Business Process Modeling in Horticultural Supply Chains

Producers and Consumers in the Horticultural Value Chain (Seminar SM10)
28th International Horticultural Congress, Lisboa, August 22-17, 2010
C.N. Verdouw, A.J.M. Beulens, J.H. Trienekens, J. Wolfert

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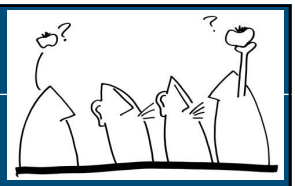
Introduction



- Problem context
  - Trend towards dynamic demand-driven supply chains
  - High variety and variability of supply chain configurations
  - Interoperability and agility of information systems
- Objective
  - To discuss a process modeling framework, which enables rapid design and implementation of demand-driven supply chains.
- Based on multiple case studies in Dutch potted plants and European fruit supply chains
- Two parts of the framework:
  - A) Object System Definition
  - B) Modeling Toolbox

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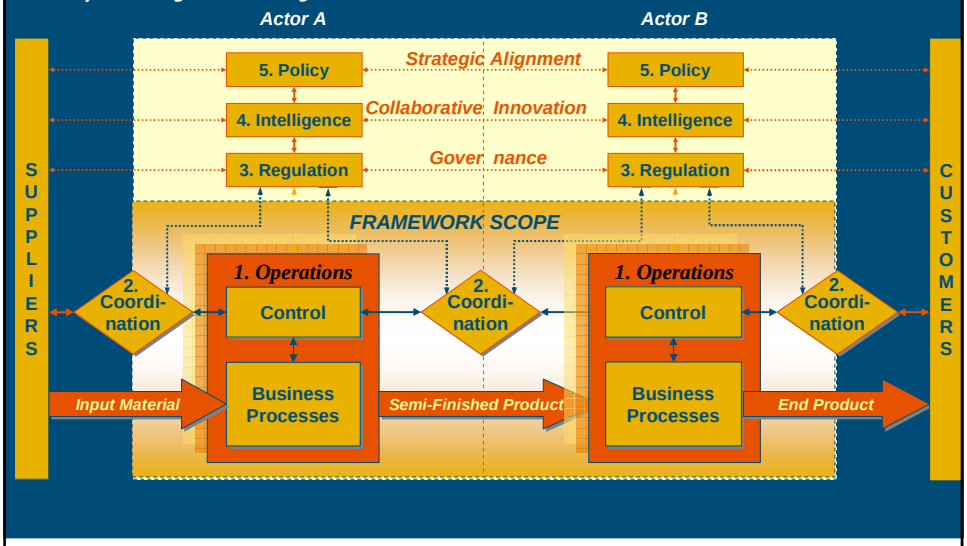
A) Object System Definition



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B) Modelling Toolbox

- Reference Knowledge in the form of:
  - Standard Model Components (based on SCOR)
  - Configuration Trees
  - Templates
- Levels of aggregation
  1. **Product Flow Models**
     - *Allocation of Basic Transformations*
  2. **Supply Chain Thread Diagram**
     - *Control and Coordination of Transformations*
  3. **Main Business Process Diagrams**
     - *Sequence and Interaction of Detailed Activities*
  4. **Sub Business Process Diagrams**

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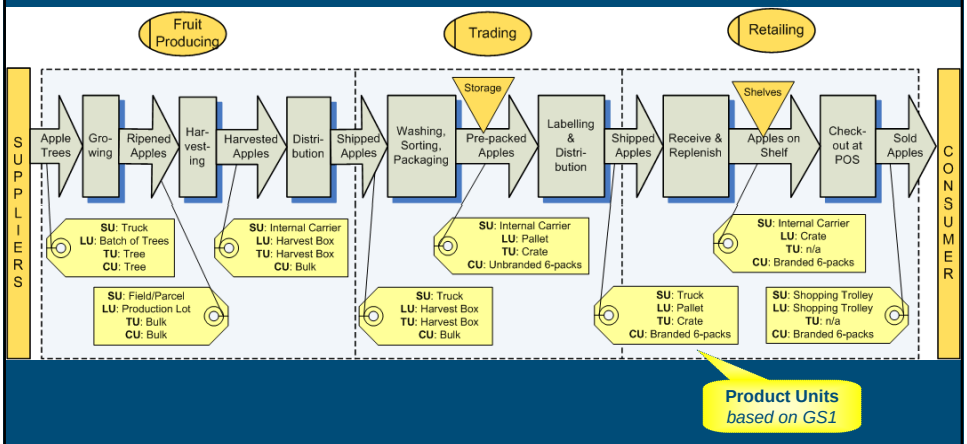
1. Product Flow Diagrams

Allocation of Basic Transformations

Illustrative example!



Product Units *based on GS1*

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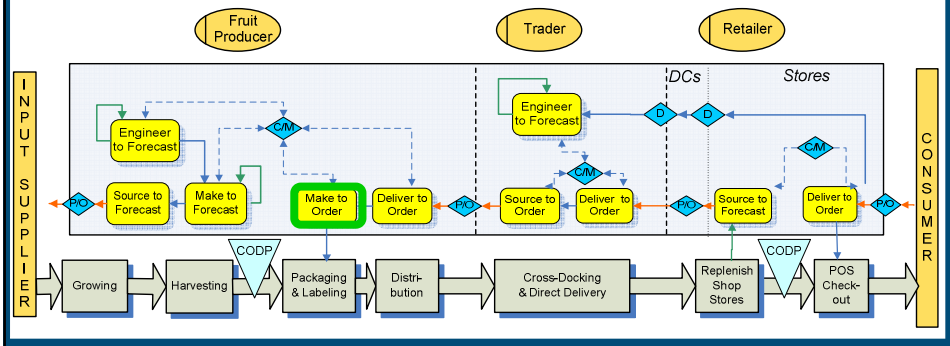
2. Supply Chain Thread Diagram

Control and Coordination of Transformations

Illustrative example!



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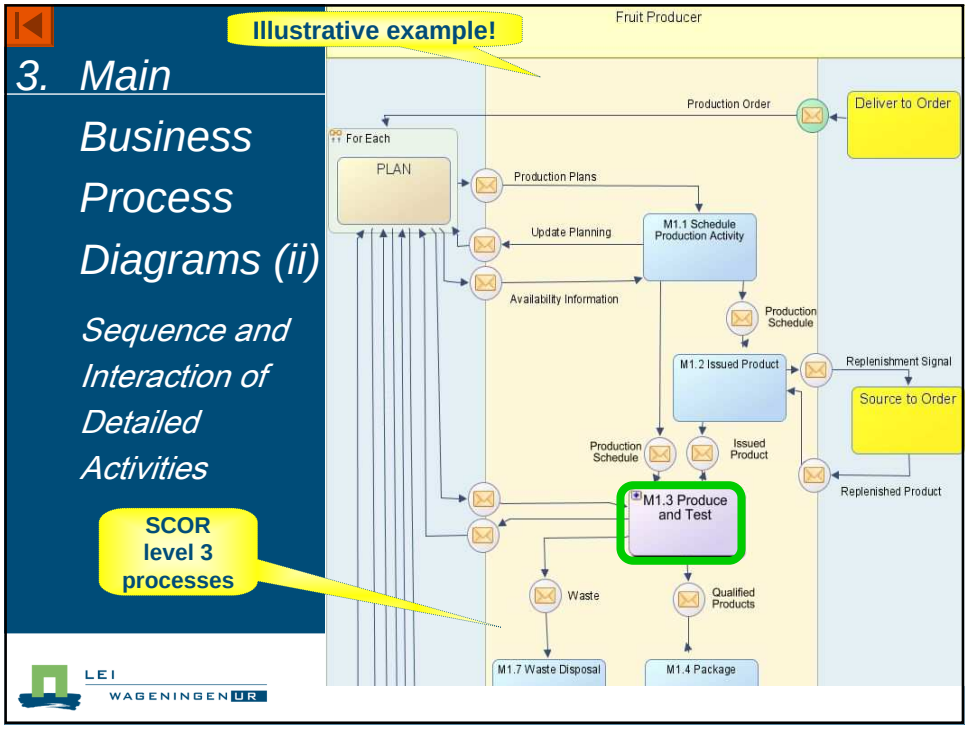
3. Main Business Process Diagrams (ii)
Sequence and Interaction of Detailed Activities
Illustrative example!
SCOR level 3 processes
Fruit Producer
Production Order
Deliver to Order
For Each
PLAN
Production Plans
Update Planning
M1.1 Schedule Production Activity
Availability Information
Production Schedule
M1.2 Issued Product
Replenishment Signal
Source to Order
Production Schedule
Issued Product
Replenished Product
M1.3 Produce and Test
Waste
Qualified Products
M1.7 Waste Disposal
M1.4 Package
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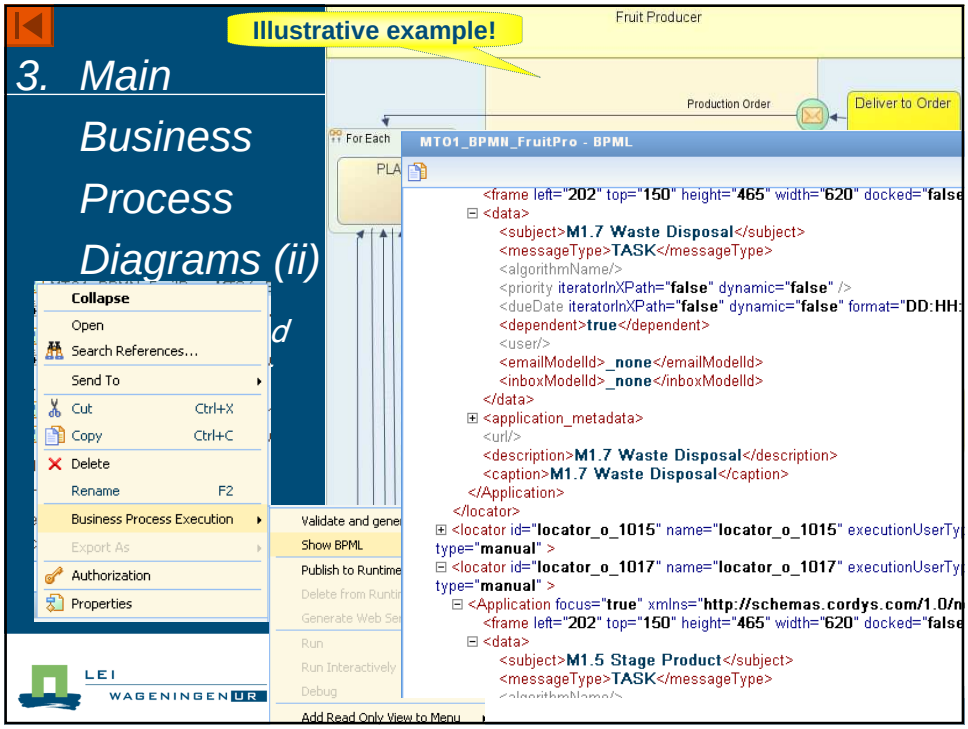
3. Main Business Process Diagrams (ii)
Illustrative example!
Fruit Producer
Production Order
Deliver to Order
For Each
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</Application>
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<messageType>TASK</messageType>
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Open
Search References...
Send To
Cut Ctrl+X
Copy Ctrl+C
Delete
Rename F2
Business Process Execution
Export As
Authorization
Properties
Validate and gene
Show BPML
Publish to Runtime
Delete from Runti
Generate Web Se
Run
Run Interactively
Debug
Add Read Only View to Menu
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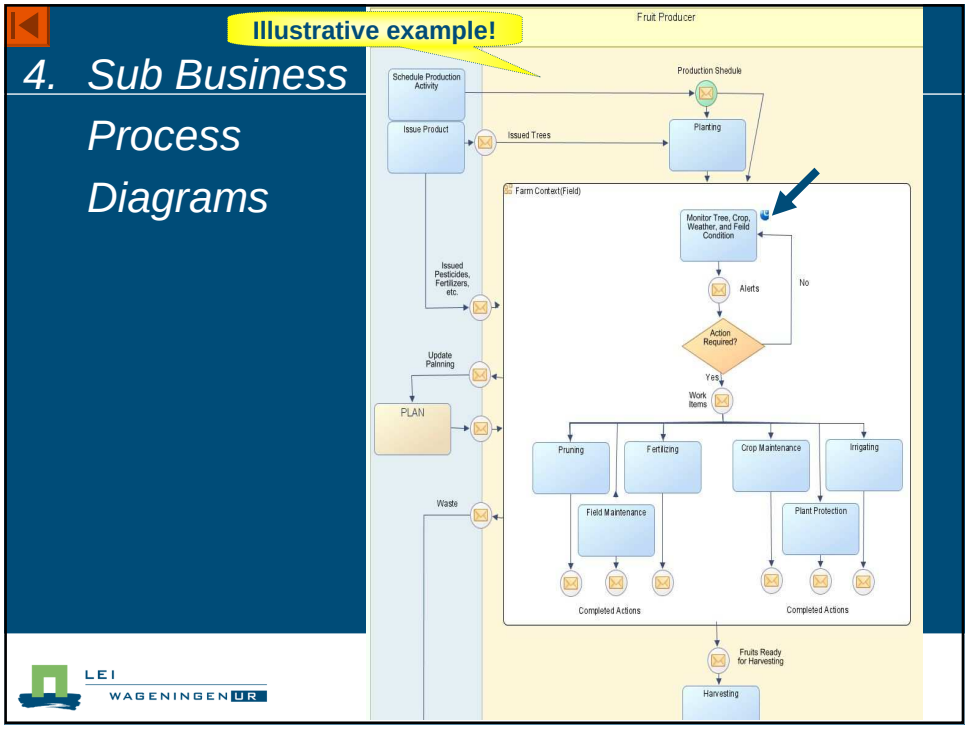
Illustrative example!
4. Sub Business Process Diagrams
Fruit Producer
Schedule Production Activity
Production Shedule
Issue Product
Issued Trees
Planting
Farm Context(Field)
Monitor Tree, Crop, Weather, and Feild Condition
Issued Pesticides, Fertilizers, etc.
Alerts
No
Action Required?
Yes
Update Palnning
Work Items
PLAN
Pruning
Fertilizing
Crop Maintenance
Irrigating
Waste
Field Maintenance
Plant Protection
Completed Actions
Completed Actions
Fruits Ready for Harvesting
Harvesting
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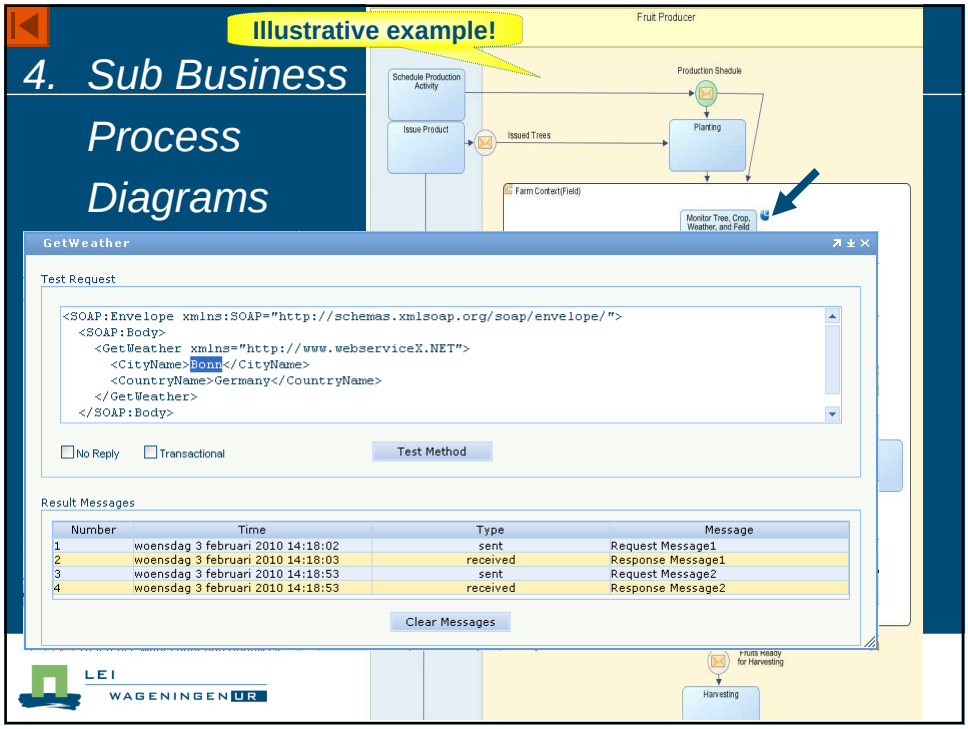
Illustrative example!
4. Sub Business Process Diagrams
Fruit Producer
Schedule Production Activity
Production Shedule
Issue Product
Issued Trees
Planting
Farm Context(Field)
Monitor Tree, Crop, Weather, and Feild
GetWeather
Test Request
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No Reply
Transactional
Test Method
Result Messages
Number
Time
Type
Message
1
woensdag 3 februari 2010 14:18:02
sent
Request Message1
2
woensdag 3 februari 2010 14:18:03
received
Response Message1
3
woensdag 3 februari 2010 14:18:53
sent
Request Message2
4
woensdag 3 februari 2010 14:18:53
received
Response Message2
Clear Messages
Fruits Ready for Harvesting
Harvesting
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To conclude: Main benefits of the framework

- It helps to **map supply chain processes**, including its control and coordination, in a timely, punctual and coherent way
- It supports a **seamless translation** of high-level supply chain designs to detailed information engineering models
- It enables **rapid instantiation** of various supply chain configurations (instead of dictating a single blueprint)
- It combines **horti-specific knowledge** with reuse of knowledge provided by generic cross-industry standards (SCOR, GS1)

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Thank you for your attention!

Further information:

- C.N. Verdouw, A.J.M. Beulens, J.H. Trienekens, J.G.A.J. van der Vorst (2010). A framework for modelling business processes in demand-driven supply chains.
Production Planning and Control, in press.

- C.N. Verdouw, A.J.M. Beulens, J.H. Trienekens, J. Wolfert (2010). Process modelling in demand-driven supply chains: A reference model for the fruit industry.
Computers and Electronics in Agriculture, 73 (2), 174-187.

- C.N. Verdouw, A.J.M. Beulens, J.H. Trienekens, T. Verwaart (2010). Towards dynamic reference information models: Readiness for ICT mass customization.
Computers in Industry, in press.

- C.N. Verdouw, A.J.M. Beulens, J.H. Trienekens, T. Verwaart (2010). Mastering demand and supply uncertainty with combined product and process configuration.
International Journal of Computer Integrated Manufacturing, 23 (6), 515-528.

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