# **Dashboard Documentation**

## ****Page 1: Overview****

### ****Purpose****

To provide a high-level summary of the business's performance, focusing on key metrics, revenue distribution, and delivery efficiency.

### ****Visuals and Insights****

1. **Cards**
   * **On-time Percentage**: Displays the percentage of orders delivered within the estimated time, offering a quick glance at delivery performance.
   * **Average Delivery Days**: Represents the average time it takes to deliver an order, helping monitor delivery efficiency.
   * **Total Revenue**: Shows the cumulative revenue, providing an overall financial view.
   * **Total Number of Orders**: Displays the total number of orders processed, giving a measure of business activity.
2. **Bar Chart: Geographical Regions Revenue Generation**
   * Displays revenue contribution from different regions, highlighting top-performing areas.
   * **Business Value**: Identifies regions requiring more focus or further investment.
3. **Bar Chart: Top-performing Product Categories**
   * Highlights the best-selling product categories for better inventory planning and marketing efforts.
4. **Bar with Line Chart: Average Delivery Time Across Cities**
   * The bar chart shows average delivery times for cities.
   * The line represents the estimated delivery time for comparison.
   * **Business Value**: Highlights cities with delivery delays, enabling targeted logistical improvements.

## ****Page 2: Sales Details****

### ****Purpose****

To provide a detailed analysis of sales performance, order patterns, and cancellation trends for better operational decisions.

### ****Visuals and Insights****

1. **Cards**
   * Average Product Weight
   * Average Product Width
   * Average Product Length
   * Average Product Height
2. **Bar Chart with Line: Top 10 Purchase Cities**
   * Bars show revenue from the top 10 cities, while the line represents the number of orders.
   * **Business Value**: Identifies cities driving the most revenue and high order volumes.
3. **Line Chart: Canceled Rate Across Product Categories**
   * Visualizes the cancellation rate for different product categories.
   * **Business Value**: Identifies categories with high cancellation rates for investigation and process improvement.
4. **Scatter Plot: Correlation Between Delivery Time and Customer Satisfaction**
   * Shows the relationship between delivery time and satisfaction scores.
   * **Business Value**: Highlights how delivery time affects customer satisfaction.
5. **Line Chart: Trend of Orders Over Time**
   * Contains two lines: one for the number of orders and another for order value.
   * **Business Value**: Tracks sales trends to identify peak periods or declining performance.
6. **Matrix: Orders Per Different Hours**
   * Displays the distribution of orders across different hours of the day.
   * **Business Value**: Identifies peak order times for operational planning.
7. **Pie Chart: Orders Meeting Estimated Delivery Time**
   * Shows the proportion of orders delivered on time.
   * **Business Value**: Measures logistics efficiency and customer satisfaction.

## ****Page 3: Customer Insights and RFM Analysis****

### ****Purpose****

To understand customer behavior, segment customers for better targeting, and analyze satisfaction levels **knowing that customers have Frequency of 1** so in RFM our main focusing were **Recency** and **Monetary** to segment customers based on.

### ****Visuals and Insights****

1. **Map: Orders for Each Customer Segment Based on Location**
   * Shows orders represented by bubbles, differentiated by customer segments.
   * **Business Value**: Pinpoints regions dominated by specific customer segments for targeted marketing.
2. **Bar Chart: Overview of Customer Segments**
   * Displays the number of customers in each segment.
   * **Business Value**: Offers insights into customer distribution and helps prioritize high-value segments.
3. **Small Multiple Bar Charts: Customer Segmentation by State**
   * Each state shows its customer segments.
   * **Business Value**: Provides a granular view of customer segments by region.
4. **Bar Chart: Different Satisfaction Levels**
   * Displays the number of customers across satisfaction levels.
   * Tooltip reveals segment-specific details when hovering over bars.
   * **Business Value**: Identifies areas where customer experience can be improved.

## ****Page 4: ML Model Predictions****

### ****Purpose****

To forecast future sales by product category and provide actionable insights for inventory and marketing strategies, here we use our data for next 6 months based on my ML model.

### ****Visuals and Insights****

1. **Line Charts: Predicted Sales Per Product Category**
   * Separate line charts for each category show forecasted sales over the next six months.
   * **Business Value**: Enables proactive planning for high-demand categories and optimizing resources.

## ****Future Achievements and Enhancements****

1. **Enhance RFM Segmentation**
   * Introduce dynamic segments that adapt to changing customer behavior.
2. **Integrate ML Predictions with Regional Insights**
   * Combine product category predictions with geographical analysis for targeted stock distribution.
3. **Interactive Logistics Map**
   * Use the Python-generated map to integrate customer-seller distances directly into Power BI for live insights.
4. **Customer Churn Prediction**
   * Expand ML models to predict customer churn based on satisfaction scores and order patterns.
5. **Real-Time Dashboard Updates**
   * Enable real-time data refresh to provide up-to-the-minute insights for decision-making.

## ****Additional Notes****

### ****Customer Segmentation ML Model****

* A customer segmentation model using unsupervised ML (KMeans) clusters customers into five classes based on:
  + customer\_zip\_code\_prefix
  + payment\_value
  + price

### ****Interactive Map (Python)****

* The Python-generated interactive map visualizes customer-seller proximity:
  + **Impact**: Enhances delivery routing, reduces costs, and improves customer satisfaction by minimizing delivery time.
  + Python scripts handle data processing, including loading data into SQL Server and extracting it using pyodbc.

## ****Summary****

This dashboard provides a comprehensive analysis of business performance, combining descriptive analytics and predictive modeling. It supports strategic planning, operational efficiency, and customer engagement, paving the way for continuous improvement.