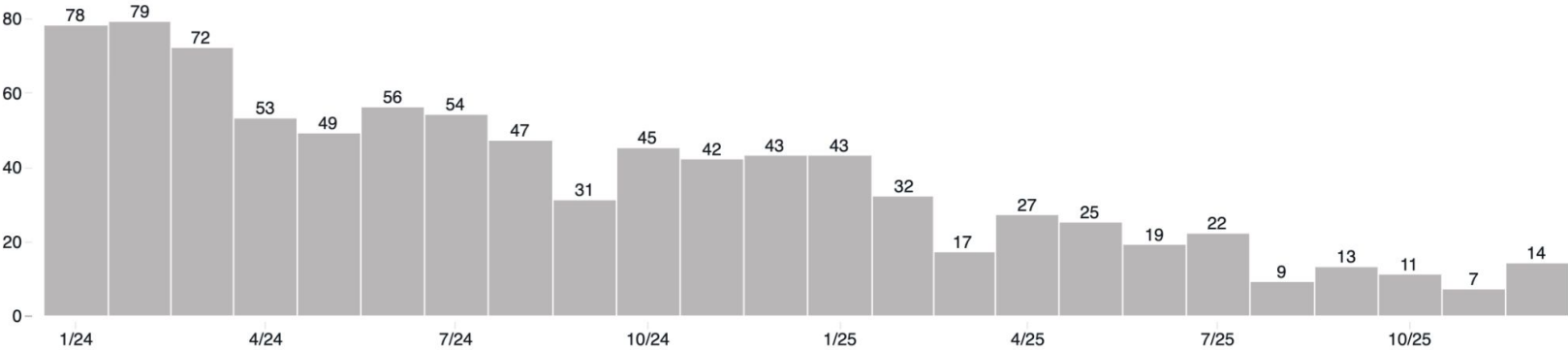
Introduce **post-purchase journeys** that guide customers from the 1st to the 2nd and 3rd purchase (bundles, replenishment reminders, personalized recommendations).

Cohort Size
(New Customers)

Updated state (2024 + 2025 data)

Cohort Size (New Customers)

- Customer acquisition peaked in early 2024 (February) and declined steadily throughout the year.

- New cohorts in 2025 are generally smaller, indicating slower customer inflow

- The addition of 2025 data does not change 2024 cohort sizes, because each cohort is defined by the customer's first purchase month, which does not change over time.

Recommendation

Invest in acquisition channels that historically generated larger cohorts (e.g. campaigns active in early 2024), and test reactivation of similar strategies to stabilize customer inflow.

Next Steps and Improvement

Expand and enrich the customer dataset to enable more targeted acquisition and retention strategies

Collect or integrate additional customer attributes (e.g. demographics, acquisition channel, device, region).

Thank you!