Supply Chain Game First Report

Introduction

In the rapidly changing field of supply chain management, practical simulations provide essential insights into the complex decision-making processes and strategic considerations necessary for successful operations. The Supply Chain Simulation, an extensive business game, offered our team a valuable chance to engage with the challenges and intricacies of managing a supply chain for Jacobs Industries, a producer of industrial foam chemicals.
Throughout the simulation, our team, "logisticlegends" tackled a variety of crucial decisions, including capacity expansions, inventory management, transportation mode selection, and demand forecasting. This report summarizes our team's actions, reasoning, and reflective analysis, emphasizing the key lessons and recommendations from our experience.

Actions Taken

From the beginning, our team understood the necessity of balancing customer demand, reducing operational costs, and increasing profitability. To achieve this, we adopted a comprehensive strategy that included the following actions:

1. **Capacity Expansion:** Recognizing seasonal demand variations, we preemptively increased the production capacity at the Calopeia factory in stages. On Day 831, we raised the capacity from 20 drums per day to 22 drums per day, and further expanded to 25 drums per day-on-Day 1097, followed by 26 drums per day-on-Day 1206. These strategic capacity increases helped us meet the rising demand and avoid stockouts and lost sales.

2. **Order Quantity Adjustments**: To reduce batch production and transportation costs, we modified the order quantities for shipments from the Calopeia factory to the Calopeia warehouse based on demand fluctuations. Initially, the order quantity was set to 200 drums on Day 779. As demand changed, we adjusted the quantity to 180 drums on Day 932, and later, on Day 1175, we reverted it back to 200 drums.

3. **Reorder Point Modifications**: Understanding the importance of maintaining appropriate inventory levels, we consistently monitored and adjusted the reorder points to initiate production at the Calopeia factory. Initially, on Day 799, we set the reorder point at 350 drums. Over time, based on demand forecasts, we fine-tuned this value and finally settled on a reorder point of 500 drums by Day 1440.

4. **Transportation Mode Selection**: To reduce transportation costs and guarantee on-time deliveries, we implemented a hybrid strategy that used both truck and mail shipments. For larger batches, we preferred truck transportation, as seen in our choice to use a truck on Day 1151. In contrast, for smaller quantities, we chose mail shipments to save costs, as shown by our actions on Days 1045 and 1395.

Analysis

Capacity

Looking back, our strategy to expand capacity effectively addressed the changing demand patterns. By incrementally increasing production capacity, we managed to handle demand surges while reducing the risk of overcapacity and its related costs. Nonetheless, we recognize that a more proactive approach in predicting demand spikes earlier could have enhanced our operational efficiency and profitability even more.

Order Quantity

We adjusted our order quantities dynamically to balance the costs of batch production and transportation. Initially, increasing the order to 200 drums helped us save money through economies of scale. Later, reducing the order to 180 drums during times of lower demand helped us lower inventory holding costs. Finally, returning to the larger batch size of 200 drums at the end of the simulation allowed us to meet the final surge in demand while still benefiting from the cost advantages of larger production runs.

Reorder Point

Adjusting our reorder points was essential for keeping inventory at ideal levels and avoiding stockouts. By regularly tracking demand trends and modifying the reorder points, we managed to initiate production at the right moments, ensuring a consistent supply of drums to fulfill customer orders. Looking back, we realize that we could have been more proactive in making these adjustments, especially during times of sudden demand changes, to improve our responsiveness and reduce the risk of lost sales.

Transportation Mode

Our mixed strategy for choosing transportation modes turned out to be economical. By utilizing the cost advantages of trucking for larger shipments, we managed to lower transportation expenses and ensure timely deliveries. On the other hand, using mail shipments for smaller quantities helped us cut costs even more while maintaining good customer service.

Final Recommendations and Insights Gained

Drawing from our experience and analysis, we propose the following recommendations for future supply chain management initiatives:

1. **Demand Forecasting:** Invest in reliable methods for predicting demand to better understand demand trends. This will help in making decisions ahead of time and reducing the necessity for last-minute changes, resulting in improved operational effectiveness and reduced costs.

2. **Collaborative Planning**: Encourage strong teamwork and communication among everyone involved in the supply chain. This will help coordinate production, inventory, and transportation plans more effectively, making sure materials move smoothly and reducing any problems.

3. **Continuous Improvement**: Foster a mindset of ongoing enhancement through frequent assessment and adjustment of procedures, using insights from data and adopting effective approaches from top players in the field. This approach will empower companies to remain at the forefront and sustain a competitive advantage amidst the constantly evolving supply chain environment.

4. **Sustainability Considerations**: Incorporating sustainability principles into supply chain decision-making involves examining environmentally friendly transportation options, adopting circular economy strategies, and efficiently using resources to reduce environmental harm while also ensuring sustained profitability in the long run.

Participating in the Simulation Game was a real eye-opener for our team. We got to see firsthand how complicated supply chain management can be, with all its moving parts and dependencies. Learning to stay flexible, use data to make decisions, and work closely with other teams were key takeaways from this experience.

We also realized that every decision we make in one part of the supply chain can affect everything else. By constantly tweaking our strategies, we managed to stay ahead and ended up with the second-highest cash position of $5,945,063.87 among all the teams.

Overall, the simulation was a great learning opportunity. It taught us practical skills and gave us a deeper understanding of how to run a successful supply chain. As we move forward in our careers, the lessons we learned will come in handy as we tackle the challenges of real-world supply chain management.

Appendix:

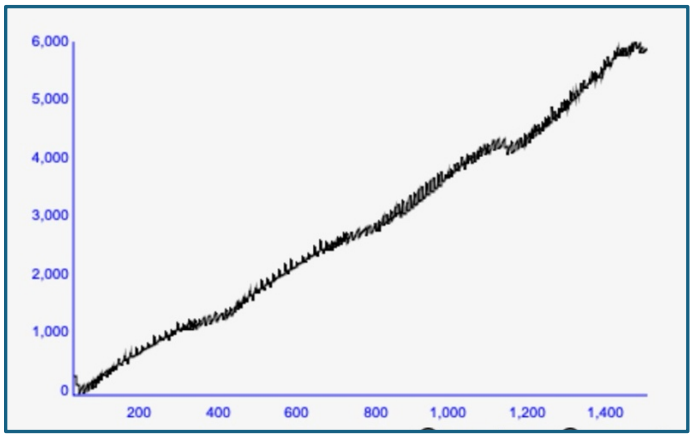

Figure 1: Plot of cash balance (thousands of dollars)

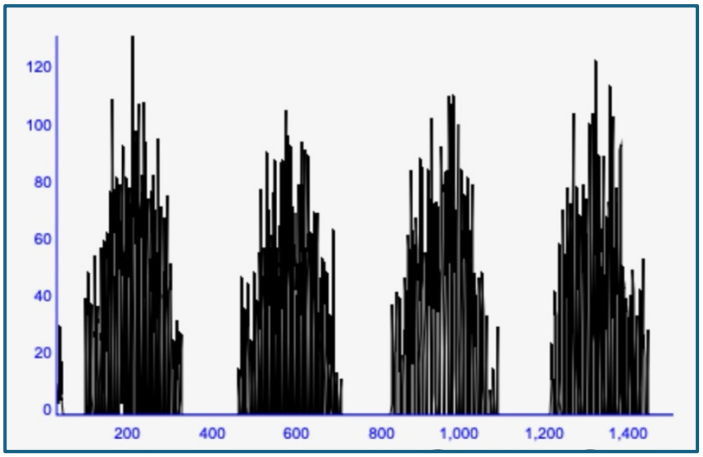

Figure 2: Lost Demand for each destination region

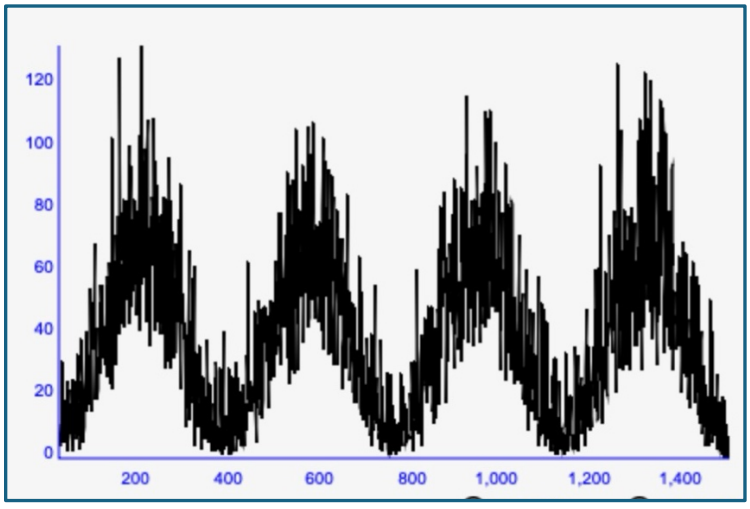

Figure 3: Demand for each destination region

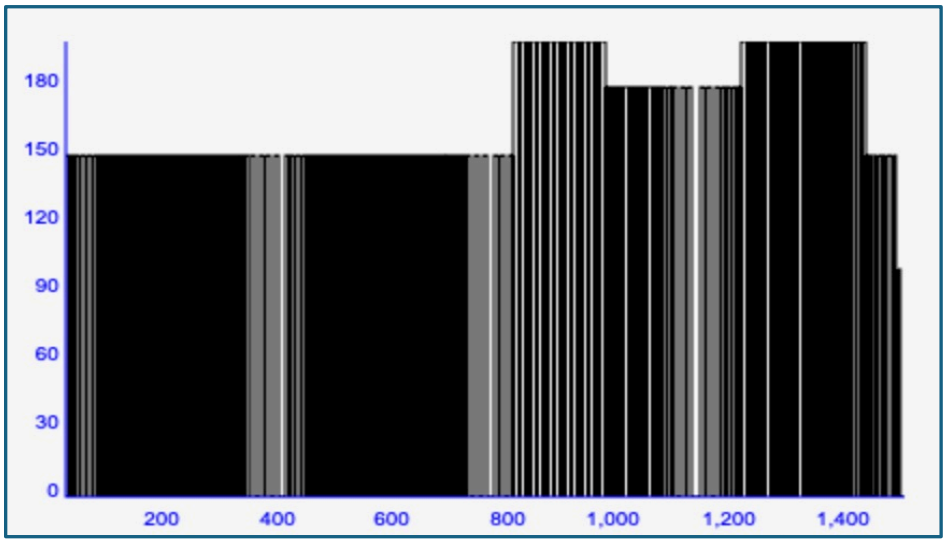

Figure 4: WIP Inventory in the Calopeia factory, for each warehouse destination

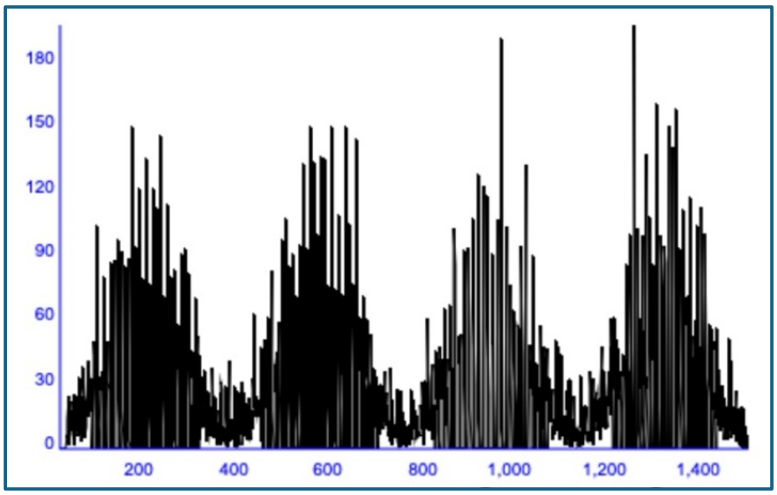

Figure 5: Shipments for the fast segment out of the Calopeia warehouse, for each destination region.

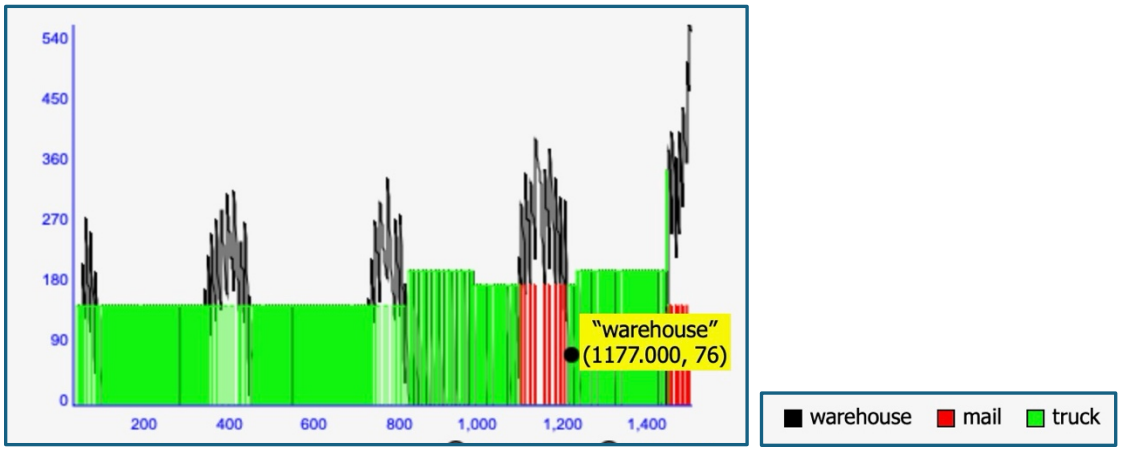

Figure 6: Finished Goods Inventory at or destined for the warehouse in Calopeia, by current location

Day	Parameter	New Value
779.07	Order quantity: Calopeia factory to Calopeia warehouse.	200
799.35	Order point: Calopeia factory to Calopeia warehouse.	350
831.47	Schedule factory capacity change in Calopeia	22.00
871.34	Order point: Calopeia factory to Calopeia warehouse.	375
932.47	Order quantity: Calopeia factory to Calopeia warehouse.	180
932.65	Order point: Calopeia factory to Calopeia warehouse.	350
1,002.54	Order point: Calopeia factory to Calopeia warehouse.	325
1,022.63	Order point: Calopeia factory to Calopeia warehouse.	300
1,045.57	Shipping from Calopeia factory to Calopeia warehouse.	mail
1,097.03	Schedule factory capacity change in Calopeia	25.00
1,151.00	Shipping from Calopeia factory to Calopeia warehouse.	truck
1,175.71	Order quantity: Calopeia factory to Calopeia warehouse.	200
1,175.87	Order point: Calopeia factory to Calopeia warehouse.	325
1,206.33	Schedule factory capacity change in Calopeia	26.00
1,361.45	Order point: Calopeia factory to Calopeia warehouse.	250
1,363.74	Order point: Calopeia factory to Calopeia warehouse.	300
1,382.19	Order point: Calopeia factory to Calopeia warehouse.	250
1,387.73	Order quantity: Calopeia factory to Calopeia warehouse.	150
1,390.01	Order point: Calopeia factory to Calopeia warehouse.	375
1,395.19	Shipping from Calopeia factory to Calopeia warehouse.	mail
1,440.59	Order point: Calopeia factory to Calopeia warehouse.	500
1,444.59	Order quantity: Calopeia factory to Calopeia warehouse.	100

Showing 1 to 22 of 22 entries

Figure 7: Transaction History

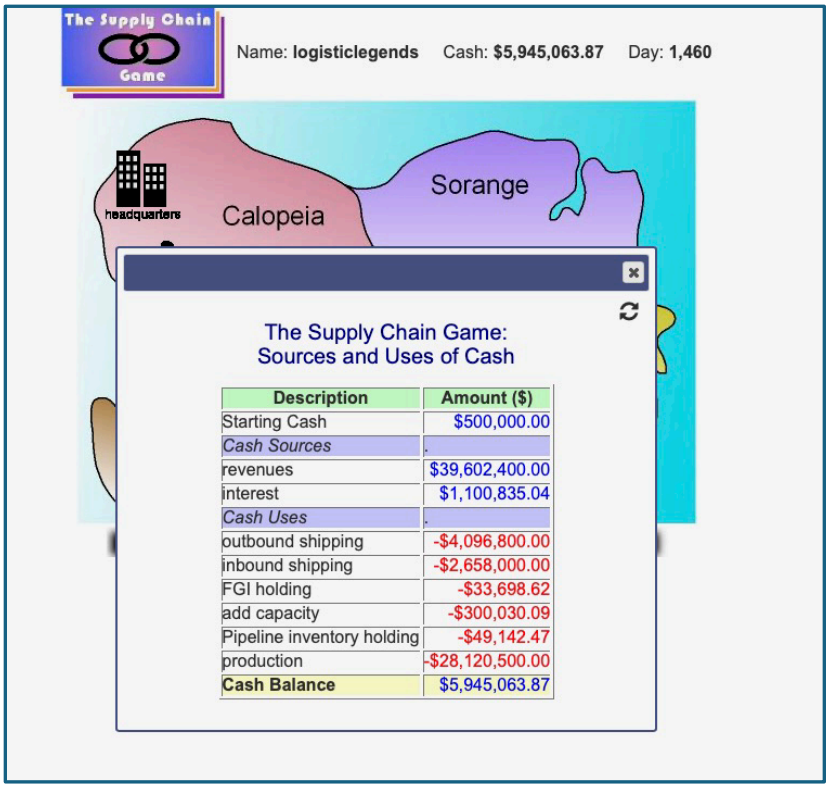

Figure 8: Sources and Uses of Cash

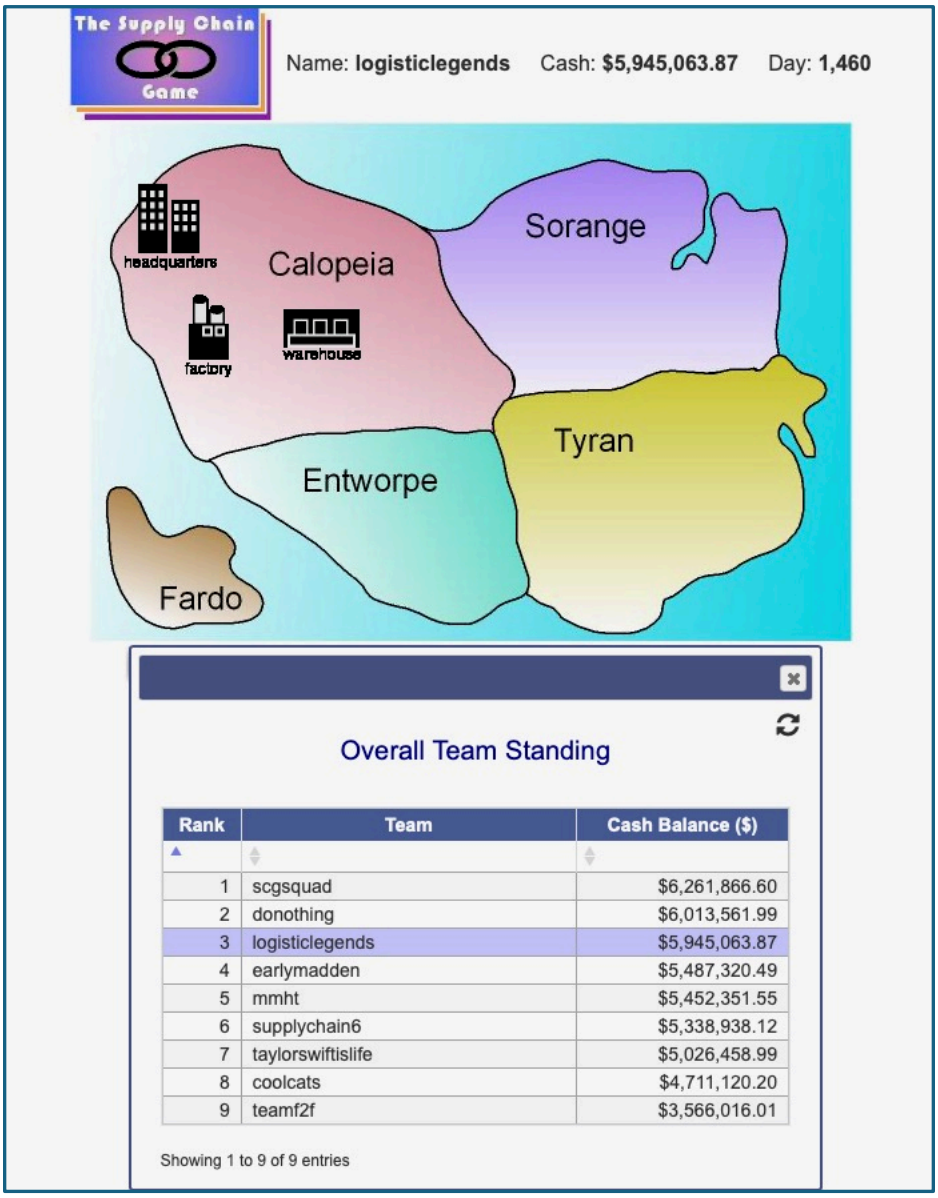

Figure 9: Overall Team Standing