**Problem Definition Worksheet** - Complete each section below:

1. **Problem Statement:** Define your problem. What pains are you (or your customers, family, clients, etc.) experiencing? What is broken, wrong or not working? How do you know that you have a problem? What is telling you this? What is your **evidence**?

The importance of profit maximization cannot be overlooked. This project is going to focus on how to maximize the profit for Corey Oil. Corey oil is a wholesaler and located in Wisconsin. Its main merchandises are petroleum products and motor oil/lubricants. The selling prices at Corey Oil varies. The house products are the major portion of the sales market, including 5W20 semi-synthetic and 5W30 semi-synthetic motor oils. Targeting on these two products, the researcher can identify the variance and the gaps between selling price and product cost. The estimated profit by maximization can increase up to 8% of a $3,240,000 business. Corey Oil understands how purchasing in bulk quantity can lead to low cost. However, the unregulated selling price which is quoted by different salesman can lead to the loss of the opportunity and profit. The goal is to research and find the relationship between selling amount and quantity of the two targeted products. Therefore, the researcher can realize the profit maximization by regulating the selling price.

1. **Business Impact:** Why should you fix this problem? What is the estimated benefit for solving this problem? What is this problem worth in **dollars**? How will you measure success? What is your key output (y)?

It’s important to identify the relationship between selling price and product cost. The product cost can be suppressed or minimized by increasing the procurement quantity. However, the variance of the selling price will lead to the unearned potential profit. Based on the trend of sales of two targeted house products, the profit can increase between 5% to 8% of a $3,240,000 business. In other words, the profit can grow up to $259,200 per year. The measurement of success will be based on dollars that expected to increase by regulating the sale price. The key output(y) is the profit in dollars.

1. **Goals:** What are your improvement objectives, **goals** or targets? How much “better” do you want to be? **Quantify** this goal.

Goal 1: Regulate the selling price of the house products to maximize the total profit. The target of maximization of total profit will set as 5% to 8%.

Goal 2: Identify the price and cost relationship to analyze the trend for future sale plans. The pattern will be identified for budgeting and planning for future fiscal years. The align of planning will sustain the maximum profitability with 1% to 2% room for bargaining.

1. **Project Scope:** What are your boundaries? What is the first step and last step of the process you need to **fix**? What is ***not*** within your scope?

The first step is to collect the selling prices and the procurement cost for the target products. The last step is to set the suggested selling price for the products. Between the data collection and expected output, the profit will be optimal. The project will not include all the merchandise that Corey Oil sells. The main focus is to identify the house products that sell the most in the past and its trend. Then, it would lead to the maximum profit to be earned.

1. **Team:** Who is the process owner/champion? Who do you need to work with or involve to analyze and/or impact this process?

The researcher for the project is the owner. The owner will handle project planning, data collection, and data analysis. This project will involve personnel from procurement and invoicing department who enter the data. Those two positions will also monitor the data integrity.

1. **Project plan:**(veryhigh-level): Estimate **time (or date)** per DMAIC step. Develop a rough timeline.

This project will take eight weeks to complete. The high-level timeline is advised with DMAIC steps as below.

Define: the first week. The goal is to maximize the profit by identifying the relationship between product quantity, cost, and selling price. The target products are 5W20 semi-synthetic and 5W30 semi-synthetic.

Measure: the second week to the sixth week. The data should be collected includes the history of the product cost and procurement quantity from procurement personnel and the history of quantity sold and selling price from invoicing department. The quantity is measured by gallons. The price is set as dollar/gallon.

Analyze: the seventh week. The regression model will establish the formula between quantity, selling price, and product cost. The below formulas can determine the optimal sale price for the product.

Cost = ax+y

Unit Sales = f(price) = z+bp

Revenue = (z+bp)\*p

Costs = y+a(z+bp)

Profit = Revenue – Costs

Solve p

By solving p, the researcher can get the optimal point of the selling price.

Improve: the eighth week. Using this optimal selling price to communicate with salespeople, the company can increase the profit considerably.

Control: the eighth week. Keep on collecting the procurement cost, selling price, and quantity to observe the sales pattern. It’s crucial to see if the salespeople are using suggested price to comply the company policy. More data collected can be used in comparing the relationship of the three factors. The regression can be re-run and reflect on the suggested price.

1. **Process Map**: What are the steps in the process you are trying to fix? Document the flow of process steps (of the process you are working to improve). This should be a high-level flow chart.