

# ICEB + eBRF 2006

## A Multidisciplinary Framework for Concept Evolution: A Research Tool for Developing Business Models

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# Project description

## RESEARCH PROBLEM:

*“.. to analyze and model information, material and financial flows in the enterprise network, in an effort to combine all individual results into a general model of integrated enterprise network.”*

## RESEARCH METHODOLOGY:

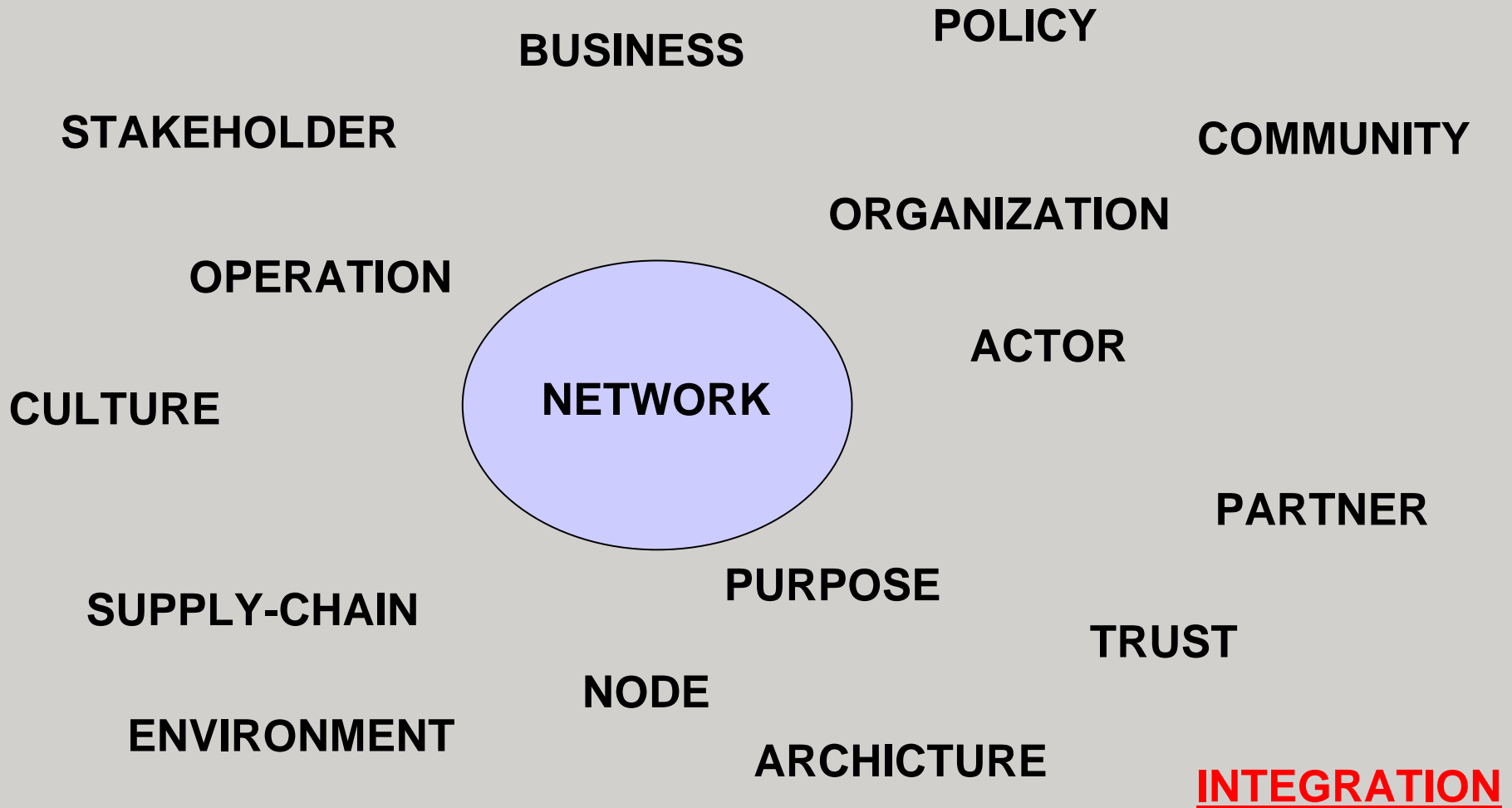
### **Design science:**

- business models development serves human purposes
- natural sciences try to understand reality

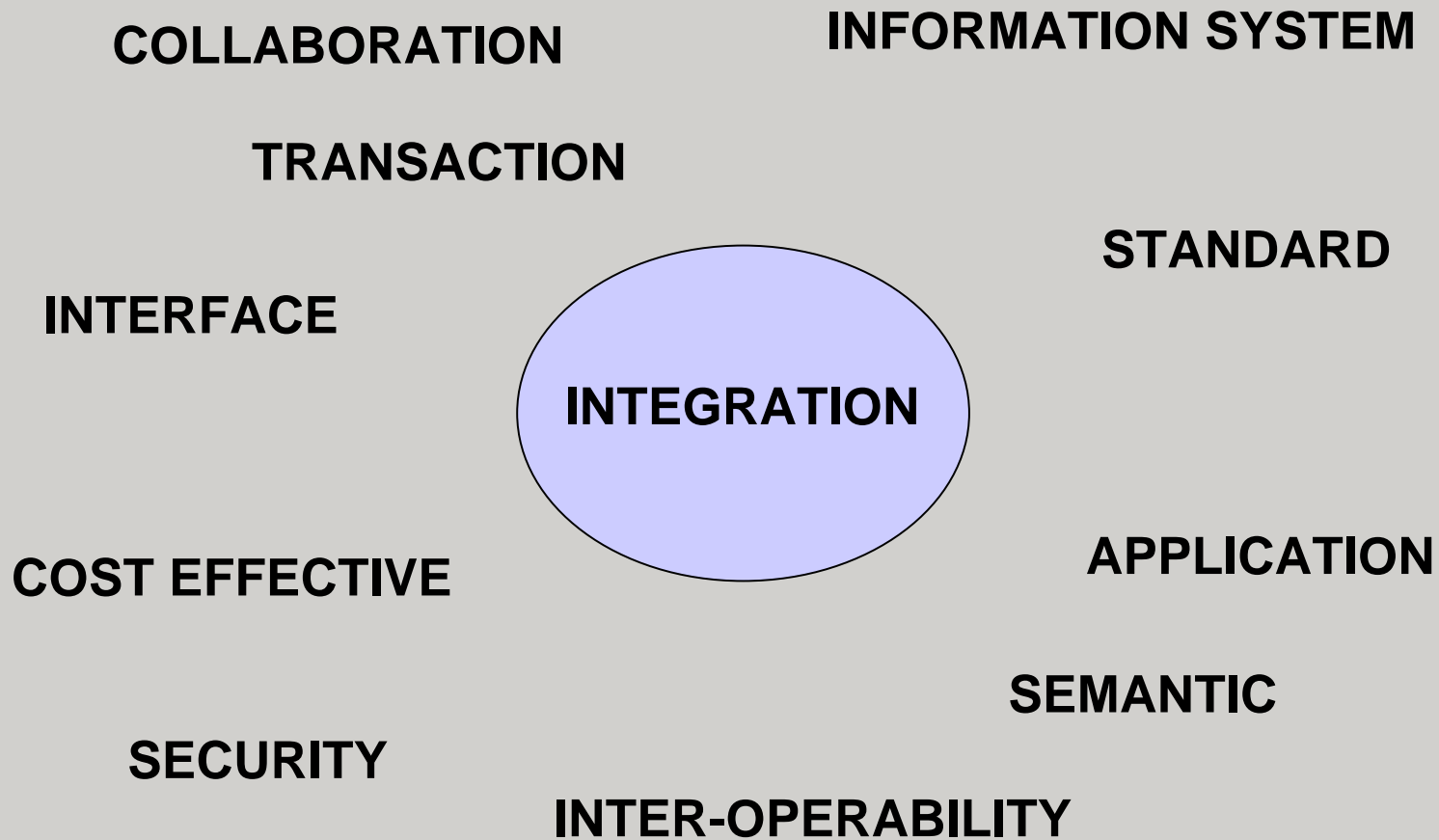
### **Constructive Research Approach (CRA):**

- form of CASE-study research
- find solutions (constructs) to predetermined problems
- generate new knowledge in the target area

# Research domain: "network"

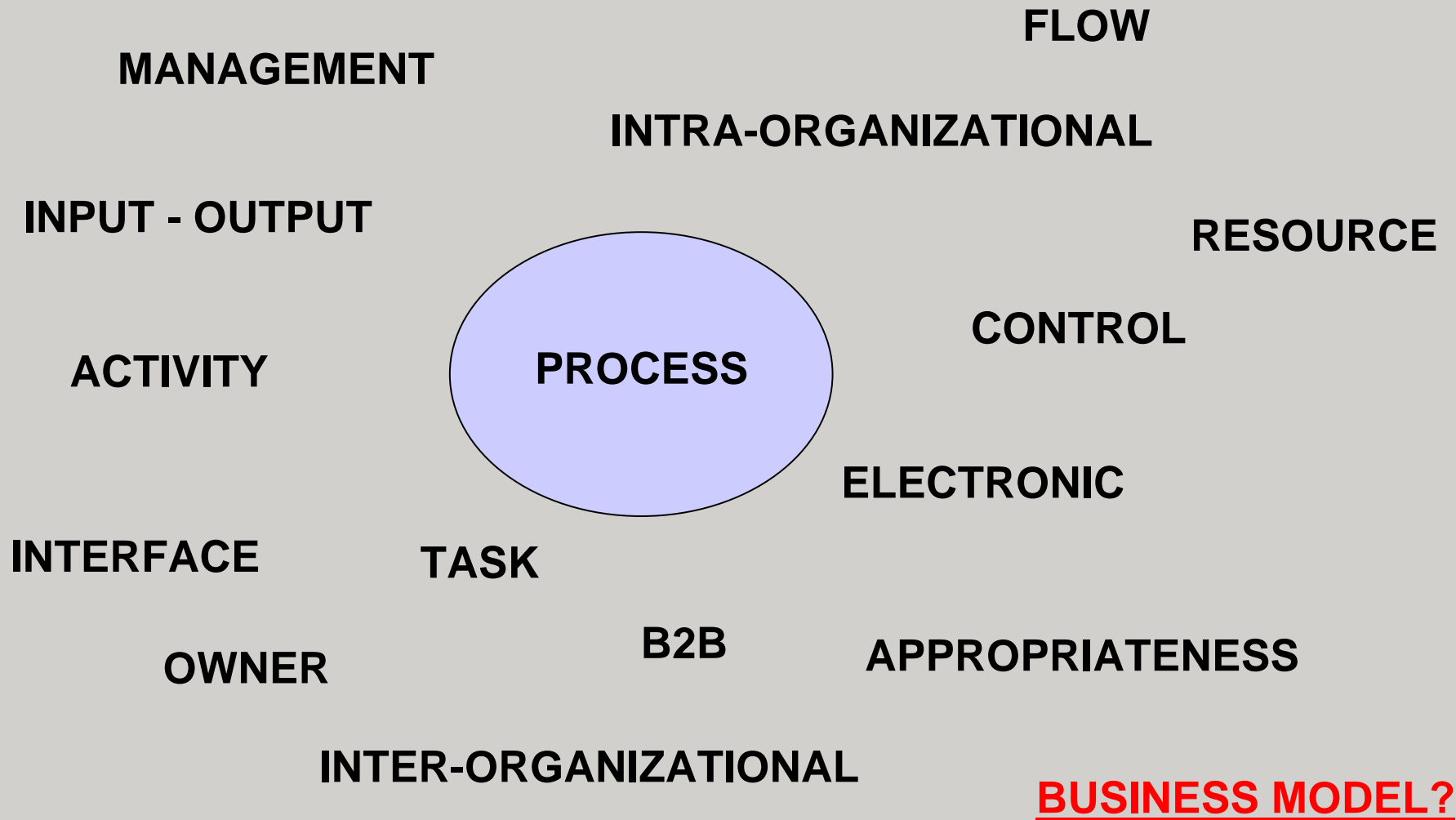


# Research domain: "integration"



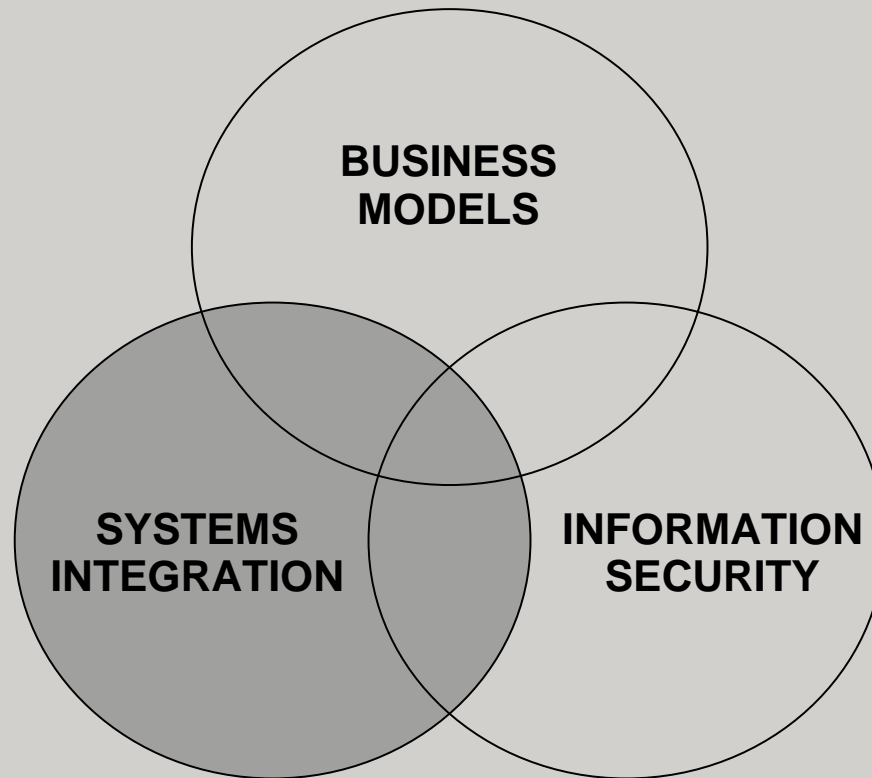
**PROCESS**

# Research domain: "process"

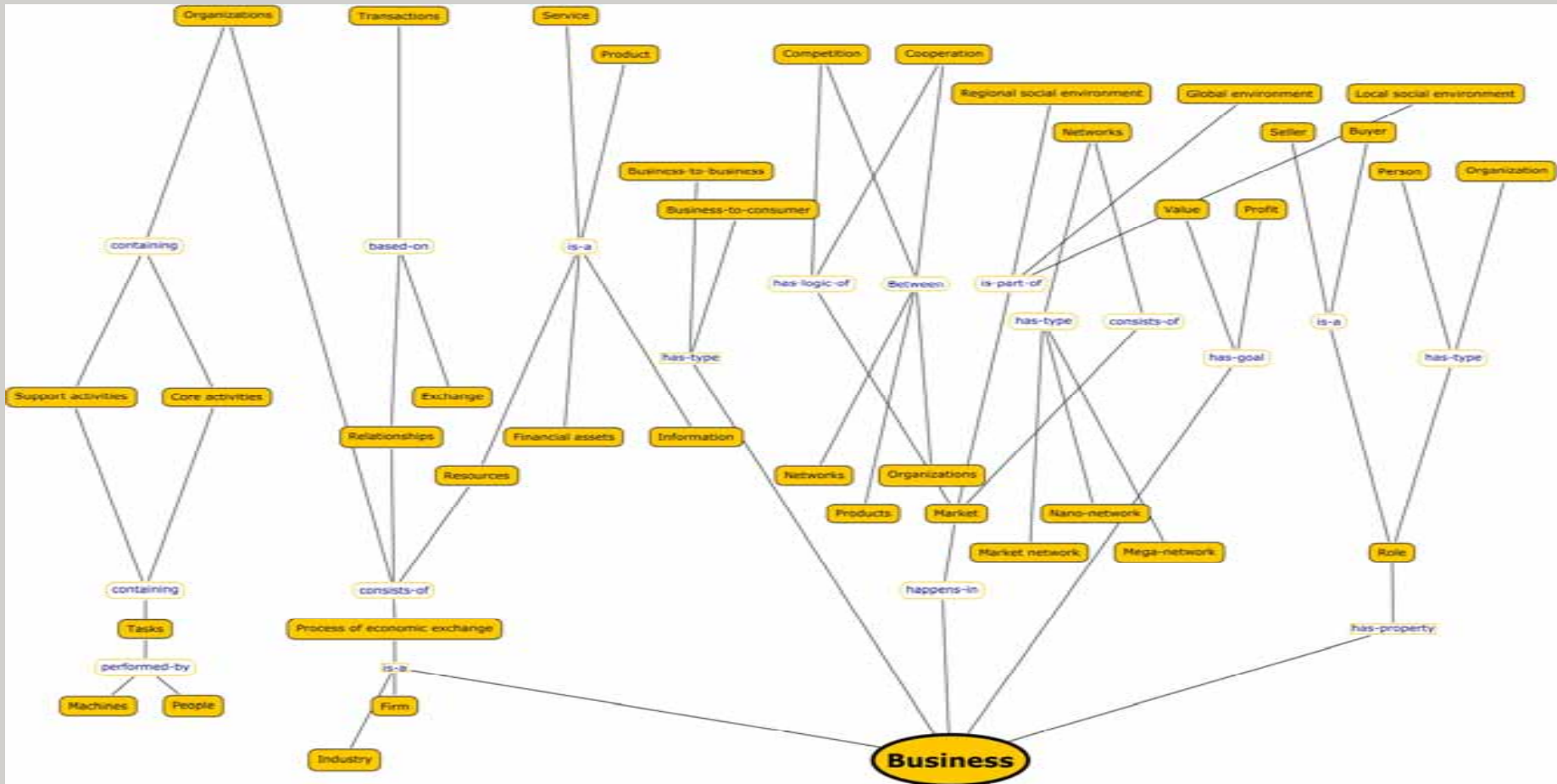


# Overlapping research areas

The research consists of three conflating research areas: business models, systems integration and information security.



# Business models view ..



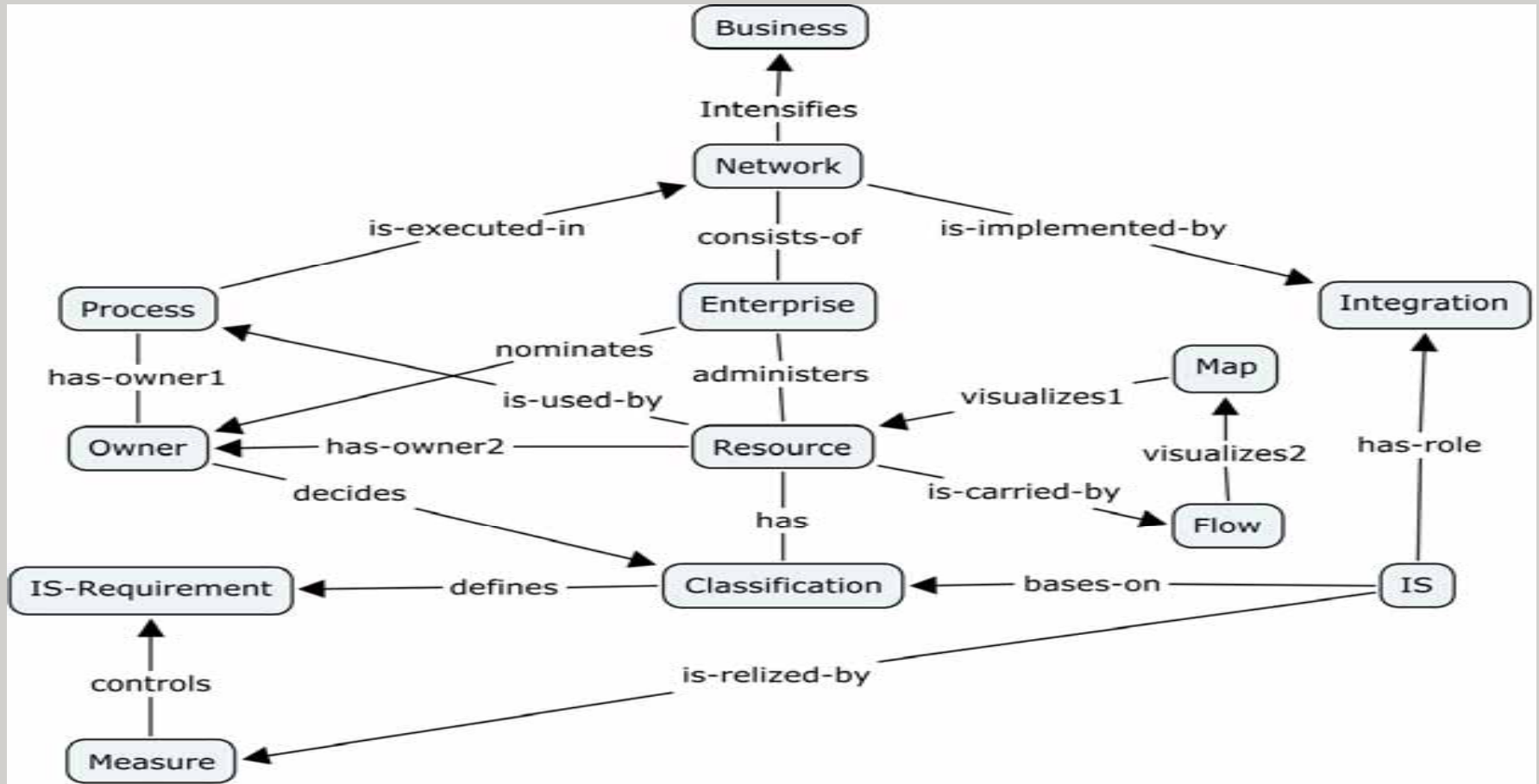
.. concept map representation

# Systems integration approach ..

1. Identification and analysis of core **B2B** vocabulary, **standards**, frameworks and enabling **technologies**
2. Analysis and modeling of material and **information flows** in an integrated **business** network
3. Requirements specification for a **process based** information systems **integration** model

*.. declarative concept analysis*

# Information security perspective ..



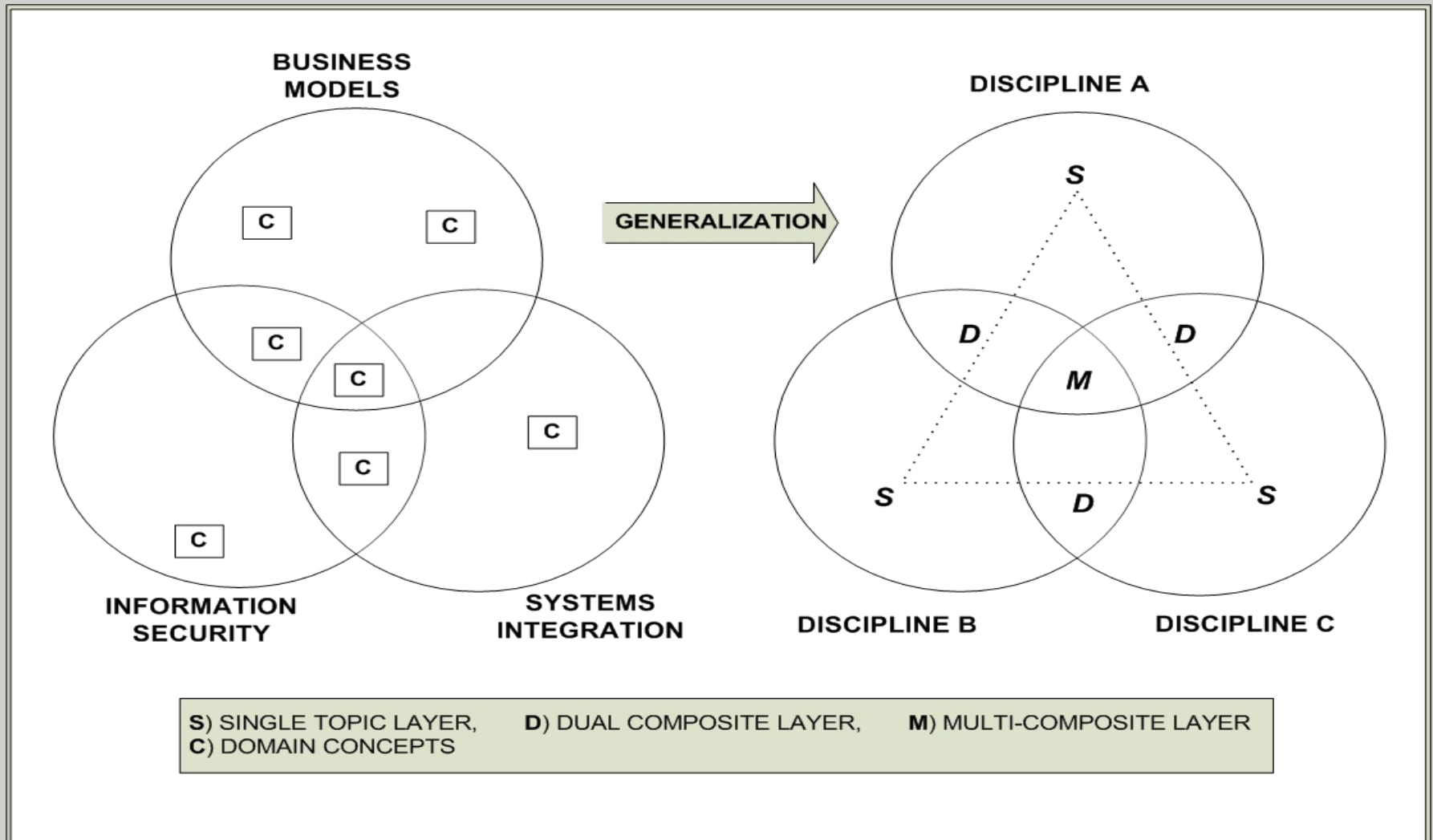
.. also a concept map, but ..

# Multidisciplinary Concept Evolution

## Challenges of cross-disciplinary understanding

1. Difficulties in selecting the “right” concepts
2. Inconsistent concept definitions between research areas
3. Problems in communicating the meanings of the concepts between researchers
4. Missing ground level consensus about the core concepts

# Layered concept composition



# ..harmonizing the concept semantics..

## Research tool based on *concept evolution*:

- to serve as a practical tool for conceptualization:
  - > *generalization, abstraction, ontology engineering*
- to help in generating a coherent, formally expressive and mutually accepted representation of strongly interconnected concept semantics:
  - > *general and shared body of meaning*
- to aid in solving problems related to semantic interoperability in general:
  - > *real-world stakeholders view, communities*

# Concept evolution in practice..

## 1. Generalization (analytical approach)

- concept hierarchies, inheritance, object properties and relations
- object modeling, set-theory based paradigms

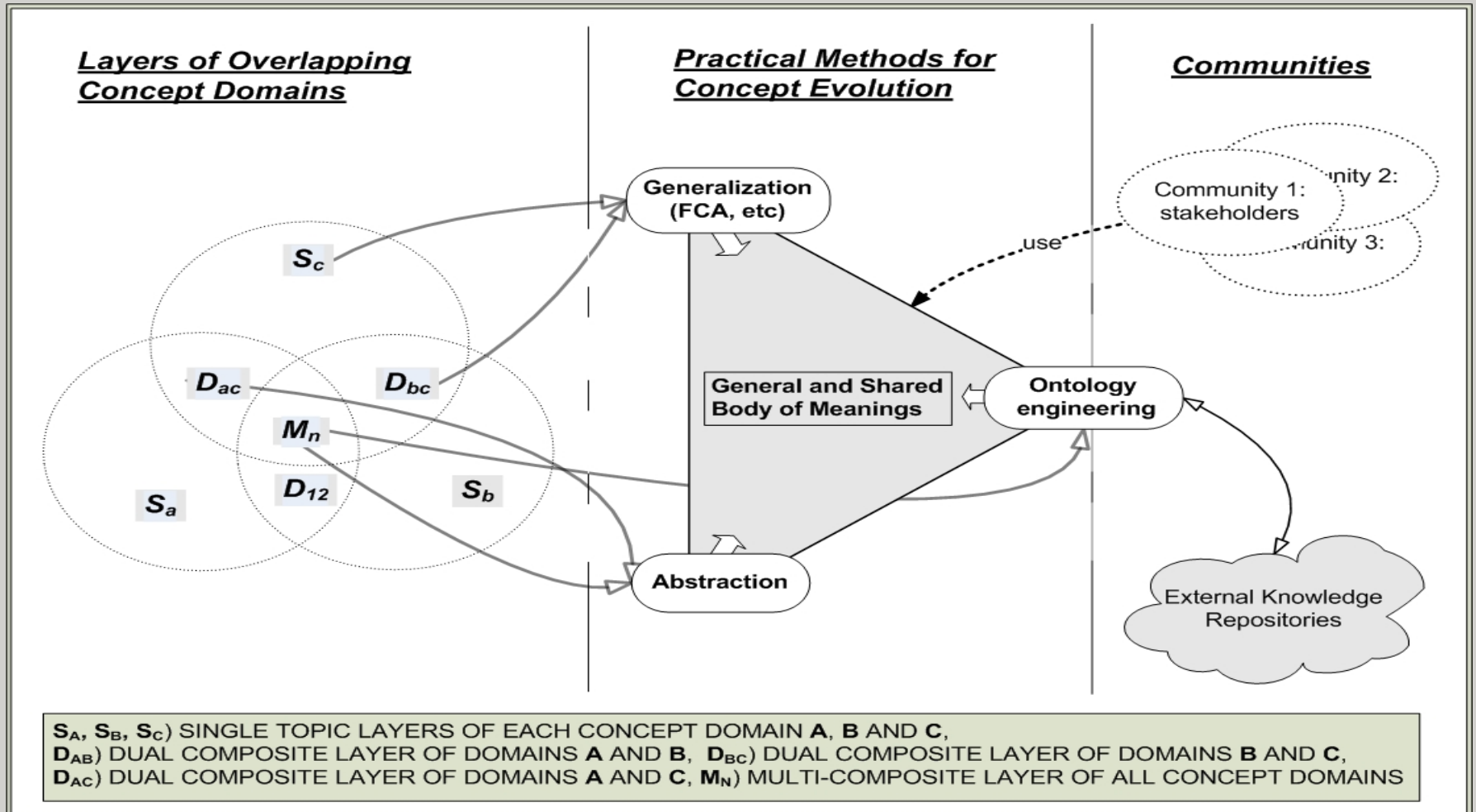
## 2. Abstraction (intuitive approach)

- creative cognitive process, subjective interpretations
- reduces the level of detail, enables higher level representations

## 3. Ontology engineering (formal/semantic approach)

- ontology mapping links together varying concept hierarchies, taxonomies and vocabularies.
- provides a formal representation language for definitions based on Web Ontology Language (OWL) specification
- relates the body-of-meaning to external knowledge repositories

# Emergence of meaning



# Components of the framework

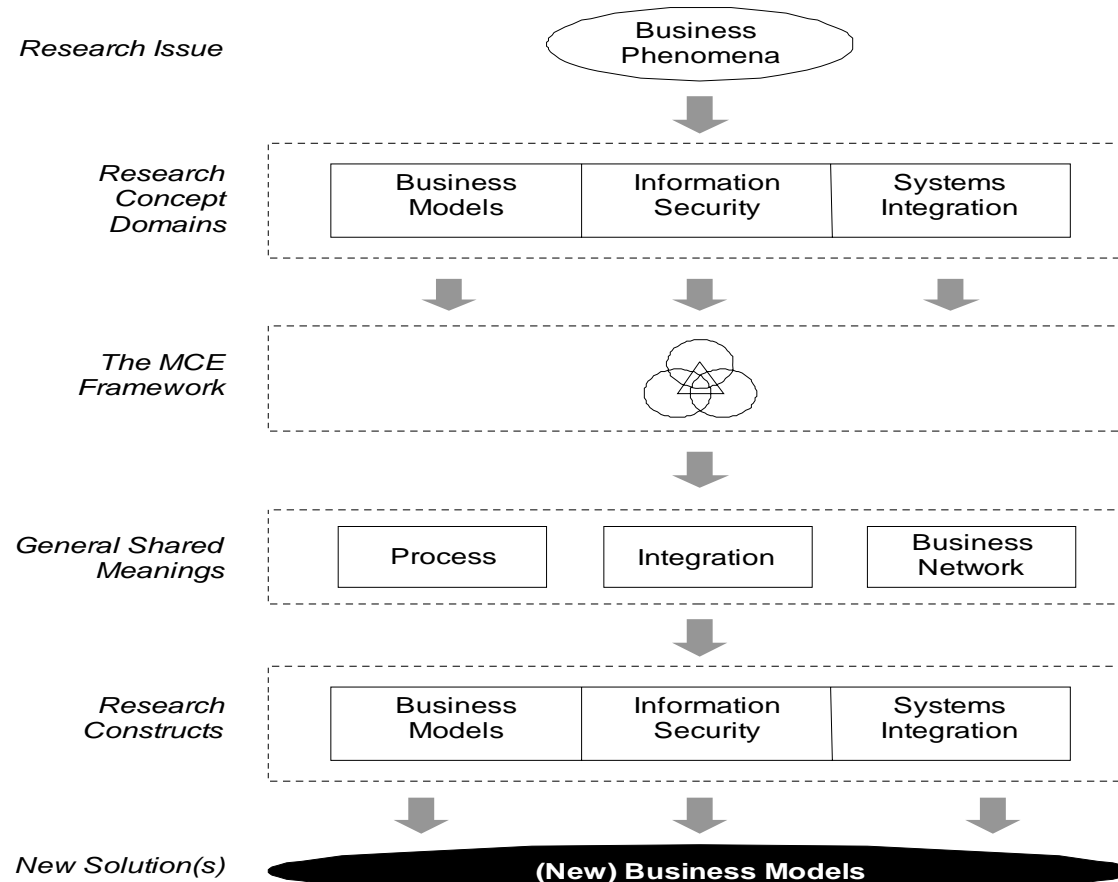
1. ***Cross-disciplinary conceptualization metamodel***
2. ***The practical methods for concept evolution***
3. ***Shared repository of meaning***
4. **Research related *functional requirements*:**
  - visualize inter-connectedness of concept semantics
  - provide mutually accepted representation formalisms
  - in-line with constructive research approach

# Business context considerations

## Challenges in business related research:

- subjective views of **business stakeholders**
- information security and systems integration are both **business issues**
- importance of **shared meanings** especially in inter-organizational network context
- issues in enabling **semantic interoperability**

# CASE: network business models



# Benefits and utilization of MCE

1. Helps the communication between different domain (for ex. business) and research stakeholders (especially inter-organizational understanding)
2. Aids in multidisciplinary research domain conceptualization
3. Shared meaning repository provides a valuable resource for construction development in CRA
4. New networked business models development require practical ways to combine knowledge originating from varying information sources

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