

AGENT-BASED MODELING TO SUPPORT OPERATIONS MANAGEMENT IN A MULTI-PLANT ENTERPRISE

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ABSTRACT. *A global industrial enterprise is a complex network of different distributed production plants producing, handling and distributing specific products. Agent-based modeling is a proven approach for modeling complex networks of intelligent and distributed actors. In this paper, we will demonstrate how an agent-based model can be used to evaluate the dynamic behavior of a global enterprise, considering both the system-level performance as well as the components' behavior. This quantitative model can be very useful for predicting the effects of local and operational activities on plant performance and improving the tactical and strategic decision-making at the enterprise level.*

Keywords: Agent based models, Multi-plant enterprise, Operation management, Ab-normal situation management

1. **Introduction.** To remain competitive in today's ever-changing markets, companies have to examine alternative solutions for their logistics network. One of these solutions may be shifting from one-plant manufacturing facilities to multi-plant enterprise. Such shifting can bring many advantages, i.e. being close to low cost raw materials, proximity to market, flexibility in producing many products and specialization in activities [1]. On the other hand, the physical network of a multi-plant enterprise and the social network of actors involved in its operation collectively, form an interconnected complex system where the actors determine the development and operation of the physical network, and the physical network affects the behavior of the actors.

An industrial enterprise system can be viewed as a multi-level system, whether hierarchically interconnected or decentralized, with a number of operational regimes at the various system levels. Usually, at each level of the decomposed system local performance objectives are defined which should, preferably, not be restricted to the optimization of local goals, but rather aim at optimally contributing to the overall goal. However, the relation between local and overall system performance, objectives may be rather fuzzy, especially since the overall objective is often not defined in detail and concerned with a longer time horizon. The local objectives are generally more detailed, concerned with a