



IITM Online BS Degree Program,
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Chennai, Tamil Nadu, India, 600036

REFRIGERATE THE RISK: OPTIMIZING INVENTORY & OPERATIONS IN DAIRY RETAIL

Submitted by
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Organizational Background



Business

Kribhco Karmachari Sahkari Dhiran Purvarsh Society

Location

Kribhco Township, Hazira, Surat

Organization Type

B2C Organization

Founded

Year 2000 | Dairy & ice cream shop

Owner Name

Mr. Ashok Jana

No. of Employees

Shop owner + 6 delivery boys

Problem Statements

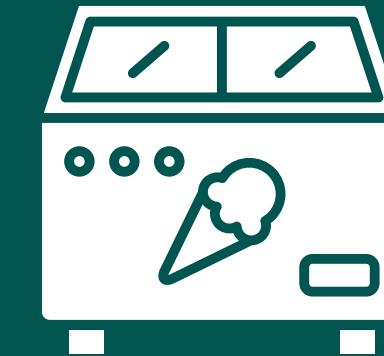
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Inventory Management Issues

Frequent overstocking and stockouts due to absence of demand pattern recognition, resulting in either wastage or missed sales.

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Cold Storage Concerns

Risk of milk and ice cream spoilage due to inadequate temperature control during extended power outages and lack of cold-chain monitoring.

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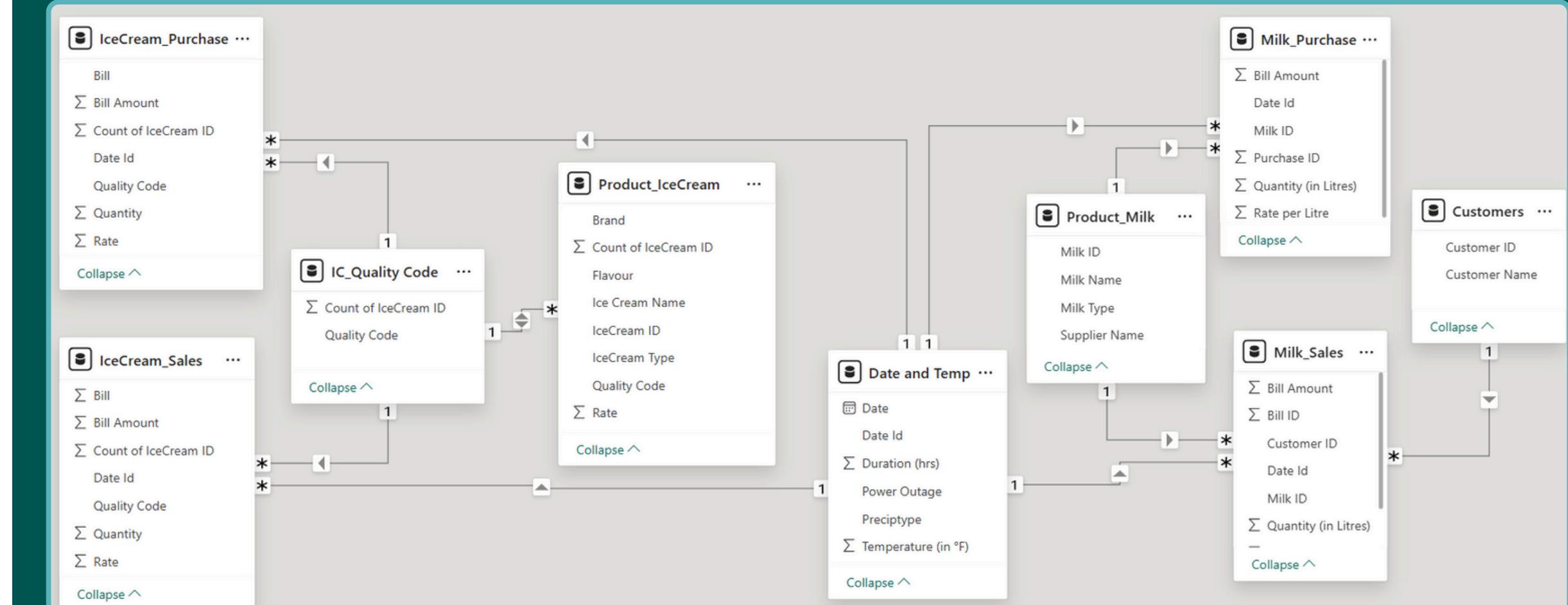


Delivery Disruptions

Home delivery issues such as packet damage and delays, especially during high-demand or bulk delivery scenarios.

Data Collection

- Data Type:** Primary
- Duration:** April 2024 - March 2025
- Source:** Raw Excel files, Supplier Bill Invoices, Transaction Register
- Products Sold:** Milk and Ice Cream



Raw Data



Data Cleaning Methods Applied

Cleaned Data



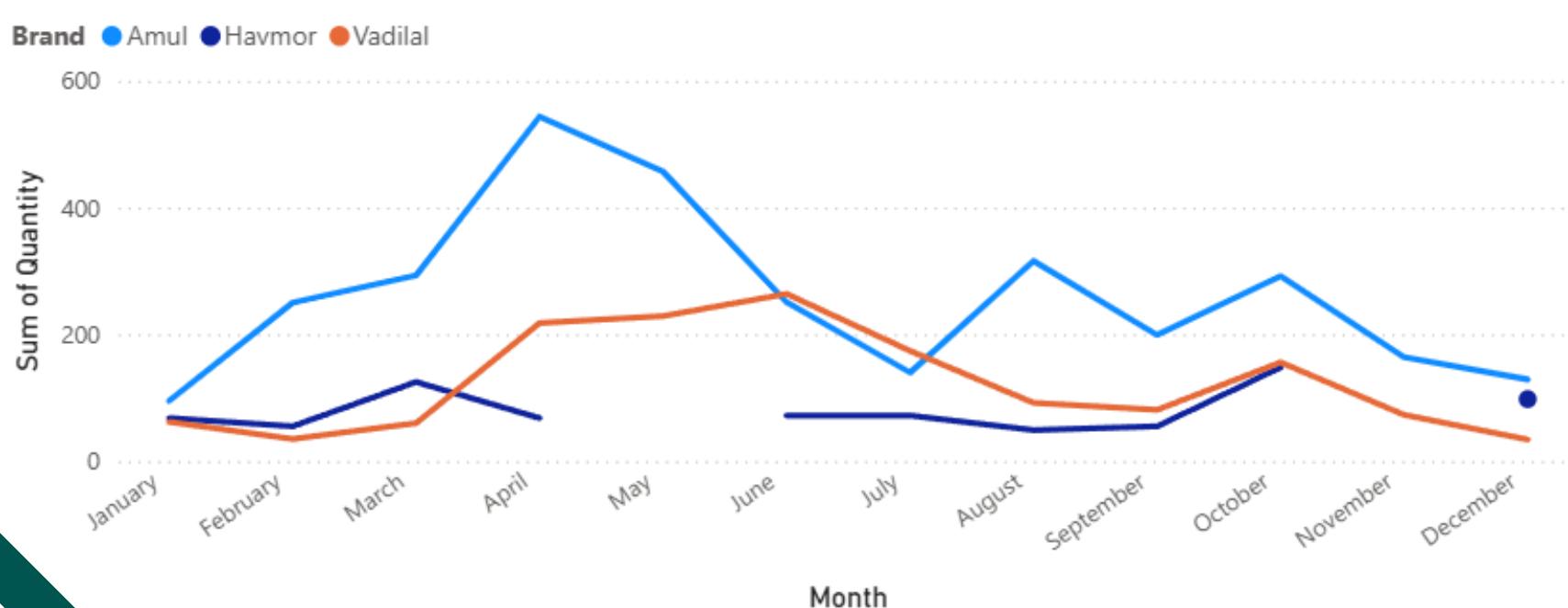
Data Cleaning Methodology:

- Structured data into star schema with fact and dimension tables.
- Standardized names, dates; removed duplicates, aligned columns.
- Mapped ice cream quality codes to product attributes via records/research.

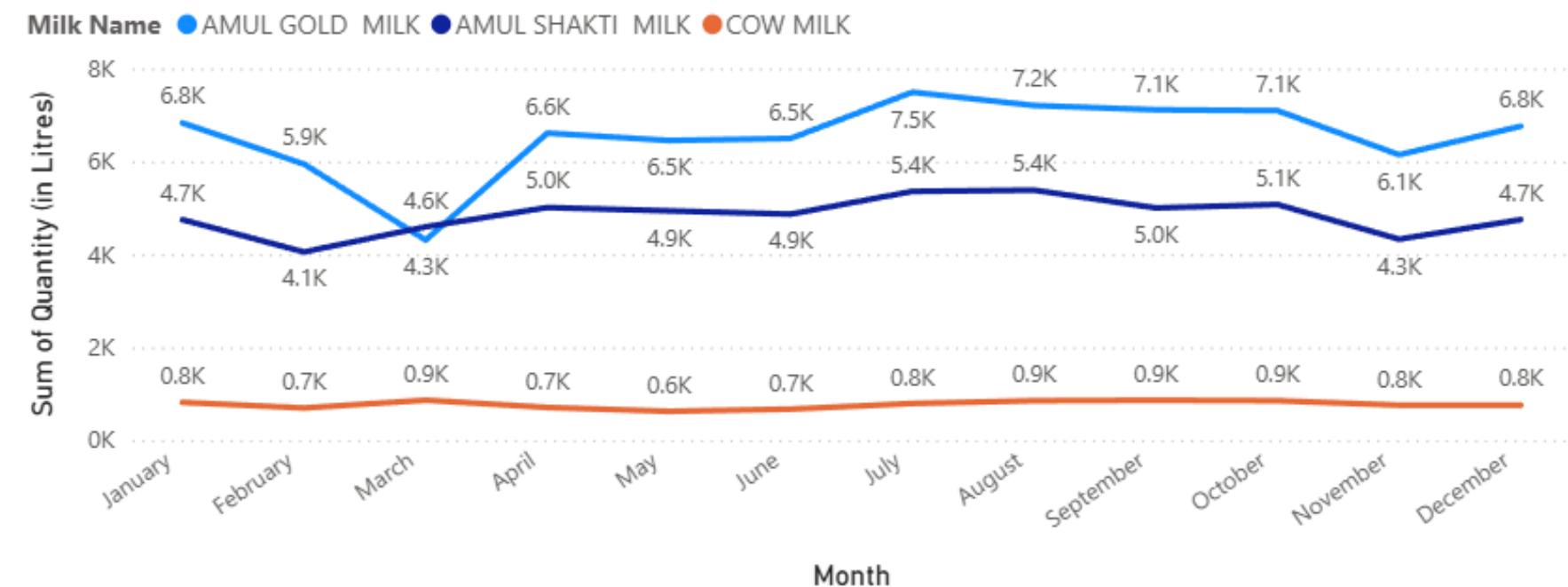
Demand Trend Analysis

- Amul Gold:** Year-round sales leader with steady demand.
- Amul Shakti:** Peaks mid-year, mirroring Amul Gold's seasonal trend.
- Cow Milk:** Steady but low sales, serving a niche segment.
- Seasonality:** Demand peaks in summer (Jul–Oct), dips in fall/winter with a brief slowdown in November before recovering in December.
- Overall:** Amul Gold & Shakti drive majority of milk sales, crucial for planning deliveries & labor.

Monthly Ice Cream Brand Demand Pattern



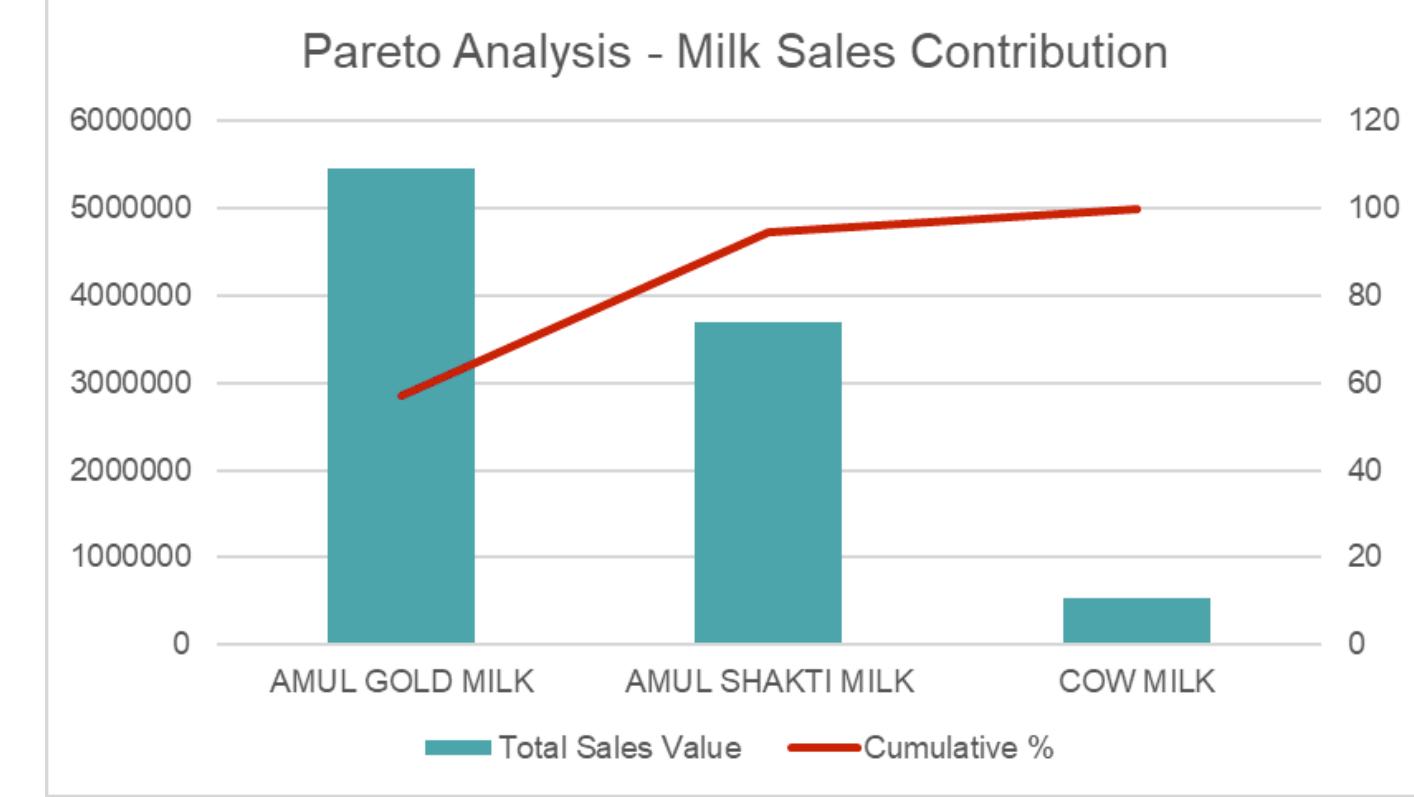
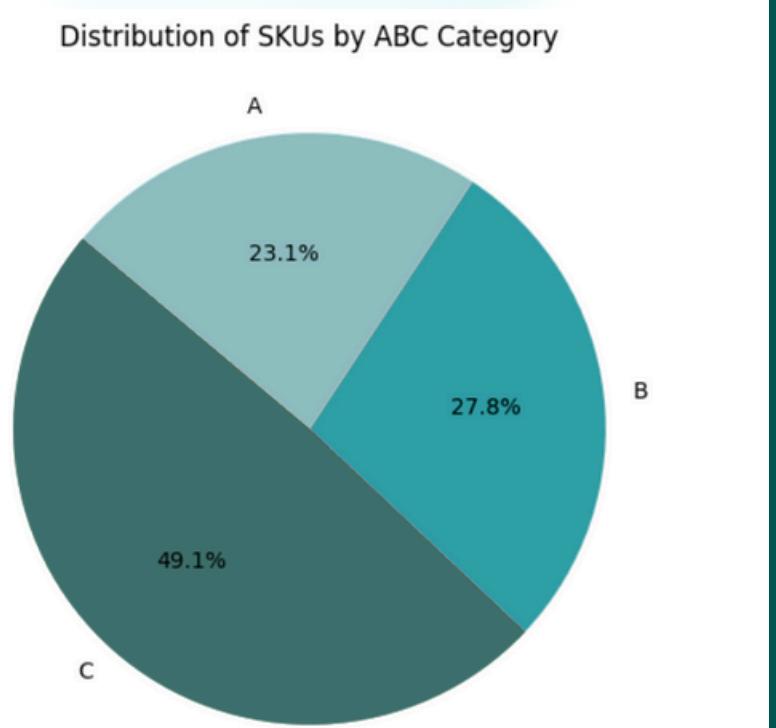
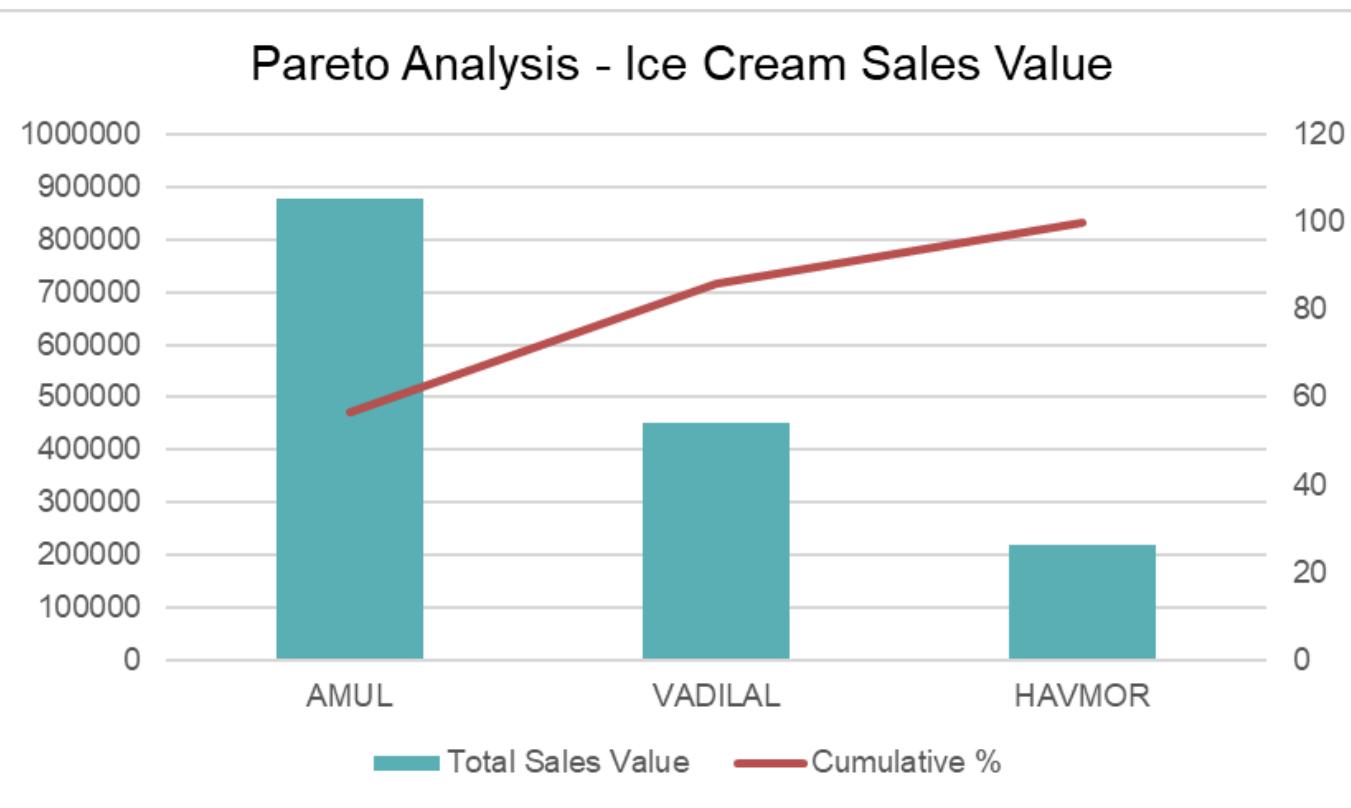
Monthly Milk Consumption Pattern



- Amul:** Market leader with major peaks in April and August (summer-driven demand).
- Vadilal:** Consistently second; peak in June and secondary rise in October.
- Havmor:** Lowest but most stable sales
- Peak Periods:** April–June, Amul dominates. However, August–October, all three brands active.
- Overall:** Amul shows broad appeal, Vadilal steady competition, Havmor consistent but smaller role.

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Product Performance Analysis



- A items (23.1%)** – Major revenue drivers; ensure high availability.
- B items (27.8%)** – Medium value; keep balanced stock.
- C items (49.1%)** – Nearly half of SKUs but low revenue; consider consolidation.
- Amul (~60%)** – Top priority; avoid stockouts.
- Vadilal** – Second key contributor; maintain focus.
- Havmor** – Minor share; lower priority.

- Amul Gold Milk (A)**: Highest revenue contributor.
- Amul Shakti (B)**: Moderate revenue but **highest profit** margin.
- Cow Milk (C)**: Minimal Contribution

Consumer Behavior Analysis

Flavor-wise Sales:

- Top Flavors: Chocolate, Butterscotch, and Mango lead sales.
- Mid Flavors: Kulfi and Vanilla hold notable share.
- Long Tail: Many niche flavors contribute small volumes, aligning with ABC 'C' category items.

Ice Cream Type Popularity:

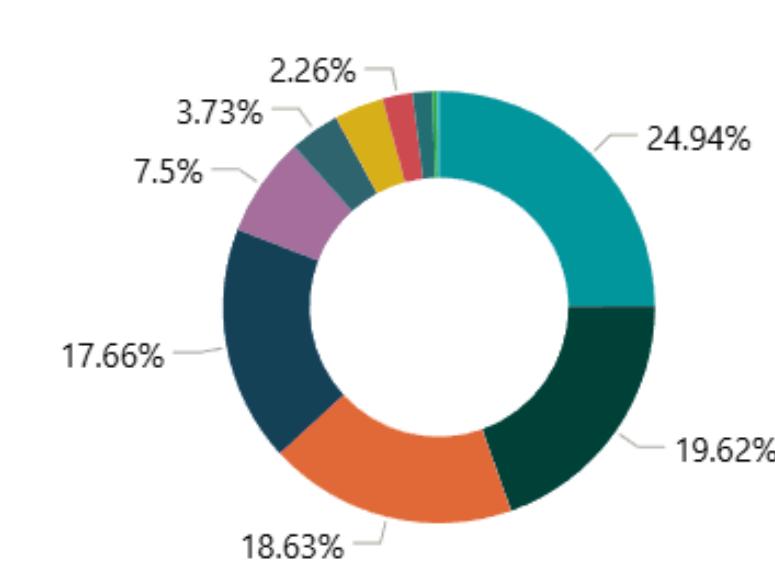
- Top Formats: Stick (24.94%) and Cup (19.62%).
- Mid Formats: Family Pack (18.63%) and Tub (17.66%).
- Low Formats: Cone, Cassatta, and Party Pack have limited demand.

- High-Value Customers: Few loyal buyers dominate sales (e.g., Bijay 19.08K units, Nirupa 11.23K).
- Long Tail: Many smaller buyers contribute collectively to demand.
- Preference: 60.15% favor Full Cream Milk, rest Toned Milk.
- Consumer behavior shows reliance on a few key customers and a clear tilt toward full cream milk.

Flavor-wise Sales Breakdown



Popularity of IceCream Type

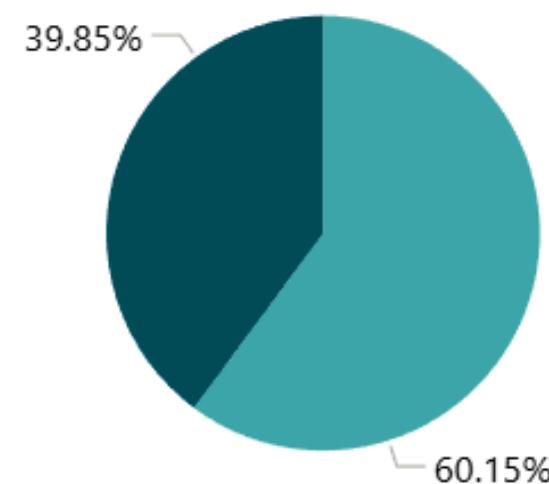


Top Loyal Milk Customers



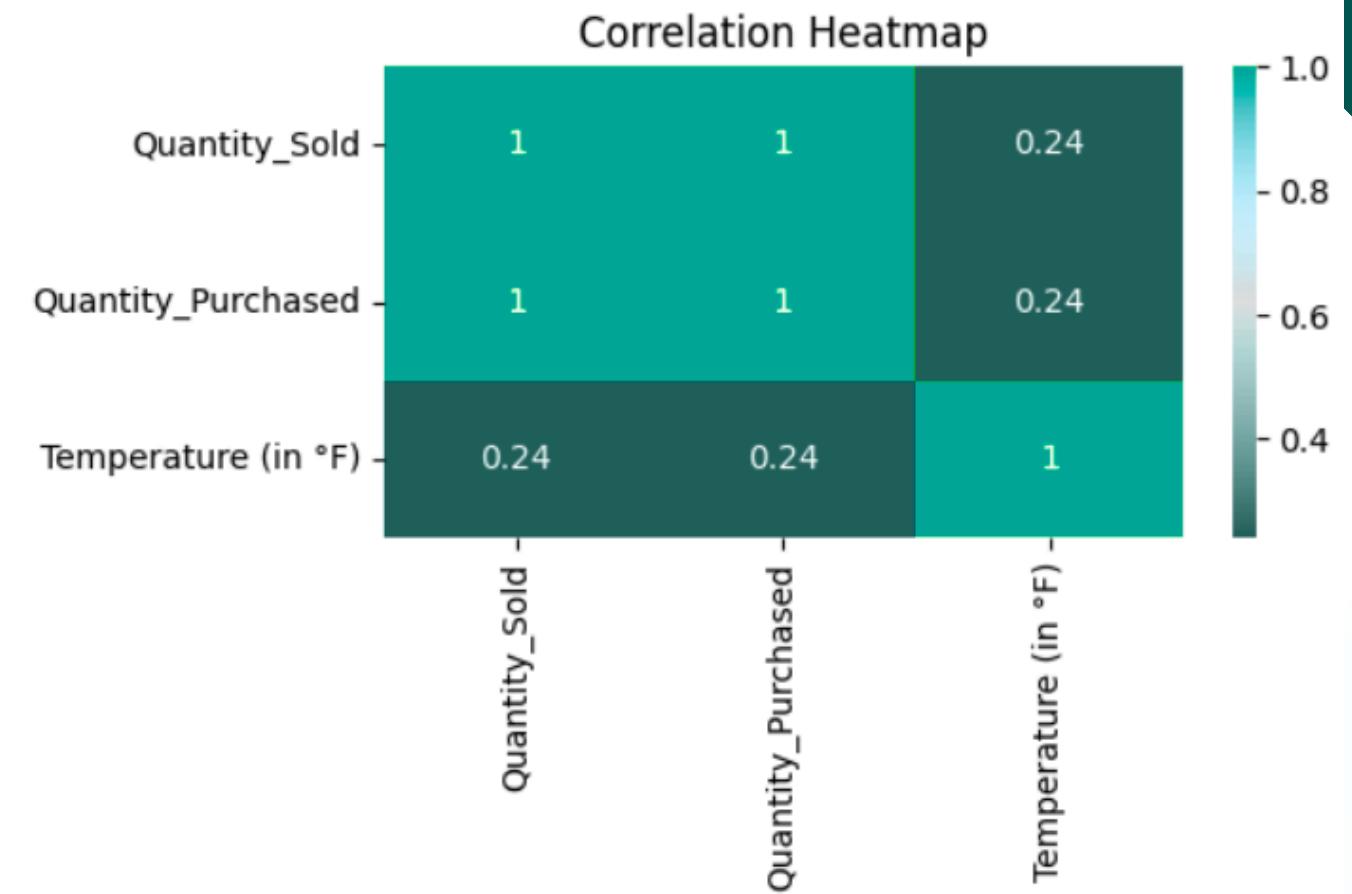
Consumer Milk Type Preferences

Milk Type ● Full Cream ● Toned

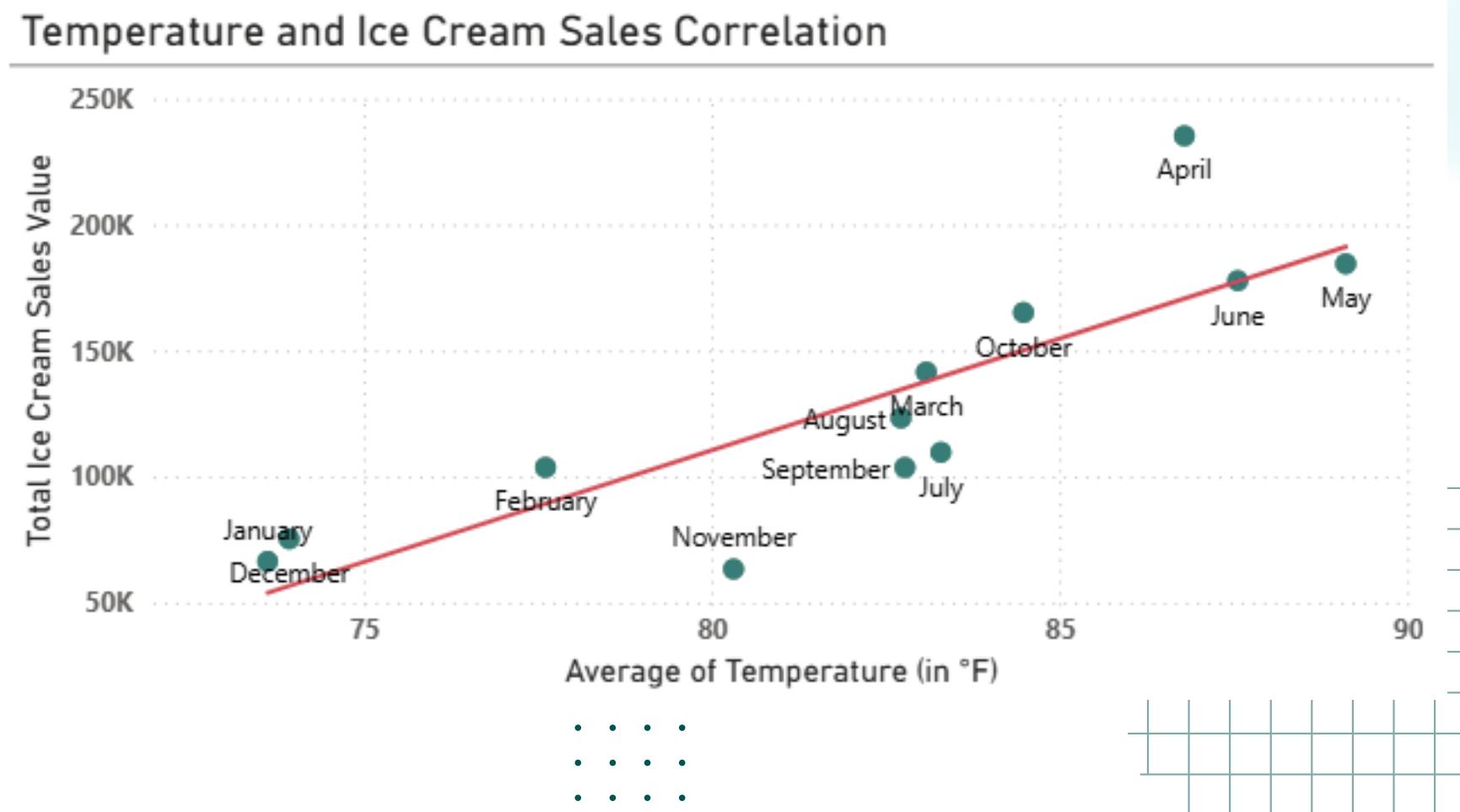


Correlation Analysis

- **Sales-Purchase Match (1.00):** Purchases mirror sales as returns aren't recorded, limiting demand accuracy.
- **Temperature Impact (0.24):** Minimal effect on demand.



- **Positive Correlation:** Ice cream sales rise as temperature increases from 70°F to 85°F.
- **Decline around 90°F:** Sales drop slightly at very high temperatures (~90°F).
- **Seasonality:** Confirms temperature as a key driver, with strong seasonal sales patterns.



Recommendations

Inventory Optimization

- Use past sales trends (milk: Apr–Aug, ice cream: Apr–Jun & Aug–Oct) to set dynamic stock levels instead of fixed reorders.
- Prioritize Category A SKUs for full availability; review Category C SKUs for phase-out or demand-boosting offers (discounts/combos).
- Restock fast movers regularly; order slow movers only on customer request.

Perishable Product Handling

- Order just enough stock for 7–10 days to prevent spoilage.
- Use insulated boxes or inverter-cooler combos to maintain temperatures during outages.
- Label stocks with dates to ensure FIFO usage.

Strategic Delivery Planning

- Scale manpower & vehicles during peak summer & festive periods, not year-round.
- Split large orders (above median size) into smaller parcels to reduce damage.
- Cluster orders by area, design efficient routes, and assign staff to minimize travel time and fuel.
- Prioritize top loyal customers during peak days to minimize churn risk.

**THANK
YOU**

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