

SUPPLY CHAIN DATA ANALYSIS USING AI TOOLS

BUSINESS PROBLEM:

Atlique Mart, a rapidly growing organic food manufacturer, has seen its expansion constrained by an increasingly complex supply chain supported by outdated, manual data processes. The company's growth has outpaced its ability to effectively track, monitor, and optimize its operations. With data flowing in from various distributors as unstructured CSV files via email, the consolidation process is slow, error-prone, and heavily manual. This lack of real-time visibility into supply chain performance has forced the organization into a reactive mode of operation, preventing management from making timely, data-driven decisions. As a result, several critical challenges have emerged:

- **Lack of Timely Data:** Critical sales and fulfillment data was received in unstructured files via email, requiring slow, error-prone manual consolidation.
- **Poor Performance Visibility:** We were unable to consistently track crucial supply chain metrics, making it difficult to assess efficiency, hold partners accountable, and understand the customer experience.
- **Reactive Decision-Making:** The absence of real-time analytics led to frequent stockouts, excess inventory, and an inability to strategically address systemic issues, directly impacting revenue and customer satisfaction.

OUR SOLUTION:

To solve these challenges, we engineered a robust, automated solution with three core components:

1. **Automated Data Ingestion:** An n8n workflow was established to monitor incoming emails, automatically extract attached data files, and initiate the data processing workflow. This was enabled by creating secure access to the Gmail API.
2. **Centralized Data Warehouse:** All extracted data is cleaned, structured, and loaded into a central PostgreSQL database hosted on Supabase. We successfully created tables for all key business dimensions, including customers, products, and order lines, establishing a single source of truth.
3. **AI-Powered Analytics & Visualization:** Using Quadratic AI, we connect directly to the database to perform complex analysis. This tool allows us to clean and merge data, calculate critical KPIs, and generate answers to key business questions using streamlined prompts.

Final Aggregated Table:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	
1	OrderAnalysis																Sep 6, 2025
2	order_id	order_placement_date	customer_id	product_id	order_qty	agreed_delivery_date	actual_delivery_date	delivery_qty	In Full	On Time	On Time In Full	product name	category	customer...	city	total amount INR	
3	FMR34203601	03/01/2025	789203	25891601	110	03/04/2025	03/04/2025	110.1	1	1	1	AM Tea 500	beverages	Rel Fresh	Vadodara	24750	
4	FMR332030501	03/01/2025	789320	25891203	347	03/02/2025	03/02/2025	347.1	1	1	1	AM Butter 500	Dairy	Whole Foods	New Jersey, US	104100	
5	FMR33320501	03/01/2025	789320	25891203	187	03/03/2025	03/03/2025	150.0	1	0	0	AM Butter 500	Dairy	Whole Foods	New Jersey, US	56100	
6	FMR34220601	03/01/2025	789220	25891203	235	03/04/2025	03/04/2025	235.1	1	1	1	AM Butter 500	Dairy	ShopRite	New Jersey, US	70500	
7	FMR33703603	03/01/2025	789703	25891203	176	03/03/2025	03/03/2025	176.1	1	1	1	AM Butter 500	Dairy	Sorefoz Mart	Vadodara	52800	
8	FMR33721603	03/01/2025	789721	25891203	345	03/03/2025	03/03/2025	345.1	1	1	1	AM Butter 500	Dairy	Logic Stores	Ahmedabad	103500	
9	FMR33420203	03/01/2025	789420	25891203	138	03/03/2025	03/06/2025	138.1	0	0	0	AM Butter 500	Dairy	Lidl	New Jersey, US	41400	
10	FMR34420402	03/01/2025	789420	25891203	381	03/04/2025	03/05/2025	381.1	0	0	0	AM Butter 500	Dairy	Lidl	New Jersey, US	114300	
11	FMR32403401	03/01/2025	789403	25891203	348	03/02/2025	03/02/2025	348.1	1	1	1	AM Butter 500	Dairy	Propel Mart	Vadodara	104400	
12	FMR34121203	03/01/2025	789121	25891203	480	03/04/2025	03/06/2025	480.1	0	0	0	AM Butter 500	Dairy	Coolblue	Ahmedabad	144000	
13	FMR32501601	03/01/2025	789501	25891203	478	03/02/2025	03/02/2025	478.1	1	1	1	AM Butter 500	Dairy	Best Market	New Jersey, US	143400	
14	FMR34501203	03/01/2025	789501	25891203	491	03/04/2025	03/04/2025	491.1	1	1	1	AM Butter 500	Dairy	Best Market	New Jersey, US	147300	
15	FMR34102602	03/01/2025	789102	25891203	407	03/04/2025	03/04/2025	387.0	1	0	0	AM Butter 500	Dairy	Vijay Stores	Ahmedabad	122100	
16	FMR33902203	03/01/2025	789902	25891203	299	03/03/2025	03/03/2025	299.1	1	1	1	AM Butter 500	Dairy	Elite Mart	Ahmedabad	89700	
17	FMR34903603	03/01/2025	789903	25891203	329	03/04/2025	03/04/2025	329.1	1	1	1	AM Butter 500	Dairy	Elite Mart	Vadodara	96700	
18	FMR3421203	03/01/2025	789421	25891203	441	03/02/2025	03/03/2025	419.0	0	0	0	AM Butter 500	Dairy	Lotus Mart	Ahmedabad	132300	
19	FMR3421203	03/01/2025	789421	25891203	104	03/03/2025	03/06/2025	99.0	0	0	0	AM Butter 500	Dairy	Lotus Mart	Ahmedabad	31200	
20	FMR33402203	03/01/2025	789402	25891203	491	03/03/2025	03/05/2025	491.1	0	0	0	AM Butter 500	Dairy	Propel Mart	Ahmedabad	147300	
21	FMR33621603	03/01/2025	789621	25891203	138	03/03/2025	03/03/2025	138.1	1	1	1	AM Butter 500	Dairy	Expert Mart	Ahmedabad	41400	
22	FMR34520301	03/01/2025	789520	25891203	172	03/04/2025	03/04/2025	155.0	1	0	0	AM Butter 500	Dairy	Fairway Marke	New Jersey, US	51600	
23	FMR33702302	03/01/2025	789702	25891302	38	03/03/2025	03/03/2025	30.0	1	0	0	AM Ghee 150	Dairy	Sorefoz Mart	Ahmedabad	5130	
24	FMR23320302	03/01/2025	789320	25891302	54	03/02/2025	03/02/2025	54.1	1	1	1	AM Ghee 150	Dairy	Whole Foods	New Jersey, US	7290	
25	FMR34603302	03/01/2025	789603	25891302	37	03/04/2025	03/04/2025	37.1	1	1	1	AM Ghee 150	Dairy	Info Stores	Vadodara	4995	
26	FMR34721502	03/01/2025	789721	25891302	63	03/04/2025	03/05/2025	60.0	0	0	0	AM Ghee 150	Dairy	Logic Stores	Ahmedabad	8505	
27	FMR33621302	03/01/2025	789621	25891302	56	03/03/2025	03/04/2025	56.1	0	0	0	AM Ghee 150	Dairy	Expert Mart	Ahmedabad	7560	
28	FMR32520302	03/01/2025	789520	25891302	54	03/02/2025	03/03/2025	49.0	0	0	0	AM Ghee 150	Dairy	Fairway Marke	New Jersey, US	7290	
29	FMR33520601	03/01/2025	789520	25891302	42	03/03/2025	03/05/2025	34.0	0	0	0	AM Ghee 150	Dairy	Fairway Marke	New Jersey, US	5670	
30	FMR34520302	03/01/2025	789520	25891302	23	03/04/2025	03/05/2025	22.0	0	0	0	AM Ghee 150	Dairy	Fairway Marke	New Jersey, US	3105	
31	FMR32420602	03/01/2025	789420	25891302	49	03/02/2025	03/04/2025	49.1	0	0	0	AM Ghee 150	Dairy	Lidl	New Jersey, US	6615	
32	FMR32903402	03/01/2025	789902	25891302	70	03/02/2025	03/02/2025	70.1	1	1	1	AM Ghee 150	Dairy	Elite Mart	Ahmedabad	9450	
33	FMR32521302	03/01/2025	789521	25891302	34	03/02/2025	03/03/2025	34.1	0	0	0	AM Ghee 150	Dairy	Acclaimed Stor	Ahmedabad	4590	
34	FMR32720302	03/01/2025	789720	25891302	49	03/02/2025	03/02/2025	49.1	1	1	1	AM Ghee 150	Dairy	Colonial Farms	New Jersey, US	6615	
35	FMR33401603	03/01/2025	789401	25891302	40	03/03/2025	03/03/2025	40.1	1	1	1	AM Ghee 150	Dairy	Wegmans	New Jersey, US	5400	
36	FMR33121302	03/01/2025	789121	25891302	26	03/03/2025	03/03/2025	26.1	1	1	1	AM Ghee 150	Dairy	Coolblue	Ahmedabad	3510	
37	FMR32903403	03/01/2025	789903	25891302	42	03/02/2025	03/02/2025	40.0	1	0	0	AM Ghee 150	Dairy	Elite Mart	Vadodara	5670	
38	FMR32422302	03/01/2025	789422	25891302	67	03/02/2025	03/05/2025	54.0	0	0	0	AM Ghee 150	Dairy	Lotus Mart	Vadodara	9045	

Key Performance Indicators (KPIs) Now Being Tracked:

This new system provides continuous monitoring of the most important supply chain metrics, measuring our ability to meet customer demand effectively.

- **On-Time Delivery (OTD):** Measures if an order is delivered by the agreed-upon date. This is a key metric for our warehouse and distribution teams.
- **In-Full Delivery (IF):** Measures if the customer receives the exact quantity of items they requested. An order is only "In-Full" if all its items are delivered completely.
- **On-Time In-Full (OTIF):** Considered the gold standard of performance, this hard metric measures our ability to deliver exactly what the customer ordered, exactly when they expected it. It is the ultimate measure of reliability from the customer's point of view.
- **Line & Volume Fill Rates:** Internal metrics used by the supply planning team to understand fulfillment performance at a more granular level.

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	A	B	C	D
1	KPICalculations		Sep 6, 2025	
2	KPI	Value		
3	Total Order Lines	24195		
4	Line Fill Rate (%)	65.93		
5	Volume Fill Rate (%)	96.6		
6	Total Orders	13467		
7	On Time Delivery (%)	71.21		
8	In Full Delivery (%)	65.93		
9	On Time In Full (%)	47.84		
10				
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BUSINESS QUESTIONS:

1. Top 5 customers in India based on order value and their OTIF %, IF %, OT %

	A	B	C	D	E	F	G	H	I
1	📊 TopCustomersAnalysis								Sep 6, 2025
2	customer_id	customer_name	city	Total_Order_Valu...	OTIF_Perc...	IF_Percen...	OT_Perce...	Total_Orders	
3	789402	Propel Mart	Ahmedabad	18534490	64.64	74.26	86.28	707	
4	789902	Elite Mart	Ahmedabad	18194928	66.25	76.33	86.41	714	
5	789102	Vijay Stores	Ahmedabad	18154402	59.86	73.61	82.45	735	
6	789521	Acclaimed Stores	Ahmedabad	18117153	18.36	73.03	26.54	697	
7	789103	Vijay Stores	Vadodara	17970915	25.25	28.94	87.09	705	
8									
9									
10									
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2. Quantify the revenue loss attributed to undelivered orders.

	A	B	C
1	RevenueLossAnalysis		Sep 6, 2025
2	Metric	Value	
3	Total Potential Revenue (INR)	604,874,419.00	
4	Actual Delivered Revenue (INR)	583,964,636.00	
5	Revenue Loss from Undelivered Orders (INR)	20,909,783.00	
6	Revenue Loss Percentage	3.46%	
7			
8			
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3. Identify customers with the most significant On-Time, In Full (OTIF) discrepancies.

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4. Calculate the average delay time for late deliveries.

	A	B	C
1	🔗 DeliveryDelayAnalysis	Sep 6, 2025	
2	Metric	Value	
3	Average Delay for Late Deliveries (days)	1.69	
4	Median Delay for Late Deliveries (days)	2.00	
5	Maximum Delay (days)	3	
6	Minimum Delay (days)	1	
7	Total Late Deliveries	6966	
8	Percentage of Orders Delayed	28.79%	
9			
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5. Identify product categories with the lowest 'In Full' delivery rates. What could this indicate about supply chain bottlenecks?

	A	B	C	D	E	F
1	🔗 CategoryInFullAnalysis					Sep 6, 2025
2	Product_C...	In_Full_Percentage	Fill_Rate_Percentage	Total_Ord...	Total_Ord...	Total_Deli...
3	Dairy	65.8	96.59	16086	4453599	4301946
4	Food	66.18	96.59	4095	720325	695746
5	beverages	66.22	96.61	4014	502524	485474
6						
7						

Based on the data showing all three product categories (Dairy, Food, and beverages) having similarly low "In Full" delivery rates around 65-66%, this suggests **systemic supply chain bottlenecks** rather than category-specific issues. Here's what this could indicate:

Key Indicators:

- Fill rates are high (96.6%) but In Full rates are low (66%) - this suggests orders are being partially fulfilled but rarely completely fulfilled
- The consistency across categories points to systemic rather than category-specific issues

This pattern typically indicates problems in the order fulfillment process rather than production or sourcing issues specific to any one product category.

Strategic Recommendations & Next Steps:

- **Prioritize High-Value Customer Service:** Engage with top customers who have been identified as having low On-Time In-Full (OTIF) rates to address service gaps and rebuild confidence.
- **Conduct Root Cause Analysis:** Launch a targeted investigation into the product categories experiencing the lowest 'In-Full' rates. This will help identify and resolve underlying supply, inventory, or logistics issues.
- **Set Performance Improvement Targets:** Use the newly established OTIF and average delivery delay metrics to set clear, measurable performance goals for the supply chain and distribution teams.
- **Embed Data-Driven Reviews:** Incorporate the insights and dashboards from this analytics system into regular business review meetings to ensure continuous monitoring and foster a culture of data-driven improvement.