

Knowledge Production & Transfer in Services

An Operations-Research (OR) Perspective

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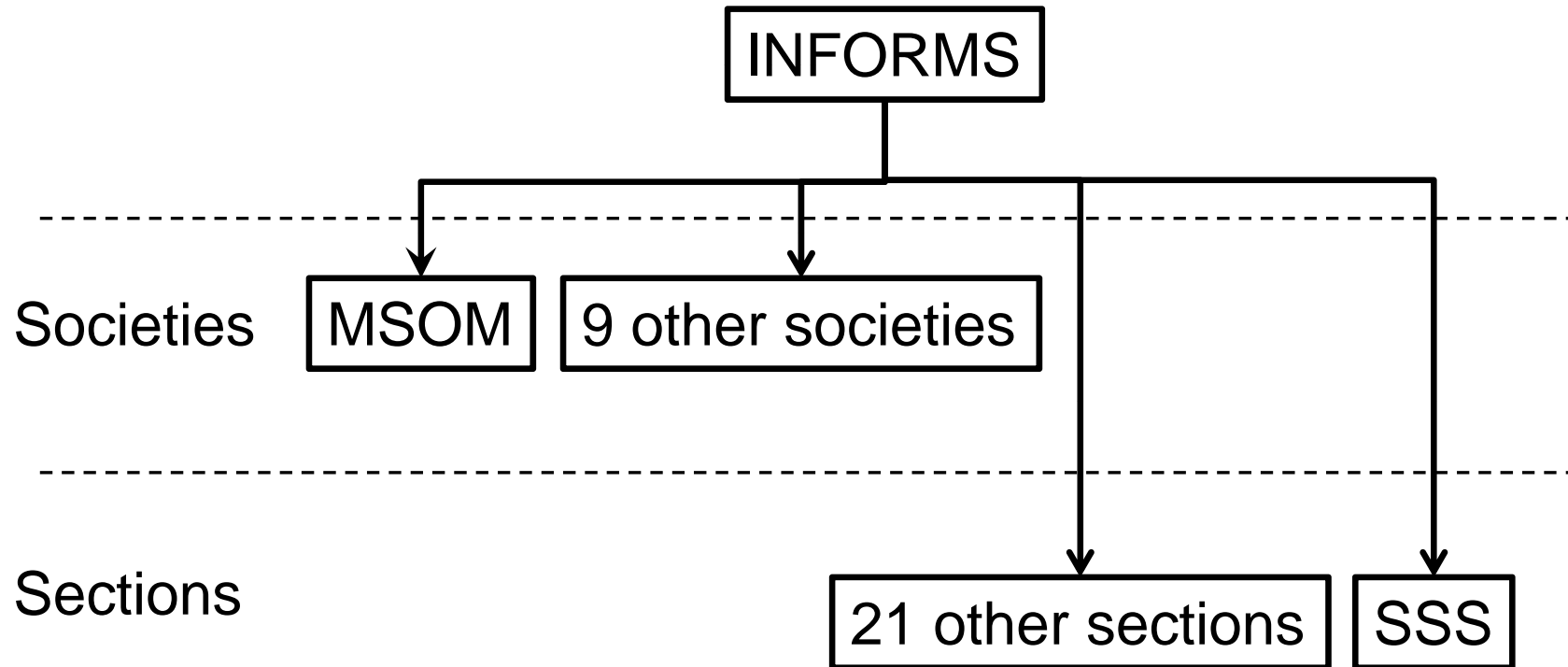


Definition of knowledge

- Philosophical - “justified, true belief”
- OR knowledge of service
 - Un-justified
 - Un-true
 - Believed



Current context





The OR methodology

- OR tradition – descriptive models of systems
 - Ontology – the foundation
 - Rationalism - Mathematical model of service processes, networks of processes
 - Empirical validation (maybe)
- Prescriptive models of systems design and control
 - Based on descriptive models of system
 - The optimizer is the agent or agent group
 - Unlike mfg, JTB cannot be assumed



Literature chronology

- Queuing models
- DEA – macro process representation
- Micro process models
- Decision models
 - Negotiation - game theory
 - Agent decision models
- Ontologies and reference models (e.g., OWL)
- Multi-stage, multi-party, evolutionary systems – simulation models



Technologies for KM, KA, KE

- Cloud computing
 - Knowledge is commoditized, dis-aggregated, offered for sale like telephone service, electricity service. Pay for what you use.
 - CSA = continuous-stream analytics.
 - Intelligent services - SAAS, DAAS, MAAS
 - Social network information diffusion
 - Cloud sensors
- Data mining



The OR service proposition

- We model decisions
- Decision processes determine service-system performance
 - SSN trajectory is controlled by decision processes
 - DMUs are agents of the SSN
 - Decision processes are knowledge intensive
 - Agent knowledge is incomplete, dynamic, subjective
- Examples – consulting, education, health care, government services, intelligent on-line services, ...



Theme: Decision models in SSME

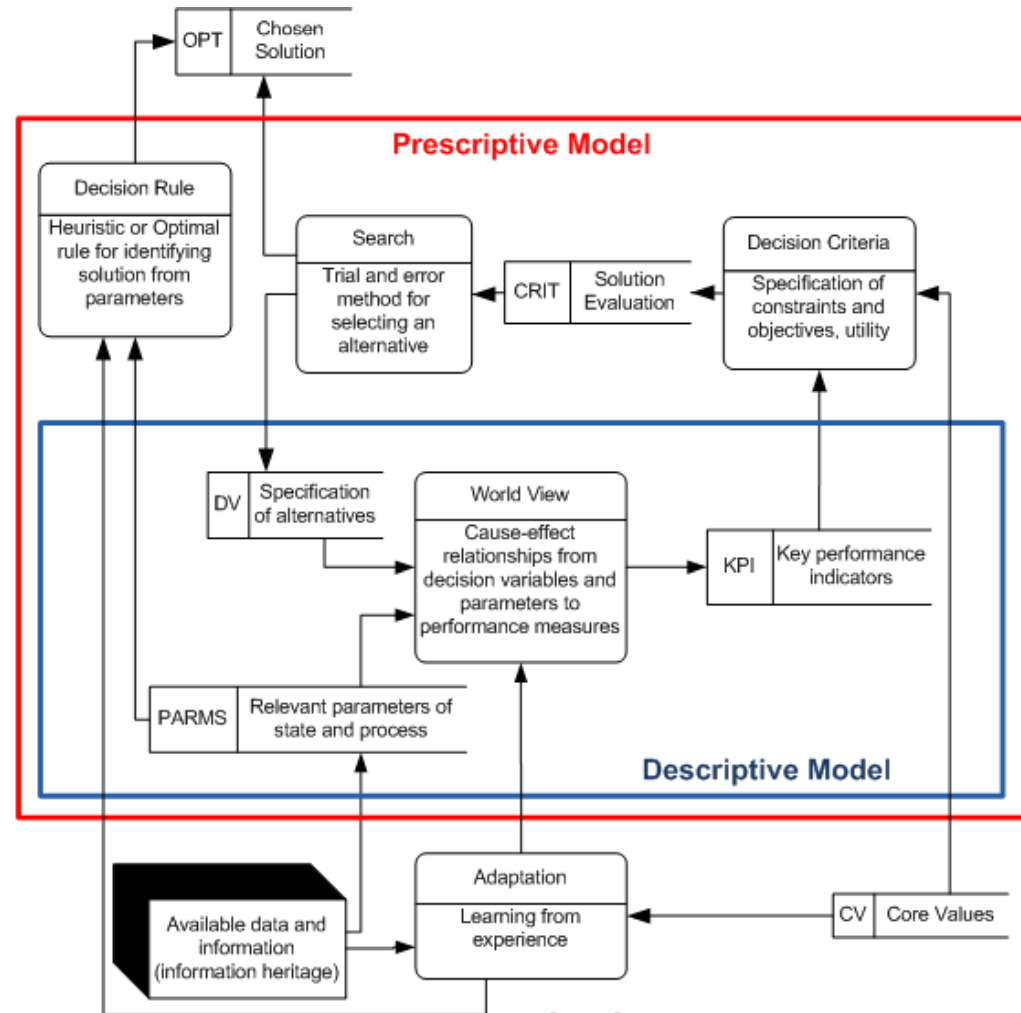
- Co-creation involves a lot of co-decision making
- Decisions are made via decision models
 - Intrinsic, heuristic, stochastic, multi-criteria, intuitive
 - Can be modeled
 - Are knowledge intensive
- Decision models provide structure to knowledge specs and adaptation processes



Theme: Decision nodes in SSN

- Performance of a service hinges on agents' decisions
- Modeling fallacies
 - People know how to make decisions
 - Decisions are made by applying decision rules
 - Decision making is a phenomenon
- JTB is illusive
 - Ontology dialects
 - Education of agents as part of SSN design
- *E.g., Interact, Serve, Propose, Agree, Realize* are too general

Process: Framework for decisions



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Process: frameworks for adaptation

➤ Levels of adaptation

- Level 0 – non-adaptive, deterministic, open loop
 - Level 1 – activity adaptive
 - Level 2 – trajectory adaptive
 - Level 3 – forecast adaptive
 - Level 4 – estimation adaptive
 - Level 5 – specification adaptive
 - Level 6 – decision rule adaptive
 - Level 7 – criteria adaptive understanding
- KB and KM within service design and execution



Context: Research directions

- More detailed UML, BPMN for decision making processes and adaptation
- Service design via explicit decision support
- Real-world data
 - On-line service data – what decisions are made
 - Interview data – why decisions are made
 - Unprecedented empirical validation



Context: Research environment

- Service testing labs (e.g., U. of Leipzig)
- Empirical studies – expose agents' internal decision-modeling processes
- Collaboration with SRII
- Marketing/OR collaboration



The next big thing in OR

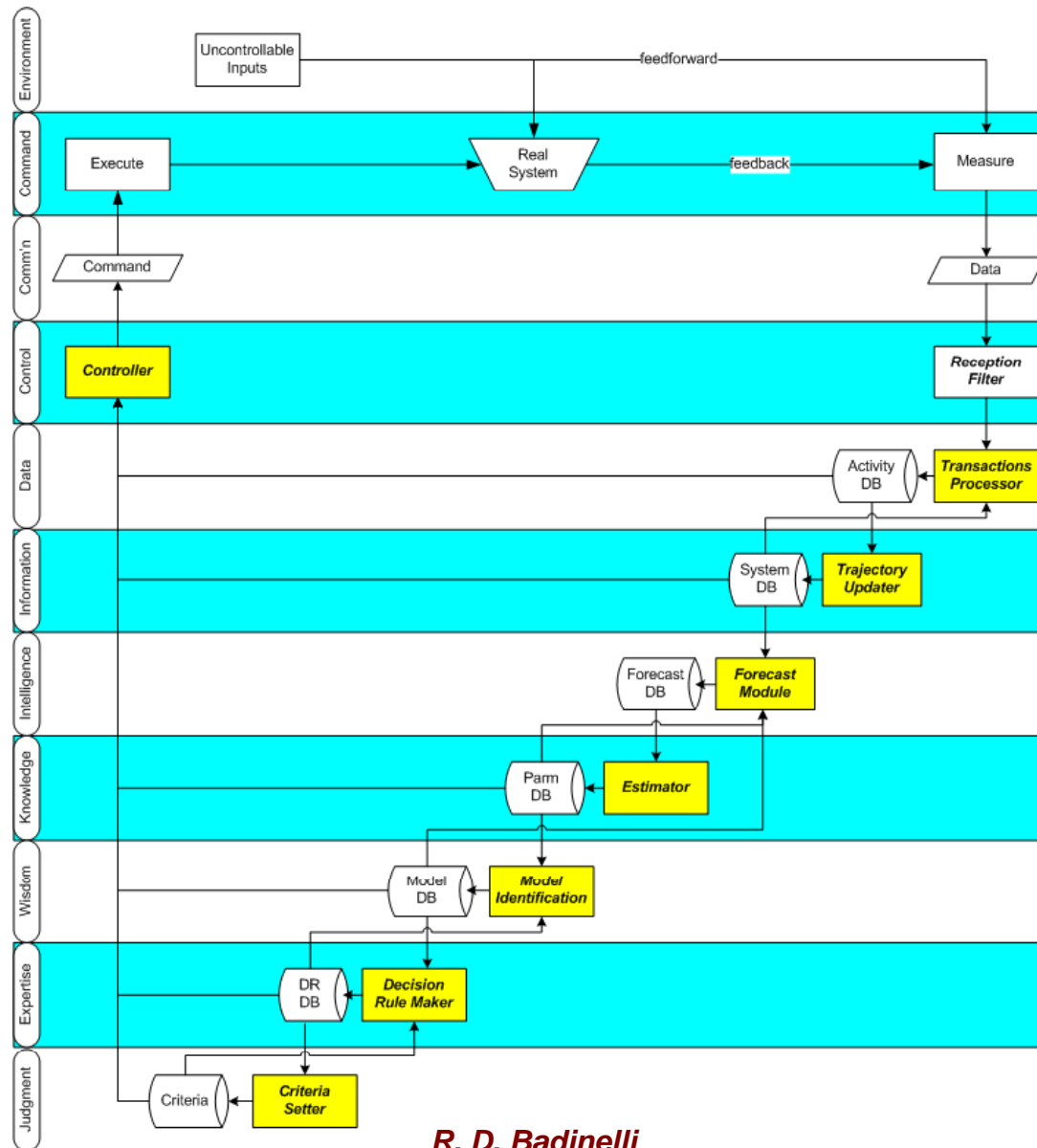
➤ Manufacturing

- Product design
- Process design
- Capacity acquisition
- Location/layout
- Revenue management
- Aggregate planning
- P&IC
- Shop floor control
- Quality control

➤ Service

- Service design
- PSS design
- Capacity acquisition
- Revenue process design
- Location/layout/IT design
- Resource planning
- Resource allocation
- Resource dispatching
- Quality control

Adaptation/ Learning



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