Supply Chain Simulation Game Report

Submitted by: Keyur Nandu, Gaurav Sable, Sanjay Katyal, Tejashree Shendge, Tharunkumar Chandirasekaran

1. Introduction

The supply chain simulation game is an interactive learning experience that immerses participants in the complexities of managing a supply chain. Players navigate various challenges, such as production, distribution, and inventory management, to optimize performance and profitability. Through simulation, participants gain practical insights into supply chain dynamics and decision-making processes.

The primary goal is to maximize profitability while carefully managing costs associated with excess inventory and markdowns at the same time work with the board members to gain votes.

2. Summary of Year 1 and Year 2

In Year 1, of the simulation game, the company implemented upgrades in communication and storage capacity, which led to a significant increase in total revenue to $169,894,000. However, costs were also high at $121,505,000, resulting in a gross margin of $48,389,000 with a margin percentage of 28.48%. No change orders were issued during the year.

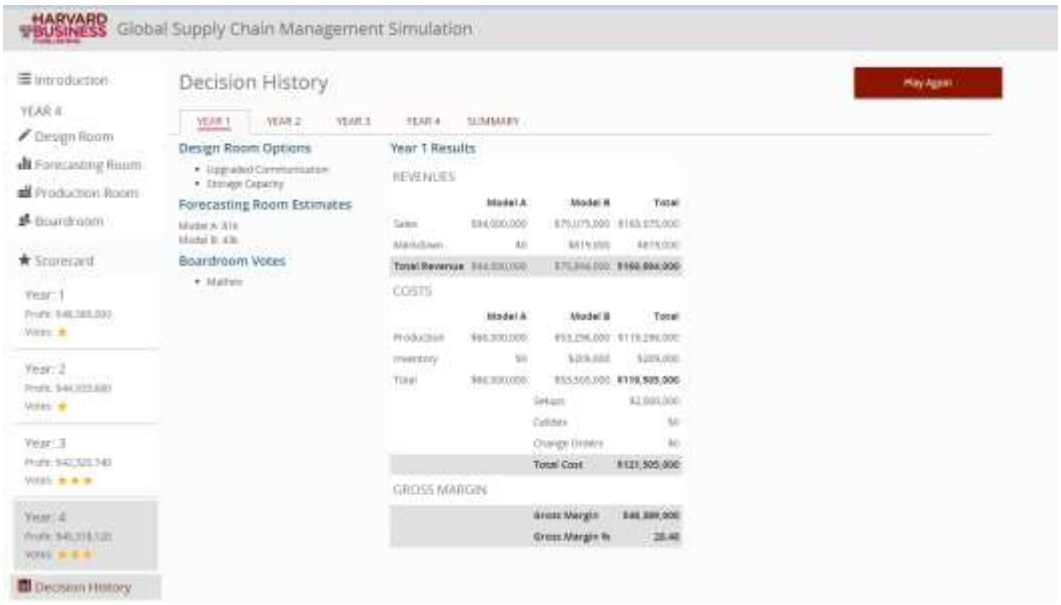

Figure 1: Year 1 Performance

In Year 2, the focus shifted towards durability and stylishness in design options, with an investment in setting up the CELLDEX industry conference for $2M. Although there was a slight increase in total revenue to $175,407,000, costs also rose significantly to $130,473,320. This led to a lower gross margin of $44,933,680 with a margin percentage of 25.62%. Despite the challenges, there was still a vote of confidence from the board with one vote.

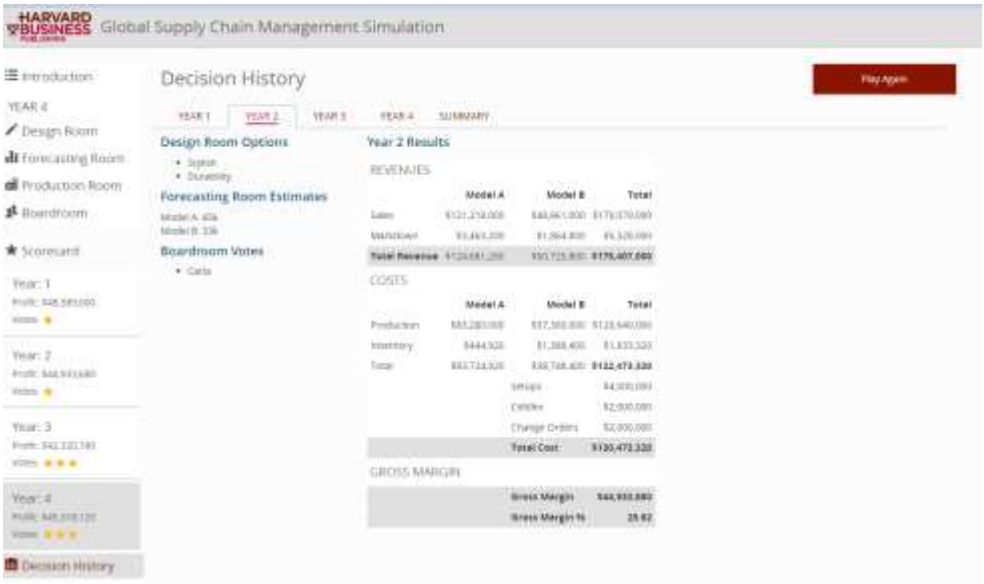

Figure 2: Year 2 Performance

3. Major Challenges

- **Forecasting Accuracy**: Despite efforts to forecast demand internally in Year 1 and through CELLDEX experts in Year 2, inaccuracies persisted. Overestimating demand for Model B in Year 1 and Year 2 led to excess inventory and increased holding costs. We faced issue to get accurate forecast due to sudden decrease in sales of model B.
- **Product Design Strategy**: While product upgrades like extended batteries and increased storage capacity in Year 1 yielded profit, unexpected market trend in Year 2 where the hardware prices were reduced hindered demand for the Pro model (Model B), Our strategy revolved to get minimum variance and to select iterations of features which gives us positive feedback from consultants.
- **Supplier Allocation**: In both years, spreading production across multiple suppliers aimed at hedging against risks. However, misallocating production, such as overcommitting to a single supplier like FarAway in Year 2, resulted in delayed adjustments to demand changes and increased holding costs.
- **Change Orders**: Implementing change orders to adjust production quantities based on demand fluctuations proved crucial. However, the timing and magnitude of these adjustments require careful consideration to avoid excess inventory or stockouts. Our allocation focused on balanced approach, and we reduced the excess inventory as we get better forecast predictions. Our conservative risk approach in year one for model A was based on idea that change in supplier quantity had a fee of 2M and the lead time was more expensive that the sales we could have done, which resulted in stockout. For year 2 we took a risky approach, incorporating leanings from year 1 since the overage cost was high, we focused to have a positive inventory and procure more than our requirement to avoid stockout, which turned out to not be in our Favor coupled with low demand for Model B.

4. Potential Mistakes

- **Overconfidence in Forecasts**: Relying solely on internal forecasts in Year 1 and heavily on CELLDEX in Year 2 without critically assessing market trends led to inaccurate demand predictions.

- **Neglecting Market Dynamics**: Failing to incorporate emerging features and competitor offerings in product design decisions limited appeal and demand for the Pro model (Model B).
- **Supplier Management**: Misallocating production quantities among suppliers and not adjusting promptly to changes in demand contributed to increased holding costs and reduced profit margins.
- **Board Member Alignment**: Disregarding committee instructions despite achieving profit goals led to a lack of recognition and potentially missed strategic insights. Improving forecast accuracy, adapting product designs to evolving market demands, optimizing supplier allocations, and aligning with committee expectations are crucial areas for improvement to enhance profitability in future simulation rounds.

5. Year 3 Strategy

- **Product Design:** We chose durability and audio quality based on the product design team's suggestions and the positive average review points. This decision was made to meet the basic requirements of a phone and to cater to the market demand.
- **Marketing and Forecasting:** Despite the previous year's inaccurate predictions, we decided to pay for CELLDEX's expert forecasting. This decision was based on their assurance of improved forecasting for Model B. We ordered one standard deviation less than the forecasted value for Model B, planning to place change orders later if demand increased.
- **Production Planning:** We chose three suppliers (FarFarAway, FarAway, and PrettyClose) to be cautious and to have the flexibility to place change orders based on demand fluctuations. More order quantity was allocated to FarFarAway and FarAway suppliers, and PrettyClose was selected to satisfy any excess demand due to its zero lead time. Our allocation was designed in such a way to have flexibility to incorporate increase in order quantity as it had no cap like 60% when we reduce inventory and we can have better market projections was we played along an the change fee was 2M for any supplier we can easily increase the production for PrettyClose supplier with 0 Lead time.
- **Change Orders:** We placed a change order in June with the PrettyClose supplier when Model B was stocked out in May. However, as the demand for Model B kept fluctuating, we faced minor stockout issues until September.

Despite maintaining the CELLDEX industry conference investment, total revenue decreased to $157,029,500, with costs at $114,708,760. The gross margin was $42,320,740, with a margin percentage of 26.95%. However, there was an increase in board confidence with three votes.

6. Year 4 Strategy

- **Product Design:** We chose to improve only the audio quality among all other options. This decision was based on the positive median review points and the low standard deviation for both models, indicating low fluctuations from the actual demand. This feature also had the highest profit margin.
- **Marketing and Forecasting:** Due to the previous year's inaccurate predictions and the minimal standard deviation in the demand forecast of both models, we decided not to invest in the CELLDEX forecasting team. We ordered the exact values of the forecasted quantity without considering any standard deviations.
- **Production Planning:** We chose only two suppliers this time (FarFarAway and PrettyClose). The minimum confirmed demand was allocated as order quantity to the FarFarAway supplier, and PrettyClose was selected to satisfy any excess demand due to its zero lead time.

- **Change Orders:** We placed change orders three times (in June, August, and September) to increase the order quantity of Model B and reduce Model A. This decision was beneficial as it allowed immediate action due to PrettyClose's zero lead time.

Production adjustments were made with change orders issued in June, August, and September. Despite these changes, total revenue saw a slight increase to $159,221,800, while costs remained relatively stable at $113,903,680. This resulted in a gross margin of $45,318,120 and a margin percentage of 28.46%. The board continued to demonstrate confidence in the company's direction with three votes. Overall, the strategy adjustments seemed to positively impact the financial performance compared to Year 3.

In conclusion, our strategies in Year 3 and 4 were based on learning from previous years, understanding market demand, and managing production effectively. The board members recognized our efforts and gave you three votes in both years, acknowledging our good choices in profit margin, ordering the right quantities, and choosing the correct amount of domestic and overseas suppliers.

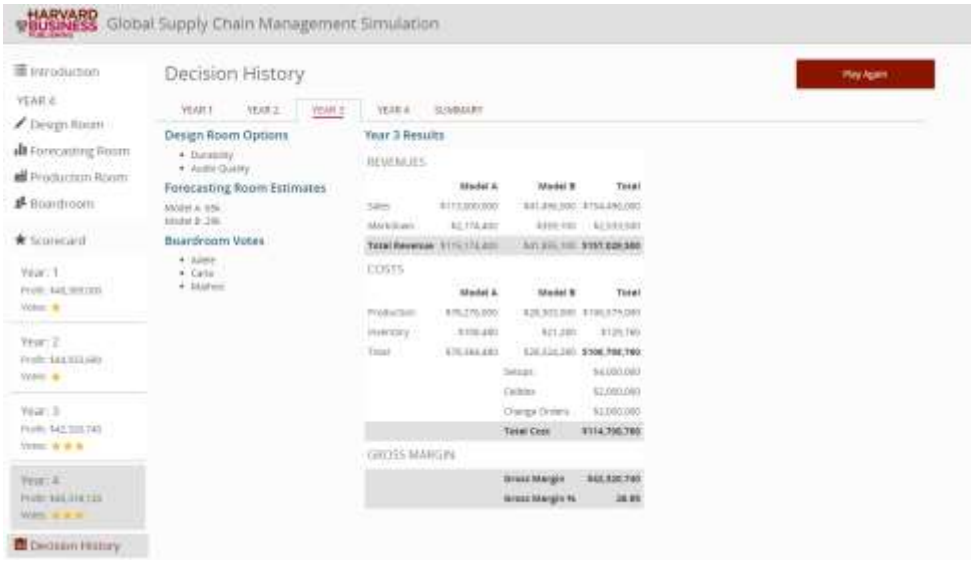

Figure 3: Year 3 Performance

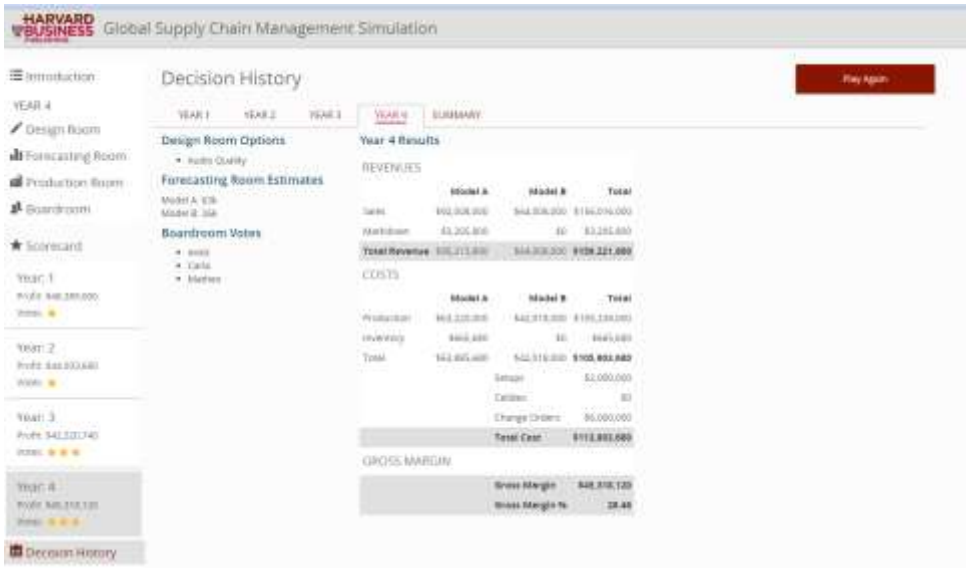

Figure 4: Year 4 Performance

7. Board Member Reviews and Meeting Discussion

Board members surprised me with their insights and perspectives. It's fascinating when they bring up issues or propose solutions that hadn't crossed my mind. We think they care about these issues because each of them brings unique expertise and a sense of responsibility to the table. They want to ensure the success and sustainability of our company or project. Adele's comment surprised us as it brought attention to an aspect of supply chain management that hadn't been emphasized by other board members: the consideration of stockout, holding, and markdown costs. While the other comments praised our understanding of demand forecasting and supply chain dynamics, Adele's critique highlighted the importance of balancing stockout costs with markdown costs, which was the part we didn't get correctly and resulted in losing her vote.

I believe the board members care deeply about the issues they raised during our meeting because they directly impact the profitability and efficiency of our supply chain operations. Each board member's comment reflects their specific concerns regarding different aspects of our performance, such as demand forecasting accuracy, production planning, understanding of cost implications, and flexibility in responding to changes in demand. By addressing these issues, the board aims to ensure that our supply chain operations are optimized for maximum profitability and resilience.

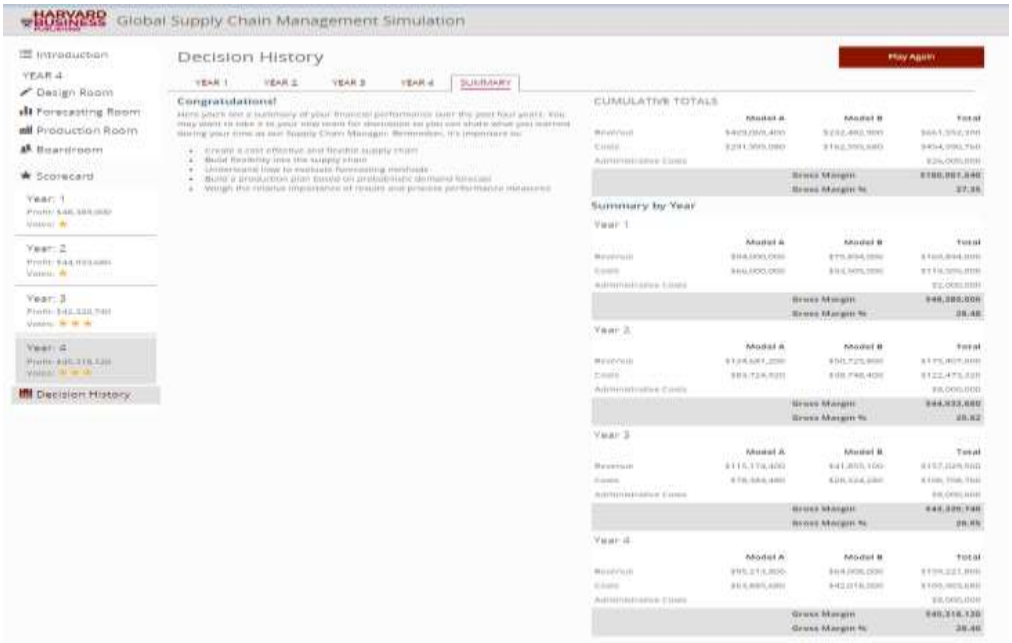

Figure 5 Performance Summary