

Chapter 20

Value–Oriented Specification of Service Systems: Modeling the Contribution Perspective of Enterprise Networks

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ABSTRACT

In this paper, we analyze relevant state of the art in the areas of Service Science, Business Modeling and Enterprise Engineering in specifying service systems. The main shortcoming identified essentially resides in the lack of capability to model the purpose and value of a given service system in a structured way to guide current and future development efforts. In order to address these issues, our research focuses on modeling enterprises as service systems along three perspectives, namely: construction, function and contribution to differentiate and integrate their teleological and ontological models. With the proposed approach, we are able to clearly specify how each component of an enterprise system provides a service – thus value – to other components of the same system or of the environment along different, possibly intertwining and overlapped value chains.

INTRODUCTION

Implementing strategy has always been a significant challenge. Increasing pace of business environment and complexity and increasing dependency and use of ICT dramatically augments

entropy in enterprises, leading to the well-known statistics of as much as 90 percent of organizations failing in applying their strategies (Kaplan & Norton, 2004). Misalignments between business and its support systems is considered the main culprit of such failures (Henderson & Venkatraman, 1993;

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Laudon & Laudon, 2011). Managing complexity inherent to these systems of systems and their dynamics is crucial in dealing with these issues. Most methods used up to now to manage this complexity are not based on a transversal, coherent and concise conceptual model. There are many vertical approaches, from different disciplines (e.g. traditional management, information systems, IT management, etc.). Enterprise Engineering (EE), as a means of applying engineering methods and tools to organizations, aims at becoming a holistic and transversal approach to address the mentioned challenges.

Complex service systems form as enterprise networks are dynamically set up according to offer and demand in their ecosystem. The knowledge about how their services are used and how they combine with other services to provide valuable solutions to market demands is crucial in dealing with the dynamics of the service networks. We consider that the hinge point between the business vision of a system and its implementation by supporting systems is not modeled in current approaches in a way that adequately supports the development and evolution of a system and its positioning in a value network.

Formally integrating the notion of purpose into service system development activities requires addressing both the teleological and ontological perspectives of a system in an integrated, bi-directional way. However, while Management approaches generally focus on the teleological perspective, Engineering approaches are generally focused solely on the ontological perspective (Op't Land & Pombinho, 2012).

The disciplines of Economics and Management have long been aiming to address these concerns, with Service research particularly gaining momentum. The advances of the said disciplines on service are mostly seen as promising but generally lack formalization and constructability. If there is one area where constructability is – by definition – necessary, is IT development. In IT, service-orientation has also recently been considered a

silver bullet for improving alignment between business and supporting systems. More return on investment and overall agility are expected thanks to enhancing standardization, loose coupling and business involvement. While its potential benefits are mostly clear, the way of working to attain them is not. The challenge begins in the early stages of the development process: how to formally define the purpose, the scope and the meaning of a service?

There are known approaches for describing services from both functional (Oaks, ter Hofstede, & Edmond, 2003) and non-functional perspectives. One example of the latter case, a domain-independent taxonomy is presented in O'Sullivan (2006). It aims at representing non-functional properties of conventional, electronic and web services by identifying and studying 80 service patterns. Business service definition and development is performed in the industry, driven by best practices, with approaches such as SOMA (Bell, 2008). Nevertheless, we cannot find an engineering approach to these service development activities that is both systematical and methodical. The cause seems to be a widespread shortcoming in state of the art approaches in terms of: 1) lack of grounding on sound theories and 2) integration with EE frameworks and methodologies. These issues are starting to be thoroughly addressed by merging practice-oriented methodologies, such as Agile development, with more academic approaches, as presented in (Lankhorst, 2012).

In this paper, we present a summary of state of the art analysis and devise a set of concepts and a method to support systematic, value based, service system development decisions. In order to improve service-oriented enterprise engineering, namely service value definition, we propose a combination of approaches based on sound theories. This paper extends previous work (Pombinho, Aveiro, & Tribolet, 2012a) by elaborating on the conceptual framework and providing a method that allows, by design, recursive definition of the value contribution of different system components and services.

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