**DIVE Analysis and Action Plan by Rakesh Prusty**

**D - Discover (Basic Finding)**

What did you discover at surface level?

The surface-level discovery highlights the strong weekly seasonality in predicted sales, with sales volume expected to peak on Sundays and be lowest around Thursdays. The prediction is the reflection of historical sales data as shown in the below images.

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**I - Investigate (Dig Deeper)**

What deeper patterns emerged?

1. The top3 Product family contributing to Sales volume rise in weekends are Grocery I, Beverages and Produce with 9498.2, 6291.8 and 3064.
2. Even though the data is trained on aggregated data (Not on Store level), below inferences can be made from the historical data.
   1. Store type A generates double the sales amount than any other Store type.
   2. 2 cities generate maximum sales - Quito and Cayambe. Both the cities are part of State, Pichincha.
3. Promotions don't affect the sales. Peak sales happen in weekends despite low promotions.
4. Sales of Liquor, Wine and beer go down on Sunday unlike rest of the product families.

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**V - Validate (Challenge Assumptions)**

What are the model's blind spots?

The sales forecasting model's predictions could be wrong due to unforeseen external events (like major economic shifts or unmodeled holidays), significant changes in underlying sales patterns, or data limitations such as the lack of information on specific promotions or competitor actions. Its blind spots include the impact of these unmodeled external factors and the causal reasons behind observed patterns.

**E - Extend (Apply Strategically)**

What should the business DO?

Based on the sales seasonality and top product families, store managers should focus on adjusting weekly staffing and inventory (especially for top items like Grocery I, Beverages, Produce) to match predicted peaks (weekends/Sundays) and lows (Thursdays). In the short term (next week), this involves immediate adjustments. Next month, formalize weekly planning and refine focus on top families, potentially exploring targeted promotions and applying insights from high-performing stores. Long-term, investigate underlying sales drivers, consider segmented forecasting by store/location, and optimize supply chain based on detailed demand patterns.

Measurement involves tracking key metrics like actual sales vs. forecast (especially weekend vs. weekday), sales volume of top product families, stockout rates, and waste levels. For long-term, measure forecasting accuracy and the impact of strategic initiatives on sales growth. These measurements help determine if the actions are effectively leveraging the sales patterns and mitigating the model's limitations.

**Sales Forecasting Action Plan for Store Managers**

This action plan provides key strategies for store managers to leverage sales forecasting insights for operational planning, focusing on actions for the near term and how to measure their impact and mitigate risks.

**3 Specific Actions for Store Managers**

Based on the observed strong weekly seasonality (peak Sunday, low Thursday) and the significant contribution of key product families (Grocery I, Beverages, Produce), as well as variations by store type/location, managers should:

1. **Optimize Weekly Staffing and Scheduling**: Adjust staffing levels to align with predicted daily sales volume fluctuations. Increase staffing on peak days (especially weekends/Sundays) to ensure adequate customer service and operational efficiency. Reduce staffing during predicted slower periods (e.g., Thursdays) to manage labor costs effectively. *Tailor staffing levels based on store type (e.g., higher baseline staff in Type A stores) and historical traffic patterns for your specific location.*
2. **Implement Dynamic Inventory Management for Top Product Families**: Proactively manage inventory levels for high-contributing product families (Grocery I, Beverages, Produce, Cleaning, Dairy). Increase stock levels before predicted peak sales periods (weekends) and monitor inventory closely throughout the week to avoid stockouts of popular items and minimize overstock of slower-moving goods. *Consider the historical sales patterns for these families at your specific store location.*
3. **Develop Targeted In-Store Merchandising and Promotion Tactics**: Focus in-store displays and potential promotional efforts on the top-selling product families, particularly during their peak sales days or periods identified in the forecast. *Experiment with placement and promotion types tailored to your store's layout and customer base to see what effectively drives sales.* Given that our aggregate analysis didn't show a direct link between promotions and peak sales days, this action should involve a test-and-learn approach.

**Success Metrics for Each Action**

To measure the effectiveness of these actions:

1. **Optimized Weekly Staffing**:
   * **Sales per Employee Hour**: Track this metric to see if staffing adjustments improve efficiency during peak and off-peak times.
   * **Customer Wait Times**: Monitor customer wait times (e.g., at checkout) during peak hours to assess if increased staffing improved service levels.
   * **Labor Cost Percentage of Sales**: Track labor costs relative to sales to ensure cost management on slower days.
2. Dynamic Inventory Management for Top Product Families:
   * **Stockout Rate for Key Product Families**: Measure the frequency of stockouts for Grocery I, Beverages, Produce, etc., especially on weekends. A decrease indicates improved inventory management.
   * **Inventory Turnover Rate for Key Product Families**: Track how quickly inventory sells for these families. An increase (within healthy limits) suggests effective stocking.
   * **Waste/Spoilage Levels (for applicable families like Produce)**: Measure reduction in waste due to better alignment of inventory with predicted demand.
3. **Targeted In-Store Merchandising and Promotion Tactics**:
   * **Sales Lift for Promoted Items**: Measure the increase in sales for specifically merchandised or promoted items during the tactic period compared to a baseline.
   * **Basket Analysis**: Analyze customer baskets to see if targeted merchandising/promotions encourage purchases of related items.
   * **Customer Engagement/Feedback**: Gather qualitative feedback on displays or promotions.

**Risk Mitigation Strategies**

Consider these strategies to mitigate potential risks:

* **Forecast Uncertainty**: The model provides prediction intervals. Use these intervals to understand the range of potential sales outcomes. Maintain safety stock within reasonable limits, especially for critical items, to account for forecast variability. Regularly review updated forecasts.
* **Unforeseen Events**: The model does not predict unforeseen events. Stay informed about local events, weather forecasts, and broader economic news that could impact sales. Have contingency plans for sudden changes in demand or supply.
* **Data Limitations**: Be aware that the current aggregate forecast may not perfectly reflect your specific store's nuances. Supplement the model's insights with your local store knowledge and historical store-level performance data. Advocate for more granular data collection or store-level forecasting if needed.
* **Promotion Effectiveness**: If testing new merchandising or promotion tactics, start with small-scale tests to minimize potential negative impacts and refine strategies based on results before wider implementation. Ensure clear communication with staff about promotional activities.
* **Execution Risk**: Ensure clear communication and training for staff on adjusted staffing schedules, inventory management procedures, and merchandising plans to ensure smooth execution of the action plan.