Optimization of TheLook to Survive from Crisis of 2023

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Question 1 Business Understanding

Based on the business background we have, we will state some informations related to our business problems.

- To face the potential crisis of 2023, the company needs to optimize its management.
- The optimization itself can be done by cutting off resources in some categories with the lowest growth in the past 1 year.
- Monitoring users to buy some products for the following months in 2022 by giving promotions related to them is a good way to face the potential mentioned earlier.

Question 1 Business Understanding - hypothesis

We can make some hypotheses for these business problems.

- The growth rate of inventory of all categories is fluctuated but mostly increasing in the period of 2019 to 2023.
- There at least 2 categories that are needed to be cut since they give low inventory growth in the period 2019-2023.
- More than 5% of active users that completed their first order have their next order(s) completed in next month.

Question 5 Table Result Schema & Table Result

Filter Enter property name or value

Field name	Type	Mode
product_category	STRING	NULLABLE
year_product_created	INTEGER	NULLABLE
month_product_created	INTEGER	NULLABLE
year_month	STRING	NULLABLE
total_product	INTEGER	NULLABLE
growth_rate	FLOAT	NULLABLE

Row	product_category	year_product_cr	month_product_	year_month	total_product	growth_rate
1	Accessories	2018	12	2018-12	5	*null*
2	Accessories	2019	1	2019-1	4	-20.0
3	Accessories	2019	2	2019-2	6	50.0
4	Accessories	2019	3	2019-3	14	133.33
5	Accessories	2019	4	2019-4	15	7.14
6	Accessories	2019	5	2019-5	12	-20.0
7	Accessories	2019	6	2019-6	25	108.33
8	Accessories	2019	7	2019-7	24	-4.0
9	Accessories	2019	8	2019-8	42	75.0
10	Accessories	2019	9	2019-9	37	-11.9
11	Accessories	2019	10	2019-10	40	8.11

Question 5 SQL Syntax:

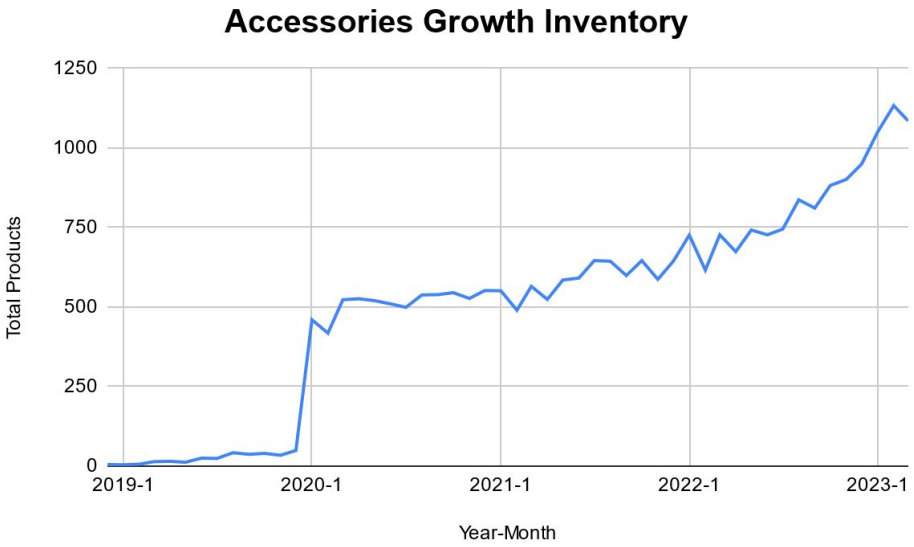
https://console.cloud.google.com/bigquery?sq=453651544900:e64008fa45c54314801d1c24730c2226

```sql
WITH percentage_growth_over_month_of_accessories AS
(
SELECT
  inventory_items.product_category,
  COUNT(inventory_items.product_id) AS total_product_1,
  EXTRACT(YEAR FROM DATE(DATE_TRUNC(inventory_items.created_at, year))) AS year_product_created,
  EXTRACT(MONTH FROM DATE(DATE_TRUNC(inventory_items.created_at, month))) AS month_product_created
  FROM `sql-project-376612.thelook_ecommerce.inventory_items` inventory_items
  WHERE product_category = "Accessories"
  GROUP BY 1, 3, 4
  ORDER BY 3, 4 ASC
)
SELECT product_category, year_product_created, month_product_created,
CONCAT(year_product_created, "-", month_product_created) AS year_month,
total_product_1 AS total_product,
ROUND ((total_product_1 - LAG(total_product_1) OVER(ORDER BY year_product_created, month_product_created ASC))/(LAG(total_product_1) OVER(ORDER
BY year_product_created, month_product_created ASC)) * 100, 2) AS growth_rate
FROM percentage_growth_over_month_of_accessories
GROUP BY product_category, year_product_created, month_product_created, total_product_1
ORDER BY year_product_created, month_product_created ASC;
```

Question 5 Insights - 1

Based on the graph of accessories growth inventory, we obtain some facts below.

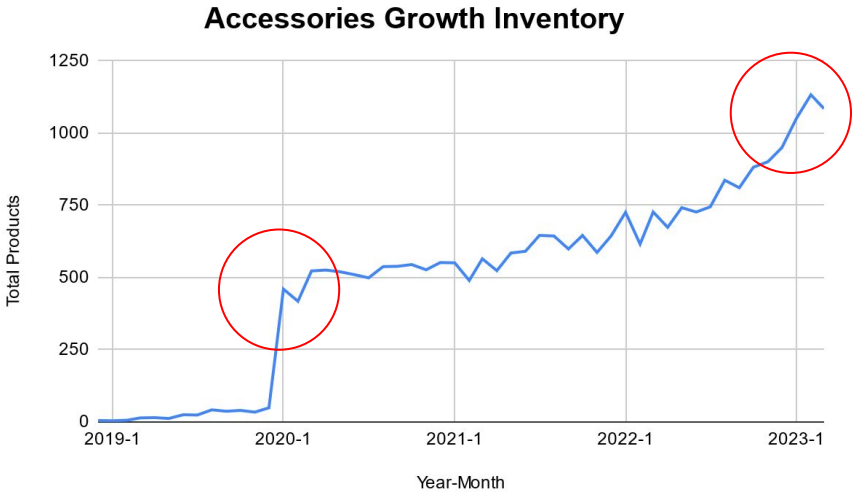
- There is a significant increase of inventory in January 2020, which is nearly 840% increase from December 2019.
- After January 2020, the growth inventory is actually increasing in a form of rough quadratic curve until February 2023. Its maximum total products is about 1125.

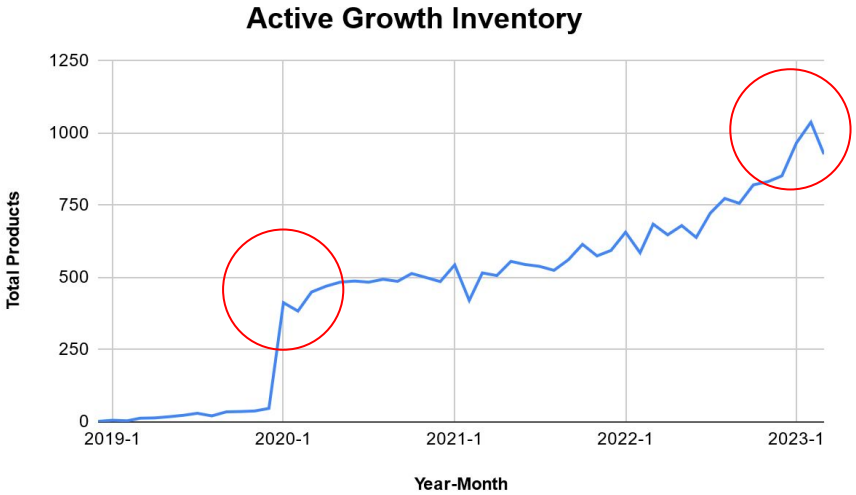


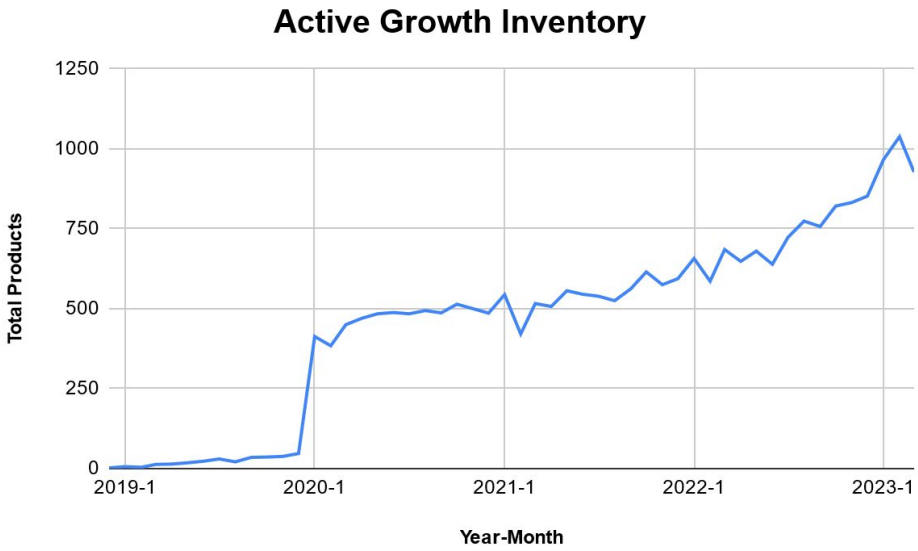
- Afterwards, its growth is starting to decrease about 4%.
- Since the data obtained here is in the middle of April 2023, thus we do not involve the data of inventory of April 2023.

Question 5 Insights - 2

If we analyze on other categories such as Active, Blazers and Jackets, Dresses, Intimates, Jeans, and Underwear, we will have the almost exact trend as Accessories Growth Inventory graph. The difference is just the maximum products stored in the inventory of each category!

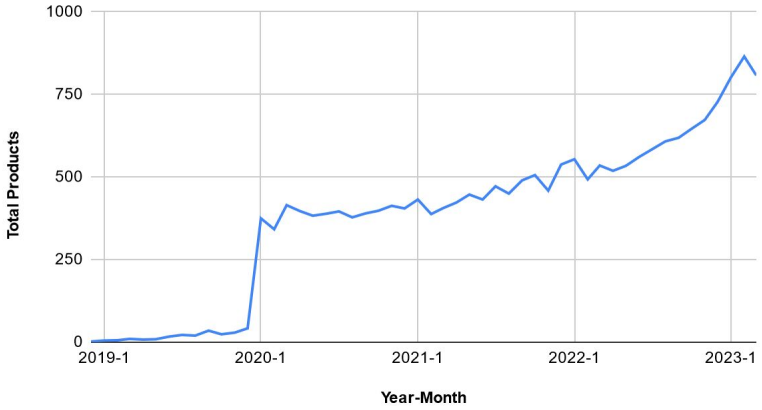




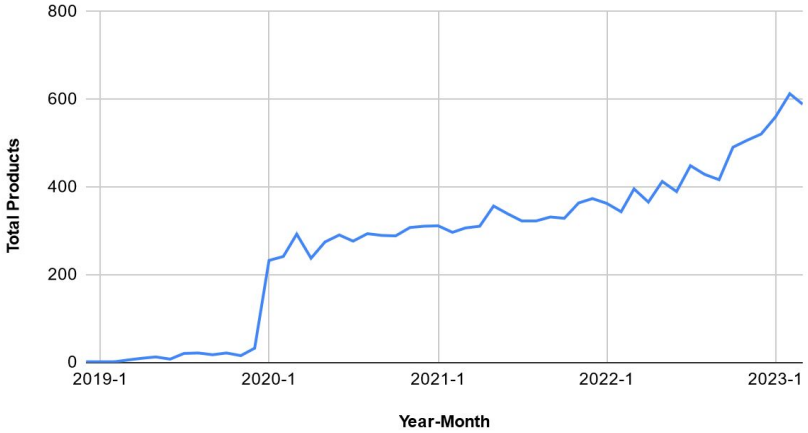

Active Growth Inventory
1250
1000
750
500
250
0
Total Products
2019-1
2020-1
2021-1
2022-1
2023-1
Year-Month


Blazers & Jackets Growth Inventory
400
300
200
100
0
Total Products
2019-1
2020-1
2021-1
2022-1
2023-1
Year-Month

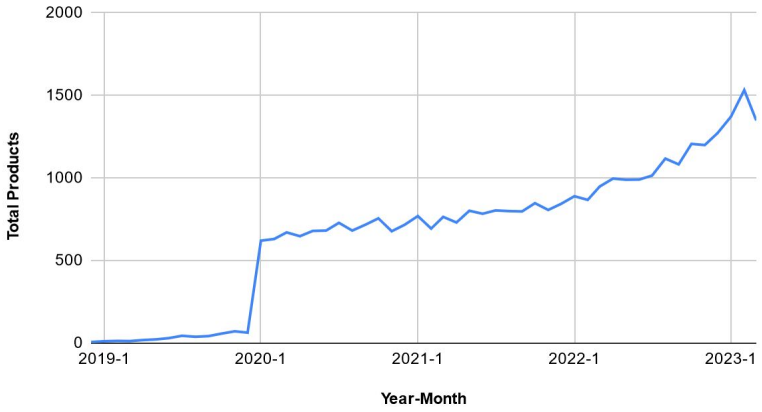
Underwear Growth Inventory



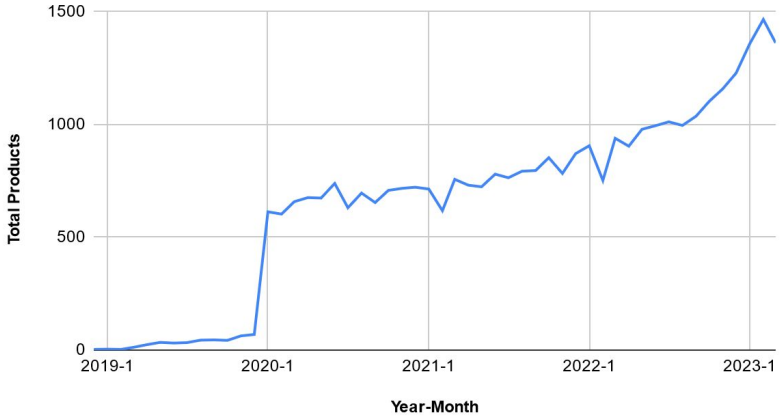
Dresses Growth Inventory



Intimates Growth Inventory



Jeans Growth Inventory



Question 5 Insights - 3

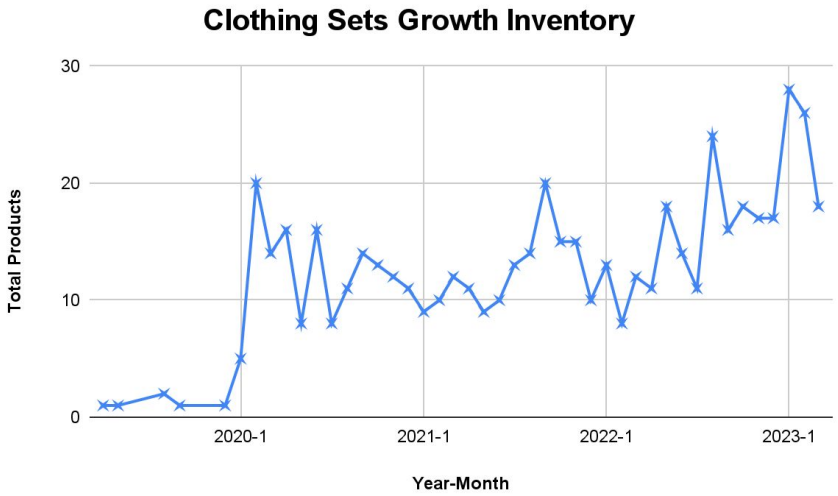
Based on those graphs we sketched before, we find some facts in order to give insights to do some decision.

- The biggest increase is 1242,86% which is obtained on Blazers and Jackets Growth Inventory on January 2020 from December 2019.
- Although that graph reaches its biggest increase, the amount of Blazers and Jackets product on January 2020 is less than 200 (188, to be exact) compared to the other graphics. We may consider cutting this resource.
- Intimates give the highest amount of its products, that is larger than 1500 products on February 2023. We may not cut this resource.

Question 5 Insights - 4

If we sketch the graph of Clothing Sets growth inventory, we will find something odd trend that do not match with Accessories growth inventory trend. Let us take a look.

We obtain some facts below.



- The biggest increase is just about 120% which is in August 2022 from July 2022.
- However, the maximum amount of Clothing sets product is even less than 30 (28, to be exact). Thus we must cut this resource!

Question 6 Table Result Schema & Table Result

Filter Enter property name or value

Field name	Type	Mode
first_order_date	DATE	NULLABLE
diff_month	INTEGER	NULLABLE
cohort_size	INTEGER	NULLABLE
total_user	INTEGER	NULLABLE
percentage_user_come_back	FLOAT	NULLABLE

Row	first_order_date	diff_month	cohort_size	total_user	percentage_user
1	2022-01-01	0	670	670	1.0
2	2022-01-01	1	670	16	0.0239
3	2022-01-01	2	670	9	0.0134
4	2022-01-01	3	670	9	0.0134
5	2022-01-01	4	670	9	0.0134
6	2022-01-01	5	670	3	0.0045
7	2022-01-01	6	670	4	0.006
8	2022-01-01	7	670	6	0.009
9	2022-01-01	8	670	7	0.0104
10	2022-01-01	9	670	11	0.0164
11	2022-01-01	10	670	5	0.0075

Question 6 SQL Syntax:

https://console.cloud.google.com/bigquery?sq=453651544900:cb641410b2fc478bb156d9c35e6821d6

```sql
WITH cte_1 AS
(
  SELECT DISTINCT
  order_items.user_id AS user_id,
  MIN(date_trunc(date(created_at), MONTH)) OVER (PARTITION BY order_items.user_id) AS first_order_date,
  date_trunc(date(created_at), MONTH) AS running_order_date
  FROM `sql-project-376612.thelook_ecommerce.order_items` order_items
  WHERE status = 'Complete'
),
cte_2 AS
(
  SELECT *,
  DATE_DIFF(running_order_date, first_order_date, MONTH) AS diff_month,
  COUNT(DISTINCT user_id) OVER(PARTITION BY first_order_date) AS cohort_size
  FROM cte_1
),
cte_3 AS
(
  SELECT first_order_date, diff_month, cohort_size,
  COUNT(DISTINCT user_id) AS total_user
  FROM cte_2
  WHERE first_order_date >= "2022-01-01"
  GROUP BY 1, 2, 3
  ORDER BY 1, 2
)
SELECT *,
ROUND(total_user/cohort_size, 4) AS percentage_user
FROM cte_3
```

Question 6 Insights - 1

SUM of percenta diff_month

first_order_date	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
2022-01-01	100.00%	2.39%	1.34%	1.34%	1.34%	0.45%	0.60%	0.90%	1.04%	1.64%	0.75%	0.75%	0.75%	0.90%	1.04%	0.30%
2022-02-01	100.00%	3.83%	1.00%	0.50%	0.83%	1.00%	0.83%	1.67%	1.50%	1.17%	1.50%	0.67%	1.33%	1.67%	0.83%	
2022-03-01	100.00%	3.13%	1.22%	0.68%	1.09%	1.77%	0.82%	0.68%	1.09%	0.82%	1.50%	0.41%	0.68%	0.14%		
2022-04-01	100.00%	2.45%	1.29%	2.07%	0.90%	0.39%	1.29%	1.42%	1.29%	0.90%	0.90%	1.29%	0.90%			
2022-05-01	100.00%	3.63%	1.29%	1.17%	1.06%	1.17%	0.94%	1.06%	1.52%	1.06%	1.17%	0.12%				
2022-06-01	100.00%	2.89%	1.01%	2.14%	1.38%	1.26%	0.88%	1.89%	1.01%	1.51%	0.63%					
2022-07-01	100.00%	2.44%	1.06%	1.38%	1.80%	1.80%	1.27%	1.17%	0.95%	0.32%						
2022-08-01	100.00%	2.26%	1.54%	1.03%	2.05%	1.33%	1.75%	2.26%	1.03%							
2022-09-01	100.00%	3.82%	2.45%	2.65%	1.96%	0.98%	1.08%	0.78%								
2022-10-01	100.00%	3.93%	1.52%	2.05%	2.05%	1.69%	0.62%									
2022-11-01	100.00%	4.35%	1.89%	1.80%	1.97%	1.15%										
2022-12-01	100.00%	3.46%	1.96%	2.86%	1.35%											
2023-01-01	100.00%	4.36%	2.18%	1.36%												
2023-02-01	100.00%	6.66%	2.27%													
2023-03-01	100.00%	6.08%														
2023-04-01	100.00%															

Based on the cohort analysis above, we can obtain facts that

- Data above are obtained only from completed orders.
- After one month that users having their first completed order between January 2022 and January 2023, the active users that completed their orders are decreasing to between 2% to 4%.
- Interesting enough that more than 6% of users having their first completed order on February and March 2023 completed their next orders on next month. (*to be continued to next slide*)

Question 6 Insights - 2

(*Cont'd*)

- **September 2022** may be the month where **few active users completed their orders**. It is proved by only 0.39% of active users that completed their first order on April 2022 completed their orders and 2.26% of active users that completed their first order on August 2022 completed their orders. It is possible that **there were some feature changes** on store or **few promotions** were available on that month that make users were less likely to order and complete their orders.

Question 6 Insights - 3

(*Cont'd*)

- **March 2023** may be the month where **most active users completed their orders**. It is proved by **2.86%** of **active users** that completed their first order on **December 2022** completed their orders which is **the biggest** among the **active users after two or more months**.
- Another prove to previous point is **6.66%** of **active users** that completed their first order on **February 2023** completed their orders which is **the biggest** among the **active users after one month**.
- It is possible that the company understood the users' complaints about the store and made some major changes or gave some big promotions that attracted users to buy products.

SUMMARY

- Accessories, Active, Blazers and Jackets, Dresses, Intimates, Jeans, and Underwear Growth Inventory graph have the almost exact trend as Accessories Growth Inventory. The difference is just the maximum products stored in the inventory of each category.
- We may cut resources from Blazers and Jackets and Clothing sets since they give the low growth production.
- September 2022 may be the month where few active users completed their orders, while March 2023 may be the month where most of them completed their orders.

HYPOTHESIS CONCLUSION

We can conclude that:

- The growth rate of inventory of all categories is fluctuated but mostly increasing in the period of 2019 to 2023

  => **hypothesis accepted**

- There at least 2 categories that are needed to be cut since they give low inventory growth in the period 2019-2023

  => **hypothesis accepted**

- More than 5% of active users that completed their first order have their next order(s) completed in next month

  => **hypothesis not accepted**

THANK YOU!