State of the Art in Supply Chain
- Overview -

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Supply chain management refers to integrated planning:
- **Functional integration** of purchasing, manufacturing, transportation, warehousing, and sales activities
- **Spatial integration** of activities across geographically dispersed vendors, facilities, and markets
- **Intertemporal integration** of activities over strategic, tactical, and operational planning horizons
Supply Chain System Hierarchy

Source: Tayur, et al. [1999]
IT Trend for Business Applications

Virtual Enterprise

Integration with external
Information Management
Data Integration
Automation

OA
FA

EIS
MIS
MRP
QMS
MMS
CIM
FMS

EIS
DSS
ERP
PDM
MES
QMS
MMS
IMS

EIS
DSS
SFA
SCM
ERP
PDM
MES
QMS
MMS
IMS

Virtual Portal

Employees
Partners
Public

Internet
Intranet
Extranet

Source: Kim. PSE Asia [2002]
Session Program

What is Missing to Enable Optimization of Inventory Deployment and Supply Planning?
Sridhar Tayur
SmartOps and Carnegie Mellon University

Supporting Supply Chain Planning and Scheduling in Oil and Chemical Industry
Nort Thijssen
Shell Global Solutions International

Challenges of Strategic Supply Chain Planning and Modeling
Jeremy Shapiro
Slim Technologies and MIT
What is missing to enable optimization of inventory deployment and supply planning? Sridhar Tayur

Persistent drivers of inventory inefficiency

- Inherent and increasing supply and demand uncertainty
- Increasing complexity in multistage supply chain
- Uncoordinated decision-making within companies and across supply chains

Optimization of inventory deployment and supply planning are enabled by following approaches

- Stochastic approach directly accommodates supply and demand uncertainty, variability, and complexity.
- All inventory forms and components are simultaneously, holistically optimized.
- Supply chain interdependencies are accounted for and managed over time.
- Coordinating decisions across functions, echelons, and enterprises is used.
Challenges of strategic supply chain planning and modeling

Jeremy Shapiro

- Enlarging the scope of strategic planning studies and models
- Reflecting theories of strategy in data-driven optimization models
- Formalizing scenario planning, applying stochastic programming and modeling risk
- Expanding business processes to exploit fact-based analysis of strategic plans
Supporting supply chain planning and scheduling decisions in the oil & chemical industry
Nort Thijsen

<table>
<thead>
<tr>
<th>Core requirements for an integrated tool set</th>
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<tr>
<td>Integration</td>
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<tr>
<td>• Complete horizontal integration</td>
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<tr>
<td>• Seamless system from feedstock trade through to product trading</td>
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<tr>
<td>Convergence</td>
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<tr>
<td>• Convergence of strategy, planning and scheduling</td>
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<tr>
<td>• Vertical systems integration</td>
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<tr>
<td>Modularity</td>
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<tr>
<td>• Phased implementation and scheduling</td>
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<tr>
<td>Scalability</td>
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<tr>
<td>• Application to the most simple and/or complex supply chains</td>
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<tr>
<td>Viewing</td>
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<tr>
<td>• Interactive, customized viewing</td>
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<tr>
<td>• Internet and workflow enabled viewing</td>
</tr>
<tr>
<td>Speed</td>
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<tr>
<td>• Real-time optimization speed</td>
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<tr>
<td>Link</td>
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<tr>
<td>• Direct links to online refinery/plant optimization</td>
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**GMOS/NetSim**

- Accessing best practice know-how from supply chain all over the globe
- Getting quick practical answer with solving real problem
- Enhancing business vision and direction
**Current position**
Prof. of Operations Management and Manufacturing, CMU
President of SmartOps

**Educational Backgrounds**
B.Tech, IIT, Madras
Ph.D., Cornell Univ.

**Research interests**
Internet-enabled supply chains, supply chain management, managing product variety, plant management, JIT and logistics
Speaker: Dr. Jeremy Shapiro

Current position
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President of SLIM Technologies

Educational Backgrounds
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Research interests
Integer programming, large-scale programming on parallel computers, integration of mathematical programming and heuristic methods, supply chain management and portfolio optimization
Speaker: Nort Thijsen

Current position
Senior Consultant
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Educational Backgrounds
M.S., Univ. of Technology, Eindhoven
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Professional experiences
Shell research center in Amsterdam, 1981~1988, Decision support system
Shell refinery, 1988~1992, Refinery planning & scheduling
Shell Global Solution International, 1993~present, Supply chain optimization services for the oil chemicals & gas industry