

DS Project Portfolio

Showcasing Some Use Cases in the Past

Project 1: Impact of El Niño on Sales Volume of Products

Business Problem and Objective

- How does El Niño impact the sales of company brands across regions, and how can we adapt our strategies to mitigate the effects and enhance resilience during such events?
- The objective is to understand the climatic effects on the sales performance of 500+ SKU and quantify the magnitude of changes in sales volume during and after El Niño events.

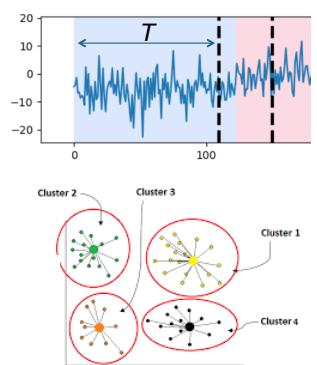
Technical Solution

Data: Nino SST 3.4, monthly sales volume

Stage 1: Determination of observation periods. KNN imputation.

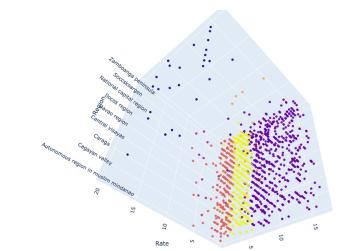
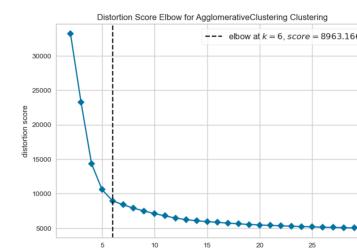
Stage 2: Gaussian Kernel CPD via *ruptures* package. Collection of time-delay effect T from onset of El Niño and calculation of impact $M = \sum 3$ steps forward / $\sum 3$ steps backward.

Stage 3: K-means clustering on T , M , brand and region. Elbow method was used.



Outcome and Insights

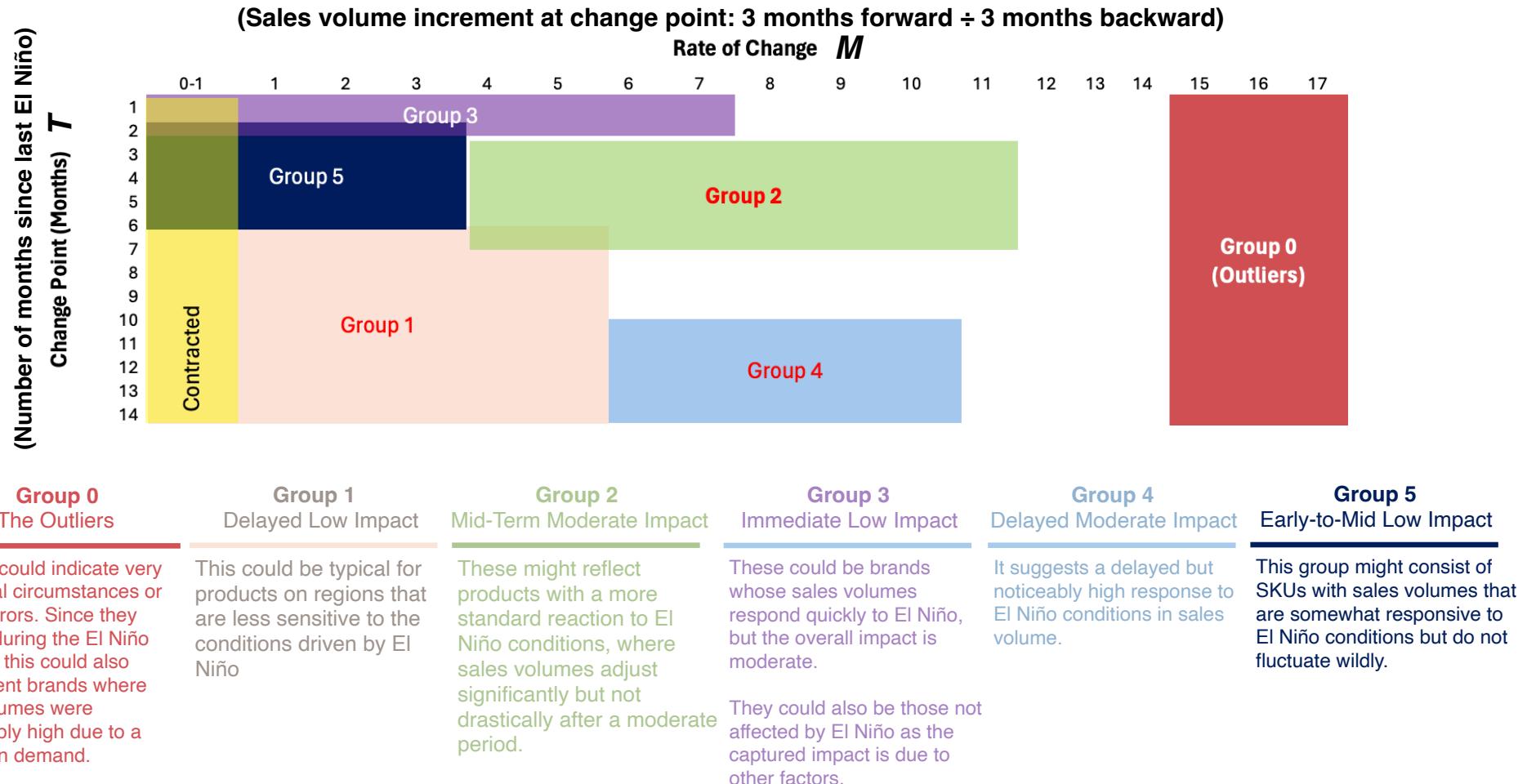
2 sets of 6-cluster groupings have been identified among 500+ SKUs for each instances of El Niño from 2010 to 2023



Strategic Recommendations

- **Root Cause Analysis per BU** to help identify specific factors driving sales volume changes and tailor strategies to address these issues effectively.
- **Analyzing Impact on Raw Material Prices** could provide insights into how these price changes might directly influence SKU sales volumes.
- **Reapply with Updated El Niño Data** to ensure that the analysis reflects the latest climatic conditions and adds confidence in the insights for decision-making.

Project 1: Impact of El Niño on Sales Volume of Products



Project 2: Office Space Optimization

Business Problem and Objective

- The issue came to light when one day, a vice president officer observed significant discrepancy between room occupancy and availability in the building, raising concerns on whether additional space needed to be leased.
- The goal was to enhance the efficiency of office space utilization by developing an optimized seating plan based on room capacities and employee demand.

Technical Solution

Data: Room capacity, seat demand per department

Stage 1: Identification of reserved and non-reserved seats.

Stage 2: Determination of constraints like number of required days per week.

Formulation of utilization function.

Stage 3: Experiment on Linear programming (via *Gurobi*). 3 days vs. 4 days onsite setup.

Room	j	capacity
501-503-505	1	56
502	2	26
506	3	11
504	4	24
702-704-706	5	15
801	6	18
804	7	14
805	8	16

Department	d_original	scheme_3	scheme_4
a	12	3	4
b	8	4	4
c	14	3	4
d	20	3	4
e	21	5	5
f	3	3	4
g	20	3	4
h	15	3	4
i	23	3	4
j	14	3	4
k	10	3	4
l	3	3	4

Outcome and Insights

Room	Department	Available Workstation	Requirement	Mon	Tue	Wed	Thu	Fri
E01-503-505	Marketing	56	3	0	0	0	3	0
E01	Meat	56	8	0	0	0	0	8
501-503-505	Domestic Sales	56	22	22	0	22	0	0
501-503-505	Procurement and by Products / Corp...	56	4	0	4	0	4	0
501-503-505	Global	56	23	0	23	0	23	23
501-503-505	Investor Relations	56	4	0	4	0	4	0
501-503-505	Dairy	56	12	12	0	12	0	0
502	Domestics Sales	26	20	20	0	20	0	0
602	Domestic Sales	26	20	0	0	20	0	20
504	Domestics Sales	24	22	0	22	0	0	0
504	Sardines -	24	20	20	0	0	20	20

- 3-day onsite presence per week achieved near-maximal utilization, with 20% of the space still available for potential reallocation.
- 4-day scheme is not feasible
- The linear program optimizes the layout by attempting to free up adjacent spaces.

Strategic Recommendations

- Incorporate Proximity and Floor Preferences** to ensure that departments with interrelated functions are situated near each other and align with any preferences for specific floors, improving overall operational efficiency and collaboration.
- Space Utilization Monitoring System** to help verify that the planned seating layout is effectively implemented and maintained, allowing for timely adjustments if deviations are detected.

Project 3: Optimal Contract Level Through Simulation

Business Problem and Objective

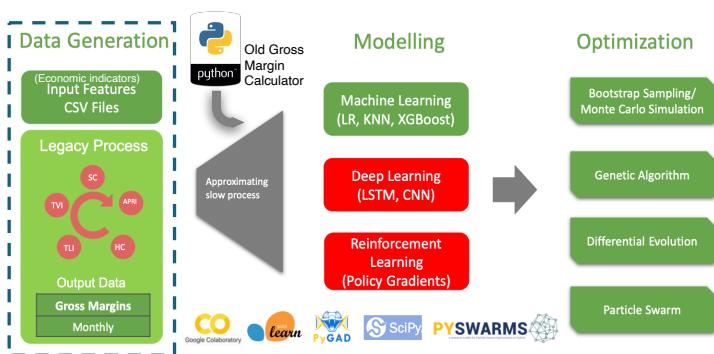
- A team of energy traders needed to determine the optimal ratio of energy sourced from power plants versus the spot market (**contract level**) to settle customer contracts.
- The goal was to identify the most advantageous contract level by considering uncertain economic scenarios in the future. It involved optimizing the % of energy procured from own power plants vs. spot market to maximize gross margin for the next 5 years.

Outcome and Insights

- ROI: +₱2.4B** total gross margin vs. original process
- 99% accurate, extremely fast gross margin calculator
- A tool that calculates the risk of falling below a threshold of total gross margin based on chosen contract level



Technical Solution



Strategic Recommendations

- Build a pipeline of the modeling, simulation and output tool on a Cloud Platform** to facilitate scalable analysis, real-time updates, and easier collaboration, allowing for more efficient and flexible management of energy supply ratios and contract optimizations.