



## **Cross-Organizational Workflows: A Classification of Design Decisions**

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# Introduction

- Research goal:
  - To systematically investigate design decisions in cross-organizational workflows
- Results:
  - Three areas of design decisions can be distinguished
  - Design decisions (and supporting modeling techniques) differ for each of them
  - Web service standards such as ebXML, BPEL4WS, and WSCI play a different role in each of them

1. Introduction

2. Value modeling

3. Coordination modeling

4. Workflow design

5. Conclusion

# Three areas of design decisions in cross-organizational workflows

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## Value modeling



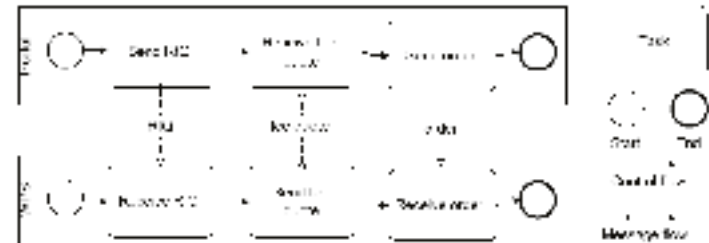
**Business network issues: assigning activities to economic actors**



## Coordination modeling



**Inter-business issues: interactions between business partners**



## Workflow design



**Intra-business issues: realizing what is promised to other businesses**

- Operations management issues
- IS applications and infrastructure issues

## Research method: case study

- Providing portals for 2 Japanese artists
- Portal functionality:
  - Providing general artist information
  - Selling merchandise
  - On-demand printing of lyrics, music scores
  - Forums
  - Real-time chat
- Business partners:
  - Record companies
  - Printing service
  - Delivery (shipping) service
  - Settlement (payment) service

### 1. Introduction

### 2. Value modeling

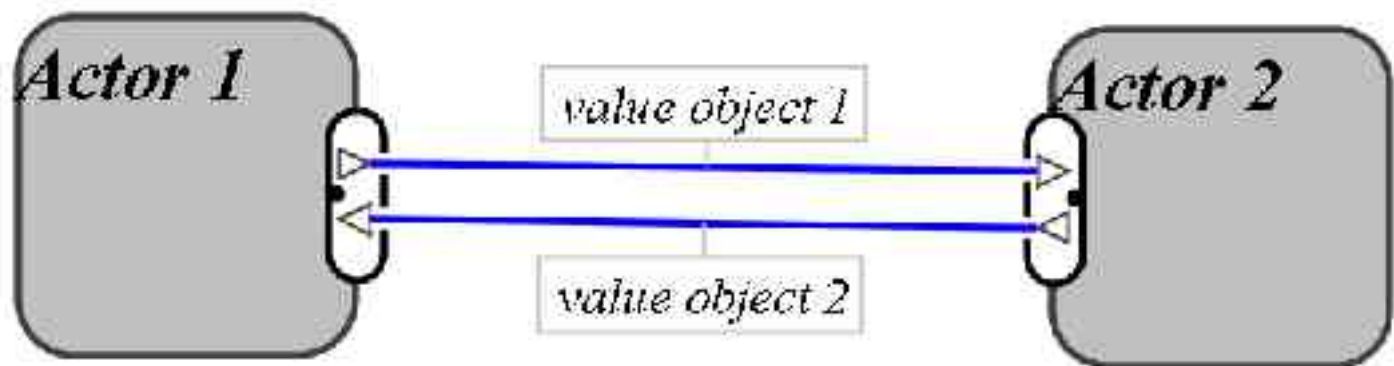
### 3. Coordination modeling

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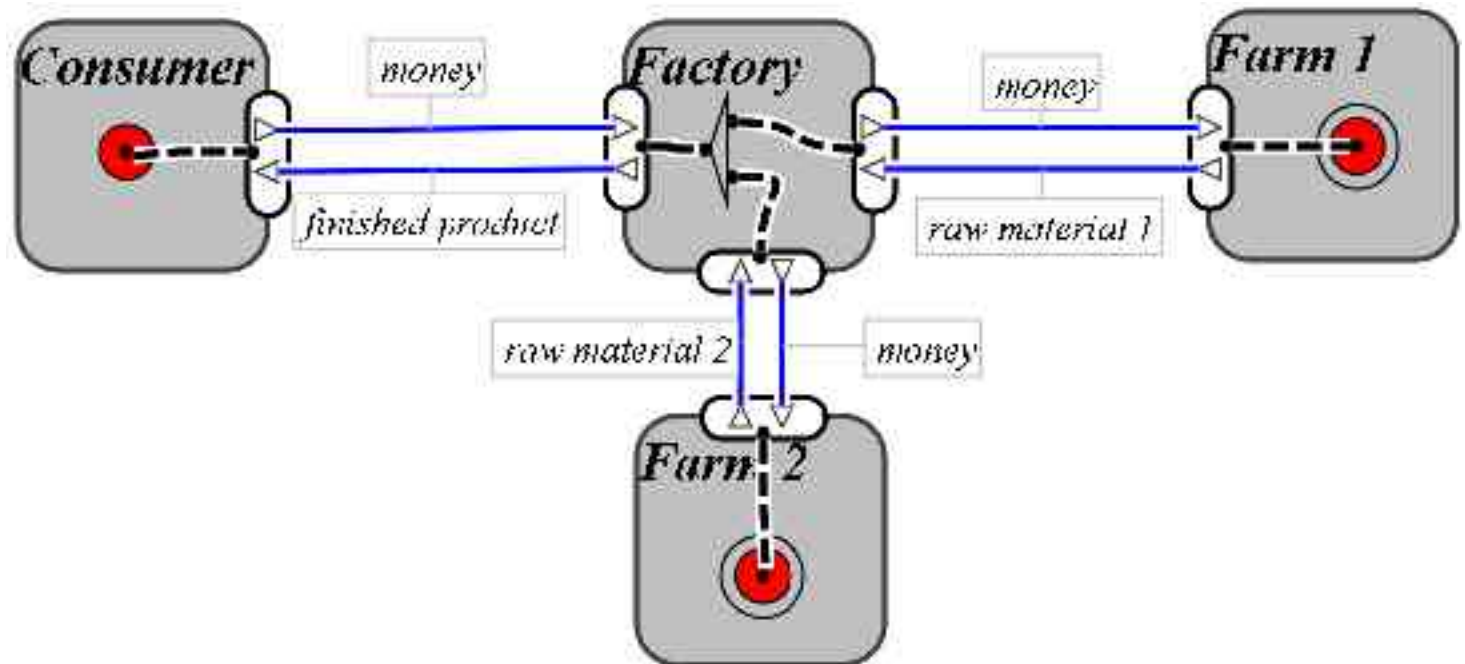
## Value modeling technique 1/2

- Value modeling concepts
  - **Actor**: economically independent entity
  - **Value object**: thing of value to the actors
  - **Value transfer**: economical activity
  - **Value exchange**: pair of value transfers
    - Models economic reciprocity



## Value modeling technique 2/2

- Dependency paths indicate causal relations between value exchanges
  - A dependency path is **not** a business process!!



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## Value modeling design decisions

- Which consumer needs do exist?
- How are these consumer needs satisfied by items of economic value that can be produced or consumed by enterprises and end-customers, and are by definition of economic value?
- Who is offering/requesting value objects to/from the environment?
- What are the reciprocal value object exchanged between enterprise/end-customers?
- What bundles of value objects exist?
- What partnerships do exist?

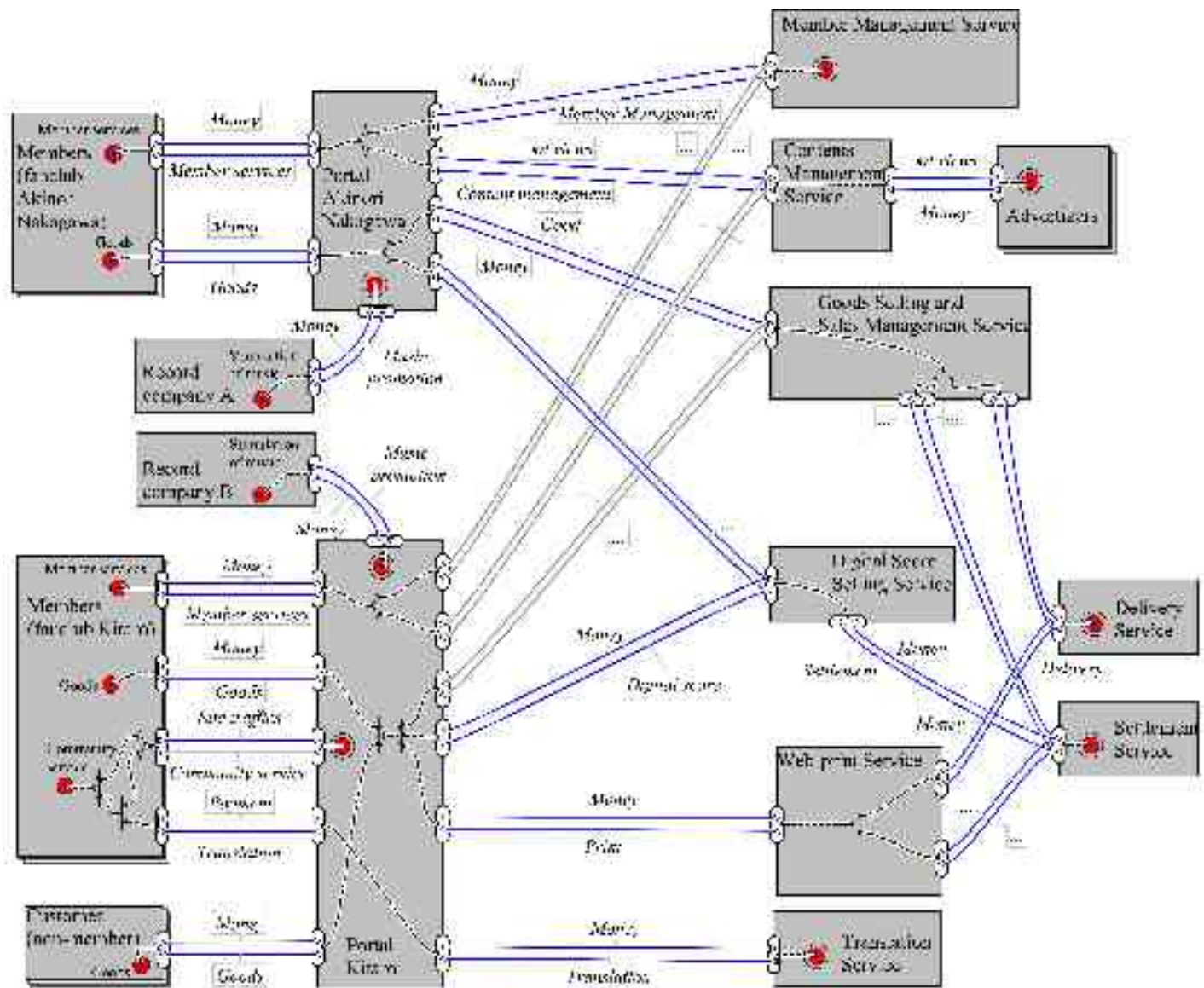
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| Legend | Actor | Value interface | Value part | Value Exchange | Start stimulus | Connect. element | End stimulus | OR element | AND element |
|--------|-------|-----------------|------------|----------------|----------------|------------------|--------------|------------|-------------|
|        |       |                 |            |                |                |                  |              |            |             |

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## Coordination modeling

- Coordination: interaction **between** actors needed to produce a result
- Two kinds of processes:
  - Coordination processes between actors ...
    - ... listing steps of both actors
  - Business processes or workflows ...
    - ... inside (private to) one actor ...
    - ... and designed to execute steps from coordination processes

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# Coordination modeling example

- Coordination process between portal and web printing service
- This is BPMN notation

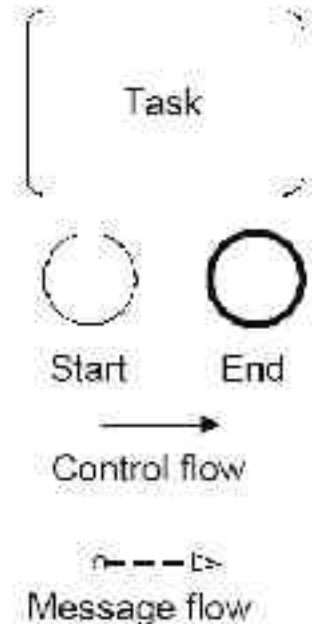
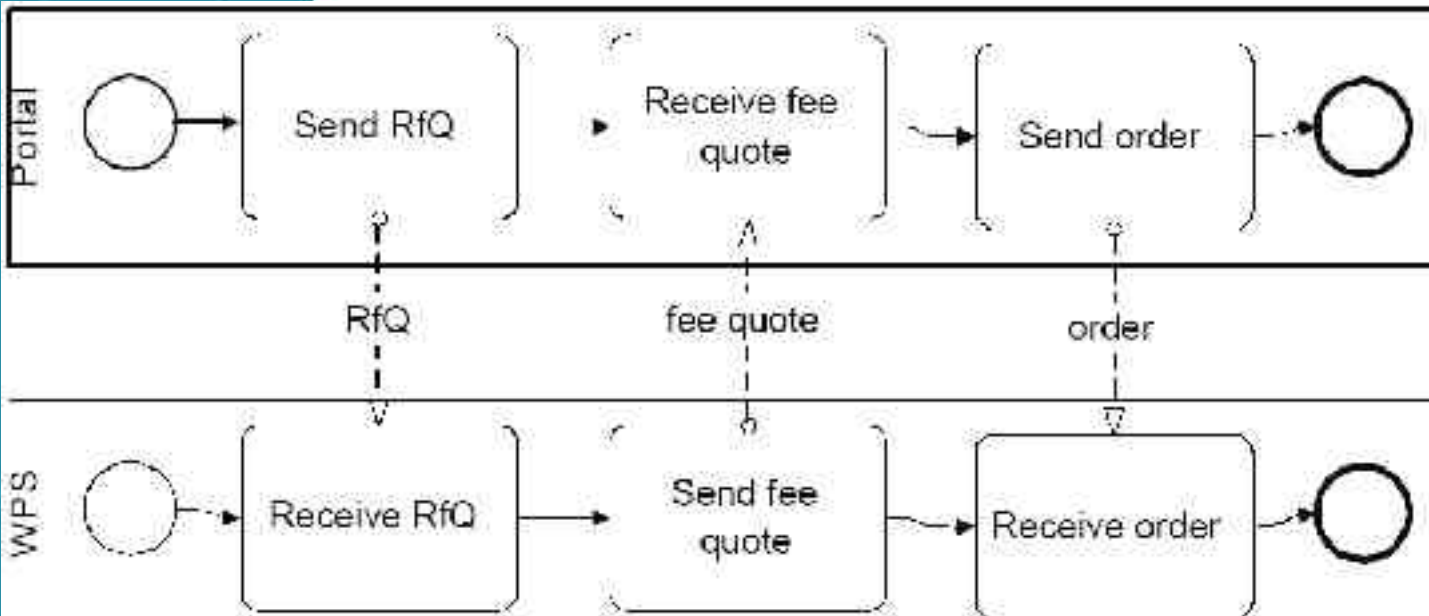
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## Coordination modeling design decisions

### Coordination process design decisions

- Which information is exchanged between business partners, and in which order?
- What are the trust relations between the actors?
- Are additional actors needed to resolve trust issues (e.g., trusted third parties?)
- Who is responsible for the coordination activities at each business partner?

### IT support design decisions

- What technology to use (e.g., HTML forms, web services)?
- Synchronous or asynchronous information exchange?
- What is the format of the message data exchanged?

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## Process modeling standards

- BPMN: 3 kinds of processes
  - Coordination process: similar to ours
  - Abstract process: public part of private process
    - Only steps of one actor, only those steps visible to business partners
  - Internal process: similar to workflow
- BPEL4WS: 2 kinds of processes
  - Abstract processes
  - Internal processes

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## Workflow modeling

Workflow design decisions:

- Mainly concerned with issues in operations management and organization theory, e.g. customer order decoupling point

IT support design decisions:

- What information systems are needed?
- What functions do these information systems need to offer?
- Distribution decisions, e.g. central IT facilities or facilities per location

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## Example workflow design decision

- Customer-order decoupling point (CODP):
  - Keep e.g. song lyrics on stock ...
  - ... or print them on demand (batch size 1)  
...
  - ... or collect a number of orders
- This is most probably a private, secret process step
- Supporting techniques:
  - Standard (“old fashioned”) workflow notations and tools
  - BPEL internal processes
  - Simulation, linear programming

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## Example workflow process

- Again: BPMN notation (BPEL has no graphical notation, strictly speaking)
- Swimlanes are departments, *not* economic entities

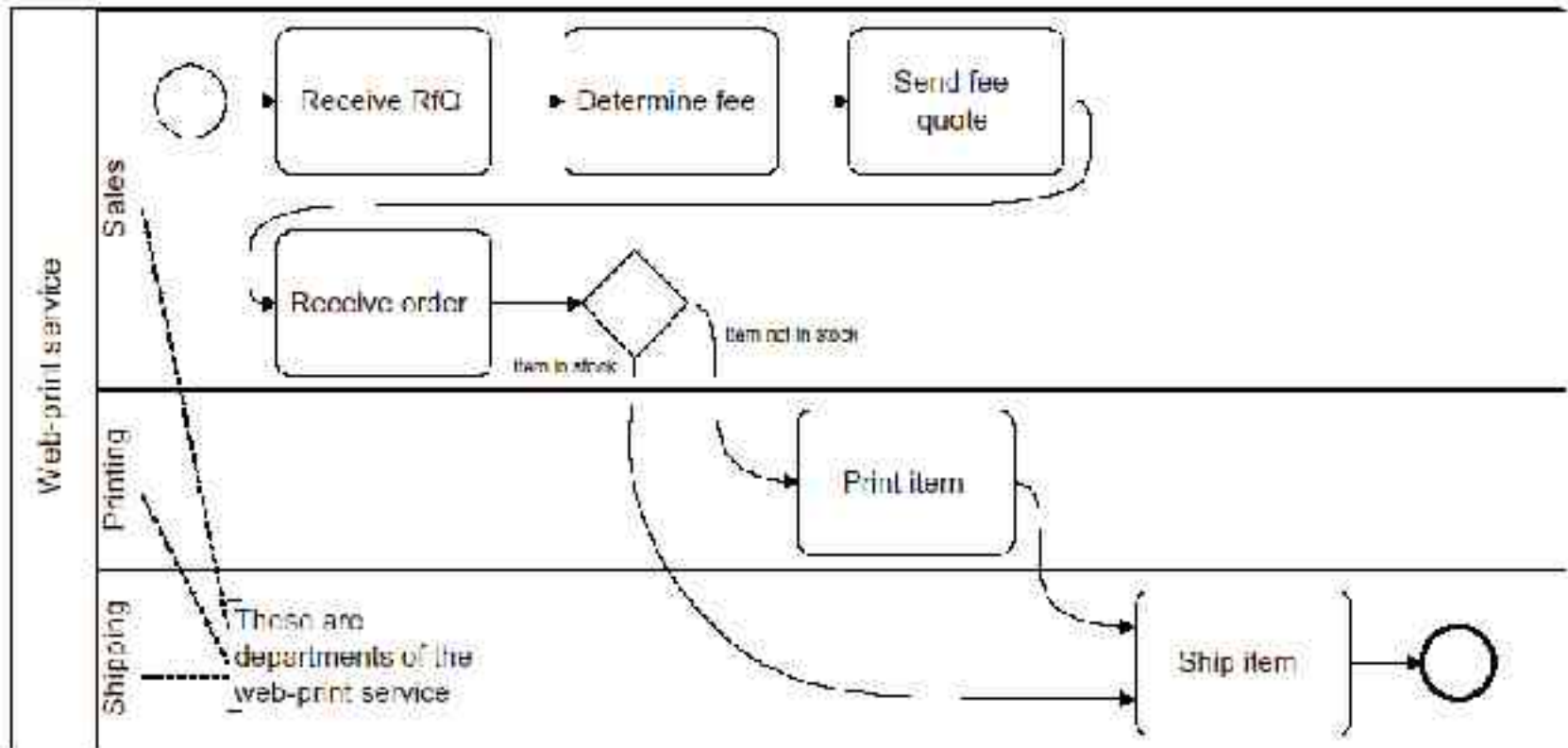
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## Conclusion

- Three areas of design decisions can be distinguished
- Concerns are really different at each of them; this is **not** refinement
- Modeling techniques differ as well
- Lightweight modeling approach enables multidisciplinary teams of decision makers to design cross-organizational workflows
  - “Don’t leave all decisions to the managers ...”
  - “... and neither to software engineers”

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