Using Design Science Research to Develop a Modeling Technique for Service Design

Lysanne Lessard and Eric Yu

Faculty of Information, University of Toronto
140 St. George Street, Toronto, ON, M5S 3G6, Canada
{llysanne.lessard,eric.yu}@utoronto.ca

Abstract. Knowledge-intensive business services (KIBS) such as consulting and research and development services are important factors of performance and innovation in industrialized economies. However, current modeling techniques aimed at supporting service design do not account for their core characteristics such as the relational nature of exchanges among providers, clients, and other actors. Using data from a case of academic research and development service as a type of KIBS, we present a modeling technique that can support the design of successful service engagements in this domain. This work is guided by the understanding of service as a process of collaborative value creation, or value cocreation. Beyond the contribution of the modeling technique to KIBS design, our work shows the strength of using a Design Science Research methodology in creating design artifacts that are strongly aligned with the problem domain for which they are developed.

Keywords: Design Science Research, KIBS engagements, service design, value cocreation, modeling technique.

1 Introduction

Knowledge-intensive business services (KIBS) such as information services, computing, and research and development services are important factors of performance and innovation in industrialized economies [1]. While current literature on KIBS helps us understand their core characteristics and patterns of innovation, it has rarely addressed how best to support their design. The understanding of service as a process of collaborative value creation, or value cocreation [2], could provide a framework guiding KIBS design. It allows us to understand parties engaged in KIBS relationships as service systems - collections of specialized resources (people, technology, information, etc.) organized in a manner that enables collaborative value creation, or value cocreation [3]. However, a full understanding of the value cocreation process has yet to be developed [3]; moreover, this understanding needs to be transformed into design tools in order to provide practical design support to KIBS professionals. Using a Design Science Research methodology, our work aims to identify generative mechanisms of value cocreation in KIBS and express them through a modeling technique that can support the analysis and design of service engagements in the domain of KIBS.
We propose to derive the modeling technique from Agent-Oriented modeling, in particular $i^*$ (short for distributed intentionality) [4]. $i^*$ offers a socio-technical perspective on organization and information system design, viewing people, organizations and technologies as actors that depend on each other to reach their goals. Such an approach can be contrasted with current service-specific modeling techniques such as Service Blueprinting [5] and a number of other process-based techniques. While these techniques support the design of service activities, they are unable to link activities to expected benefits and high-level interests of actors engaged in service relationships.

Beyond the contribution of the modeling technique to KIBS design, our work shows the strength of using a Design Science Research (DSR) Methodology in creating relevant design artifacts for a given domain. We use an extended DSR framework, which explicitly adds ‘understanding of the domain’ to the original ‘build’ and ‘evaluate’ research activities [6, 7]. This allows us to anchor our modeling technique in empirical data. Specifically, we are conducting a multiple-case study of service engagements in academic research and development services as a type of KIBS. The key mechanisms of value cocreation identified through the case study first lead to the development of a design framework comprised of identified generative mechanisms and resulting design-oriented questions. Our modeling technique is then adapted from $i^*$ and other techniques in order to both express generative mechanisms and help answer design-oriented questions of the design framework.

2 Research Problem and Objectives

As with many design problems, developing a modeling technique to support the design of Knowledge-Intensive Business Services (KIBS) involves addressing two nested problems: a knowledge problem and a practical one [8]. Core characteristics of KIBS are their knowledge intensity, the involvement of clients in production, and the relational nature of exchanges among providers, clients, and other actors [1, 9]; these characteristics need to be taken into account when designing for KIBS. Service is increasingly being understood as a process of collaborative value creation, or value cocreation [2]. Taken as a framework, value cocreation addresses these core characteristics through its focus on knowledge and skills and their embodiment in technology, on the collaborative process between provider and client, and by situating the creation of value in a wider value configuration space. However, a full understanding of the process of value cocreation has yet to be developed [3]. A better understanding of how value is cocreated in KIBS is thus needed before this framework can be used as a basis for their design.

The practical problem relates to transforming this understanding into tools that can support the design of successful KIBS engagements. Because of their communicative and analytical affordances, models are key service design tools. Many modeling techniques have been proposed in this regard, including Service Blueprinting [5] and a number of other process-based techniques. These service-specific modeling techniques focus on provider-client interactions and sequential activities; they are not able to express key concepts of value cocreation such as collaboration, subjective value