Consideration: Graphs and other visuals will be on excel document.

1. Briefly describe how you would design the forecasting process used to determine an estimate of demand for products at the brewery. Who should be part of that conversation, what different trends, cycles, seasonal issues, etc., should be considered to ensure the most accurate demand plan, etc.?

The first step is to integrate the supply chain process. Demand Supply Integration (DSI) end-to-end process must engage all stakeholders and functions through alignment in processes, tools, and fostered culture to achieve DSI. DSI will help an organization optimize its resources to achieve goals through demand, inventory, supply, and financial planning. The DSI conversation: led by Senior Leadership, Finance. On the supply side, there should be production, logistics, and upstream suppliers. On the demand side, there should be Sales & Marketing and downstream channel partners. If all parties are there and can collaborate this will yield value creation internally and externally through information flow, visibility, and exchange. Each stakeholder collects information from different aspects of their respective departments like capacity constraints, historical data, market research, and customer feedback loop information to understand the patterns and tradeoffs for demand. Other things to consider are product characteristics, seasonality issues, and cyclical trends.

For example, most beer is consumed during the summer months. We have also seen an increase in those participating in "Dry January". Accounting for these external factors would help us determine seasonality within the product line. There could be economic trends that we should be aware of factors that may influence consumer consumption. Overall, to ensure the most accurate demand plan: inventory management, capacity forecast from supply, financial goals from finance, and demand forecast (VOC) need to be integrated. Through demand planning meetings: strategy alignment from top leadership, technology, and a final demand review for approval from top management. Establishing a collaborative forecasting model could ensure continuous improvement with the end in mind.

2. Briefly describe a process to use the forecast to plan supply chain decisions, including ordering raw materials and supporting materials (cans, labels, packaging, etc.), scheduling brew, and distributing the planned beers to meet expected demand. **Basically, what parts of the brewery's business is affected by the demand forecast and how? What steps would you take to ensure that the forecast is used consistently across supply chain functions?**

Once the demand forecast is established, it serves as a critical input for various functions within the brewery's supply chain. The procurement team relies on the forecast to determine optimal inventory levels and reorder points for raw materials like hops, barley, yeast, and water. Using a lean strategy, the production scheduling could ensure that beer is made and produced to align with forecasted demand minimizing waste. Packaging and Labeling departments would use the demand forecast to plan the production of cans, materials, and labels for the canning and bottling process. This would ensure that the materials would align with the sales as well. The Distribution planning department would utilize the forecast to create efficient delivery schedules. This would drive total value creation and ensure the last-mile delivery process is optimized.

To ensure consistency, there must be a process that would allow a team to administer the demand forecast to all departments that would be considered stakeholders with a Demand Supply Integration (DSI) meeting with a stable cadence. This would ensure that the supply chain is integrated and drives shareholder value. The process would then have to be standardized, to ensure consistency and efficiency for information and product flow. Cross-functional collaboration in mind, there must be clear performance metrics that could be continuously monitored and improved. This would make the company's supply chain responsive and resilient.

3. Suppose you decide to implement a 4-week simple moving average to forecast the next week's demand for '52-49' beer. What would be the most likely outcome in terms of the bias of a simple moving forecast for this data? What would be the most likely supply chain implications of the 4-week simple moving average forecast of '52-49' if you implemented it into your planning process without addressing the bias?

After conducting a 4-week simple moving average (SMA) the forecasted Hazy demand for 52-49 would be 791. One observation that I noticed is that Hazy IPA week 52 demand is higher than it. The most likely outcome in terms of bias of SMA for this data is very high. Hazy IPA product characteristics show a trend increase in demand. Therefore, by default, it will have an error that will significantly increase over time. The most likely supply chain implications of the 4-week SMA forecast of 52-49; if implemented into the planning process without addressing the bias will have a domino effect. What do I mean when I say this? It will impact almost every function of a business due to how highly interconnected it is. The most impact I could think of is resource allocation to support the demand: labor reduction to not collect overhead. Key performance indicators will impact across functions, missed sales, and possibilities of consumers finding alternatives due to Hazy not matching supply to customer demand.

4. Create a forecast of '52-49' Hazy IPA for week 53. Support the method you choose based on the characteristics of the data and relevant measures of forecast quality. You may use data tables and/or figures to support your chosen method.

The primary forecasting method that I recommend for this data is regression. Looking at Hazy demand data it was obvious that there was an increasing trend with no seasonality. Below are the outputs for week 53 with different forecasting methods.

- ES Forecast: 709 (w/ .3 smoothing constant)
- Regression Forecast: 713

5. Create a forecast for the next four weeks of 'Bye Saban' pilsner. Support the method you choose based on the characteristics of the data and relevant measures of forecast quality. You may use data tables and/or figures to support your chosen method.

Pilsner Sales data indicated an increasing trend and seasonality for every third week of the month. I conducted regression analysis and a seasonal index. Below are forecasted sales for Weeks 13-16.

- Week 13: 10116
- Week 14: 12630
- Week 15:16396
- Week 16:13953

6. You use what you learned from the forecasting process to ask some questions about what is happening with the 'Bye Saban' pilsner. You know that with your production schedule that you usually have a new batch of this beer finishing around the third week of each month. You find out that your master brewer is concerned about quality and excess inventory and has been running a special in the tasting room the 3rd week of each month with everything left over from the previous month. How would this affect your forecast and demand planning moving forward for this product? Explain your answer.

Initial thoughts on revamping tasting assessment. promotion strategy to capitalize. One from a marketing promotion standpoint I think that will drastically alter consumer behavior from a timing standpoint in the eyes of the Master Brewer Common sense is if there is bulk inventory, quantity discounts are favorable, and beer is a perishable product with relation to quality and pricing. Therefore, it expires and needs to turn quickly. Ultimately, it will impact forecast and demand planning for this product, due to the seasonality change it will plummet customer consumption in W1 & W2 pushed to W3 moving forward. Additionally, there may be a surplus in W4 with the urgency to exhaust the remaining inventory. Therefore, this will be a spike in cost and capacity which will result in tied-up capital. I recommend conducting demand sensing and evaluating how new products and timing sensitivity impact on existing product lines' forecast cadence.