

Introduction to the Minitrack Decision Technologies for Supply Chain Management

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1. Introduction

In the last few years tremendous efforts have been made by retailers, distributors, manufacturers, and suppliers to reduce costs, increase quality and service, and to cut lead times substantially. It is becoming clear that those goals in most cases can only be met if partnerships are established throughout the logistical network. Establishing, integrating, and coordinating such networks are the main objectives of Supply Chain Management (SCM). Many analysts expect that competition in the future will not be between different companies but rather between loosely coupled, dynamically adapting virtual enterprises that form supply chains.

Information Technology (IT) is a prerequisite for successful SCM today and will become even more so in the future. Business-to-business transactions are made via the internet and ERP systems manage the transactional information within the enterprise. While IT systems are vital components in supply chains, their

successful management rely on intelligent and coordinated decision making throughout the network. Decision support and decision technologies are becoming increasingly important in this field. Data Warehouses and Data Mining can be used to store and analyze e.g. product, inventory, and sales information. Simulation and optimization, which can be found in so-called advanced planning and scheduling systems, can be employed for e.g. inventory, production, procurement, and distribution planning. Intelligent Agents can e.g. communicate with different partners in the supply chain, assist in seeking information, share product information, negotiate prices, and distribute alerts throughout the supply chain.

2. Focus, Topics and Presentations

The minitrack focuses on modeling, algorithms, and implementation for decision support in the field of SupplyChain Management. These technologies can be used to assist decision makers at all levels of management:

- Strategic Management; design of the supply network, choice of partners, vertical integration and outsourcing, product design and lifecycles
- Tactical Management; purchasing, (vendor-managed) inventory, and production planning, collaborative forecasting and replenishment, distribution and transportation planning, design of information and work flows
- Operational Management; Available-to-Promise (ATP), Capable-to-Promise (CTP), scheduling of machines and staffs, routing of products and vehicles, organization of returns and services

The following decision technologies are important in all supply chain software systems:

(1) Simulation

- Simulation of entire supply chains enable managers to assess different design scenarios with respect to e.g. locations, planning algorithms, and cost structures

(2) Advanced Planning and Scheduling Software (APS)

- APS software systems employ optimization and simulation algorithms in order to provide decision support for strategic network planning, demand planning, master planning, demand fulfillment and ATP/CTP, production planning and scheduling and distribution and transport planning

(3) Agent Technologies

- Agent Technologies can assist with various activities in the supply chain. These include information gathering, filtering, and distribution throughout the supply chain, analysis and negotiation within marketplaces, triggering alerts and re-planning activities etc.

(4) Data Warehousing, OLAP, and Data Mining

- These Technologies assist managers in the gathering, reporting on, and analysis of information of the entire supply chain

(5) Descriptive Models

- Descriptive models are an important tool for analyzing, benchmarking, and re-designing supply chains

(6) Forecasting Models

- The corresponding models and algorithms are an integral part of all supply chain software systems. They are building blocks enabling real-time information sharing throughout the supply chain

The three presentations of the minitrack within HICSS-35 cover a big part of the SCM area. Two of them are dealing with applications in pulp mill industry or in harbour SCM respectively. The methodological focus is on integrated production planning and scheduling on one hand side and on simulation using Multi-Agent Systems on the other. Finally managing the real-time supply chain is an important issue in the SCM area.