Cost Optimization
Inventory vs. Labor

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MIT GLOBAL SCALE NETWORK

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Motivation / Background

The sponsor company faces the ultimate trade-off between cost-efficiency and flexibility. How much inventory should they hold? How flexible should they be? What should their staffing strategy be?

Focus area is a manufacturing site in Germany, mainly due to :

- **High-tech, complex equipment**
- **Most premium product range**
- **High labor costs**
- **Low crewing flexibility**
- **High level of training required**



> Making vs. Packing

- **Packing is more flexible due to simple labor- dependency**
- **Making is less flexible and more capital intensive**

Key Question / Hypothesis

What should the optimal production planning approach be? Should the plant become more flexible at the expense of production stability?



The main purpose of this project is to optimize total supply chain costs, with specific focus on inventory and manufacturing costs.

Relevant Literature

- ***Hafezalkotob, A., Chaharbaghi, S., & Lakeh, T. M. (2019), Journal of Industrial Engineering International***
- ***Cheraghalikhani, A., Khoshalhan, F., & Mokhtari, H. (2019), International Journal of Industrial Engineering Computations***



The Problem

The key challenge is to optimize supply chain costs while maintaining target CSL and considering manufacturing & logistical constraints that cannot be regularly reflected in standard planning cycles, as well as potentially challenging some of the constraints.



Methodology



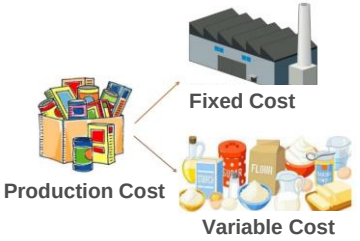
During the first step, multiple sessions occurred with various functions, to acquaint ourselves with the company processes, sites & portfolio, and align on the project scope.

In our four-step iterative process, data collection was initiated with elements such as demand and supply capability, followed by quantitative analysis. Next, model creation and simulation will follow, with stakeholder feedback and feasibility checks.

Initial Observations : Progress To-Date

Following extensive analysis of the site cost structure, the fixed and variable cost drivers were identified.

The model objective function, decision variables & constraints were identified, with the digital prototype & sensitivity analysis to follow.





Expected Contribution

The team intends to develop a model, custom-fit for the sponsor company site, to optimize total supply chain costs.

Additionally, the team intends to clarify the tradeoffs between inventory and manufacturing costs, with specific focus on labor costs.

Finally, the team will attempt to identify issues to potentially enable the re-use of this model in similar manufacturing sites.





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