Slide 1

Block IV: Coda

Modeling networked value constellations with *e³value*

Hans Akkermans & Jaap Gordijn

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Slide 2

1. Various extensions of *e³value* underway
   - **e³control**
   - **e³service**
   - INTEROP NoE   InterOP

2. Industry and business applications of *e³*

3. Practical lessons learned on business ontologies & their application

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Slide 3

e³control - Modelling of Inter-Organizational Controls

- Ensure proper behavior of enterprises in trading
  - Based on accounting and auditing field
- *e³value* ontology/methodology grounded in theory of Transaction Cost Economics (Williamson)
  - studies safeguards against opportunistic behavior in contracts
- Control mechanisms are themselves commercial services provisioned by enterprises in a network

- Example: an escrow service to guarantee payment for export trade transaction (e.g. by a bank)

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Slide 4

1. Analyze the control problem: construct an *e³control* model

- *e³control* relaxes the economic reciprocity constraint of *e³value*

- *e³control* shows sub-ideal scenarios and penalties

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Slide 5

2. Design a control mechanism addressing the control problem

- Library of control patterns is under development
- Example:
  - Control problem: PA does not trust CA
  - Control solution: a *pre-execution* pattern

Slide 6

Value modeling and eService bundling

- Often, value objects are themselves complex and composed of multiple elements
- Value interfaces often represent economic bundling of several different value elements

- Key example: services and service bundles that are (electronically) offered to the market, possibly by a multi-actor value constellation

- Extension to *e³value*: modeling services as component-based value objects
  - (e)Service ontology
  - Automatic configuration of service bundles

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Issues in eService modeling

Service Ontology:

- Must properly model (business research) consensus on service management/marketing
  - This is remote from Web Service literature!
- And enable automatic service bundle composition, also on the Web
  - Component-based
  - Customer needs and requirements
  - Intrinsic constraints between service components
  - Knowledge-based reasoning algorithms

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e^3service ontology

- Service ontology modules:
  - Service offering view (supply)
  - Service value view (customer)

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e^3service bundle configuration

- Bundling by knowledge-based configuration algorithm
- Such that combinatorial explosion is managed by:
  - Respecting service element dependencies as constraints
  - Constraints from proper input/outcome links and types in chain/network of service elements
  - Set of customer needs and requirements
- Computed output = set of feasible service bundles

Service bundle offered by an outpatient memory clinic

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InterOP NoE: Extensions to e^3value

- Goals, i*: Namur, Toronto (cf. IEEE Software)
- Process: KTH Stockholm, Tudor Luxembourg, Tilburg
- Ontological foundations of business models: Lausanne
- Risk: Tilburg
- Alignment: Twente

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Applications of e^3 Ontologies in Business and Industry

- Internet radio and music rights clearance
- And many others …

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FENIX EU-IP in Energy Industry

- Innovative architectures and services in smart power networks (FENIX EU-IP)
- Commercial aggregation of many small power production and consumption units (DER)
- Virtual Power Plant concept

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Smart Power Networks (1)

- Real-time imbalance in demand-supply match of power grid is very costly
  - (and can even become critical for security of supply)

- *e³value* studies show very significant business case for "Distributed Balancing" services (DBS)
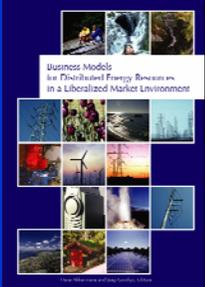
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Smart Power Networks (2)

- DBS e-service industrial field tests
- Distributed Control by eMarket technologies
- Automatic imbalance reduction in real time
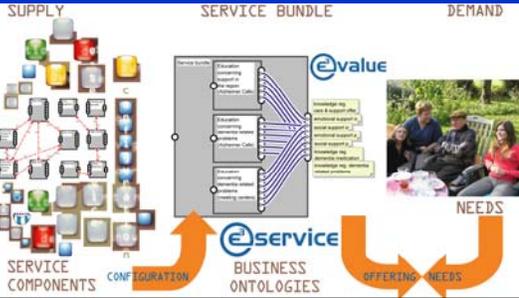- Result > 40% imbalance reduction
  - Commercialization underway
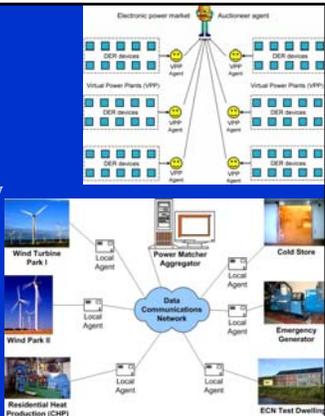
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ITAIDE EU-IP in eGovernment

- Develop fast e-customs procedures in EU
- Based on *e³value* and *e³control*
- E.g. Heineken beer exports

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Offering eService Bundles for Dementia Care at Home

FRUX
FREEBAND

- Application based on *e³service* ontology

Online Design of Events
(San Sebastián)

- In addition to *e³service*, domain ontologies for events (from tourist organization)
- Blackboard-style opportunistic reasoning for web service composition

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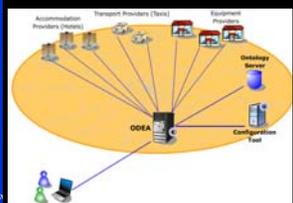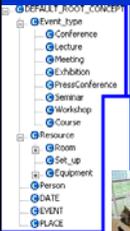
Take home message

- Before embarking on an IS development track for multi-enterprise information systems supporting IT-enabled value propositions:

  - You'd better first explore the constellation of enterprises from an economic perspective

  - And understand why the multi-enterprise IS is needed from a business point of view in the first place.

- You can use *e³value* to do so

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With the *e³value* methodology you can answer questions such as …

- What is the business case?
  - Perspective of business actors
  - and of end customers
- What are the goals, and who "own" these?
- What technology is used?
- Which actors are involved?
- How can they make a profit?
- What are estimates on cash flow and investments?
- What kind of IT expenses are involved?

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Business Ontology Research Program

- Model/ontology-based theory formation and understanding of networked value constellations
- Achieve seamless business-IT technology alignment
- Practical (design) applications for business innovation with advanced IS/IT
- Research feedback loop between theory and industry practice (action research)
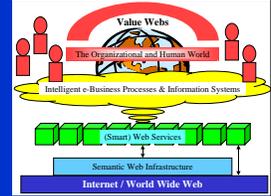
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Ontology Outreach =

knowledge**web**

- Put application first, not ontology
- Lightweight approach works in practice
  - Formal heavyweight "scientific" style scares off people
  - And often leads to irrelevance of academic research
- Graphical approach helps knowledge exchange
  - Recall: ontology is for shared understanding
- Work from business issues to technology
  - Not other way around, they *know* you're credible as a techie
- Follow 80-20 rules
  - First things first, "good enough" satisficing answers to *their* problems (not yours); save formalist detail, perfectionism for later
- Good tooling is important
  - Helps to make the case for practicality of ontology

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Thanks for your attention!

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