

Flexible Complexity Management and Engineering by Innovative Services

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The management and engineering of innovative services for a global client base in a service economy struggles with continuously increasing complexity (Benedettini and Neely 2012a). To address the problem of growing complexity, one of the objectives of *Service Science* is to couple “the power of science and engineering to support knowledge workers within complex service environments through knowledge centered technological architectures and solutions” (Bitner and Brown 2008; Paton and McLaughlin 2008). To this end, the creation and delivery of services involve understanding and engineering improvements in the complex processes and relationships that are a part of information inter-operations. For instance, *value networks*, which have evolved from value chains or grids, are based on the engineering and use of complex web-portals that interconnect large numbers of participants, i.e. different kind of vendors and suppliers, who bring value to the end users (Basole and Rouse 2008). Moreover, the inherent

complexity arising from the complex web of relationships between vendors and suppliers of services that changes and evolves over time is a significant challenge. Addressing new problems in this constantly changing environment itself is a challenge that can be met by applying innovative servitization strategies. As Benedettini and Neely (2012a) claim “..., it must be considered that complexity in services can originate from many other sources than the service system”. They also state that to consider just service systems or underlying infrastructure complexity is “too narrow to capture the meaning of complexity in services”.

Furthermore, the statistical data gleaned from research performed by many industrialized countries shows—that the service economy has evolved to become the largest share apart from the manufacturing and agricultural sectors. As Spohrer et al. (2007) describe: “The growth of the service sector has resulted in part from the specialization and outsourcing of service activities performed inside manufacturing firms”. The most illustrative service cases to be pointed as examples are as follows: product design, human resources management, customer relationship management, and IT environment maintenance. This in turn has evolved over time to become an extremely complex environment (Spohrer et al. 2007). Besides, the substance and nature of complex environments is such that any “siloes” stand-alone scientific subject or researcher working within these siloes cannot tussle against challenges and achieve a continuing sustainable success (Bitner and Brown 2008; Paton and McLaughlin 2008). Thus, understanding and measuring complexity has always been a topic for variety of researchers and scientific disciplines.

It is incredibly difficult to define and measure the complexity of service delivery systems because of its range of meanings for different subjects and sciences (Benedettini and Neely 2012a). Additionally, “In relatively recent times,

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complexity thinking and complexity research have started to be applied also to management science” (Benedettini and Neely 2012a; Robertson 2004). Consequently, to remain competitive and relevant, service enterprises have shifted their strategy focus beyond cost, quality and technology management towards innovative services leadership. As a result, innovative services are gradually emerging into the unique vending offers of the enterprises in response to the increasingly dynamic, competitive and complex environments (Bullinger et al. 2003). At the same time, the enterprises need to keep their service marketplace constantly developing, being always “one step ahead of their competitors” to ensure that they can meet customer requirements.

In practice, however, reaching these ideals is difficult. The continuously increasing service as well as service systems complexity, especially when confronted with serious real-world challenges such as the lack of clear problem definition [“no unequivocal descriptions of the service contents, the relevant processes and the necessary resources” (Bullinger et al. 2003)] and the lack of transparency as a result of quality problems in general (Bullinger et al. 2003). Other authors also stress that: “There is an urgent need to address the big issues of a society built on complex and often fragmented systems” (Ng and Andreu 2012). Ng and Andreu continue: “These value-creating complex service systems encompass a wide range of constellations from businesses to local communities”. Similarly, Benedettini and Neely note that: “The shift of manufacturers into services has been described as a process that involves the provision of services of increasing complexity ... Complexity appears to be a characteristic of the services offered, rather than a consequence of the different approaches to complexity that may be taken by individual firms” (Benedettini and Neely 2012b).

To showcase emerging work in this area, this Special Issue focuses on the framework for flexible management and engineering of innovative services, specifically on the flexible complexity management that arises from activities focused on the creation, modeling or delivery of innovative services. Accordingly, our purpose is to provide a systematic exemplification of the flexible complexity management by meanings and roles. Further, we highlight in this special issue various research aspects of the flexible complexity management of innovative services. This issue features works that are the most relevant to the Special Issue theme and reflect realistic, practical considerations.

The paper authored by Fauska et al. “Agile Management of Complex Goods & Services Bundles for B2B E-Commerce by Global Narrow-Specialized Companies” analyzes the “usage and managing of E-Commerce by global narrow-specialized companies is, as this business strategy represents highly demanded approach to competitive scheme in global markets of goods & services bundles”. Furthermore, the

paper contributes to the “limited knowledge regarding agile management of E-commerce by global narrow-specialized companies”. The work seeks to “help managers of global narrow-specialized companies to make decisions on investments and execution of E-Commerce strategy”.

In the paper entitled “Efficient Managing of Complex Programs with Project Management Services”, Stoshikj, et al. examine “complex project management processes and propose understanding of project management tools as a service, both when speaking in software terms and management skills frames”. They claim that “Project management can be offered as a service in different forms”. Thus, the authors divide the approach onto two parts: “Companies specialized in project management may manage a project for the benefits of third party, using the client’s technical knowledge and principles of work”, and “Companies that want to manage their projects internally need project management training service and software solution with certain functionalities and characteristics”. Moreover, their recommended solution “must follow the company policies in regard to resources, time and cost management, collaboration etc.”.

Lepmets et al. in the “The Evaluation of the IT Service Quality Measurement Framework in Industry”, target a twofold purpose—on the one side to: “evaluate an IT service quality measurement framework”, and on the other side to “refine the IT service quality measurement framework for the IT service industry”. The authors also describe “the notion of IT service quality from a holistic point of view”. Thus, they consider “the IT service quality measures that could help IT service organizations to understand the quality of the IT services they offer and address the areas where provider-driven IT service improvement is needed”. Specifically, they “take a closer look at how process performance relates to other IT service quality measures and to the overall IT service quality”.

Stieninger and Nedbal in the “Characteristics of Cloud Computing in the Business Context: A Systematic Literature Review” recognize that “Cloud Computing services have become more cost effective and technically flexible than traditional solutions”. In turn, “they (Cloud Computing services) are gaining more and more attention among organizations”. However, “there is still disagreement about the exact meaning of Cloud Computing”. Thus, the authors evaluate “current status concerning the conceptualization of Cloud Computing research by reviewing and classifying existing scientific literature”.

In the paper, “The implementation of innovative services in education by using Cloud infrastructure and their economic aspects”, Balco and Gregus deliver “information related to economic aspects of implementation the services based on cloud concept where the process of education was adapted for cloud environment to reduce investment and operation costs of organization”. They claim that “Today’s

economic environment requires from suppliers cost effective services for commercial as well as no commercial environments". Thus, they discover that: "The debates regarding this topic are presenting different strategies. In the first group are supporters of traditional technology... On the other hand ... professionals who understand very well the market requirements". And, as result "... non-standard innovative solutions provide a high level of autonomy for users, flexibility in management and create space for creativity in the future".

Finally, Mladenow et al. "Social Crowd Integration in New Product Development—Crowdsourcing Communities Nourish the Open Innovation Paradigm", investigate "new product development (NPD) using social crowd integration concepts". They emphasize that: "The core of the open innovation paradigm is based on the principle of collecting ideas from external sources into the organization, and bringing those adapted, transformed and enriched ideas to the market". Further, the authors explore a challenge in this field: "However, under the constant pressure of being innovative, companies have to try harder to tap their customers' knowledge and abilities". Additionally, they propose a solution for these pressures: "Crowdsourcing communities provide an arena for a vast amount of consumers to actively participate in innovation processes".

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