

Value cocreation modeling: supporting the analysis and design of B2B service engagements through agent orientation and business intelligence

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Abstract. Current modeling approaches for designing services do not address the characteristics of collaborative business-to-business (B2B) service engagements. Yet, these types of service engagements, for example R&D services and other knowledge-intensive business services, are key components of industrialized economies. We identify the requirements of a modeling technique able to support the analysis and design of these types of service engagements. We briefly describe Value cocreation modeling (VCM), a modeling technique fulfilling these requirements, with an emphasis on value cocreation. VCM draws concepts and constructs from *i**, an agent-oriented modeling language, and business intelligence modeling. We briefly illustrate the use of VCM in an R&D service engagement, discuss its limitations, and outline opportunities for future work.

Keywords: Service Engagements; Modeling Requirements; Value Cocreation Modeling; *i**; Business Intelligence Modeling

1 Introduction

Business-to-business (B2B) service engagements such as R&D services and information system outsourcing are often highly collaborative in nature; providers, clients, and third-party collaborators such as consultants in these contexts need to share knowledge, interact frequently, and jointly develop solutions for the latter to be successful. They are also driven by strategic concerns such as the desire for innovation and actors' long-term interests beyond a focal engagement. However, many of the current approaches for modeling services, for example Service Blueprinting [1] and other process-based techniques, focus on dyadic provider-client interactions and sequential activities, and do not address the strategic concerns that drive these activities. Other approaches, for example e3forces [2], do enable the expression and analysis of networked actors and their strategic concerns; however, because they typically focus

on exchanges among these actors rather than on collaboratively created outputs and outcomes. There is thus a need for service modeling approaches tailored to the collaborative and strategic nature of highly collaborative B2B service engagements.

Value cocreation modeling (VCM) is a modeling technique that has been developed to provide improved support to the analysis and design of highly collaborative service engagements. It draws and adapts constructs from i^* [3] and Business Intelligence Modeling [4] to address the characteristics and needs of these types of services. It has specifically been developed to address the characteristics of knowledge-intensive business service (KIBS) engagements. KIBS engagements such as R&D service engagements differ from other types of B2B services such as professional cleaning services by their knowledge-intensity, the active involvement of clients in co-producing the service, and the relational nature of interactions among providers, clients, and other network actors [5].

2 Requirements for Modeling KIBS engagements

Guided by the understanding that value is collaboratively created among actors in service engagements [6], as well as by empirical findings, requirements for a modeling technique supporting the analysis and design of KIBS engagements have been identified [7]. These requirements were derived from empirical studies of three cases of KIBS engagements that lead to the identification of two key processes of value creation in this context. The first process concerns the *alignment* of actors' interests, value propositions, and resources with the service's deliverables and outcomes. The second process concerns the *integration* of these deliverables and outcome as new resources in line with actors' respective interests.

The requirements encompass a descriptive dimension – the identification of each actor's high-level interests, value propositions, perceived benefits, organized resources, and deliverables – and an analytical dimension – the questions for design relevant to the processes of alignment and integration in KIBS engagements. The descriptive requirements reflect each individual mechanism found to be driving the two processes of value creation, while each analytical requirement corresponds to one relationship between two or more mechanisms. Thus, a modeling technique fulfilling these requirements should possess the ability to express each element enumerated above and the relationships among them, as well as help answer related questions for design. Questions for design focus on the following relationships among descriptive elements:

- Alignment of value propositions, perceived benefits (or risks), and high-level interests.
- Organization of resources to fulfill actors' value propositions.
- Evaluation of the parity of cost of resources and risks with importance of benefits.
- Actors' valuing of the quality of deliverables and collaboration processes in regards to their expectations.

- Actors' identification of outcomes from deliverables and collaboration processes, and their valuing of those outcomes if/when integrated as resources for their high-level interests.

3 Value Cocreation Modeling

Value Cocreation Modeling (VCM) was elaborated to address the requirements presented in the previous section. VCM draws concepts and constructs mainly from two existing modeling approaches: *i** [3] and business intelligence modeling (BIM) [4]. *i** is an Agent-Oriented modeling approach developed to analyze the strategic relationships among agents in a network in order to lead to informed choices about the social structures and role and functions of information systems able to support their interests and needs [3]. *i**'s ability to depict interdependencies between actors trying to reach their goals can be useful to express collaborative service relationships and activities. BIM is a modeling technique that supports the exploration and monitoring of business objectives and risks according to chosen performance measures; this is mainly achieved through the provision of constructs for modeling hierarchical goal structures as well as the performance of individual goals through performance indicators associated with them [8]. The construct "indicators" is of particular interest for VCM because it can be used to suggest the degree to which an actor is likely to commit to a service engagement, and to value its outcomes positively.

Each modeling approach from which VCM is drawn helps to address particular dimensions of the requirements. While an extensive review and evaluation of other potential approaches was conducted in order to arrive at this conclusion, it is not presented in this paper due to space limitations. *i** provides the necessary constructs to express most of the mechanisms that are core to processes of value creation in KIBS engagements; to organize mechanisms within and across actors participating in a service engagement; and, to visually evaluate the alignment of mechanisms within and across actors. For example, the concept of *actors* is used to represent actors engaged in, or relevant to, a service relationship. The constructs *resource goals*, *task goals*, and *softgoals* are adapted to express the mechanisms related to alignment of interests and resources among actors. While these constructs address many of the requirements related to analyzing alignment among actors, neither they nor the qualitative procedure typically used to evaluate *i** models can address requirements related to the cost/benefit evaluation done by actors in a service engagement, or those related to analyzing integration.

BIM offers constructs able to express the process of creating articulated deliverables; it also enables the modeling of actors' evaluation of the engagement within models. VCM thus adapts and integrates selected constructs from BIM to complement *i**. Specifically, the construct *indicator* is used to represent actors' evaluation of the cost of resources to fulfill their value proposition against the importance of the benefits they hope to gain, and the likelihood that actors will determine a positive value from the engagement. The BIM construct *process* is also adapted to represent deliverables from service engagements.

Figure 1 presents a generic VCM model showing how constructs from *i** [3] and BIM [4] have been used and integrated. The mechanisms that are key to the processes of aligning and integrating are identified on the left. Lines have been drawn between each mechanism to highlight which *i** construct is used to express each one; these lines have been added as a visual aid and are not part of VCM. The indicators drawn from BIM do not belong to any one area; rather, they should be understood in terms of the elements that they are attached to. For example, the indicators “Quality of the process” and “Quality of the deliverables” are linked to the element “Process of creating deliverables” (what is evaluated) and to the element “Perceived benefits” (what the process of creating deliverables is evaluated against). VCM thus enables the identification of each actor’s high-level interests, perceived benefits, etc., as well as the relationship among these elements and among actors. It also expresses dependencies among actors through the different types of *i** links, and through the differentiated evaluations of the same elements by different actors.

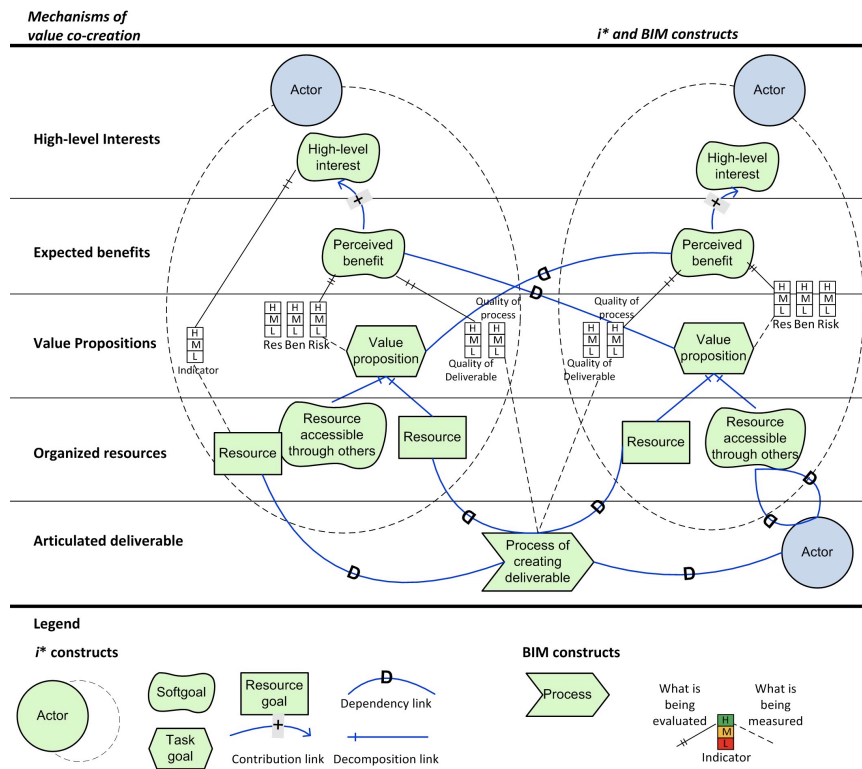


Fig. 1. Generic VCM model

Figure 2 presents a partial VCM model focused on the expression and analysis of the process of alignment. The content of the model is taken from a case study of a service engagement between a health education program in a Canadian college, a continuing care organization, and other parties. The engagement concerned the devel-

opment of a new curriculum for training health care aides (HCAs) on how to manage the behavior of clients with mental health diagnoses. Figure 2 focuses on the value propositions offered by each main actor (the college team for the project and the client’s managers) to each other, and the benefits that each actor expects to derive from the engagement. Indicators express the importance of risks, benefits, and resource costs perceived by each actor, as a means to evaluate their likely commitment to the engagement. It should be noted that the content of each element is expressed in terms of the mechanisms addressed by VCM rather than in the form that would be expected for i^* or BIM; for example, the task goal “Practical Training and Knowledge for HCAs” is expressed in terms of the college’s value proposition rather than as a task.

The model also helps to answer questions for analyzing alignment, for example ensuring that perceived benefits are aligned with high-level interests, that resources needed to fulfill value propositions are accessible for each actor, and that deliverables are identified and aligned with each actor’s interests. Using VCM before establishing a KIBS engagement could thus help to evaluate actors’ likely level of commitment and determination of value; this could then support KIBS professional in taking corrective actions as needed.

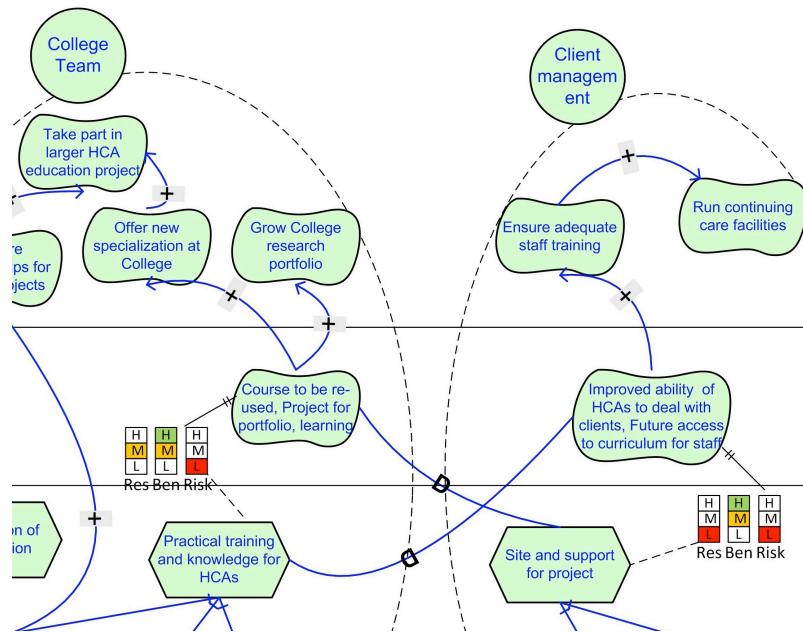


Fig. 2. Illustration of VCM for expressing and analyzing alignment in a case study

4 Contributions, limitations and future work

VCM contributes a novel approach to service modeling that addresses the specific requirements of knowledge-intensive, highly collaborative B2B service engagements.

It thus has a clear scope of applicability, in contrast to many other service-specific modeling approaches that have been developed for services as a general sector. This brief presentation of VCM and the way in which it was created also demonstrates that the concepts and constructs offered by existing modeling approaches such as *i** and BIM can be adapted and integrated for new domains. In the case of VCM, this has entailed identifying requirements from empirical studies to ensure that the choice, adaptation, and integration of constructs followed a more rigorous and traceable path than what might have been achieved through, for example, illustrative examples.

This focus on domain requirements has however led to a restricted use of both *i** and BIM. Indeed, while the use of *i** and BIM constructs complements each other and allows VCM to address most of the requirements derived from the design framework, they are used in a restricted manner within VCM. For example, the *i** task goal construct used to express value propositions was not used to its full expressivity within VCM; indeed, since a task can be decomposed into other tasks in *i**, it would have been possible to relate all value propositions within an actor to a central one that this actor wants to accomplish. Doing so would have facilitated the use of *i**'s qualitative evaluation procedure, which requires all elements to be related to others within an actor [9]. Further development of VCM, in particular through its application in real-life setting, may reveal the need to integrate some of these constructs to facilitate reflection, communication, or decision-making.

5 References

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