Building an extended ontological perspective on Service Science

Monica Drăgoicea, Theodor Borangiu, João Falcão e Cunha, Ecaterina Oltean, José Faria, Ştefan Rădulescu

Presentation prepared by Monica Drăgoicea
monica.dragoicea@acse.pub.ro

Department of Automatic Control and Systems Engineering
Faculty Of Automatic Control and Computer Science
University Politehnica of Bucharest

Summary

- Motivation
- A knowledge model for Service Science – requirements definition
- Ontological perspective on Service Science
- Implementation
- Final remarks

Service Science and Service Innovation

- identified need - economic development requires service innovation:
  - new skills and knowledge
  - need to train adaptive innovators, to
    - understand and marshal diverse, and increasingly global, resources to create value
    - identify and realize a continuous stream of innovation in service systems

- Information and communication technologies (ICT) enabled the creation of new services and service businesses

Stakeholders' perspective on Service Science
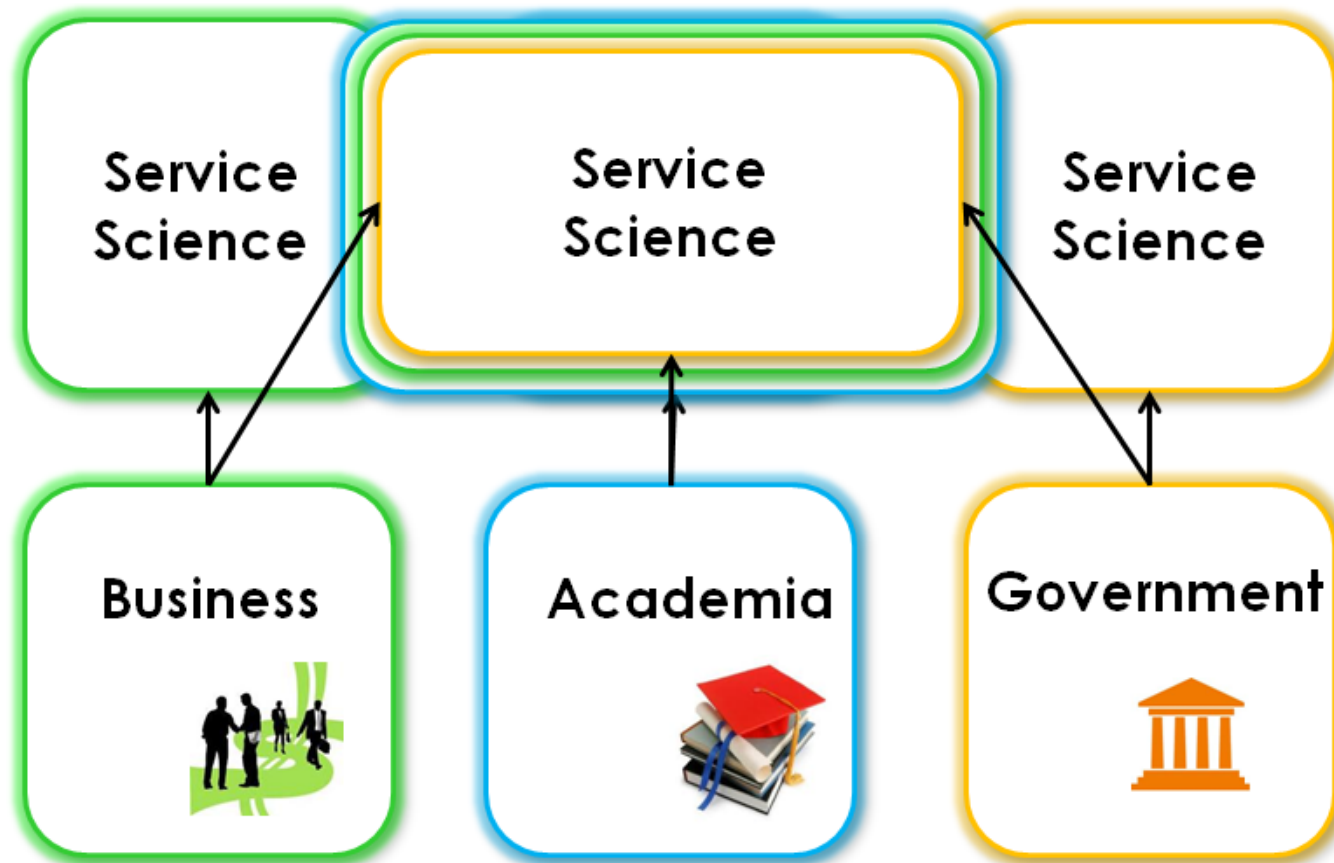
SSKE – Development Steps
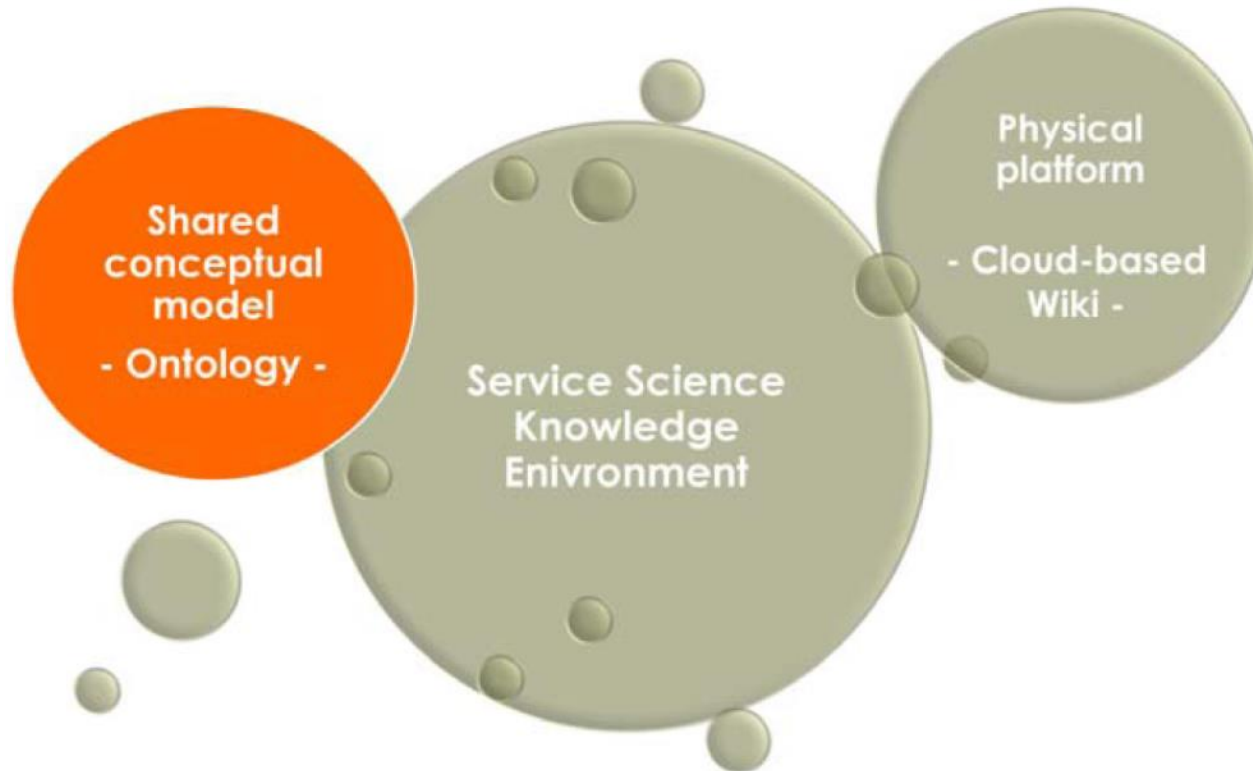
Ontological perspectives on Service Science

- focus:
  - to establish an unifying framework of service representation in different perspectives, based on the Service-Dominant Logic view
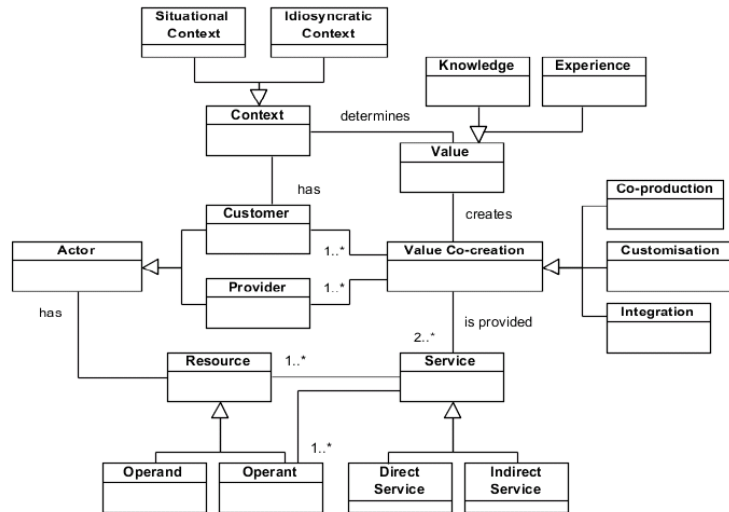   - Fragidis, G., Tarabanis, K.: Towards an Ontological Foundation of Service Dominant Logic. In: IESS 1.1, Geneva, 2011
    - Lemey, Elisah, Poels, G.: Towards a service system ontology for service science. In: Service oriented computing, ICSOC 2011, LNCS, vol.7084, 250-264, Springer, 2011
    - Mora, M., Raisinghani, M., Gelman, O., Sicilia, M.A.: Onto-ServSys: A Service System Ontology. In: Demirkan, H., et al. (eds.) The Science of Service Systems, Service Science, pp. 151–173, Springer Science+Business Media (2011)
    - Poels, G., Van Der Vurst, G., Lemey, E.: Towards an Ontology and Modeling Approach for Service Science. In: IESS 2013. LNBIP, vol. 143, pp. 285–291. Springer, (2013)
    - …

- … but all of them refer only to specific parts of knowledge that can be related to Service Science and its supporting technologies

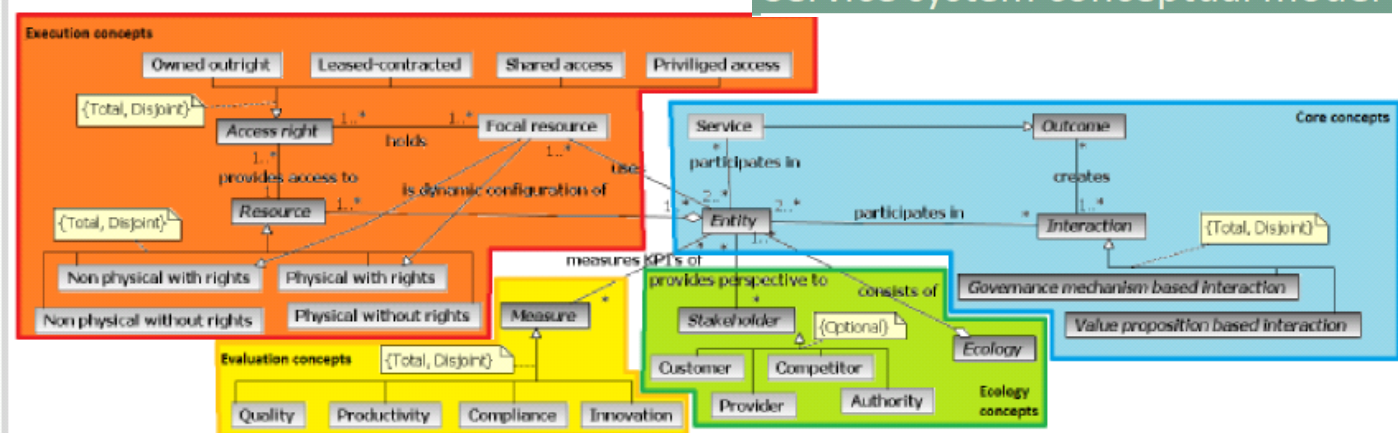# Ontological perspectives on Service Science (cont.)

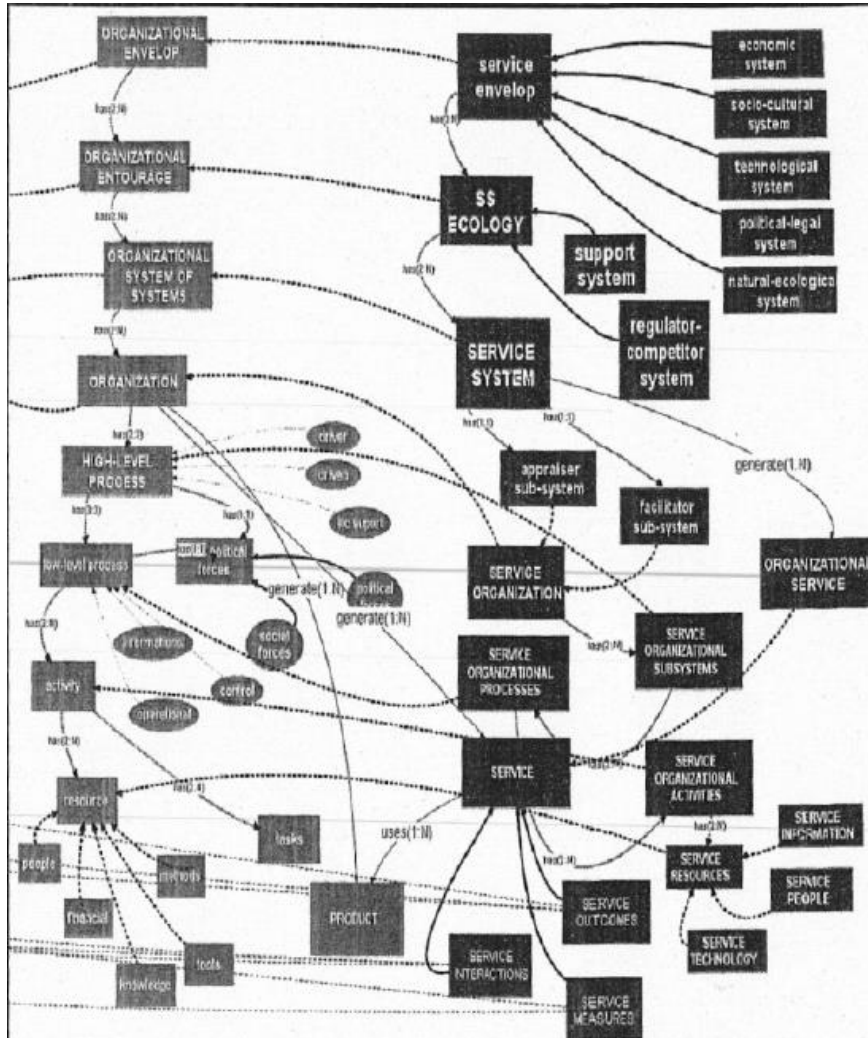## An ontological representation of S-D logic: the complete model

Fragidis, G., Tarabanis, K.: Towards an Ontological Foundation of Service Dominant Logic. In: IESS 1.1, Geneva, 2011

Poels, G., Van Der Vurst, G., Lemey, E.: Towards an Ontology and Modeling Approach for Service Science. In: IESS 2013. LNBIP, vol. 143, pp. 285–291. Springer, (2013)

Service system conceptual model

- the Onto-ServSys ontology on service systems – concepts' integration realized through a Systems Approach, that mainly consists of an *organizational system view* and a *service system view*

Mora, M., Raisinghani, M., Gelman, O., Sicilia, M.A.: Onto-ServSys: A Service System Ontology. In: Demirkan, H., et al. (eds.) The Science of Service Systems, Service Science, pp. 151–173, Springer Science+Business Media (2011)

SSKE – Ontological perspective on Service Science

- a holistic view on knowledge dedicated to the Service Science multidisciplinary domain

    - Information related to the multidisciplinary sub-domains gathered under the umbrella of the broader term "Service Science" to be classified as specific knowledge resources and

    - accessed through a dedicated knowledge base owning a specific ontology-based query formulation methodology

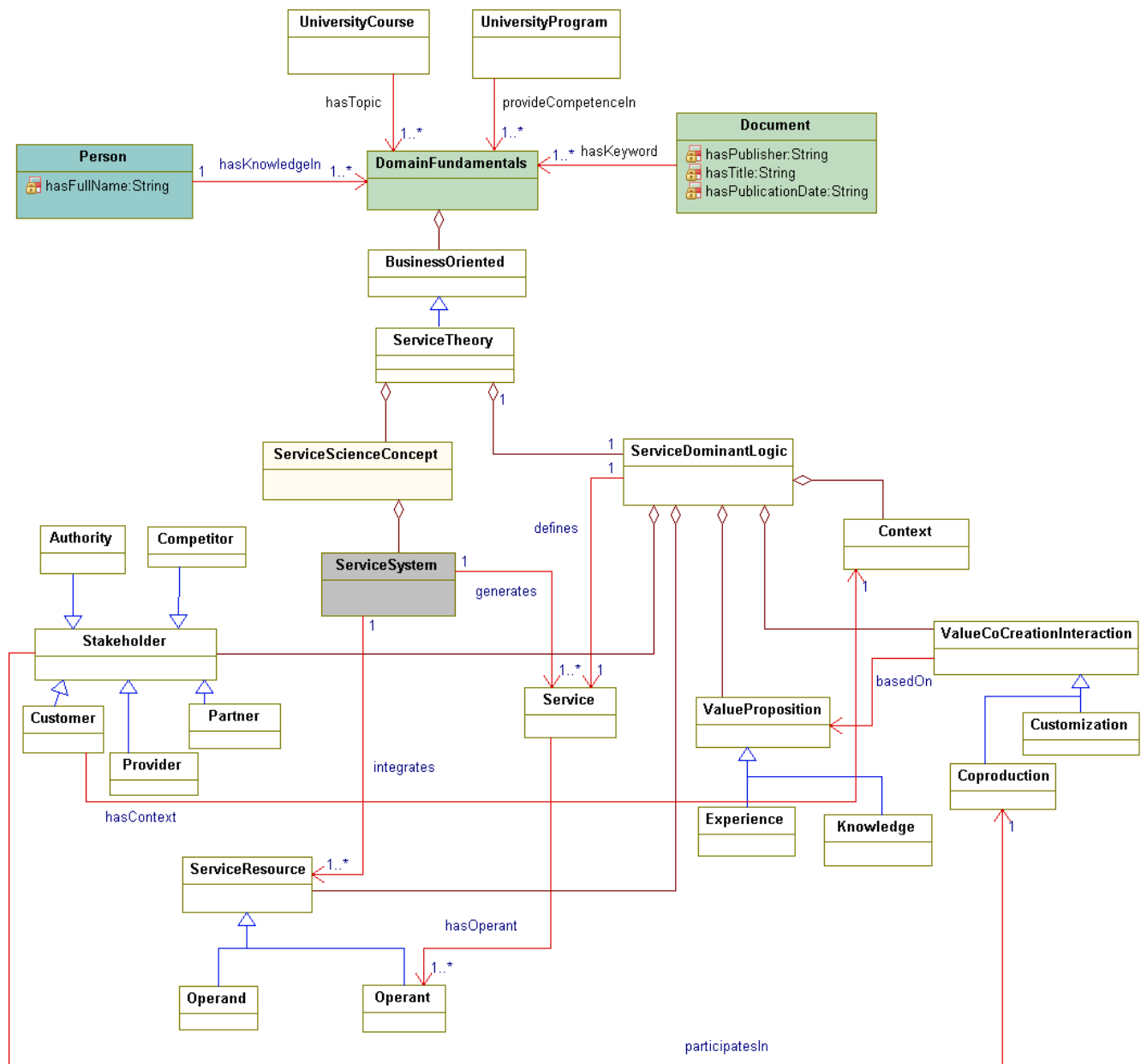- *…. to be further used for managing service related knowledge*

SSKE – knowledge resources (main ontology concepts / extended ontology)
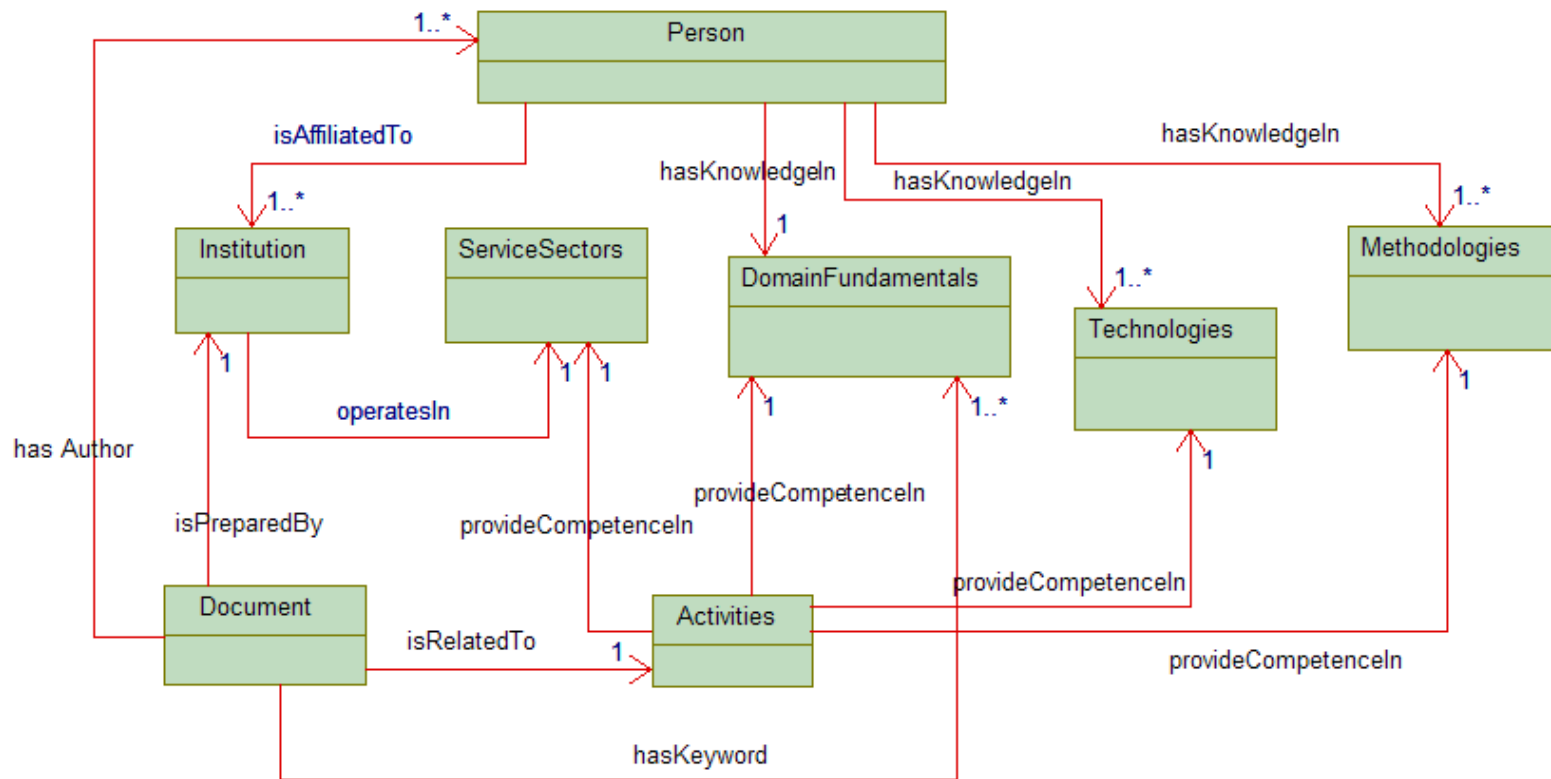
# Extended SSKE Ontology - Domain Fundamentals related concepts
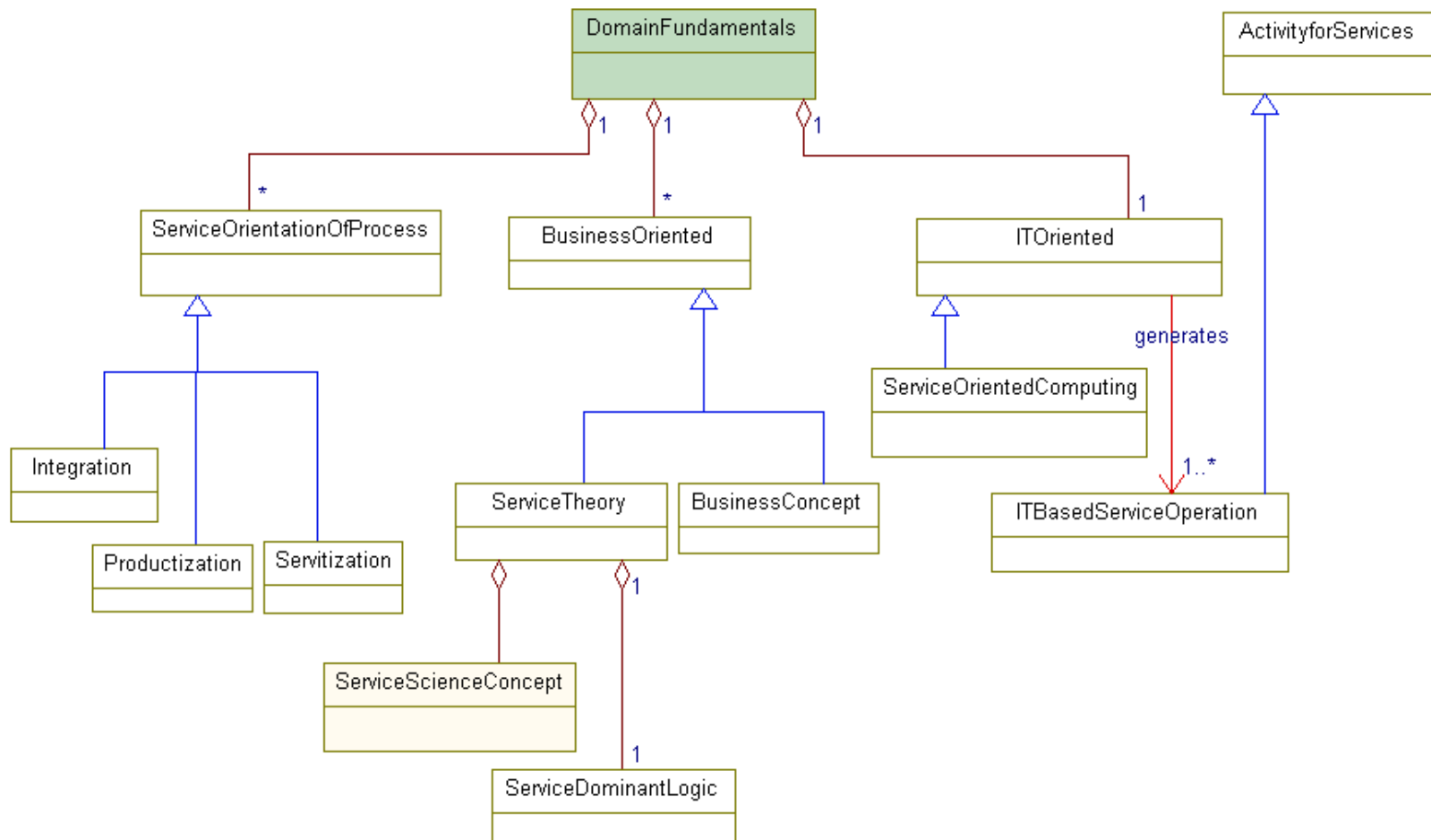
Extended SSKE Ontology - Service Science related concepts

A Systems Approach for a General Service Science Ontology

- this a general ontology structure for Service Science domain as reflected by the extended SSKE ontology
  - it is a systemic perspective
- three main modules, with increasing levels of generality
  - *service system* description (the *SS module*)
  - *organizational system of systems* description (the *Organization module*)
 - *systems of systems* description (the *Systems module*)
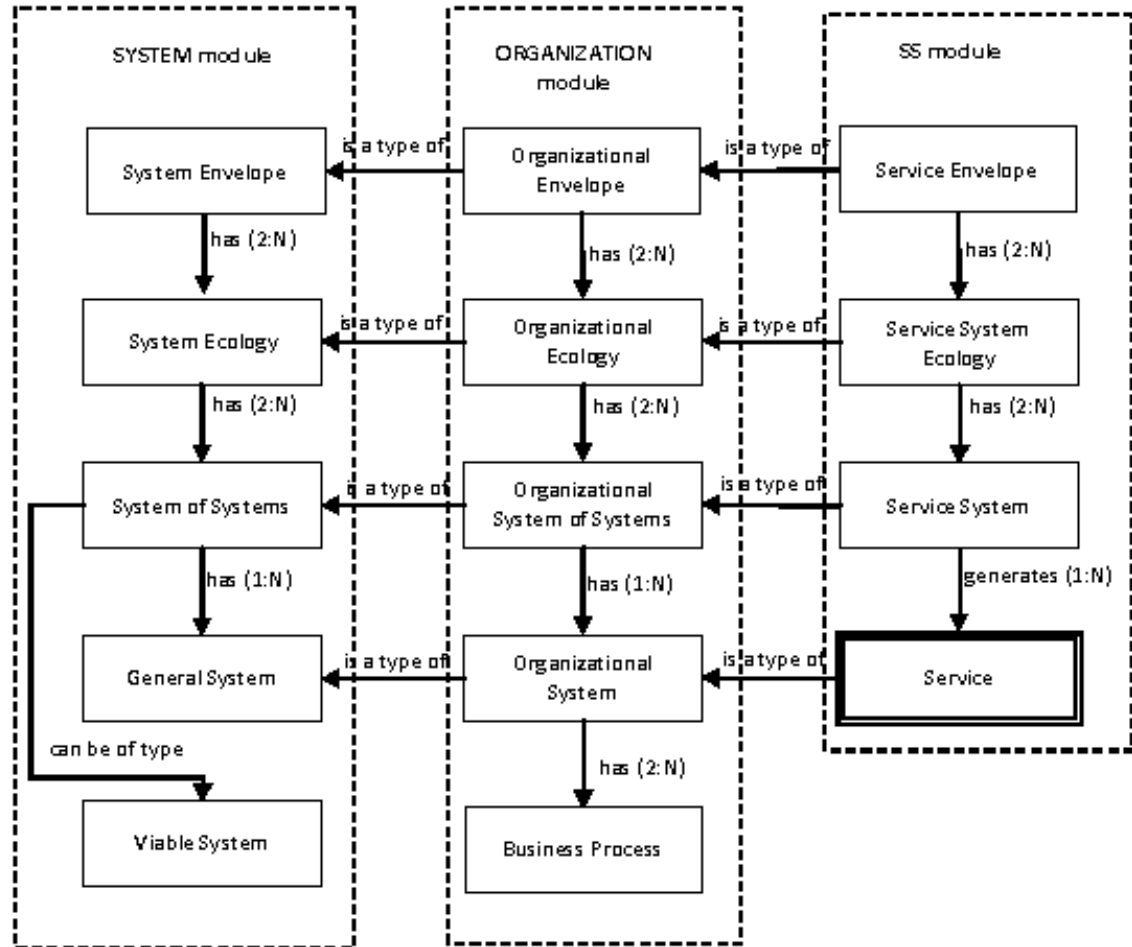
Building an extended ontology – proposed methodology

- proposing non-ambiguous relations between more specific concepts, like *Service System*, and more general ones, like *Organizational System of Systems* or *System of Systems*
- consider *Service System* from the *System of Systems* perspective that allows an adequate description of the role and place of *System Viability*

two major steps proposed:

- a gradually refinement of the granularity of the service system description, starting from the ten foundational concepts, on one side, and

- the interconnection of the *Service System* description with the *Organizational System* description and *System of Systems* description, respectively
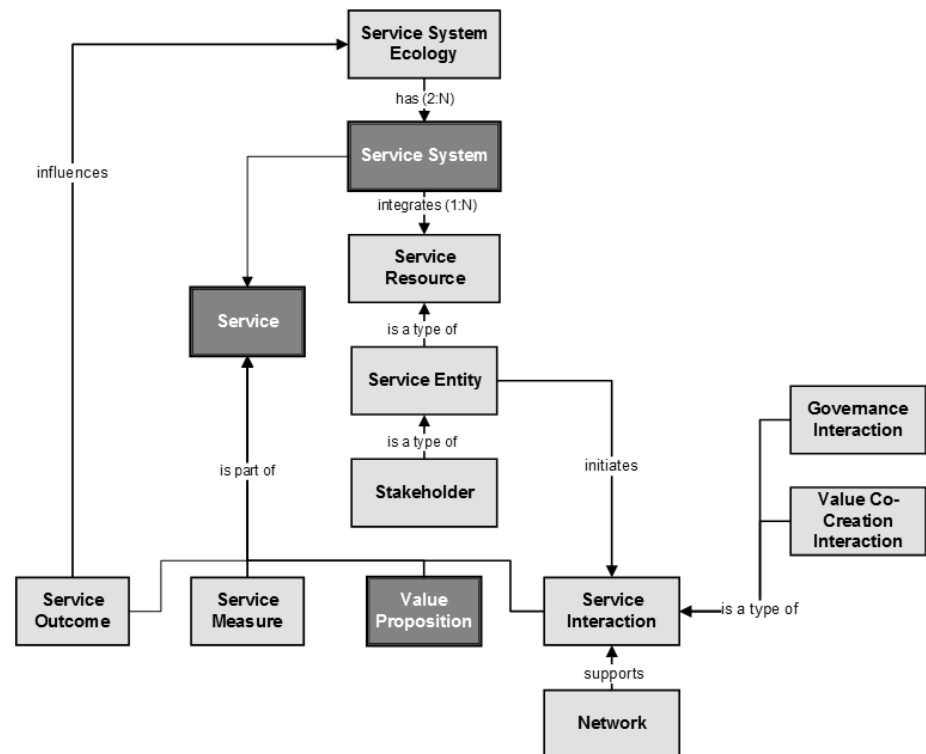
Building an extended ontology – proposed methodology (cont.) – sske.cloud.upb.ro

R@SPACE   E.

Service Domain Fundamentals   **Activities for services**   **Learning**   **Service Inno**

Last visited: Service system | Viable system | Keywords

Keywords
Documents
Articles
Books
Journals
Reports & Thesis
Projects
Research
Studies
Education
Commercial
Patents & Standards
Events
Workshops
Conferences
Virtual Exhibitions
Company Solutions
Solutions
Technologies
Products
POC & Demos
Training Centers & Programs
Institutions
Academic
Business

Keywords   [More ▼]

- Domain fundamentals
  - Business oriented
    - Business concepts
      - Business
      - Business model
      - Service business models
      - Service classification
    - Service theory
      - Service-Dominant logic
        - Value proposition
      - Service science concepts
        - Service science
        - Service envelope
          - Economic system
          - Socio-cultural system
          - Technological system
          - Political-legal system
          - Natural-ecological system
      - Service system ecology
      - Service system
        - Service
        - Service outcome
        - Service measure

- Service measure
  - Quality
  - Productivity
  - Compliance
  - Sustainable innovation
- Service resource
  - People
  - Technology
  - Shared information
  - Access right
    - Owned outright
    - Leased/Contracted
    - Shared access
    - Privileged access
- Service entity
  - Stakeholder
    - Customer
    - Provider
    - Authority
    - Competitor
    - Partner
- Service interaction
  - Value co-creation interaction
  - Governance interaction
  - Network
- Organizational envelope
- Organizational ecology
- Organizational system of systems
- Organizational system
- Envelope

- Envelope
- Ecology
- System of systems
- General system
- Viable system
  - Viable system core attribute
    - Multidisciplinary interpretative approach
    - Open systems
    - System boundaries
    - Autopoiesis and common finality
    - Homeostatsis and self-regulation
    - Structures, systems and equifinality
    - Consonance and resonance
    - System viability
    - Adaptation and relationship development
    - Complexity and decision making
  - Viable system model
- Template of VSM structure

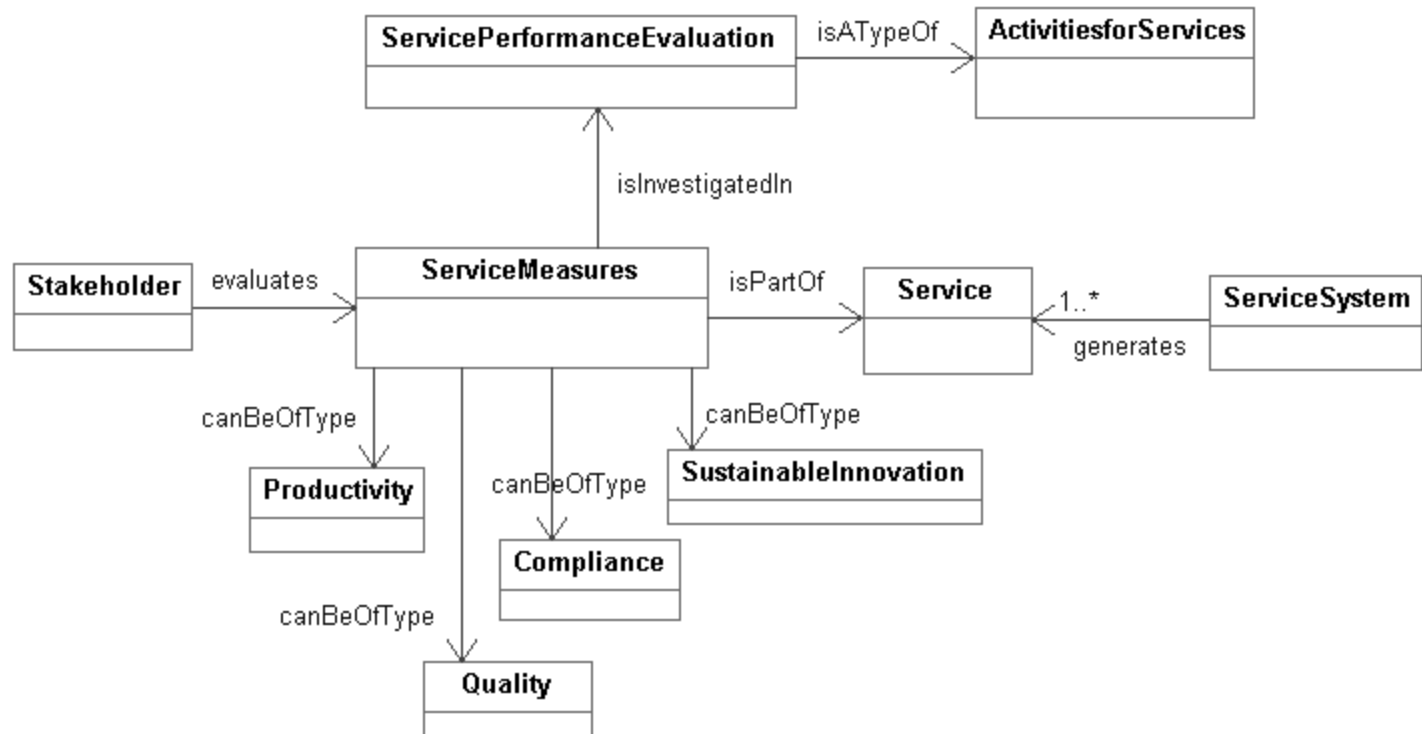# Extending the General Ontology Structure for Service Science (1)
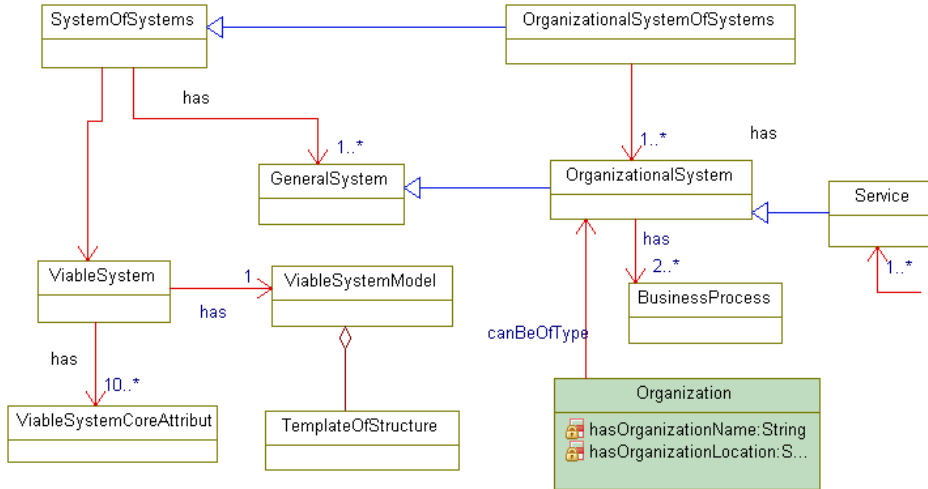
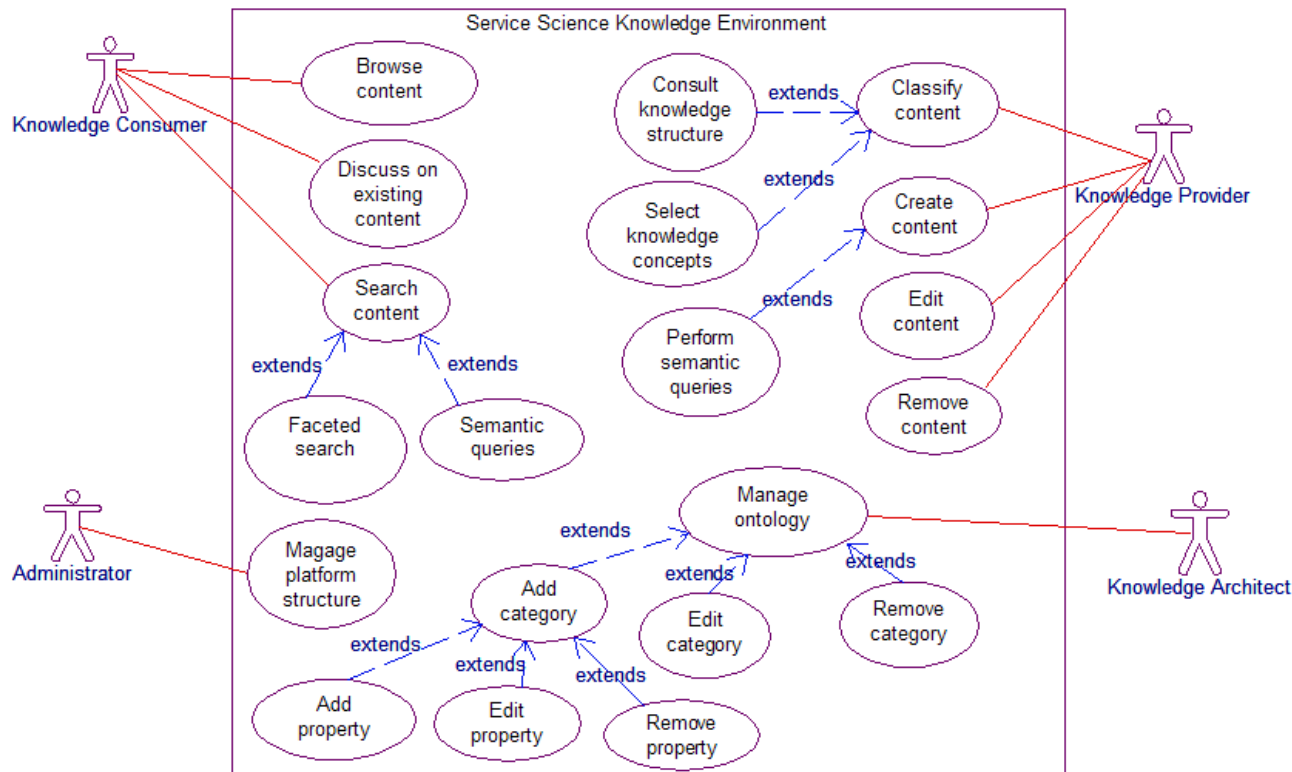- new concept category: **ActivitiesForServices**
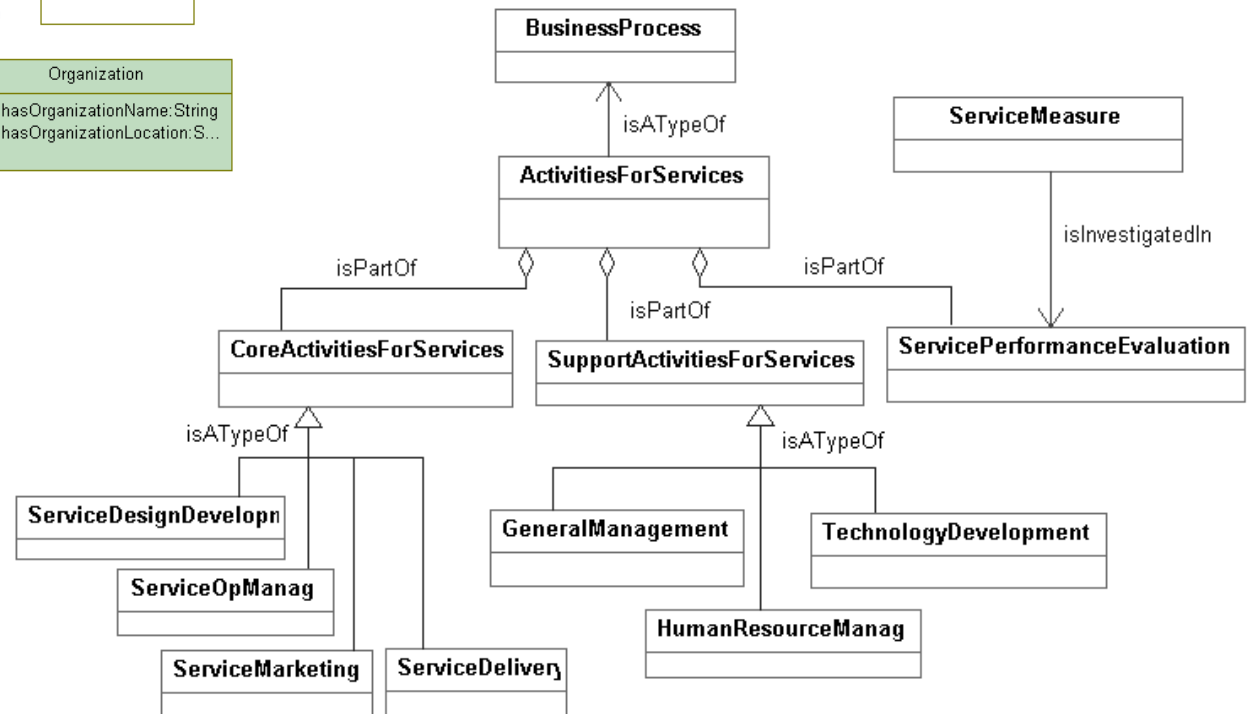
Extending the General Ontology Structure for Service Science (2)

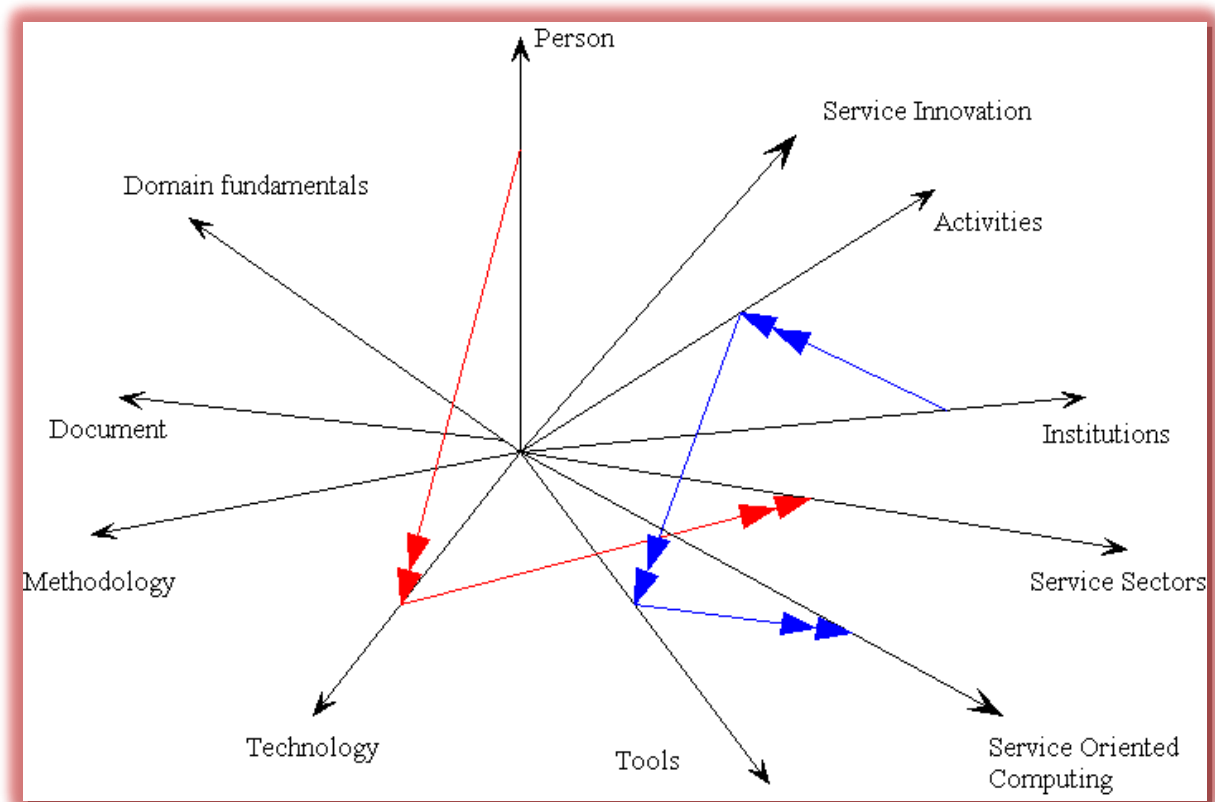- new concept category: **ServiceMeasures**

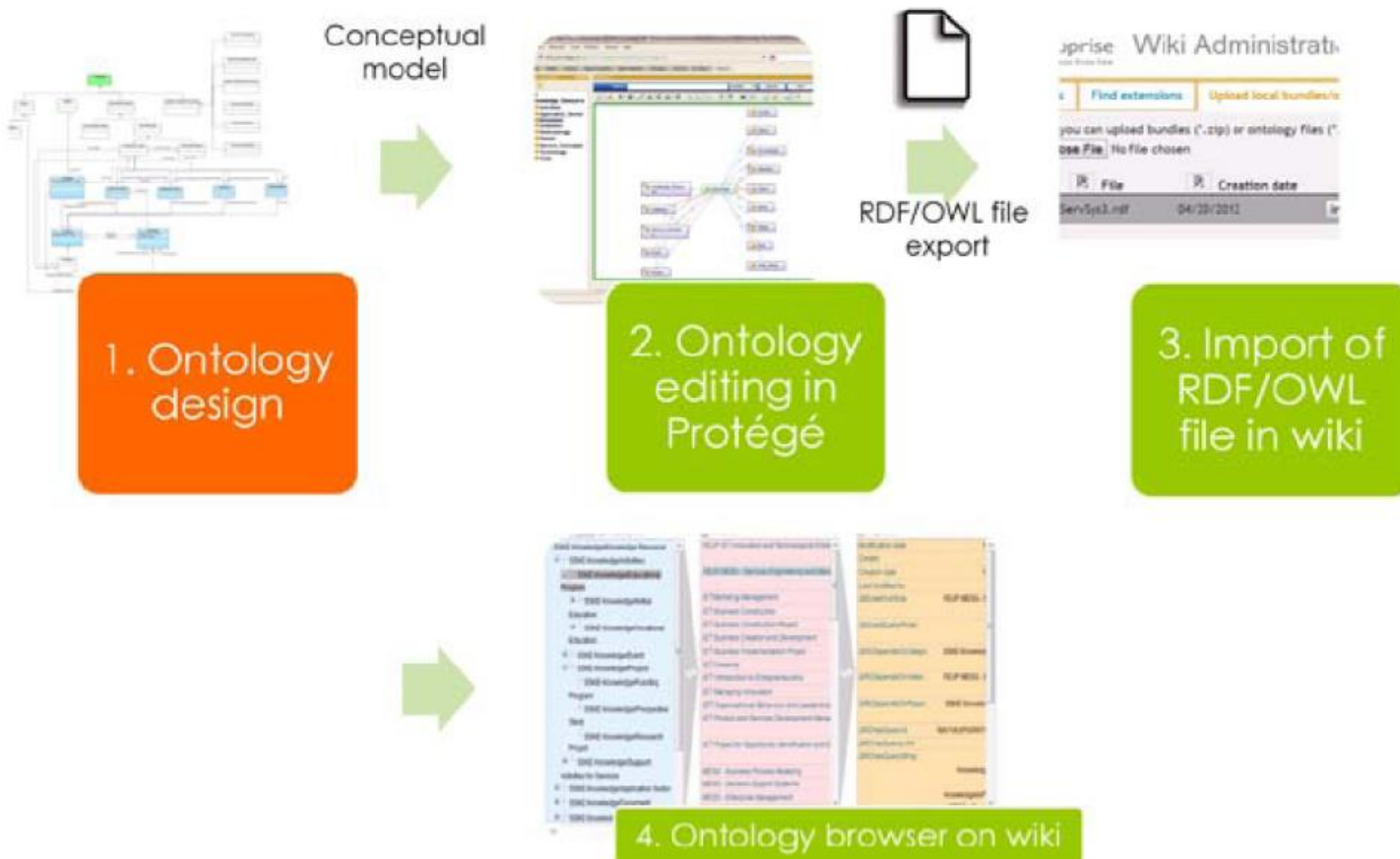# SSKE - Knowledge Oriented Collaboration for Service Science

SSKE – using the knowledge model

- a tree of interrelated concepts - an ontology - based classification

- aims at the creation of a digital library to include specific knowledge on Service Science.

  - to *classify* and to manage knowledge resources

SSKE – Design (step 1)

SSKE – Deployment (step 2)

- The SS–KE is the knowledge resource sharing component of the INSER@SPACE, using cloud computing technology

INSER@SPACE   E-Learning | **S**ervice **S**cience **K**nowledge Environment |

SSKE

Data Explorer | Query Interface | Change view

New page | Search this wiki

🏠 | **Service Domain Fundamentals** | **Activities for services** | **Learning** | **Service Innovation** | **Service Sectors** | **Methodologies** | **Contributors to SSKE**

Last visited: Service Science Knowledge Environment

Keywords
Documents
  Articles
  Books
  Journals
  Reports & Thesis
Projects
  Research
  Studies
  Education
  Commercial
Patents & Standards
Events
  Workshops
  Conferences

Service Science Knowledge Environment   [More ▼]

(Redirected from Main Page)

The main goal the **Service Science Knowledge Environment** (SSKE) is to implement a collaborative environment that would gather together different academic partners with the overall aim of creating a modern educational framework in the areas of Science, Design and Management of services ⬚, wh promoting service innovation in different service sectors.

The **Service Science Knowledge Environment** (SSKE) targets also at creating a solid knowledge-based link between academia, industry and government, along with other European institutions. It supports sharing relevant information on Service Science that would are stored in a structured wa based on a common vocabulary using an integrated ontology.

The **Service Science Knowledge Environment** (SSKE) is delivered as a service in the cloud. It will be further used for *managing service and service system related knowledge*. It intends to exploit the best opportunities for business service innovation using IBM cloud technology, which is used as a m for *information service innovation* through *virtualization* and improvement of *service front ends* for academia, industry, as well as other stakeholders.

Final remarks

- could the community use further the SSKE for *managing service related knowledge*?

- is the Service Science community interested to foster *knowledge-oriented collaboration* on this common research and education topic?

  - is it possible to support the development of a common *reference ontology* for a group of organisations sharing the same business domain, i.e. Service Science?

    - interoperability of existing ontologies on Service Science: *merging / inclusion / mapping* ?

  - templates for contributors to the SSKE - http://sske.cloud.upb.ro/sskemw/index.php/Contributors_to_the_SSKE

- your feedback would be highly appreciated:

   monica.dragoicea@acse.pub.ro   theodor.borangiu@cimr.pub.ro   jfcunha@fe.up.pt

Thank you!