Sales and Inventory Management Analysis Technical Documentation

Implemented
by

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Project Overview

The Sales and Inventory Management Dashboard is designed to provide business owners and decision-makers with insightful analytics related to sales performance and inventory levels. By leveraging Power BI's robust data visualization capabilities, the dashboard enables users to make informed decisions that enhance operational efficiency and profitability.

Objectives:

- **Analyze Sales Trends:** Track sales performance over time to identify seasonal trends, peak sales periods, and overall revenue generation.
- **Manage Inventory Effectively:** Monitor inventory levels to ensure optimal stock availability, minimize carrying costs, and prevent stockouts.
- **Facilitate Decision-Making:** Provide actionable insights through data-driven analysis that supports strategic planning and operational adjustments.

Data Requirements

Data Sources:

- **SQL Server Database:**
  - Transformed CSV files into tables within the SQL Server database, ensuring structured and efficient data management.
- **Fact Tables:**
  - Fact_Orders: Contains order details.
  - Fact_Order_Items: Details individual items in orders.
  - Fact_Sales: Records all sales transactions, including tax details.
  - Fact_Inventory: Tracks stock levels across different products.
- **Dimension Tables:**
  - Dim_Brands: Information about product brands.
  - Dim_Products: Details of products, including cost per unit.
  - Dim_Suppliers: Supplier-related data.
  - Dim_Stores: Information about retail locations.
  - Dim_Time: Timeline data for sales and inventory analysis.

Data Transformations:

1- Data Cleaning

Data cleaning process involved reviewing the raw CSV files to identify and remove all records related to alcoholic products. Each entry connected to these products was eliminated from the dataset to ensure compliance with ethical standards. This step enhanced the quality of the data used for analysis, allowing the Sales and Inventory Management Dashboard to focus solely on relevant products. By prioritizing the integrity of the data, the project is well-positioned to provide accurate insights into inventory management and sales performance.

Steps to remove alcoholic products

- **Update all orders that contains Alchloic products**

  The total cost of orders containing alcoholic products was adjusted to remove the associated costs. The SQL query calculated the total cost of alcoholic items in each order and updated the Fact_Orders table accordingly.

```
WITH AlcoholicOrderItems AS (
   SELECT
      OrderID,
      SUM(Quantity * DP.PurchasePrice) AS AlcoholicTotalCost
   FROM
      Fact_Order_Items FOI
   JOIN
      Dim_Products DP ON FOI.ProductID = DP.ProductID
   WHERE
      DP.Classification = 'Alchloic'
   GROUP BY
      FOI.OrderID
          ORDER BY
                  AlcoholicTotalCost
)
UPDATE Fact_Orders
SET Total = Total - COALESCE(AO.AlcoholicTotalCost, 0)
FROM Fact_Orders FO
LEFT JOIN AlcoholicOrderItems AO ON FO.OrderID = AO.OrderID
WHERE AO.AlcoholicTotalCost IS NOT NULL
```

- **Remove Records from the Fact_Sales Table:**

  All sales records related to alcoholic products were deleted.

```
DELETE FROM Fact_Sales WHERE ProductID IN ( SELECT ProductID FROM Dim_Products WHERE Classification = 'Alchloic' )
```

- **Remove Records from the Fact_Order_Items Table:**

  Entries for alcoholic products were also removed from the order items table.

```
DELETE FROM Fact_Order_Items
WHERE ProductID IN (
   SELECT ProductID
   FROM Dim_Products
   WHERE Classification = 'Alchloic'
)
```

- **Remove Records from the Fact_Inventory Table:**

  All inventory records related to alcoholic products were deleted.

```
DELETE FROM Fact_Inverntory
WHERE ProductID IN (
   SELECT ProductID
   FROM Dim_Products
   WHERE Classification = 'Alchloic'
)
```

- **Remove Alcoholic Products from the Dim_Products Table:**

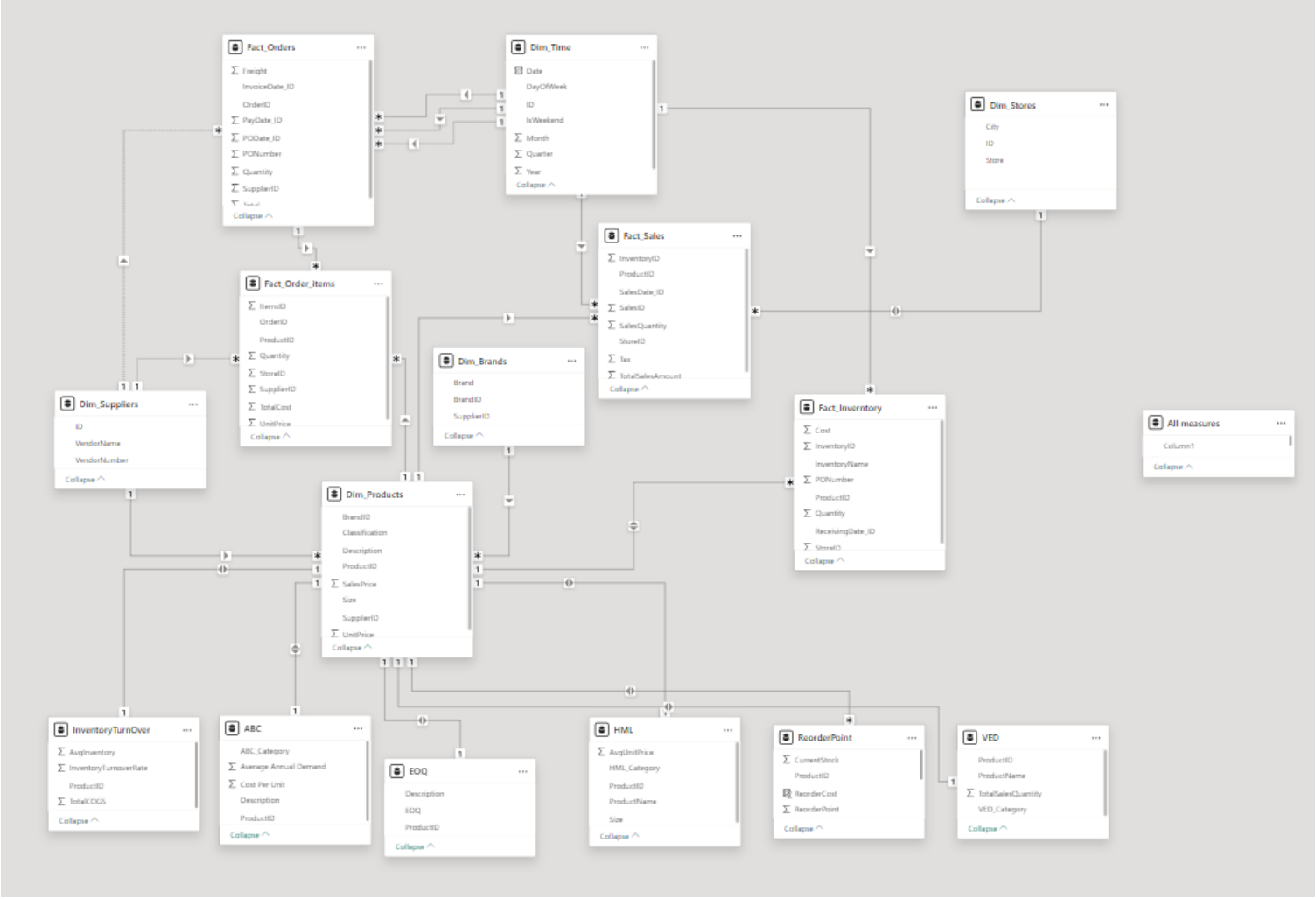
  Finally, all entries for alcoholic products were removed from the product dimension table.

```
DELETE FROM Dim_Products
```

WHERE Classification = 'Alchloic';

Data Modeling

Data Model:



Calculations and Formulas

Custom Calculations:

1- TotalValueInvenotry = sum(Fact_Inverntory[Cost])
2- TotalVendors = DISTINCTCOUNT(Dim_Suppliers[VendorName])
3- TotalQuantityInvenotry = sum(Fact_Inverntory[Quantity])
4- Total Inventory Products = DISTINCTCOUNT(Fact_Inverntory[ProductID])
5- Total Expenses = SUM(Fact_Orders[Freight]) + SUM(Fact_Orders[Total])
6- SuffStock = COUNTROWS(FILTER(ReorderPoint , ReorderPoint[ReorderStatus] = "Sufficient Stock"))
7- Revenue = SUMX('Fact_Sales', 'Fact_Sales'[TotalSalesAmount] * (1 + 'Fact_Sales'[Tax]))
8- ReorderCount = COALESCE(COUNTROWS(FILTER(ReorderPoint , ReorderPoint[ReorderStatus] = "Reorder Required")) , 0)
9- ProfitMargin = DIVIDE([Profit], [Revenue], 0)
10- Profit = SUMX(Fact_Sales,[Revenue] - RELATED(Dim_Products[UnitPrice]))
11- ABC Analysis:

ABC Analysis is the most popular inventory analysis method (especially for retail) ranks inventory from the highest revenue and profit margins to the lowest using three buckets: A, B and C.

12- VED Analysis:

This method is based on how vital it is to have an inventory item in stock. Manufacturing companies use this technique to assess the components and parts they must have on hand. With this analysis, they measure inventory based on:

a. Vital: Inventory that must always be in stock at sufficient levels
b. Essential: Have at least a small number of these items in inventory
c. Desirable: It’s not critical to always have these items on hand

13- HML Analysis:

Often used in manufacturing, this analysis measures the inventory based on high, medium and low cost.

14- Economic Order Quantity (EOQ):
This method assesses the sales rate for an item, along with its ordering costs and storage costs. Using these three variables, EOQ determines how often and how much the company should order
15- Reorder Point:
Using sales data and the lead time for new merchandise to arrive from vendors, retailers can calculate the reorder point, or the inventory threshold that should trigger reorder.

Conclusion

The Sales and Inventory Management Dashboard project has effectively transformed raw data into a powerful tool for business owners and decision-makers. Through meticulous data cleaning, we ensured that all records related to alcoholic products were removed, allowing the dashboard to provide accurate and relevant insights into sales performance and inventory management. The implementation of various analyses, including ABC, VED, HML, EOQ, and reorder point assessments, empowers users to make informed decisions that enhance operational efficiency. By leveraging a structured SQL Server database and utilizing Power BI's visualization capabilities, the project not only addresses current analytical needs but also sets the stage for future enhancements. Overall, this project demonstrates a commitment to data integrity and a focus on delivering actionable insights that support effective inventory and sales strategies.The Sales and Inventory Management Dashboard project has effectively transformed raw data into a powerful tool for business owners and decision-makers. Through meticulous data cleaning, we ensured that all records related to alcoholic products were removed, allowing the dashboard to provide accurate and relevant insights into sales performance and inventory management. The implementation of various analyses, including ABC, VED, HML, EOQ, and reorder point assessments, empowers users to make informed decisions that enhance operational efficiency. By leveraging a structured SQL Server database and utilizing Power BI's visualization capabilities, the project not only addresses current analytical needs but also sets the stage for future enhancements. Overall, this project demonstrates a commitment to data integrity and a focus on delivering actionable insights that support effective inventory and sales strategies.