SUPPLY CHAIN DATA ANALYSIS USING MICROSOFT POWER BI

"Supply Chain Management (SCM) means managing all the steps needed to make and deliver a product or service — from getting raw materials to delivering the final product to the customer."

OVERVIEW

- Problem Statement
- Datasets Used
- Column Descriptions
- ETL Process (Extract, Transform, Load)
- Data Model Overview
- Relationship diagram and explanation
- Calculated Columns
- Key Measures & KPIs
- Visual insights
- Conclusion
- Recommendations

PROBLEM STATEMENT

- AtliQ Mart is losing key customers due to poor delivery service.
- Essential products are often not delivered on time or in full.
- This has led to non-renewal of annual contracts by some customers.
- These delivery issues are damaging customer satisfaction and trust.
- Management wants to fix the problem before expanding to new cities.
- The supply chain team will track On-Time (OT%), In-Full (IF%), and On-Time In-Full (OTIF%) daily to monitor and improve performance.

DATASETS USED

This project contains these datasets:

1. dim_customers.csv
2. dim_products.csv
3. dim_date
4. dim_targets_orders
5. fact_order_lines.csv
6. fact_orders_aggregate.csv

COLUMNS DESCRIPTIONS

dim_customers: This table contains all the information about customers.

- **customer_id:** Unique ID is given to each customer
- **customer_name:** Name of the customer
- **city:** It is the city where the customer is present

dim_products: This table contains all the information about the products

- **product_name:** It is the name of the product
- **product_id:** Unique ID is given to each of the products
- **category:** It is the class to which the product belongs

dim_date: This table contains the dates at daily, monthly level and week numbers of the year

- **date:** date at the daily level
- **mmm_yy:** date at the monthly level
- **week_no:** week number of the year as per the date column

dim_targets_orders: This table contains all target data at the customer level

- **customer_id:** Unique ID that is given to each of the customers
- **ontime_target %:** Target assigned for Ontime % for a given customer
- **infull_target %:** Target assigned for infull % for a given customer
- **otif_target %:** Target assigned for otif % for a given customer

COLUMNS DESCRIPTIONS

fact_order_lines: This table contains all information about orders and each item inside the orders.

- **order_id:** Unique ID for each order the customer placed
- **order_placement_date:** It is the date when the customer placed the order
- **customer_id:** Unique ID that is given to each of the customers
- **product_id:** Unique ID that is given to each of the products
- **order_qty:** It is the number of products requested by the customer to be delivered
- **agreed_delivery_date:** It is the date agreed between the customer and AtliQ Mart to deliver the products
- **actual_delivery_date:** It is the actual date AtliQ Mart delivered the product to the customer
- **delivered_qty:** It is the number of products that are actually delivered to the customer

fact_orders_aggregate: This table contains information about OnTime, InFull and OnTime Infull information aggregated at the order level per customer

- **order_id:** Unique ID for each order the customer placed
- **customer_id:** Unique ID that is given to each of the customers
- **order_placement_date:** It is the date when the customer placed the order
- **on_time:** '1' denotes the order is delviered on time. '0' denotes the order is not delivered on time.
- **in_full:** '1' denotes the order is delviered in full quantity. '0' denotes the order is not delivered in full quantity.
- **otif:** '1' denotes the order is delviered both on time and in full quantity. '0' denotes the order is either not delivered on time or not in full quantity.

DATA PREPROCESSING

- **Extract - Imported datasets :**

  - **dim_customers.csv**
  - **dim_products.csv**
  - **dim_date**
  - **dim_targets_orders**
  - **fact_order_lines.csv**
  - **fact_orders_aggregate.csv**

- **Transform**

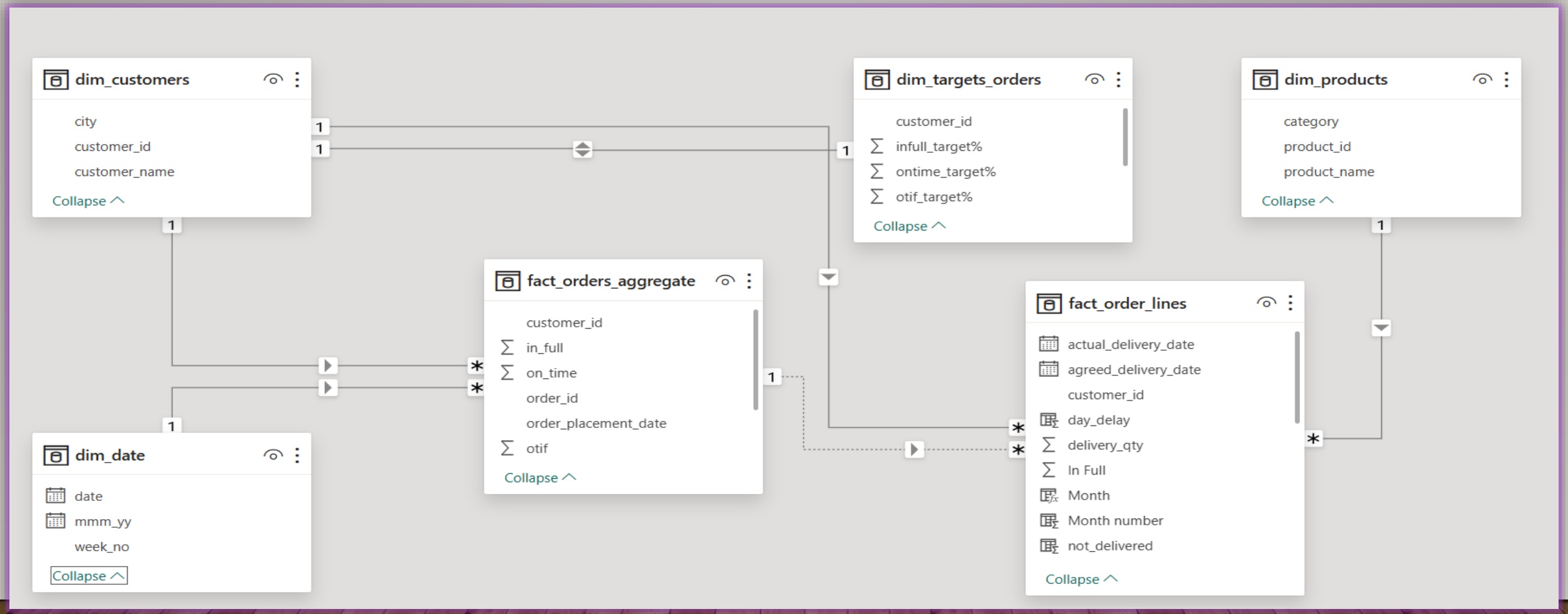
  - **Renamed and standardized column names**
  - **Removed nulls and irrelevant columns**
  - **Merged tables**
  - **Created custom columns**
  - **Removed duplicates**
  - **Filtered unnecessary records**

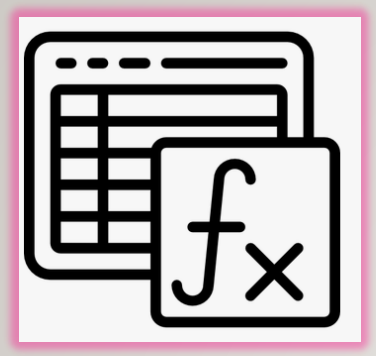
- **Load**

  - **Loaded all transformed tables into Power BI model**
  - **Created relationships**

- Measures Created

DATA MODEL OVERVIEW





CALCULATED COLUMNS

- **DATEDIFF()** - Used for: Calculating day delay between agreed_delivery_date and actual_delivery_date.
- **FORMAT()** - Used for: Converting order_placement_date into Month name format (e.g., Jan, Feb).
- **MONTH()** - Used for: Extracting month number from order_placement_date.
- **YEAR()** - Used for: Extracting year from order_placement_date.
- **WEEKNUM() with CONCATENATE()** - Used for: Creating Week Number labels (e.g., "W1", "W2", etc.).
- **Arithmetic Operation (-)** - Used for: Calculating not-delivered orders = orders_qty - delivery_qty.

KEY MEASURES

VOFR% (Measures Volume Fill Rate.) –

CALCULATE(SUM(delivery_qty)) / SUM(order_qty)

IF% (Measures In-Full performance.) –

CALCULATE(COUNT(order_lines[In Full])) / COUNT(order_lines[Total])

OT% (Measures On-Time performance.) –

CALCULATE(COUNT(order_lines[On Time])) / COUNT(order_lines[Total])

OTIF% (Measures On-Time In-Full rate.) -

CALCULATE(COUNT(order_lines[On Time In Full])) / COUNT(order_lines[Total])

LIFR% (Measures Line Item Fill Rate.)

CALCULATE(COUNT(order_lines[In Full])) / [Total Order Line]

Target-Based KPIs:

- **IF_avg** = AVERAGE(dim_target_orders[In Full %]) / 100
- **OT_avg** = AVERAGE(dim_target_orders[On Time %]) / 100
- **OTIF_avg** = AVERAGE(dim_target_orders[OTIF %]) / 100

Custom Measures

Total_order_line :

CALCULATE(COUNT(order_lines[order_id]))

- Used as denominator for other performance metrics.

MAIN KPI & CITY-WISE PERFORMANCE OVERVIEW

ATLIQ MART SUPPLY CHAIN DASHBOARD MANAGEMENT

Month

Select all | Apr | Aug | Jul | Jun | Mar | May

OTIF %

16.13% !

Goal: 0.66 (-75.53%)
2022

OT %

32.80% !

Goal: 0.86 (-61.89%)
2022

IF %

29.33% !

Goal: 0.77 (-61.67%)
2022

customer_id	OT%	IF%	OTIF%	VOFR%	LIFR%
789603	37.27%	32.79%	21.66%	97.59%	76.23%
789703	37.21%	30.69%	20.77%	97.69%	75.88%
789221	37.17%	31.26%	20.49%	97.54%	75.26%
789403	36.97%	30.60%	21.20%	97.71%	76.03%
789321	36.91%	30.70%	19.65%	97.61%	75.64%
789203	36.88%	30.22%	19.13%	97.39%	74.14%
789501	36.82%	31.02%	20.51%	97.50%	74.84%
789402	36.75%	29.39%	20.22%	97.76%	75.80%
789103	36.67%	8.76%	5.16%	93.05%	29.89%
789721	36.66%	31.30%	20.39%	97.58%	74.68%
789401	36.62%	29.55%	19.93%	97.65%	75.05%
789101	36.56%	29.39%	19.20%	97.34%	74.42%
789202	36.54%	30.31%	20.17%	97.37%	74.73%
789621	36.48%	29.54%	19.12%	97.42%	75.52%
789902	36.46%	29.58%	19.48%	97.63%	75.72%
789702	36.36%	8.97%	5.43%	92.99%	30.87%
789720	36.23%	30.60%	19.52%	97.32%	74.11%
789601	36.11%	9.88%	4.81%	92.84%	30.06%
789320	35.99%	30.72%	19.77%	97.56%	75.58%
789903	35.77%	8.23%	4.81%	92.92%	29.74%
789622	35.77%	30.01%	19.81%	97.45%	75.44%
789220	35.66%	29.36%	19.62%	97.61%	75.69%
789303	35.66%	32.14%	21.04%	97.70%	77.36%
Total	32.80%	29.33%	16.13%	96.59%	65.96%

LIFR %

65.96%

LIFR%

VOFR %

96.59%

VOFR%

TOTAL_ORDER_QTY

13.427M

Sum of order_qty

TOTAL_DELIVERED

12.969M

Sum of delivery_qty

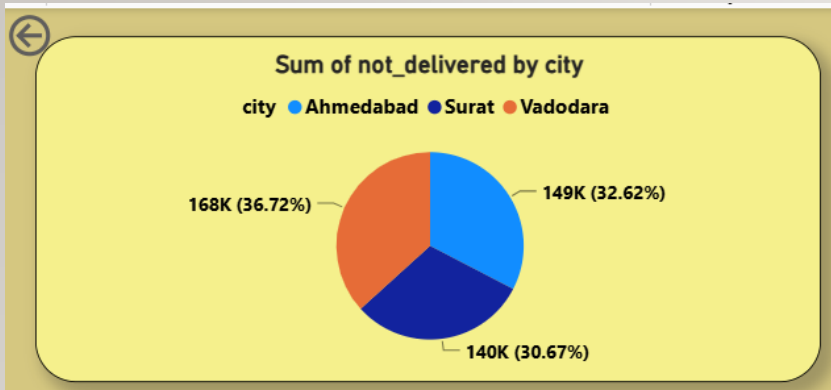
city	OTIF%	OTIF_avg	OT%	OT_avg	IF%	IF_avg
Ahmedabad	16.49%	0.67	32.69%	0.86	30.47%	0.77
Surat	16.34%	0.66	33.26%	0.86	28.56%	0.77
Vadodara	15.57%	0.65	32.50%	0.86	28.89%	0.75
Total	16.13%	0.66	32.80%	0.86	29.33%	0.77

Analysis:

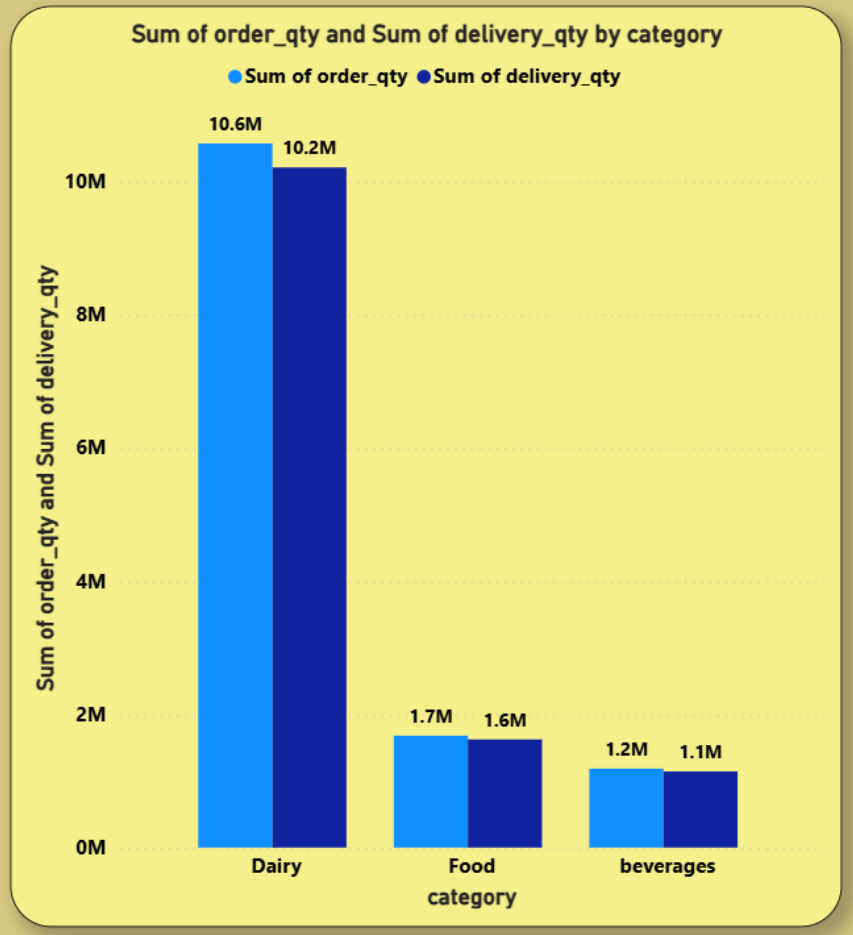
Poor delivery performance: OTIF (16.13%), OT (32.80%), and IF (29.33%) are far below targets, with many customers under 25%.

Systemic issue: Despite 96.59% volume delivered, low LIFR and poor OTIF across cities suggest widespread supply chain gaps

NON-DELIVERED ORDERS, CATEGORY-WISE ANALYSIS, AND PRODUCT-LEVEL TRENDS



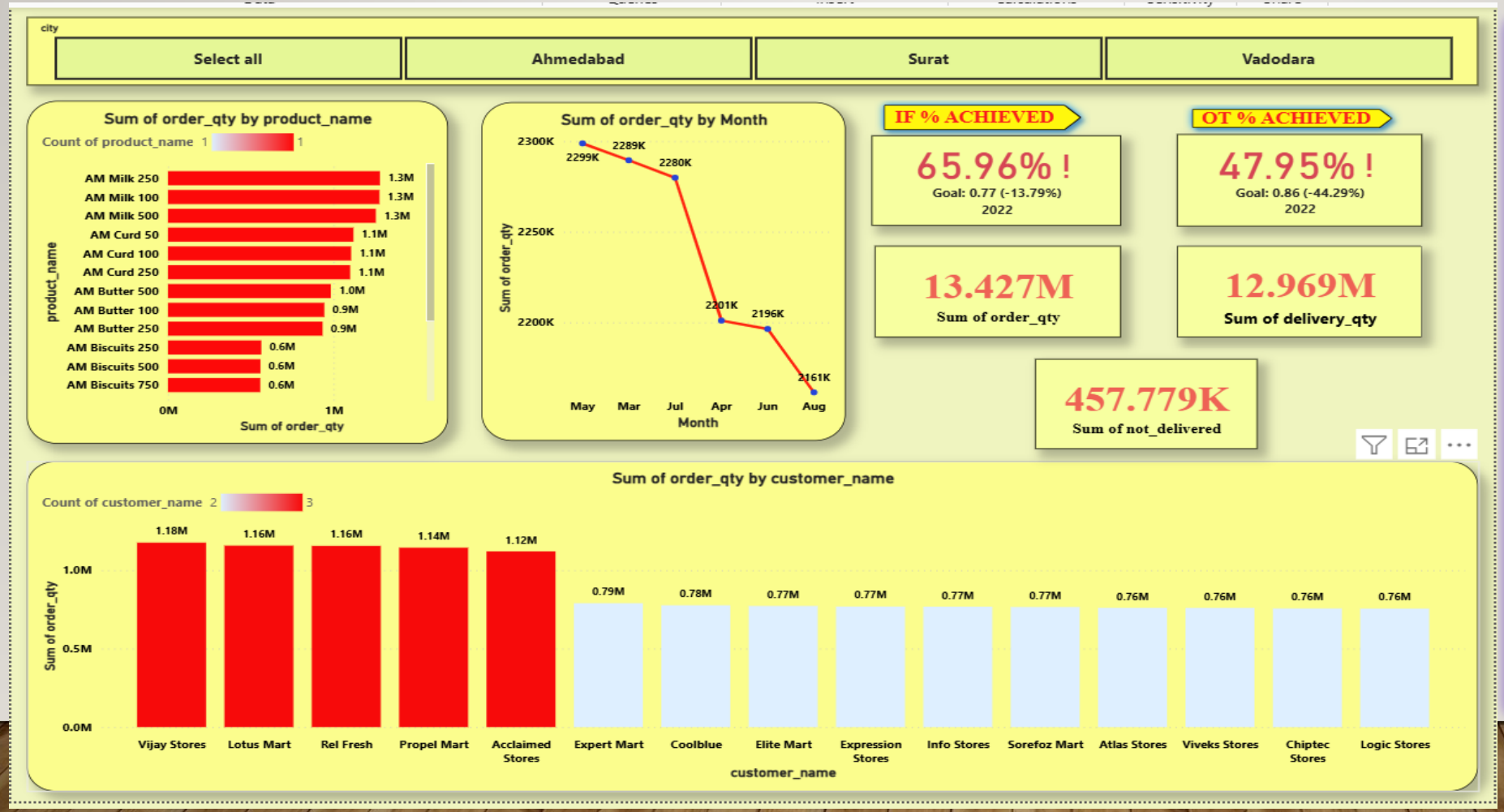
product_name	LIFR%	VOFR%	VOFR% by Week Number	LIFR% by Week Number
AM Biscuits 250	65.16%	96.58%		
AM Biscuits 500	66.10%	96.49%		
AM Biscuits 750	68.05%	96.85%		
AM Butter 100	66.66%	96.59%		
AM Butter 250	63.52%	96.36%		
AM Butter 500	65.19%	96.46%		
AM Curd 100	66.73%	96.62%		
AM Curd 250	67.05%	96.72%		
AM Curd 50	65.55%	96.62%		
AM Ghee 100	65.75%	96.59%		
AM Ghee 150	66.72%	96.69%		
AM Ghee 250	65.25%	96.53%		
AM Milk 100	65.55%	96.54%		
AM Milk 250	65.91%	96.61%		
AM Milk 500	67.51%	96.71%		
AM Tea 100	65.32%	96.59%		
AM Tea 250	65.16%	96.52%		
AM Tea 500	66.14%	96.52%		
Total	65.96%	96.59%		



Analysis:
Surat faces highest delivery issues, contributing 36.72% of non-delivered orders; Dairy leads order volume, making it the biggest contributor to supply gaps.

LIFR remains unstable (~65–68%), with products like "AM Butter 250" underperforming;VOFR is consistently high (~96–97%), indicating timely quantity delivery but incomplete order lines.

PRODUCT, TIME, AND CUSTOMER-BASED ANALYSIS



Analysis:
Milk SKUs drive majority of orders (1.1M–1.3M each); focus on top customers like Vijay Stores and Lotus Mart can significantly impact performance.

Order volume declining from May to August, with key service metrics (OT 47.95%, IF 65.96%) falling short of goals and 457K+ units undelivered.

CONCLUSION

- Overall service performance is poor with low OTIF (16.13%), OT (32.80%), and IF (29.33%).
- High VOFR (96.59%) indicates quantity is shipped, but not on time or in full.
- Surat leads in undelivered volume, pointing to logistical inefficiencies.
- Dairy products dominate order volume, making them critical to supply chain success.
- Top customers drive bulk of business — poor service here directly impacts revenue.
- Monthly order volume is declining, signaling potential demand or operational issues.

RECOMMENDATION

- Optimize delivery timelines using route planning and better logistics coordination.
- Improve warehouse operations to boost fulfillment accuracy (LIFR and IF%).
- Strengthen Dairy supply chain, focusing on high-volume SKUs like AM Milk.
- Prioritize top customers with tailored service levels and proactive issue resolution.
- Analyze order drop trends and initiate demand generation or retention efforts.
- Implement real-time monitoring via dashboards to flag OTIF issues early.


Thank
You