Supply Chain Analysis

Problem Statement:-

AtliQ Mart, an FMCG manufacturer in Gujarat, India, operates in Surat, Ahmedabad, and Vadodara, with plans to expand to major cities within two years. Facing challenges due to service issues that led to the loss of key contracts, the company is focusing on improving its delivery system. Management has tasked the supply chain analytics team to monitor 'On time' and 'In Full' deliveries daily for all customers. This effort is aimed at enhancing service quality by tracking 'On-time delivery', 'In-full delivery', and 'OnTime in Full (OTIF) %' metrics against set customer service targets.

Project Goal :-

This project is designed to analyze and report on various aspects of a company's operations, focusing on customer data, product performance, order fulfillment, and target achievements. . The project utilizes several tables from a database (presumably for a retail or FMCG business), each serving a specific purpose in the data analysis process. Goal is to analyze the available data to enable data-driven decision-making, guiding and providing recommendations to our company on how to enhance order fulfillment efficiency and other key operational aspects.

Data Collection:-

dim_customers: Stores customer information including their unique IDs, names, and city locations.

dim_dates: Contains date-related data, useful for time-based analysis.

dim_products: Holds product details, including IDs, names, and categories.

dim_targets_orders: Links customer IDs with their respective delivery targets (ontime, infull, otif).

fact_order_lines: Details individual order lines, including quantities ordered and delivered, and delivery timings.

fact_orders_aggregate: Aggregates orders data, focusing on delivery performance indicators.

Analysis and Findings:-

Line Fill Rate(LFR)=Number of fulfilled order/Total order.

Volume Fill rate = total quantity shipped / total quantity ordered.

On time %(OT%) =percentage of order delivered on time.

On full%(IF%)= percentage of order delivered on full in quantity.

OTIF%= percentage of order delivered on time and full in quantity.

In the customer distribution analysis, Surat has 11 customers, while both Ahmedabad and Vadodara have 12 customers each.

Dairy products are our top selling product.

'beverages' -''AM Tea 500, AM Tea 250, AM Tea 100'

'Dairy'- 'AM Milk 500, AM Milk 250, AM Milk 100, AM Butter 100, AM Butter 250, AM Butter 500, AM Ghee 250, AM Ghee 150, AM Ghee 100, AM Curd 250, AM Curd 100, AM Curd 50'

'Food',-'AM Biscuits 750, AM Biscuits 500, AM Biscuits 250'
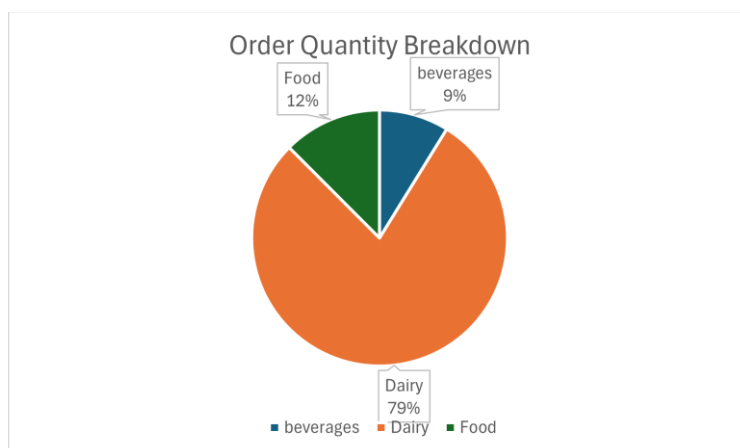
The data indicates a significant challenge with unfulfilled orders, Notably, the trend in August shows a decrease in this percentage. This suggests an improvement in the supply chain processes, reflecting the effectiveness of strategies implemented to enhance order fulfillment.
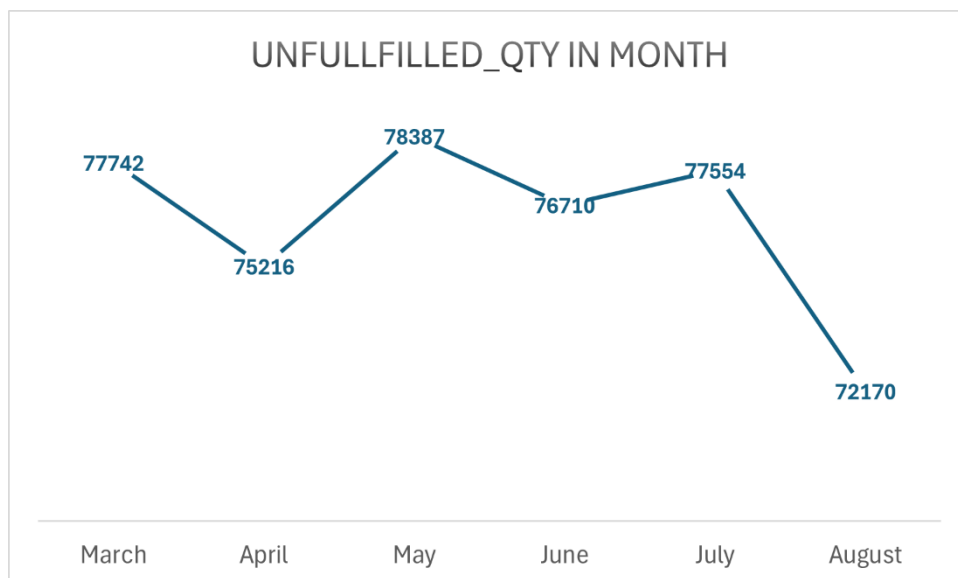
Now Dairy products are in top in unfulfilled order qty %. AM milk 100, AM milk 25 and AM milk 500 contribute highly in unfulfilled qty.

Lets now Compare IF%, OT%, OTIF% with targets on customer levels.

customer_name	OT%_target	OT%	IF%_target	IF%	OTIF%_target	OTIf%
Vijay Stores	89.33	72.45	76.04	44.98	68.04	28.28
Coolblue	77.00	29.13	71.00	44.73	54.50	13.75
Rel Fresh	88.00	72.32	79.31	58.69	69.66	38.18
Atlas Stores	87.91	71.81	78.06	59.78	68.49	39.55
Expression Stores	88.51	69.92	78.00	60.83	69.00	38.39
Chiptec Stores	89.02	71.62	81.00	60.35	72.02	38.73
Propel Mart	86.68	73.64	79.34	59.74	68.68	40.92
Lotus Mart	77.31	28.11	75.34	53.35	57.99	16.34
Viveks Stores	88.99	70.61	81.00	60.07	72.50	39.44
Acclaimed Stores	76.36	29.43	75.47	52.36	57.79	15.47
Info Stores	92.00	70.94	71.04	41.16	65.53	25.52
Expert Mart	90.99	72.54	79.99	59.81	72.98	39.11
Sorefoz Mart	87.00	72.67	71.99	39.19	62.49	25.89
Logic Stores	87.50	70.82	76.00	60.14	66.50	38.78
Elite Mart	90.99	72.45	73.05	37.94	66.54	24.37

We are not up to the mark ,we were not able to match our target for all the customer, the lower OT%,IF% can cause us loss in contracts.

Similar situation is for all 3 cities.

city	target_ontime	OT_percentage	target_in_full	IF_percentage	target_OTIF	OTIF_percentage
Surat	85.47	61.21	76.69	52.55	65.57	30.07
Ahmedaba	85.04	58.16	77.01	54.2	65.62	29.33
Vadodara	85.24	57.98	75.27	51.56	64.16	27.78

Coolblue, Elite Mart and Sorefoz Mart are customers where LFR, VFR is minimum.

customer_name	LFR	VFR
Expert Mart	75.79	97.53
Chiptec Stores	75.71	97.64
Expression Stores	75.63	97.61
Propel Mart	75.33	97.55
Atlas Stores	75.22	97.52
Logic Stores	75.05	97.55
Viveks Stores	74.48	97.44
Rel Fresh	74.32	97.47
Lotus Mart	60.21	96.03
Vijay Stores	59.74	95.88
Acclaimed Stores	59.4	95.96
Info Stores	53.43	95.29
Sorefoz Mart	53.05	95.33
Elite Mart	52.72	95.17
Coolblue	51.45	95.01

Now lets see this Product wise. Our dairy product which is our top selling product is not performing well ,when we look at LFR, we were able deliver full quantity only around 65% of the time, leading to customer dissatisfaction.

product_name	LFR	VFR
AM Milk 500	67.51	96.71
AM Milk 250	65.91	96.57
AM Milk 100	65.55	96.53
AM Butter 100	66.66	96.66
AM Butter 250	63.52	96.32
AM Butter 500	65.19	96.46
AM Ghee 250	65.25	96.5
AM Ghee 150	66.72	96.69
AM Ghee 100	65.75	96.51
AM Curd 250	67.05	96.73
AM Curd 100	66.73	96.62
AM Curd 50	65.55	96.62
AM Biscuits 750	68.05	96.86
AM Biscuits 500	66.1	96.49
AM Biscuits 250	65.16	96.58
AM Tea 500	66.14	96.55
AM Tea 250	65.16	96.59
AM Tea 100	65.32	96.61

Monthly Trend of OT%, IF% and OTIF%.
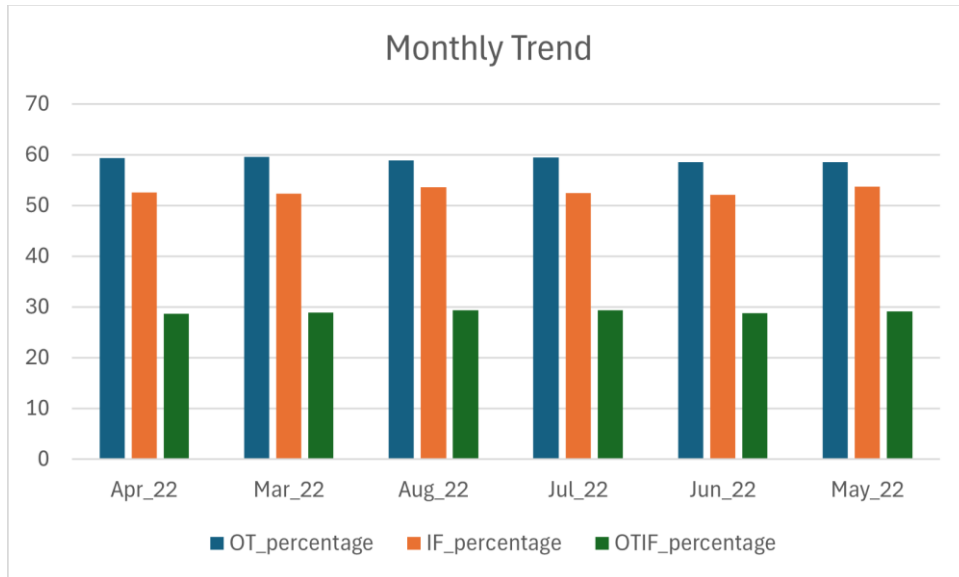
Monthly Trend of LFR and VFR.

Conclusion:-

The performance metrics indicate that while targets for IF%, OT%, and OTIF% are being met, the actual service levels to customers are not optimal. The inability to fulfill orders completely or on time has led to dissatisfaction and risk of contract losses. The VFR at around 65% and the OTIF% significantly lower than the target of 75-80% highlight critical areas for improvement. To address this, a more accurate forecasting of order quantities and production adjustments for various products may be required. Additionally, strategies to enhance on-time delivery must be prioritized to improve overall service quality and meet customer expectations.