



Research School for Operations  
Management and Logistics

**Mid- and long-term flexibility planning in innovation-driven, low-volume, high-tech manufacturing supply chains**

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Mid- and long-term flexibility planning for high-tech manufacturing supply chains encompasses tactical and strategic inventory (material) and capacity (men and machines) planning. These planning problems are complex due to a combination of characteristics of the considered industry, namely: there exists a large number of suppliers; production lead times are long; lead time variability and yield issues introduce significant supply uncertainty; demand is non-stationary and highly volatile; production is high-value and low-volume; rapid technological developments drive continuous new product introductions; there is a high level of component commonality; and capacity acquisitions are expensive and carry a long lead time. We aim to develop an integrated decision framework for inventory and capacity planning employing stochastic programming, heuristic and reinforcement learning techniques. The main business trade-off arises between customer service levels and (inventory and capacity) investment costs, which should lead to solid financial performance indicators while securing market share targets. Our industry partner in this research project is ASML