

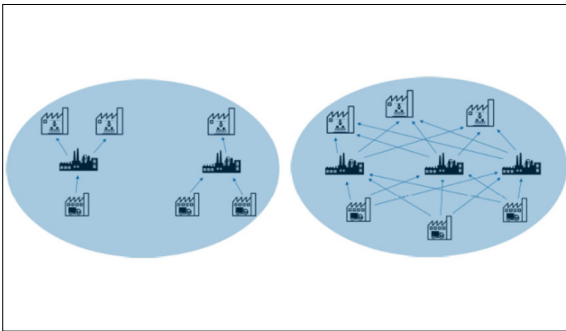


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Fact-Based Decision-Making of Production Networks in Uncertain Times

Optimization and Simulation of Global Production Networks

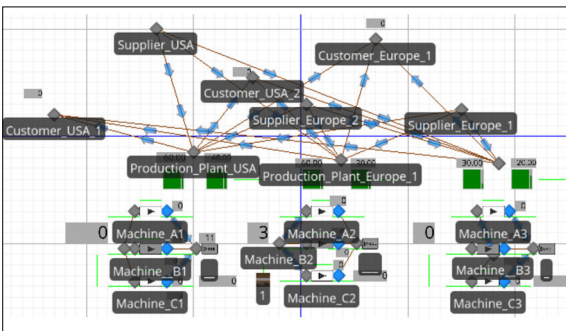


Local vs. Global Production Network
Own presentation

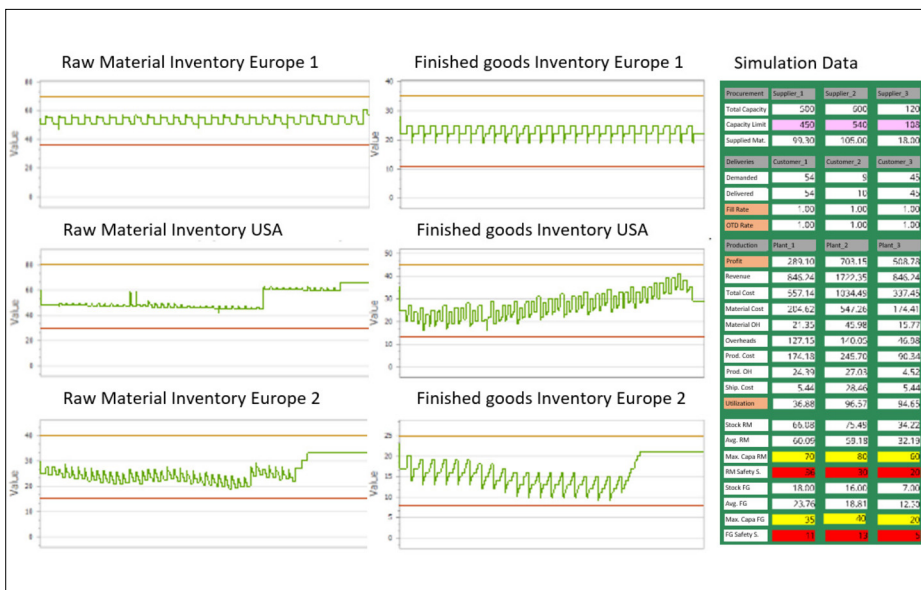
Problem: Global production networks are highly complex in managing and constantly optimizing. Recent development such as political change in power, pandemic crisis or increasing trade hurdles have changed the risk exposure of such production set-up significantly. Management decisions in production networks are therefore very complex due to coordination topics and have long-term impact such as investing into a plant. Fact-based decisions are needed to reduce risks.

Objective: This thesis is based on an in-depth case study with in-depth access to all relevant data and processes of the global production network. A mathematical model and a simulation model of this production network is built as close as possible to reality. A cross-shipping strategy is developed based on the mathematical model, different uncertainties such as supply-shortages, plant closure and demand variation are simulated and a performance comparison of the cross-shipping network vs. a local-to-local network is conducted. The impact of various uncertainties is quantified.

Result: This study provides support for production network strategy and operations decision-making. The result is very relevant during recent discussion in reducing global production networks to a more local approach. In sum it can be said that the global cross-shipping strategy performs under high uncertainties better than a local-to-local network. Furthermore, an interlinked, cross-shipping global network with multiple suppliers, production plants and customers offers much more possibilities regarding operational adjustments in uncertain times. The developed integrated fact-based decision-making approach for this case can be applied generically for different production networks.



Discrete-Event Simulation
Own presentation



Network Performance
Own presentation