THELOOK E-COMMERCE OPTIMIZATION

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01 BUSINESS OVERVIEW

BUSINESS
BACKGROUND

TheLook e-commerce company is facing a potential crisis in 2023 and needs to optimize its resource allocation. The management has decided to **cut off resources in categories with the lowest growth** in the past year.

The goal is to to <u>suggest recommendations</u> based on the insights from the analysis.

DATA OVERVIEW

thelook_ecommerce

- ▼ thelook_ecommerce ⭐ ⋮
  - distribution_centers ⭐ ⋮
  - events ⭐ ⋮
  - inventory_items ⭐ ⋮
  - order_items ⭐ ⋮
  - orders ⭐ ⋮
  - products ⭐ ⋮
  - users ⭐ ⋮

### Dataset info

Dataset ID	bigquery-public-data.thelook_ecommerce
Created	Feb 26, 2022, 7:52:02 AM UTC+8
Default table expiration	Never
Last modified	Sep 20, 2022, 3:58:24 PM UTC+8
Data location	US
Description	Fictitious E-Commerce Dataset
Default collation	
Default rounding mode	ROUNDING_MODE_UNSPECIFIED
Case insensitive	false
Labels	
Tags	⚠

Dataset contains information about users, products, orders including the order data, logistics, and also web events.

Kindly note that this dataset is synthetic, provided for product testing, evaluation and discovery.

ENTITY RELATIONSHIP DIAGRAM
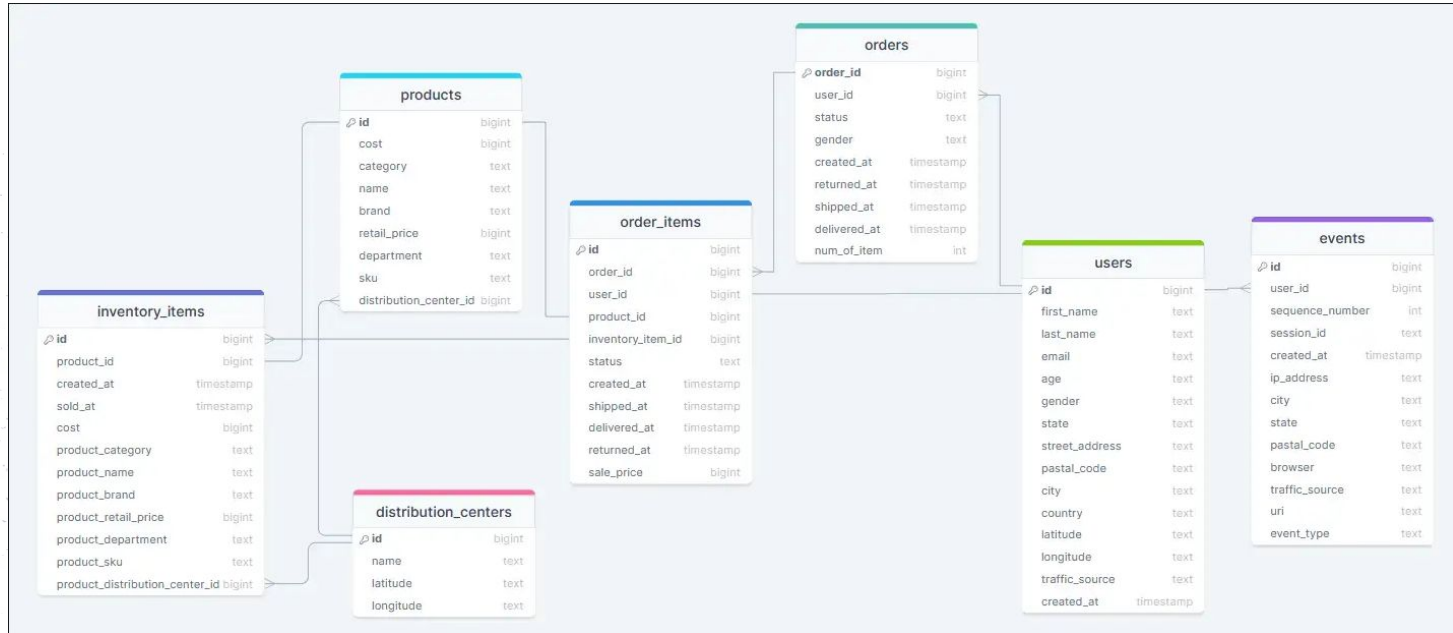
PROBLEM DEFINITION

- How to optimize operations to overcome potential crisis in 2022?
- How many returning customers in 2022?

- Find monthly growth of inventory in percentage and determine categories with low performance
- Create monthly retention cohorts

- Determining growth of inventory, revenue, and profit will enable us to make prioritization for category with optimal results
- Retention cohorts will tell us how many returning customers each month

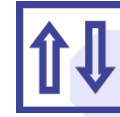## Business Question

Objective

Outcome

EXECUTIVE SUMMARY

Top 3 revenue-generating are fluctuating in terms of inventory growth, need further investigation for issue in logistics

Prioritize categories Suits & Sports Coats and Outerwear & Coats, etc, which are identified as "Stars" in BCG Matrix for maximum growth potential

Deprioritize Plus, Jumpsuits & Rompers, and Socks & Hosiery as they fall into "Pet" quadrant, indicating slower growth & low potential revenue
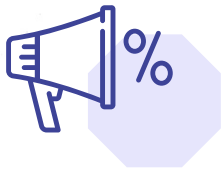
While we maintain a steady influx of new users, the absence of repeat transactions serves as a warning sign, prompting us to prioritize improvements in overall user satisfaction.
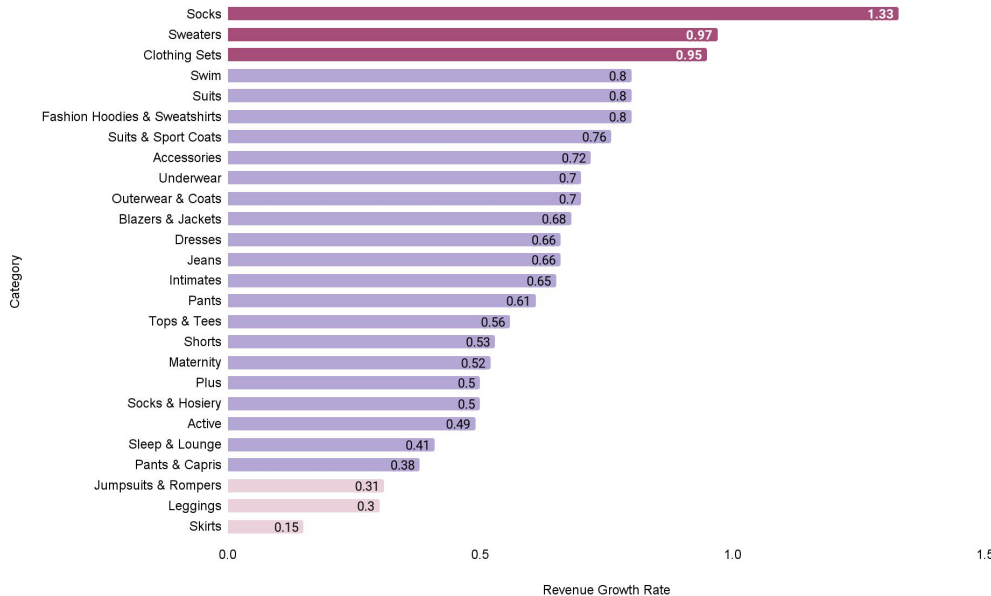
The noticeable decline in user count from month 0 to month 1 underscores the need to prioritize efforts aimed at improving retention and engagement.

02 CATEGORY ANALYSIS

OVERALL REVENUE GROWTH 2022

Category / Revenue Growth Rate

- Socks — 1.33
- Sweaters — 0.97
- Clothing Sets — 0.95
- Swim — 0.8
- Suits — 0.8
- Fashion Hoodies & Sweatshirts — 0.8
- Suits & Sport Coats — 0.76
- Accessories — 0.72
- Underwear — 0.7
- Outerwear & Coats — 0.7
- Blazers & Jackets — 0.68
- Dresses — 0.66
- Jeans — 0.66
- Intimates — 0.65
- Pants — 0.61
- Tops & Tees — 0.56
- Shorts — 0.53
- Maternity — 0.52
- Plus — 0.5
- Socks & Hosiery — 0.5
- Active — 0.49
- Sleep & Lounge — 0.41
- Pants & Capris — 0.38
- Jumpsuits & Rompers — 0.31
- Leggings — 0.3
- Skirts — 0.15

Top 3 categories with highest revenue growth are **Socks (1.33)**, **Sweaters (0.97)**, and **Clothing Sets (0.95)**, indicating popular demand or strong marketing strategies for these categories.

Jumpsuits & Rompers (0.31), **Leggings (0.3)**, and **Skirts (0.15)** are categories the l**owest revenue growth**, this suggests potential problems with market demand or the competitive landscape for these sectors.

The absence of negative growth across all categories means overall positive performance for 2022.

SQL SCHEMA

Row	category	revenue21	revenue22	revenuegrowth
1	Skirts	3845.370005607...	4431.270014762...	0.15
2	Leggings	2810.609987735...	3649.129984378...	0.3
3	Jumpsuits & Rompers	1458.339998245...	1911.650003433...	0.31
4	Pants & Capris	6388.960041999...	8785.730020523...	0.38
5	Sleep & Lounge	16891.60006904...	23755.30003166...	0.41
6	Active	14050.16999912...	20984.86999988...	0.49
7	Plus	4994.430013775...	7476.420009970...	0.5
8	Socks & Hosiery	1732.059993028...	2590.259996891...	0.5
9	Maternity	7305.899974346...	11127.51997995...	0.52

JOB INFORMATION   RESULTS   CHART   JSON   EXECUTION DETAILS

SQL SYNTAX

BigQuery Link

```sql
WITH rev_2021 AS
(
  SELECT p.category AS category,
DATE_TRUNC(DATE(oi.created_at), YEAR) AS year21,
SUM(oi.sale_price) AS revenue21
FROM `bigquery-public-data.thelook_ecommerce.products` AS p
INNER JOIN `bigquery-public-data.thelook_ecommerce.order_items` AS oi
ON p.id = oi.product_id
WHERE oi.status = 'Complete'
AND EXTRACT(YEAR FROM DATE(created_at)) = 2021
GROUP BY 1, 2),
  rev_2022 AS
(
  SELECT p.category AS category,
DATE_TRUNC(DATE(oi.created_at), YEAR) AS year22,
SUM(oi.sale_price) AS revenue22
FROM `bigquery-public-data.thelook_ecommerce.products` AS p
INNER JOIN `bigquery-public-data.thelook_ecommerce.order_items` AS oi
ON p.id = oi.product_id
WHERE oi.status = 'Complete'
AND EXTRACT(YEAR FROM DATE(created_at)) = 2022
GROUP BY 1, 2),


  rev_growth AS
(
  SELECT rev_2021.category AS category,
  revenue21,
  revenue22,
  ROUND((revenue22-revenue21)/revenue21,2) AS revenuegrowth
  FROM rev_2021
  INNER JOIN rev_2022
  ON rev_2021.category = rev_2022.category
)
SELECT
  rev_growth.category AS category,
  rev_growth.revenue21,
  rev_growth.revenue22,
  rev_growth.revenuegrowth,
FROM rev_growth
ORDER BY revenuegrowth
```

MONTHLY INVENTORY GROWTH
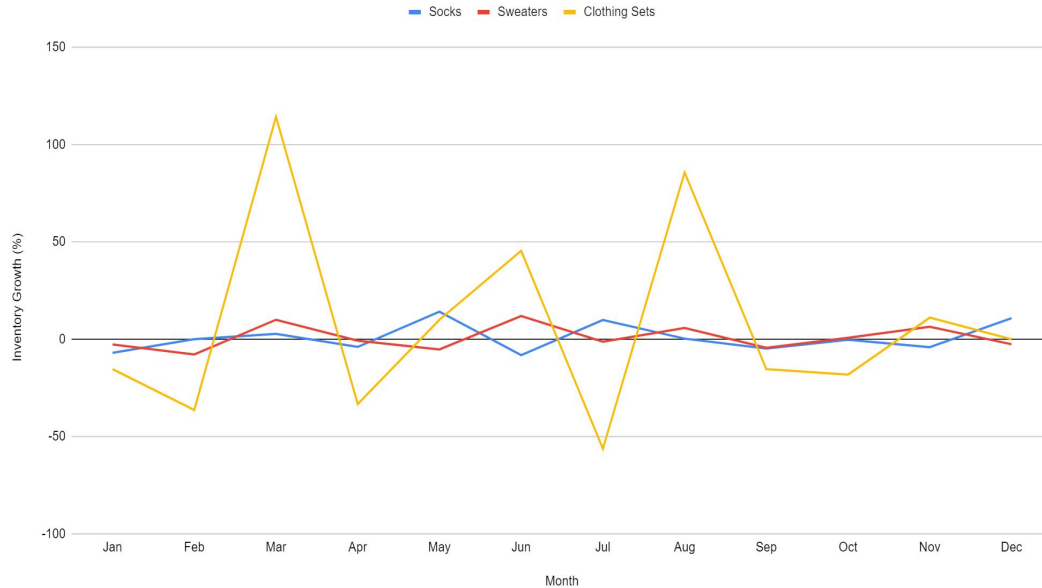
The inventory growth for **Clothing Sets** is **highly volatile throughout the year**, with significant spikes in **March, June, and September**, and notable drops in **February, April, and August**. This indicates fluctuating demand or supply chain issues specific to this category.

Both **Socks** and **Sweaters** exhibit **relatively stable inventory** growth trends compared to Clothing Sets with minor fluctuations. This stability suggests more consistent demand and/or supply chain management for these items.

Changes in consumer preferences and market trends can also impact inventory growth. Sudden popularity or decline of certain styles or types of clothing can lead to rapid changes in inventory levels.

MONTHLY INVENTORY GROWTH

Category	Jan 2022	Feb 2022	Mar 2022	Apr 2022	May 2022	Jun 2022	Jul 2022	Aug 2022	Sep 2022	Oct 2022	Nov 2022	Dec 2022
Accessories	-6.59	5.18	0.67	1.78	6.55	-4.92	7.11	6.44	-10.02	17.44	-5.72	-0.76
Active	-3.25	-5.04	12.63	-6.95	6.99	-4.5	9.91	5.58	-7.11	-3.5	2.27	5.32
Blazers & Jackets	18.9	-11.92	10.53	-1.36	12.41	-1.23	0.62	-1.85	1.26	9.94	5.65	-23.53
Clothing Sets	-15.38	-36.36	114.29	-33.33	10	45.45	-56.25	85.71	-15.38	-18.18	11.11	0
Dresses	-15.65	9.95	5.35	23.05	-26.03	18.88	-6.86	2.33	-3.79	12.6	-2.8	17.27
Fashion Hoodies & Sweatshirts	-11.05	-5.18	22.27	0.71	1.06	-11.58	15.28	-3.1	-0.89	7.17	-4.68	14.56
Intimates	-2.52	-7.9	17.51	-7	1.28	2.69	5.24	-5.12	3.86	1.04	1.91	4.18
Jeans	13.35	-15.36	11.49	0	9.22	0	-3.31	5.48	-0.49	2.77	-5.56	18.32
Jumpsuits & Rompers	15.91	-27.45	43.24	-24.53	-7.5	62.16	-21.67	-2.13	0	15.22	1.89	-16.67
Leggings	11.43	-17.95	17.19	7.33	-8.7	0	10.2	4.32	4.14	-0.57	-3.43	-7.1
Maternity	11.89	-9.84	8.3	-14.52	19.81	-5.91	7.11	-3.91	-2.44	15.42	-1.81	5.51
Outerwear & Coats	-2.11	-6.24	10.23	-11.14	22.72	-10.64	13.33	8.61	-10.44	-3.67	4.04	-1.94
Pants	8.72	-8.02	14.77	-8.48	14.38	-8.66	13.15	-0.27	3.25	0	-3.15	6.23
Pants & Capris	12.23	10.26	-6.98	-8.13	23.13	-8.84	7.27	-5.65	1.8	0.59	-7.02	8.18
Plus	26.47	-14.88	16.94	3.27	-2.26	-6.94	10.45	-8.56	11.82	7.93	-11.84	13.89
Shorts	7.17	-12.08	20.3	-8.79	-2.89	3.97	3.82	3.68	-6.91	4.76	4.73	10.24
Skirts	5.1	-27.18	42.67	-14.02	22.83	-22.12	5.68	12.9	-9.52	34.74	3.13	-22.73
Sleep & Lounge	-0.82	-5.39	14.47	-6.7	18.89	-5.01	4.73	0	-1.56	-4.76	0.74	7.35
Socks	-6.96	0	2.72	-3.97	14.14	-8.16	9.87	0.3	-4.78	-0.31	-4.09	10.82
Socks & Hosiery	-16.33	2.44	3.57	7.47	5.88	-5.56	-2.14	9.29	-7	-4.84	-6.78	22.42
Suits	-18.97	-8.51	32.56	-21.05	22.22	-1.82	-22.22	33.33	-53.57	134.62	-13.11	0
Suits & Sport Coats	6.88	-16.31	26.15	-8.13	16.37	-9.13	17.15	4.29	-9.59	-3.03	0.39	8.56
Sweaters	-2.67	-7.84	10	-0.77	-5.26	11.93	-1.29	5.77	-4.4	0.74	6.4	-2.58
Swim	0.41	9.5	0.94	-2.8	12.69	-4.78	2.15	-3.86	-1.64	5.57	3.34	3.57
Tops & Tees	6.42	-14.63	23.34	-6.08	4.25	-0.71	12.68	-6.81	7.48	-3.8	-0.49	4.13
Underwear	5.42	-22.57	28.78	-0.29	6.03	5.42	-4.63	8.89	-14.85	24.13	-15.69	18.61

As previously noted, Clothing Sets show extreme volatility. Notable changes include a **massive 114.29% growth in March**, a **significant drop of -56.25% in July**, and another large **increase of 85.71% in September.** This suggests unpredictable demand or supply chain issues specific to this category.

The **Plus** category shows **consistent positive growth** in most months, particularly high in **June (16.94%) and October (34.74%)**. **Pants & Capris** also have generally **positive growth**, with the highest spike in **October (12.99%)**.

Suits experienced significant **fluctuations**, with **major declines** in **August (-53.57%)** followed by a **dramatic recovery** in **September (134.62%)**. This might be due to seasonal changes or restocking after major sales events.

SQL SYNTAX & RESULT

```sql
WITH inv AS
(
SELECT
  product_category AS category,
  DATE_TRUNC(DATE(created_at), MONTH) AS month,
  COUNT(id) AS stock
FROM
`bigquery-public-data.thelook_ecommerce.inventory_ite
ms`
GROUP BY month, category
)
,prev_inv AS
(
SELECT category,
  month,
  stock,
  LAG (stock) OVER (PARTITION BY category ORDER BY
month) prev_stock
FROM inv
)
SELECT
  category,
  stock,
  prev_stock,
  month,
  ROUND(((stock-prev_stock)/prev_stock)*100,2) AS
inv_growth
FROM prev_inv
WHERE month BETWEEN "2019-01-01" AND "2022-12-31"
ORDER BY category, month DESC
```

JOB INFORMATION	RESULTS	CHART	JSON	EXECUTION DETAILS	EXECUTION GRAPH

Row	category	stock	prev_stock	month	inv_growth
1	Accessories	523	527	2022-12-01	-0.76
2	Accessories	527	559	2022-11-01	-5.72
3	Accessories	559	476	2022-10-01	17.44
4	Accessories	476	529	2022-09-01	-10.02
5	Accessories	529	497	2022-08-01	6.44
6	Accessories	497	464	2022-07-01	7.11
7	Accessories	464	488	2022-06-01	-4.92
8	Accessories	488	458	2022-05-01	6.55
9	Accessories	458	450	2022-04-01	1.78
10	Accessories	450	447	2022-03-01	0.67
11	Accessories	447	425	2022-02-01	5.18
12	Accessories	425	455	2022-01-01	-6.59
13	Accessories	455	432	2021-12-01	5.32
14	Accessories	432	440	2021-11-01	-1.82
15	Accessories	440	412	2021-10-01	6.8
16	Accessories	412	432	2021-09-01	-4.63
17	Accessories	432	403	2021-08-01	7.2

RECOMMENDATIONS
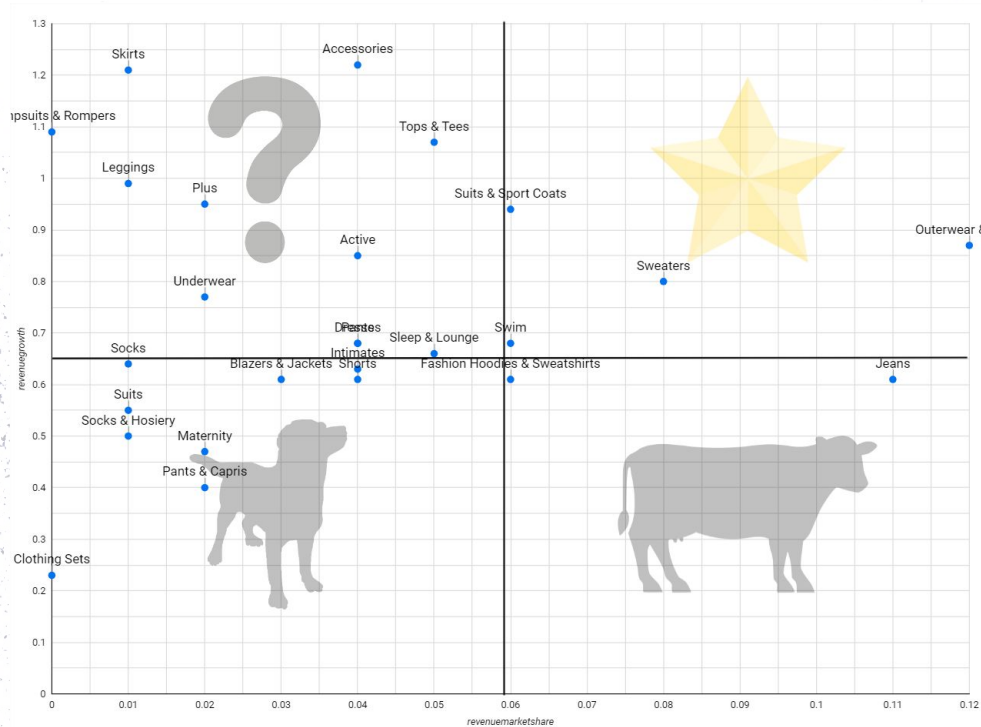
Star:
Invest resources to maintain and strengthen the market leadership position. Explore opportunities for market expansion or product line extensions.

Cash Cows:
Milk these cash cows by maximizing profitability and operational efficiency. Consider using the cash generated to invest in Question Mark or Star categories.

Question Mark:
Evaluate investment in categories with strong growth prospects and competitive advantages. Develop strategies to increase market penetration.

Dog:
Divesting or phasing out categories with low growth potential and little competitive advantage.

SQL SYNTAX BCG MATRIX

```sql
WITH rev_2021 AS
(
  SELECT p.category AS category,
DATE_TRUNC(DATE(oi.created_at), YEAR) AS year21,
SUM(oi.sale_price) AS revenue21
FROM
`bigquery-public-data.thelook_ecommerce.products` AS
p
INNER JOIN
`bigquery-public-data.thelook_ecommerce.order_items`
AS oi
ON p.id = oi.product_id
WHERE oi.status = 'Complete'
AND EXTRACT(YEAR FROM DATE(created_at)) = 2021
GROUP BY 1, 2),
rev_2022 AS
(
  SELECT p.category AS category,
DATE_TRUNC(DATE(oi.created_at), YEAR) AS year22,
SUM(oi.sale_price) AS revenue22
FROM
`bigquery-public-data.thelook_ecommerce.products` AS
p
```

```sql
INNER JOIN
`bigquery-public-data.thelook_ecommerce.order_items`
AS oi
ON p.id = oi.product_id
WHERE oi.status = 'Complete'
AND EXTRACT(YEAR FROM DATE(created_at)) = 2022
GROUP BY 1, 2),
rev_growth AS
(
  SELECT rev_2021.category AS category,
  revenue21,
  revenue22,
  ROUND((revenue22-revenue21)/revenue21,2) AS
revenuegrowth
  FROM rev_2021
  INNER JOIN rev_2022
  ON rev_2021.category = rev_2022.category
),
rev_market_share AS
(
  SELECT rev_2022.category AS category,
  revenue22,
  ROUND(revenue22/SUM(revenue22) OVER(),2) AS
revenuemarketshare
  FROM rev_2022
)
```

SQL SYNTAX BCG MATRIX

```sql
SELECT
    rev_market_share.category AS category,
    rev_growth.revenuegrowth,
    rev_market_share.revenuemarketshare,
CASE WHEN revenuemarketshare >=
AVG(revenuemarketshare) OVER()
    AND revenuegrowth >= AVG(revenuegrowth) OVER() THEN
'Star'
WHEN revenuemarketshare < AVG(revenuemarketshare)
OVER()
    AND revenuegrowth >= AVG(revenuegrowth) OVER() THEN
'Question Mark'
WHEN revenuemarketshare >= AVG(revenuemarketshare)
OVER()
    AND revenuegrowth < AVG(revenuegrowth) OVER() THEN
'Cash Cow'
ELSE 'Pet'
END AS quadrant
FROM rev_market_share
INNER JOIN rev_growth
ON rev_market_share.category = rev_growth.category
ORDER BY 1
```

BigQuery Link

TABLE RESULT BCG MATRIX

Row	category	revenuegrowth	revenuemarketshare	quadrant
1	Accessories	1.22	0.04	Star
2	Active	0.85	0.04	Star
3	Blazers & Jackets	0.61	0.03	Pet
4	Clothing Sets	0.23	0.0	Pet
5	Dresses	0.68	0.04	Cash Cow
6	Fashion Hoodies & Sweatshirts	0.61	0.06	Cash Cow
7	Intimates	0.63	0.04	Cash Cow
8	Jeans	0.61	0.11	Cash Cow
9	Jumpsuits & Rompers	1.09	0.0	Question Mark
10	Leggings	0.99	0.01	Question Mark
11	Maternity	0.47	0.02	Pet
12	Outerwear & Coats	0.87	0.12	Star
13	Pants	0.68	0.04	Cash Cow
14	Pants & Capris	0.4	0.02	Pet
15	Plus	0.95	0.02	Question Mark
16	Shorts	0.61	0.04	Cash Cow
17	Skirts	1.21	0.01	Question Mark

03

COHORT ANALYSIS

MONTHLY RETENTION COHORT

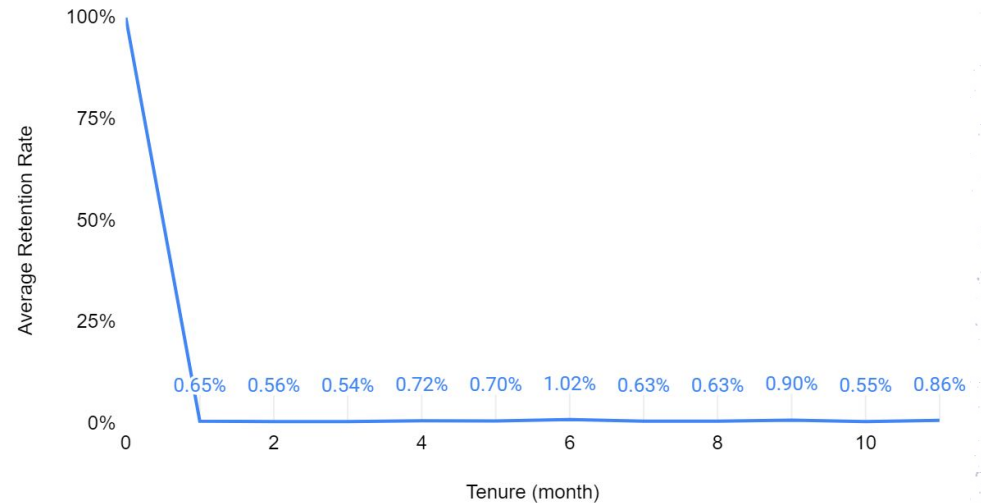| Month	Cohort Size	0	1	2	3	4	5	6	7	8	9	10	11
Jan 2022	349	100%	0.29%	1.15%	**0.00%**	0.29%	1.72%	0.57%	0.29%	0.29%	0.86%	0.57%	0.86%
Feb 2022	373	100%	1.34%	0.27%	0.54%	0.80%	0.80%	0.80%	0.80%	0.27%	1.07%	0.54%	
Mar 2022	397	100%	0.50%	0.25%	0.76%	0.50%	**0.00%**	1.26%	0.76%	1.26%	0.76%		
Apr 2022	429	100%	0.47%	0.47%	0.70%	0.70%	0.70%	0.93%	0.23%	0.70%			
May 2022	460	100%	0.22%	0.43%	0.22%	0.43%	0.65%	1.52%	1.09%				
Jun 2022	474	100%	1.05%	0.42%	0.63%	1.05%	0.21%	1.05%					
Jul 2022	493	100%	0.41%	0.81%	0.20%	0.81%	0.81%						
Aug 2022	523	100%	1.15%	0.19%	0.38%	1.15%							
Sep 2022	491	100%	**0.00%**	0.81%	1.43%								
Oct 2022	530	100%	1.13%	0.75%									
Nov 2022	571	100%	1.23%										
Dec 2022	583	100%	**0.00%**										
Average		0.65%	0.56%	0.54%	0.72%	0.70%	1.02%	0.63%	0.63%	0.90%	0.55%	0.86%	

COHORT INSIGHTS

The retention rate is **generally low**, with most cohorts showing retention rates below 2% in subsequent months. This indicates a challenge in retaining users and converting them into repeat customers. This could be due to factors like customer satisfaction, product offerings, or post-purchase engagement strategies.

The cohort sizes **increase over the year**, from **349** in January to **583** in December, suggesting successful acquisition strategies in bringing new users to the platform.

The 0% retention rates indicate periods where no follow-up purchases occurred, possibly pointing to specific issues during those times. It is crucial to investigate these periods to understand and address the underlying causes.

Average Retention Rate 2022

Average Retention Rate (y-axis): 0% to 100%

Tenure (month) (x-axis): 0 to 10

Data labels: 0.65%, 0.56%, 0.54%, 0.72%, 0.70%, 1.02%, 0.63%, 0.63%, 0.90%, 0.55%, 0.86%

SQL SYNTAX COHORT

```sql
WITH
first_cohort AS
(
SELECT DISTINCT
  user_id,
  MIN(DATE_TRUNC(DATE(o.created_at), month)) OVER
(PARTITION BY user_id) AS first_purchase,
  DATE_TRUNC(DATE(o.created_at), month) AS
next_purchase
FROM `bigquery-public-data.thelook_ecommerce.orders`
AS o
WHERE DATE_TRUNC(DATE(o.created_at), month) BETWEEN
'2022-01-01' AND '2022-12-31'
AND DATE_TRUNC(DATE(o.created_at), month) IS NOT NULL
AND o.user_id IS NOT NULL
AND o.status = "Complete"
),
difference AS
(
SELECT *,
DATE_DIFF(next_purchase, first_purchase, MONTH) AS
diff_month,
COUNT(DISTINCT user_id) OVER (PARTITION BY
first_purchase) AS cohort_size
FROM first_cohort
),
```

```sql
final_user AS
(
SELECT first_purchase,
diff_month,
cohort_size,
COUNT(DISTINCT user_id) AS total_user
FROM difference
WHERE DATE(first_purchase) BETWEEN '2022-01-01' AND
'2022-12-31'
GROUP BY 1,2,3
ORDER BY 1,2
)
SELECT *,
total_user/cohort_size AS retention_rate
FROM final_user
```

TABLE RESULT COHORT

Row	first_purchase	diff_month	cohort_size	total_user	retention_rate
1	2022-01-01	0	405	405	1.0
2	2022-01-01	1	405	2	0.004938271604...
3	2022-01-01	2	405	2	0.004938271604...
4	2022-01-01	3	405	3	0.007407407407...
5	2022-01-01	4	405	2	0.004938271604...
6	2022-01-01	5	405	2	0.004938271604...
7	2022-01-01	6	405	7	0.017283950617...
8	2022-01-01	7	405	3	0.007407407407...
9	2022-01-01	8	405	6	0.014814814814...
10	2022-01-01	10	405	4	0.009876543209...
11	2022-01-01	11	405	3	0.007407407407...
12	2022-02-01	0	349	349	1.0
13	2022-02-01	2	349	1	0.002865329512...
14	2022-02-01	3	349	3	0.008595988538...
15	2022-02-01	4	349	1	0.002865329512...
16	2022-02-01	5	349	2	0.005730659025...
17	2022-02-01	7	349	2	0.005730659025...

RECOMMENDATIONS

PERSONALIZED ENGAGEMENT

- Implement personalized email campaigns that target users based on their interest and purchase history.
- Use app notifications to remind users of items left in their cart, suggest products based on past purchases, or inform them of sales and promotions.

CUSTOMER SUPPORT

- Offer proactive customer support through live chat, social media, and email to quickly address any issues customers might have with their orders.
- Implement an easy feedback mechanism to capture customer sentiments and promptly act on any negative feedback to improve satisfaction.

RETENTION-FOCUSED PROMOTIONS

- Offer time-limited exclusive deals to past customers to entice them back to the store.
- Encourage existing customers to refer friends by offering rewards or discounts for successful referrals.

CONTINUOUS IMPROVEMENT

- Continuously test different retention strategies, such as email content, promotional offers, and loyalty rewards, to identify the most effective approaches.
- Analyze and optimize the entire customer journey, from first contact to post-purchase, to ensure a seamless and satisfying experience.

THANKS!

Let's have a friendly discussion.

Satryo Sunu Prabowo