

Dealer Order Module – Analysis and Predictive Modelling Approach

This document provides a comprehensive overview of the dealer order module, including problem statements, flow processes, insights derivable from data, and potential analytical and predictive models to be developed. The next steps would involve implementing these models using available data and validating the outputs to ensure business objectives are met.

1. Problem Statements

This document outlines an approach for understanding and analyzing the dealer order module, with a focus on predictive analytics and insights that can be derived from dealer-specific data. The following are the key problem statements:

1. **User Behavior Analytics:** The goal is to analyze and predict how much order each dealer from various states is likely to place in a particular month-year based on their historical ordering patterns. The analysis will consider primary and secondary sales data, as well as current inventory levels.
2. **Dealer Pricing Prediction:** The objective is to develop a model that predicts product price fluctuations. Factors such as seasonal demand, festive periods, and other macroeconomic indicators will be considered to determine price variations and to guide pricing strategies.

2. Dealer Order Module Flow

The order placement process for dealers follows a specific flow depending on whether the dealer is registered or not. The detailed flow is as follows:

2.1. Registered Dealers

- Dealers who are already registered in the system can place orders directly through the application.
- Order details are stored in the CRM database, and orders are tagged with a request number beginning with "REQ".

2.2. Unregistered or New Dealers

- For new or unregistered dealers (or orders placed on behalf of them), orders are first recorded in the SAP database.
- A nightly CRON job synchronizes these orders with the CRM database.
- Orders for unregistered dealers are tagged with a request number starting with "SYS".

2.3. Dealer Status Flow

- A dealer transitions from surveyed to prospective status after an account has been created in the dealer app.
- After a prospective dealer does its first steel lifting, the dealer becomes **active**. If an active dealer does not place an order for 45 days, they are classified as **inactive**.
- **Surveyed and Rejected** dealers cannot place orders on the app.

2.4. Approval Workflow

- **ASM Approval:** Optional for all orders.
- **Commercial Approval:** Mandatory for all orders.
- **Logistical Approval:** Mandatory with two options:
 - **FOR:** Company handles loading/unloading.
 - **EX:** Dealer handles loading/unloading.

Once the order passes all approval stages, it cannot be cancelled, and the products are non-returnable post-delivery.

2.4. Order Update Workflow

- If a dealer requests an extra amount, a new record is added in SAP and this data is reflected with dispatch and invoice details.

3. Relevant Database Tables

The following tables and associated data are critical for performing analysis and building predictive models for the dealer order module:

3.1. Core Data Tables

- **dispatch_item:** Stores item dispatch details, including product quantity and shipping status.
- **order_tbl:** Contains main order details, including order number, dealer ID, and order date.
- **order_prod_tbl:** Contains product-specific details, such as the product code, quantity ordered, and pricing.
- **dealer_master:** Contains core information about each dealer, such as dealer ID, name, status (prospective, active, inactive), and region.
- **dealer_partner_fn:** Contains data related to the dealer's role in the purchasing process (e.g., purchaser, recipient, payer).
- **product_dealer_tbl:** Contains product details relevant to dealer purchases, including product types and pricing.

3.2. Secondary Sales and Inventory Data

- **recomend_project_details_tbl:** Holds secondary sales data related to specific projects or clients.
- **recomend_project_tbl:** Contains project site details, which can be linked to dealer order history.
- **dealer_master_extra_info:** Stores additional details about a dealer, including the amount allowed for lifting (purchase limit).
- **opening_stock_tbl:** Contains data on inventory levels available to dealers at the time of order placement.
- **subDealerPurchase_tbl:** Stores purchase details for sub-dealers.
- **recomend_project_approval_details_tbl:** Contains approval-related data for projects.

4. Insights Derivable from Existing Data

By leveraging the data stored in the above tables, the following insights can be derived to better understand dealer behavior and improve business strategies:

4.1. Dealer Insights

- **Buying Frequency:** How often a dealer places orders and the volume of their purchases over time.

- **Inventory Levels:** The current inventory available to dealers, helping to predict out-stocking or overstocking situations.
- **Secondary Sales Data:** Insights from secondary sales can highlight demand trends for products or services tied to specific projects or clients.
- **Operational Region:** Analyzing dealer orders by state, district, or zone can help identify regional patterns and potential opportunities for sales campaigns.
- **Dealer Purchase Volume:** Total quantity of products purchased by the dealer in a given period.
- **Applicable Schemes and Discounts:** Understanding how applicable schemes and discounts influence dealer purchasing behavior.

4.2. Product & Sales Insights

- **Most Sold Products:** Identifying which products are most frequently purchased by dealers.
- **State-Wise Order Distribution:** Analyzing order distribution across different states or regions to identify high-performing areas.
- **Price Trends and Fluctuations:** Understanding price fluctuations for products across different time periods (e.g., seasonal or festive periods) and making price predictions accordingly.

5. Predictive Models and Analytical Approaches

Given the insights and data available, several predictive models can be developed to address the problem statements and deliver actionable outputs:

5.1. User Behavior Analytics

- **Objective:** Predict when a dealer is likely to place an order.
- **Data Inputs:** Historical order and dispatch data, secondary sales data, inventory levels, dealer demographics, seasonal trends.
- **Model:** Time series forecasting or machine learning algorithms (e.g., decision trees, random forests) to predict order placement frequency.
- **Output:** Predicted likelihood of order placement for each dealer in a given time frame (daily, weekly, monthly).

5.2. Dealer Pricing Model

- **Objective:** Predict product price fluctuations based on seasonal demand, festive periods, and macroeconomic factors.
- **Data Inputs:** Historical price data, seasonal patterns, economic indicators, sales data.
- **Model:** Regression analysis or time series models (e.g., ARIMA, SARIMA) to forecast price changes.
- **Output:** Predicted price trends for products for future periods, enabling proactive pricing adjustments.

6. Features to Add

To enhance the predictive models and improve the accuracy of insights, the following features should be incorporated into the analysis. These features account for external factors that significantly impact dealer behavior and pricing:

6.1. Festival Demand

- **Description:** During festive periods such as Durga Puja, Diwali, or other regional festivals, there is typically a spike in demand for certain products, leading to an increase in prices.
- **Feature to Add:** A festival demand indicator that flags specific periods or events during the year. This feature would include:
 - **Festive Period Flag:** A binary feature indicating whether the period is a festive season.

6.2. Weather-Related Impacts

- **Description:** Weather conditions, such as rainstorms, cyclones, or extreme temperatures, can impact demand for certain products (e.g., construction materials, building supplies, etc.).
- **Feature to Add:** Weather-related features that account for environmental factors affecting dealer orders:
 - **Adverse Weather Flag:** A binary feature that indicates whether the weather conditions in a specific region are adverse (e.g., significant rainfall, storms, or extreme temperatures) at the time of order placement. This feature will

help identify the correlation between adverse weather events and fluctuations in order volume.

7. Conclusion

The dealer order module presents a rich source of data that can be used to drive multiple business insights and predictive models. By analyzing historical data on dealer behavior, order patterns, inventory, and external factors such as economic trends and seasonal fluctuations, we can improve operational efficiency, optimize pricing strategies, and predict future demand with a higher degree of accuracy.

The analysis and models described in this document will help in:

- Understanding dealer behavior and optimizing order processes.
- Forecasting product pricing to align with market conditions.
- Enhancing sales strategies across regions and dealer segments.