



Research School for Operations
Management and Logistics

Complexity in high-tech manufacturing

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High-tech systems involve big and complex supply chains. It is impossible to oversee the entire operation. Manufacturing is somehow orchestrated by sharing information and coordinating the production planning between upstream teams that produce a subcomponent of the system and downstream teams that need it. Each team decides on its own operations according to this bilateral coordination and information sharing. From all bilateral coordination and decisions together thus emerges the responsiveness, resilience, and cost effectiveness of the overall supply chain.

Three complementary work packages together aim to improve this global supply chain performance via concrete improvements to the local planning and coordination process:

1. Coordinated production planning in high-tech supply chains aims to improve the production planning and forecast sharing capabilities of individual actors. Planning models in WP1 are local. To ensure improvement of the global supply chain we complement it with
2. An agent-based model for high-tech supply chains, which develops an accurate and detailed descriptive model of the entire supply chain for understanding and explaining the connection between local decisions and global performance.
3. Emergent behavior and resilience in stochastic processing networks: Practitioners prefer easy-to-understand analytical rules for production planning and capacity allocation that perform well on supply chain level. Using probabilistic scaling techniques, this WP develops such rules based on an abstraction of the detailed supply chain models.

Deligiannis is hired to work on WP3.