Some aspects concerning a generic service process model building

Theodor Borangiu, Ecaterina Oltean, Monica Drăgoicea,
João Falcão e Cunha, Iulia Iacob

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 – building service process models
- Some research problems in building generic models of service processes
- The conceptual description – a service system worldview
- A generic model of a service process lifecycle
  - A High Level Description of a Generic Service Process Lifecycle
  - Definition of the information flow in the Service Performance Evaluation (SPE) Processes
- Working example - development of a generic service system SSyst activity model
- Concluding remarks

Motivation – building service process models

- contemporary economies are characterized by a shift to service-oriented business organizations, *developing interconnected processes, in which IT technology plays a critical role*

- Service Science was initiated in 2004 by IBM, as an interdisciplinary specialization of systems science and theory of organizations dedicated to the study of service systems, *but there is still no consensus on the key concepts and theoretical foundations of Service Science*

- **generic service process**
  - there is a need for standardization and interoperability of services, stimulated by the development of IT

- development of
  - *conceptual service system models,* accompanied by
  - *activity-based models of service processes*

Motivation – cont.

- conceptual service system models
  - object oriented description (based on Service Science concepts)
  - a variety of proposals of service system conceptual descriptions is reported and comparatively studied in the literature, for example
    - 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., Gelman O., Cervantes F., et al.: A systemic approach for the formalization of the information system concept: why information systems are systems. In: J. Cano (ed.). Critical reflections of information systems: a systemic approach. 1--29, Hershey, PA, USA: Idea Group (2003)
    - 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)
    - Dragoicea, M., Borangiu Th., Falcao e Cunha, J., Oltean E, et.al: Building an Extended Ontological Perspective on Service Science. In: IESS 1.4, Geneva 2014
    - …..

!!! still no consensus and no formalization concerning the concepts in Service Science

Motivation – cont.

- activity-based models of service processes
  - earlier and somehow independent, important contributions to generation of activity-based models of service processes, based on the concept of *business process* were reported related to various service sectors such as
    - *telecommunications*: Garschhammer, M., Hauck, R., Kempter, et.al: The MNM Service Model - Refined Views on Generic Service Management. Journal of Communications and Networks, 3(4), 297--306, 2001
    - *e-government:* Koussouris, S., Tsitsanis, A., Gionis, G., Psarras, J.: Designing Generic Municipal Services Process Models towards eGovernment Interoperability Infrastructures. The Electronic Journal for E-Commerce Tools & Applications. Volume 2, 2008 and Ostasius, E., Petrasviciute, Z. Kulvietis, G.: Constructing generic e-service model in public sector. Proc. of the 16th Int. Conf. on Information and Software Technologies, Kaunas, Lithuania, 2010
    - *industrial product service systems*: Müller, P., Stark, R.: A generic Product-Service Systems development process model based on theory and empirical study. Proc. of the Int. Design Conference – DESIGN 2010, Dubrovnik –Croatia, 2010
    - *health related services*: Lundell, K.-H: Basis for discussion in health informatics - Generic process model for health related services, http://www.contsys.net, 2008

!!!! described as business processes, are specific to service sectors, and have been developed independently from Service Science

Motivation – cont.

- service systems are socio-technical systems approached in an interdisciplinary vision integrating business functions, technology and people, so that (SD-L):
  - they create value through the generated services
  - service customer takes part actively in the service generation and delivery process
  - a service has special characteristics like intangibility, inseparability, perishability and simultaneity

- ... but services must be customized based on consumer needs
  - so, customization has recently emerged as a mean to differentiate between goods and services

*!!! more complex services – "**consumer-in-the-loop**"*

"Customer-in-the-loop" services

- service *customization*:
    - reflects that customers may expect customized services and even the same customer may expect different services in different contexts or situations
    - implies large quantities of interactions, negotiation, and trade-offs between providers and customers to co-design services
    - clarifies value: the value of a specific service depends on the extent to which the service satisfies the customer requirements, so the same service has different values depending on the customer needs

- ? How to concretize imprecise, unstructured, and unclear customer needs into precise, structured, and clear customer requirements to deal with the gaps
    1. among various service actors that use different models and/or languages to collaborate with one another and
    2. between expected service by the customer and perceived service by the provider?

- ? How to improve operational capacity of a service organization to develop and manage new and more complex services?

So what is a generic service process model?

- a service can be seen as an outcome, "what a customer receives", but also

- a service can be described as a process, "the manner in which the outcome is transferred to the customer"

  - a service is a product that is a process, "a series of interactions between participants, processes, and physical elements"

- ? Could we approach the analysis and design of the service delivery systems from a process-centric perspective?

  - ? Could use a service process lifecycle able to integrate the ten foundational concepts of concepts of service science?

How to define a generic service process model?

- basic questions to be answered by service managers:

  Q1. Why is a generic service process model necessary?

  Q2. How "general" can be a generic service process model?

  Q3. What are the contributions of technology and of norms and regulations, respectively, in the design of standardized service process solutions?

  Q4. What is the well suited approach and methodology for a generic service process model building?

  Q5. And finally, from a design management perspective, what is the interdisciplinary team requested to perform the modelling task?

Research problems in building generic models of service processes

|	Garschhammer, 2001	Osatsius, 2010	Koussouris, 2008	Contsys, 2008	Müller, 2010
Service sector	Telecommunication, eCommerce	Public eServices	Municipal services, eGovernment	Health related services	Industrial production services
Research motivation	Deregulations and liberalization in telecommunications	Diversity of public eServices	Opportunity provided by Internet connectivity	Need for harmonization of concepts	Lack of generic process models for development of industrial
Research result/ technology	A top-down oriented systematic service analysis methodology/ IT dominant	A generic, adaptive eService model in the public sector/ web-based & non Internet, different access media	Overall methodology for building the Interoperable Generic Service Patterns/ IT, Internet	Generic process patterns and model for Swedish health related services/ not specified	A generic PSS development process model/ web based process guide platform

Research problems in building generic models of service processes (cont.)

	Garschhammer, 2001	Osatsius, 2010	Koussouris, 2008	Contsys, 2008	Müller, 2010
Service sector	Telecommunication, eCommerce	Public eServices	Municipal services, eGovernment	Health related services	Industrial production services
Approach/ methodology	Object-oriented top-down approach for service environment analysis/ the service as a set of interactions	SOA BPM application / use of a behaviour model part of the SOA Reference Model	Service Description Worksheets, BPMN process models / Interviews, Greek eGIF guidelines	Clinical processes as BP / activities description in core and supporting clinical processes	Initial empirical study / Interviews and literature
Generality/ perspective of the research	Non-scenario specific procedure/ languages and methods for describing functionality and quality of service parameters in a generic way	G2C, G2B, G2G interactions / seek standards, model eServices, integration of BP	eGov / national standardized documents for pan-European Interoperabili-ty	Subject of debate / process-, concept- and information model will form the Swedish information structure	Service systems for mechanical engineering, synchronizing product and service development

Conceptual description – a service system worldview

- the proposed service system worldview reflects the relations between the ten foundational concepts of the Service Science (SS) (Spohrer et al., 2008)
  - resources,
  - entities,
  - access rights,
  - value co-creation interaction,
  - governance interaction,
  - outcomes,
  - stakeholders,
  - measures,
  - networks , and
  - ecology

- … such as:

  - it considers the service system as an organizational system of systems (Mora et al., 2011, Onto-ServSys)

  - it is similar to the service system worldview in (Lemey et al., 2011)

# Conceptual description – a service system worldview (cont.)
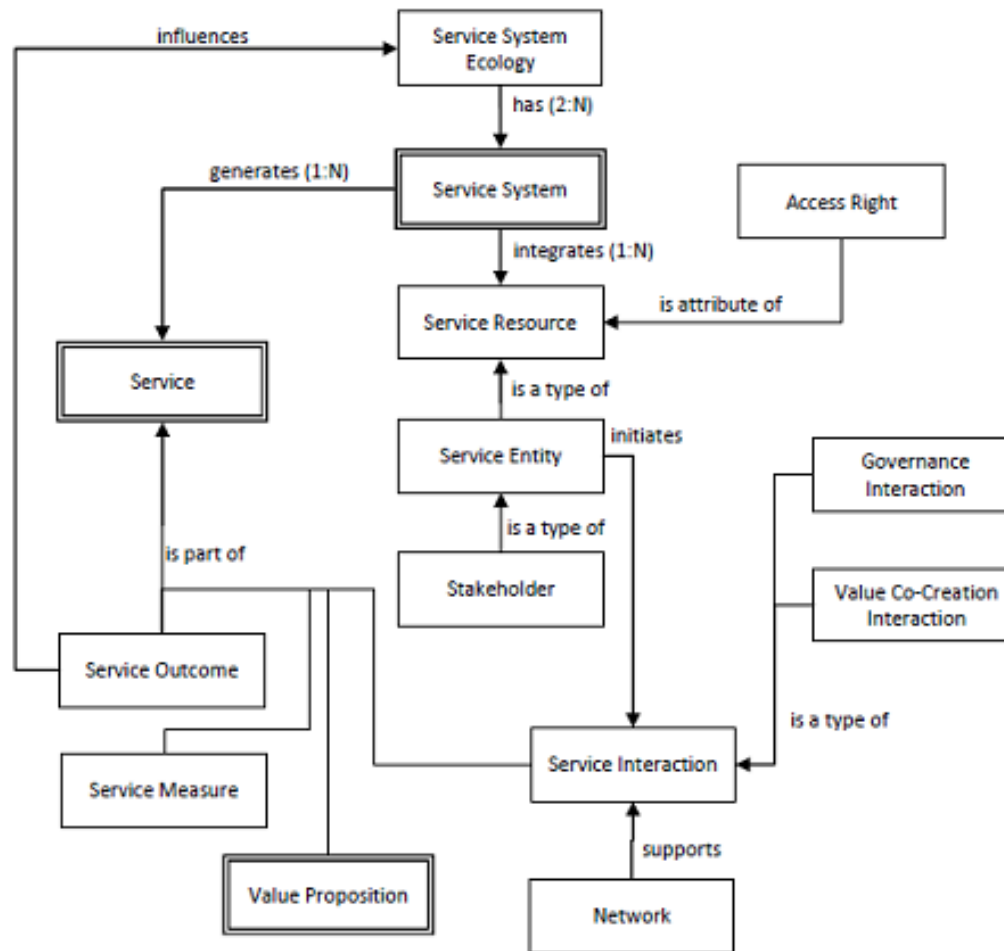
Conceptual description – a service system worldview (cont.)

- service interactions / value propositions / service outcomes
  - final states as interaction outcomes in **ISPAR** (**I**nteract-**S**ervice-**P**ropose-**A**gree-**R**ealize) model (Maglio et al., 2009)

|	Final state in the ISPAR model	Significance
1.	**R:**	Value is realized, i.e. effectively co-created
2.	**-P:**	The proposal (value proposition) is not understood
3.	**-A:**	The proposal is not agreed to
4.	**-D:**	Value is not realized and disputes do not arise
5.	**K:**	Value co-creation *disputes* are resolved in a manner that is OK for all stakeholders
6.	**-K:**	Value co-creation *disputes* are resolved in manner that is not OK for all stakeholders
7.	**W:**	An interaction is not a service interaction and is welcomed
8	**-C:**	An unwelcomed non-service interaction is not criminal
9	**J:**	An unwelcomed non-service interaction is criminal and justice results
10.	**-J:**	An unwelcome non-service interaction is criminal and justice does not result

# A High Level Description of a Generic Service Process Lifecycle
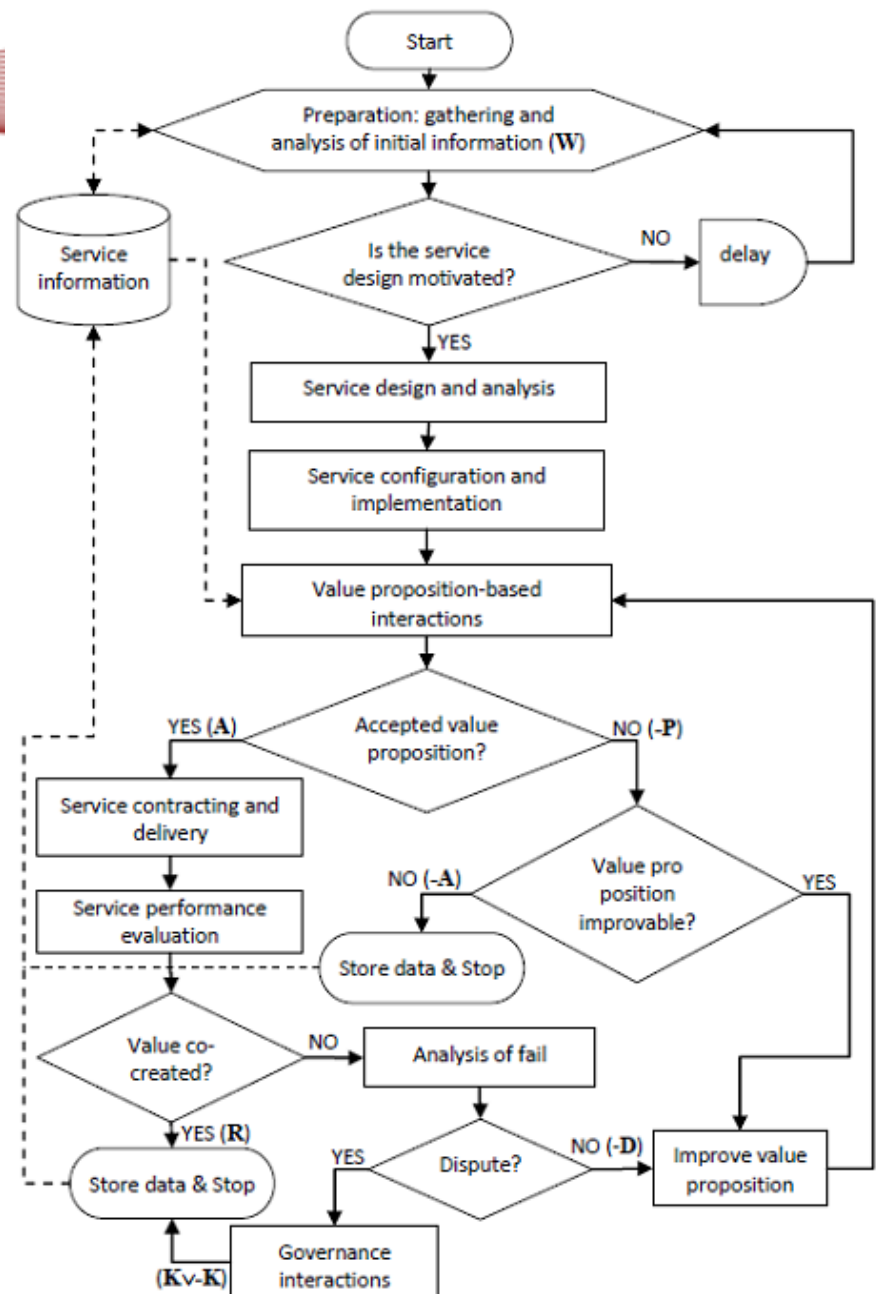
A High Level Description of a Generic Service Process Lifecycle (cont.)

- information flow in Service Performance Evaluation (SPE) process
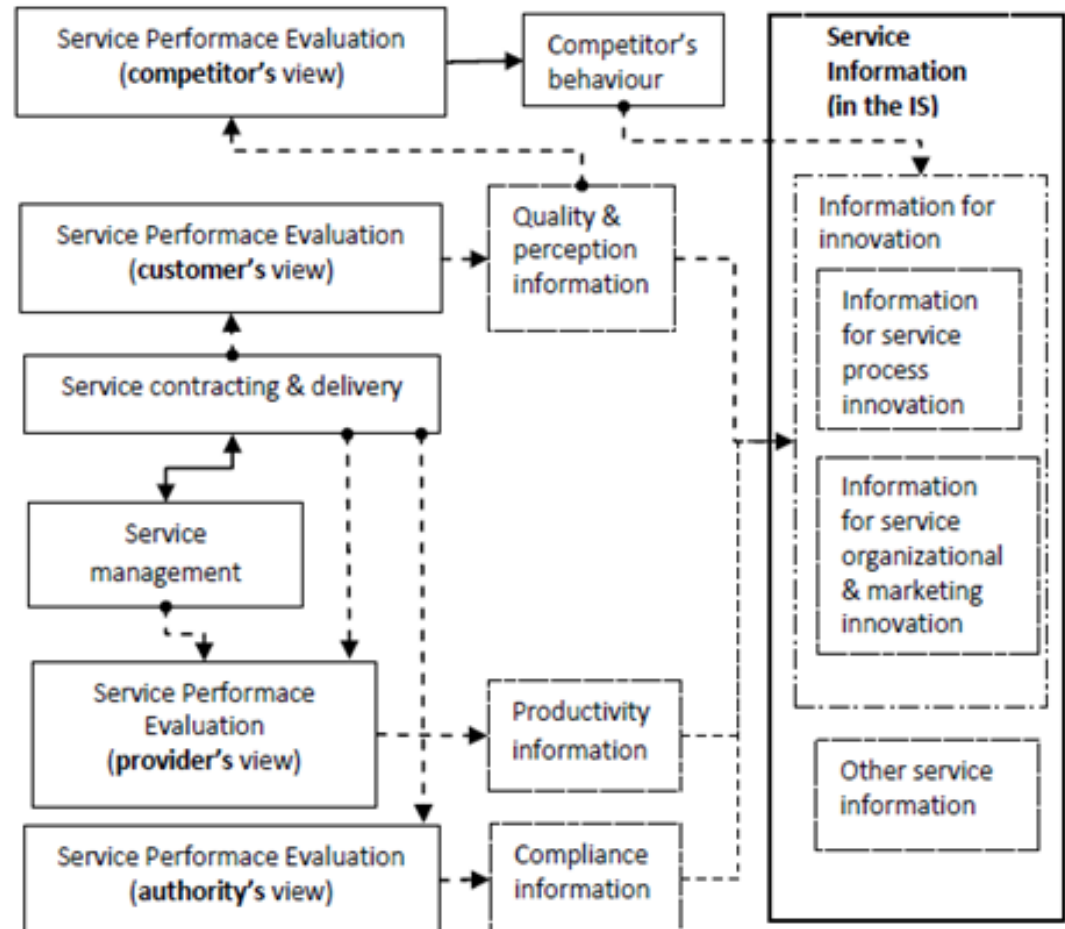
Development of a generic service system SSyst activity model

- the *activity model* of a generic Service System (SSyst), in an approach derived from the *service's lifecycle,*
  - indicating the interactions between the four stakeholders: *Service provider* (including his suppliers), *Service customer*, *Competitors* and *Compliance bodies* (government, legal national and EU service operating framework, authorities)

- the proposed SSyst lifecycle model includes four main stages, which are mapped onto the four *core service activities*
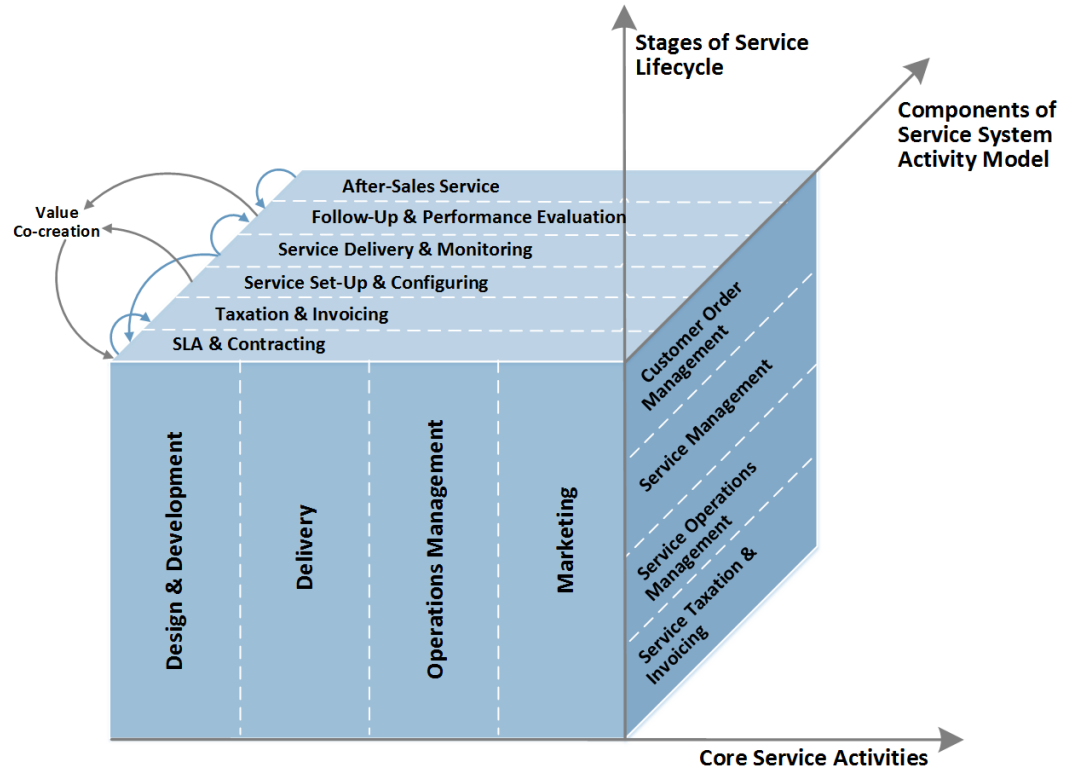
Theodor Borangiu, Monica Dragoicea, Virginia Ecaterina Oltean, Iulia Iacob, "**A Generic Service System Activity Model with Event-Driven Operation Reconfiguring Capability**", T. Borangiu et al. (eds.), Service Orientation in Holonic and Multi-agent Manufacturing and Robotics, SCI 544, pag. 159-175, Springer, 2014

Development of a generic Ssyst activity model (cont.)

Theodor Borangiu, Monica Dragoicea, Virginia Ecaterina Oltean, Iulia Iacob, "*A Generic Service System Activity Model with Event-Driven Operation Reconfiguring Capability*", T. Borangiu et al. (eds.), Service Orientation in Holonic and Multi-agent Manufacturing and Robotics, SCI 544, pag. 159-175, Springer, 2014
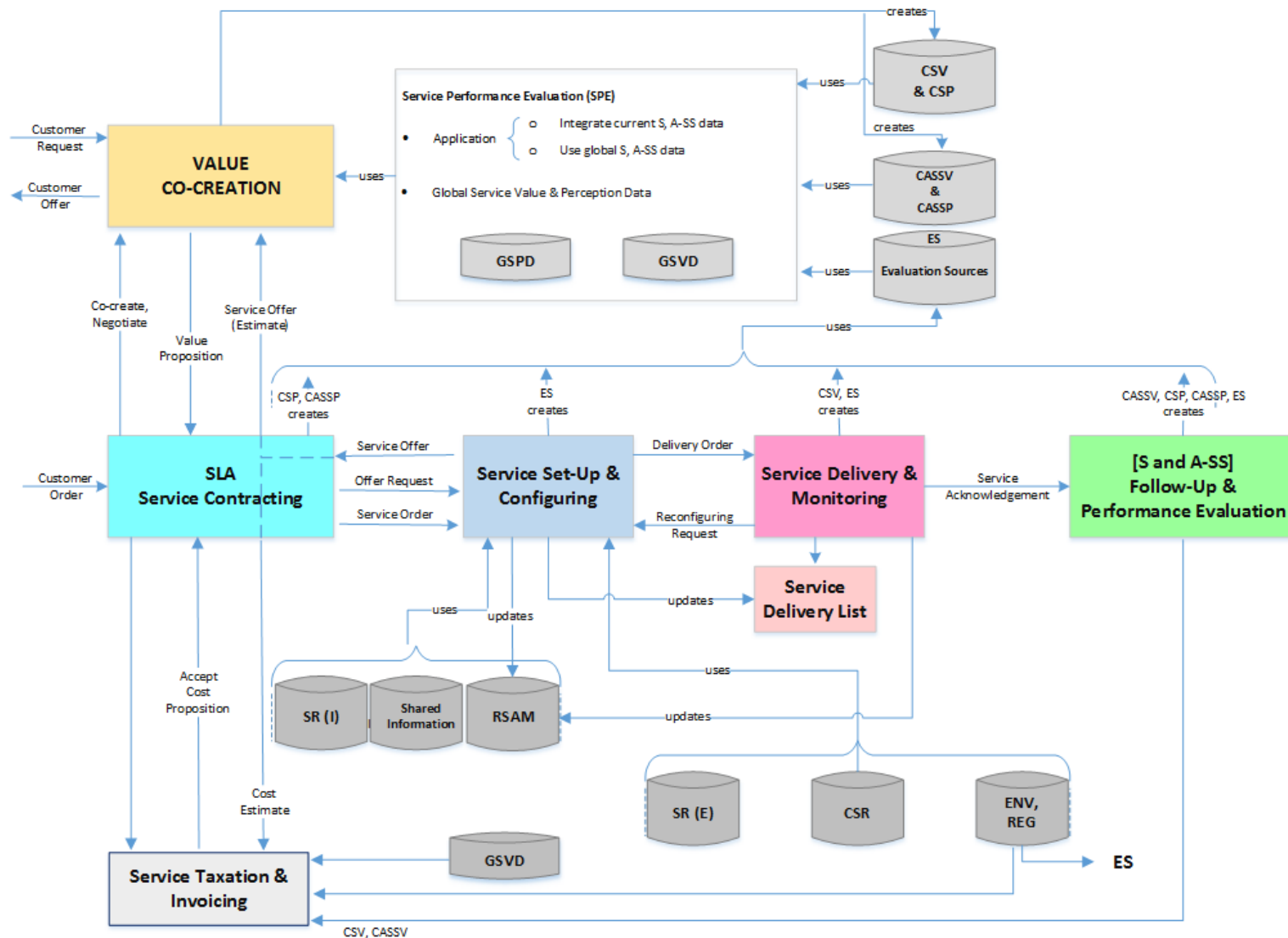
Concluding remarks

- the development of unified service process design solutions is not straightforward, as, even within a specific service sector, there may be a great a variety of service scenarios

- the generic, non-scenario-dependent service process model proposed in section 4 provides a theoretical perspective, general and simple

- the activity-based model of the service system (SSyst) proposed as an example is organized in a standard representation oriented towards the business process management point of view; it highlights roles and interactions between the four categories of stakeholders related to service systems, according to the service system worldview introduced in the paper

- this approach is suitable for further development and integration in the organization's information system

  - based on the analogy with BPM, a business-oriented standardized representation has been further created for the SSyst activities' model, to allow the definition, set up and configuring, analysis, and effective simulation of its inter correlated component activities for composite service validation by means on an information system, and the proposal of innovation patterns and solutions

Thank you!