

DDMRP Feasibility Assessment in the Pharmaceutical Industry

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Motivation / Background

- Our partner is exploring methods for streamlining the demand planning process to reduce their reliance on human labor.
- The pharmaceutical supply chains are characterized by many production stages, long lead times, infrequent production cycles with high service level expectations.
- The inventory planning methodology examined is DDMRP, a pull-based system that suggests placing strategic buffer stock at critical nodes in the supply chain to prevent bullwhip effect.
- Previous studies have not examined DDMRP on highly complex and constrained supply chains like those of the pharmaceutical industry.

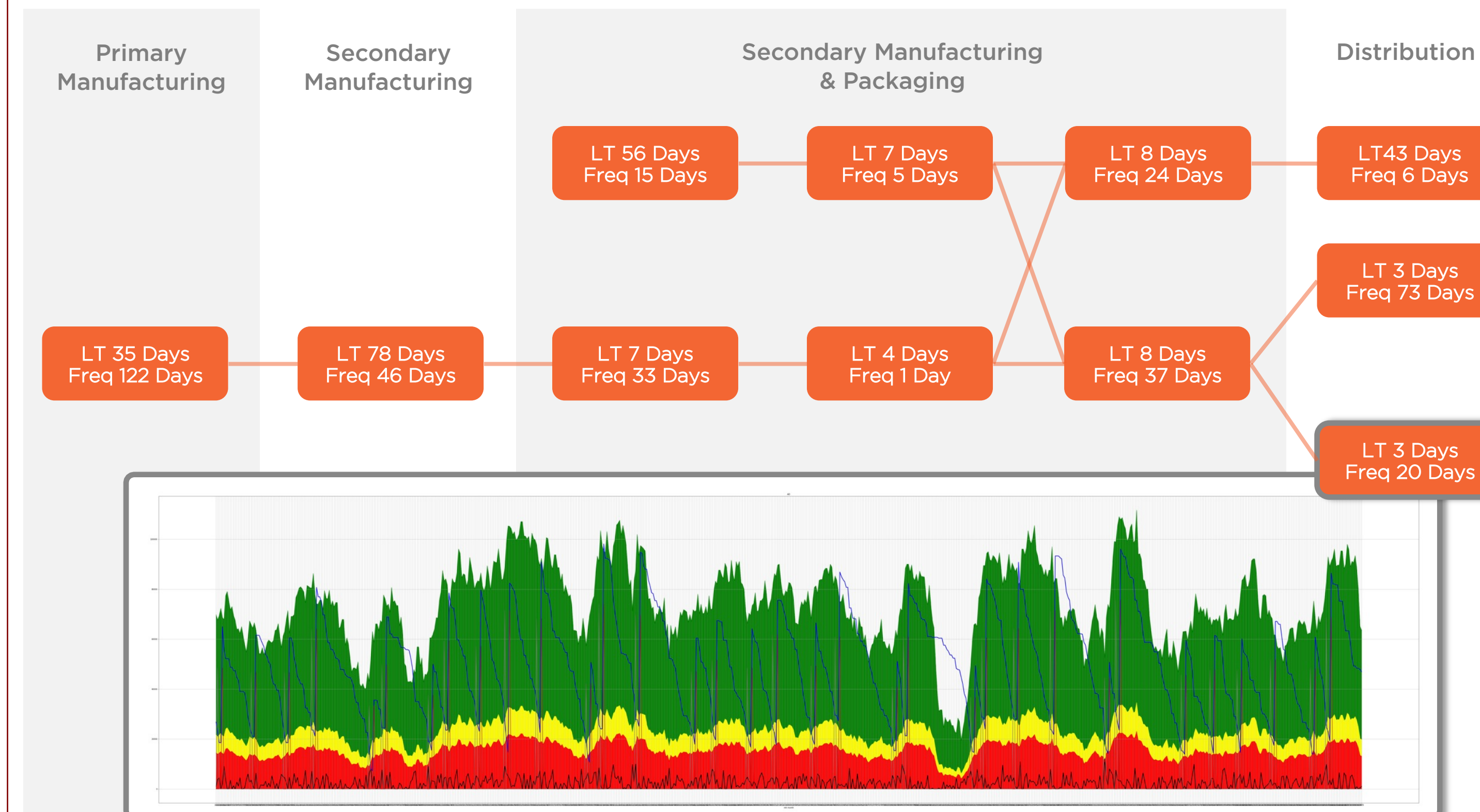
Key Questions

- Can high services levels be maintained without building excessive inventory in DDMRP implementation?
- What are the required process and capacity changes for GSK to transition to DDMRP?

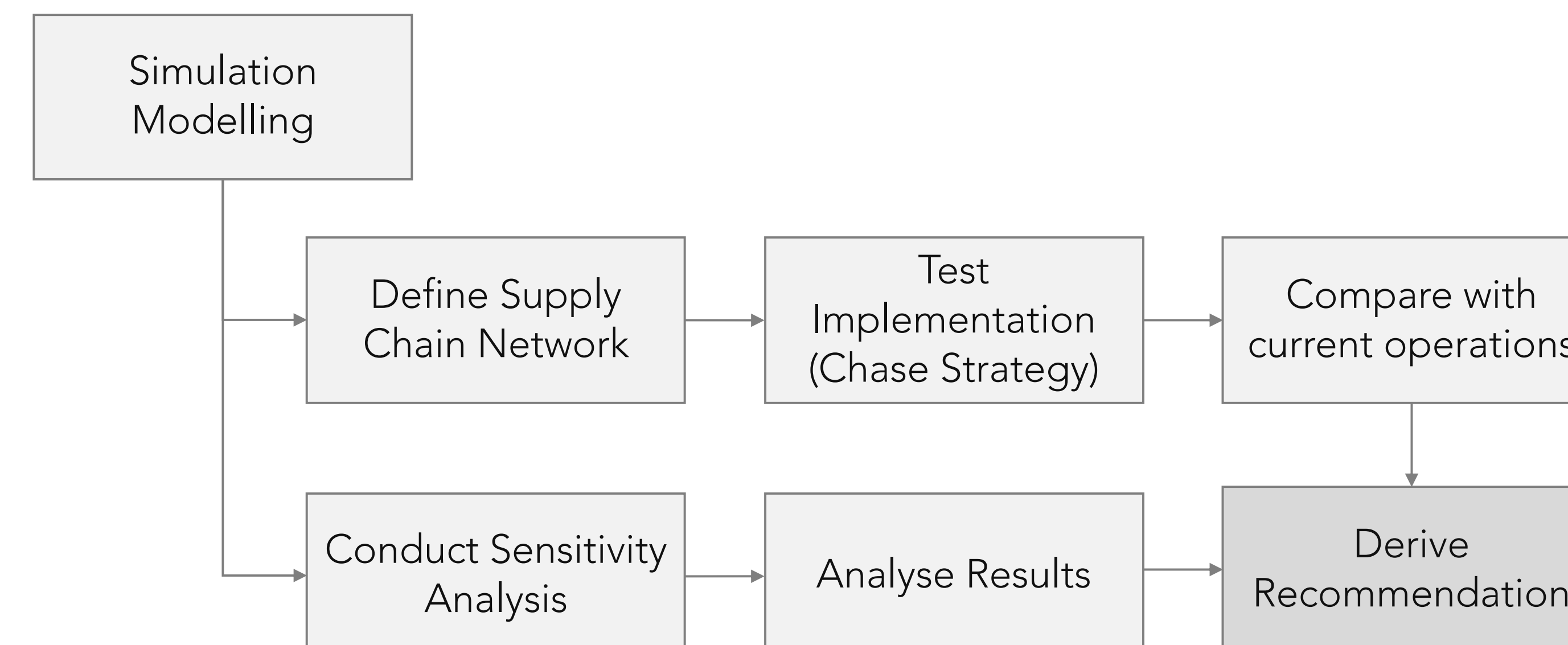
Relevant Literature

- An empirical comparison of MRPII and Demand-Driven MRP. Miclo, Romain. (2019). Journal of Production Research
- Demand Driven Material Requirements Planning (DDMRP). Ptak, C. and Smith, C. (2016)

DDMRP Simulation on Actual Production Network



Methodology



Results / Discussions

- Planning parameters can be categorized into three groups (opposite tradeoff, extreme value, and correlated) based on inventory level to service level relationship.
- Demand clusters in upstream nodes. Complete automation will not overcome the progressive increase in demand variability.
- System is at high risk of stock out if the demand over that lead time increases to an average of three times the average daily usage.
- Strategic buffer stocks only consider the incoming customer demand, but do not plan to the immediate downstream node's requirements.
- The lead time adjust will not provide benefit of increasing replenishment frequency if the MOQ or desired order frequency is binding on the reorder point.
- Strategic buffer stocks are not sized for target service level, resulting in managerial difficulty for implementation.
- Trial-and-error parameter tuning is likely required in the initial stages of DDMRP implementation.

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