**Case Study: Optimizing Walsh’s Juice Company Supply Chain**

**1. Background**

Walsh’s Juice Company sources raw grape juice from three vineyards and processes it at four plants to produce bottled juice, frozen concentrate, and jelly. Each plant has capacity constraints and varying processing costs. The goal is to minimize transportation and processing expenses while meeting production demand.

**2. Problem Statement**

How can Walsh’s Juice Company optimize its supply chain by minimizing transportation and production costs while ensuring production requirements for bottled juice, frozen concentrate, and jelly are met?

**3. Solution Approach**

We applied an **Integer Linear Programming (ILP) model** to determine the optimal transportation routes and production allocation. The model considers:

* Vineyard supply limitations.
* Plant capacity constraints.
* Fixed transportation costs per ton.
* Processing cost variations among plants.
* Demand requirements for each product.

**4. Key Findings**

* The optimized solution reduced total costs to **$10,694,500**.
* Sensitivity analysis identified that adjusting transportation costs or reallocating production could yield further savings.
* The optimal production allocation shifted to plants with lower processing costs, maximizing cost efficiency.

**5. Recommendations**

1. **Negotiate Better Transportation Rates** – Identify cost-effective routes to reduce expenses.
2. **Reallocate Production** – Shift production to plants with lower processing costs.
3. **Optimize Transportation Routes** – Reduce unnecessary mileage and ensure efficient vineyard-to-plant transport.
4. **Adjust Plant Capacity** – Expand processing at cost-efficient plants to accommodate higher production at a lower cost.

**6. Conclusion**

By implementing an optimized transportation and production strategy, Walsh’s Juice Company can significantly lower operational costs while maintaining product demand fulfilment. The ILP model serves as a valuable tool for decision-making, guiding strategic adjustments in supply chain logistics to enhance profitability.