Towards a Reference Model of Business Model & Business Process Management Alignment

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Abstract. Due to the lack of understanding business processes, the goal of our research is a consistent modeling of business models and business processes. Consistency is necessary to visualize and enhance the contribution of business processes to the value chain. In respect to prior work of analyzing existing enterprise architectures, as well as the examination of existing business model representations, the paper presents the development and basic features of a reference model. Its goal is to provide a consistent modeling of business- and business process models. The reference model addresses an improved business processes management (BPM). Improvement lies in the value contextualization of business processes to show the contribution of business processes to the business models' goals. Finally, the designed reference model builds the foundation of a further evaluation.

Keywords: Reference Modeling, Business Models, Business Process Management

1 Introduction

Business Models are not used as an isolated artifact. Monitoring and controlling the realization of the business models goals is required to increase the value of a company [1], [8]. While the business model perspective describes the creation and exchange of value in market activities, the business processes perspective addresses the realization of value in process activities. Furthermore, design, execution, and control of business models as well as business processes are enabled by Information Systems (IS) [1]. However, the execution and control function of IS requires consistency between the business model and process model level. Consistency means that specifications of the physical value transfer in the business model perspective are existent in the business process perspective, which represents the coordination of inter-organizational activities. The motivation to achieve consistency is reasoned by the lack of consistent integration of business processes to their business models [5]. In fact, there are several IS solutions such as the *Architecture of Integrated Information Systems (ARIS)*, *Business Engineering Navigator (BEN)*, or the *Design & Engineering Methodology for Organizations* (DEMO) addressing consistency. However, consistency is not achieved, yet [6]. Furthermore, consistency is getting into the focus of the current research: While Pijpers and Gordijn [13], Weigand et al. [18], or Zlatev and Wombacher [19] have emphasized the consistency in context of modeling, vom Brocke et al. [17], and Bolsinger et al. [1] have developed two approaches for a value-oriented business process modeling. Consequently, there are two main directions. On the one hand the alignment of business model and business process model; On the other hand, the enrichment of business process models with value based information, such as economic- and budgeting oriented key-figures. Based on former research on business model evaluations and the

examination of various existing IS solutions concerning business model consistency, the goal of this paper is to present a reference model that provides a recommendation for action and enable a business model driven Business Process Management (BPM). It means that the business model provides economic context information to enrich business process models semantically.

2 Research Framework of the Reference Model

The design of the reference model is the result of an inductive process. Therefore, the reference model sets the bar to a further deductive process of evaluation. In order to design the reference model, the first step builds the inductive process of analyzing existing business models. The analysis bases on prior research of Buder and Felden [3], [4], [5], [6] and was divided into three parts: First, the analysis has started with the evaluation of existing enterprise architectures, enterprise models, business models, and business process models. The goal was to examine the ability and appropriateness of existing solution concerning the consistency and integration of business models in business process models and BPM. Based on the results of a missing appropriate solution, a semantic BPM approach was propagated to close the conceptual gap between business models and business process models. However, a semantic approach requires a detailed understanding of both modeling levels. Because business model representations build the ontological base for a semantic annotation, the understanding of business models is essential for a meaningful implementation. Therefore, the second step has founded on model theory in order to analyze the expressiveness of business model representations. This requires the analysis of modeling grammars and user perceptions. As the result of a business model evaluation, the *e³value* modeling [8] language and the *Resource Event Agent* (REA) [10] model representation were examined. While the ontological analysis of modeling language constructs has shown that REA modeled with *UML* class diagrams has advantages concerning expressiveness [5], the evaluation of *e³value* and *REA* of user perceptions based on the Method Evaluation Model [11] did not show significant differences [6]. The result of the evaluation is that both models provide an appropriate expressiveness to enhance the understanding of business models.

Based on the results of the inductive process of analyzing business models, the second part builds the deductive process of developing and evaluating a reference model. According to Fettke and Loos [7], a reference model builds a theorem. Its main goal is to provide a recommendation of action and reuse in instantiated applications [2]. Moreover, building a reference model requires a well-defined method. The term “well-defined” in this context means that a well-defined syntax and a formal semantics are used. The theoretical specification of the reference model design builds the *Meta Object Facility* (MOF) [12] to provide a modular, modifiable, and reusable framework considering an object orient paradigm [14]. Therefore, the functional specification refers to the application context, i.e. which modeling method and modeling languages are used. Figure 1 presents the reference model context considering the two phases of reference modeling. Figure 2 classifies the reference model into the MOF level in order to specify modeling method and language.

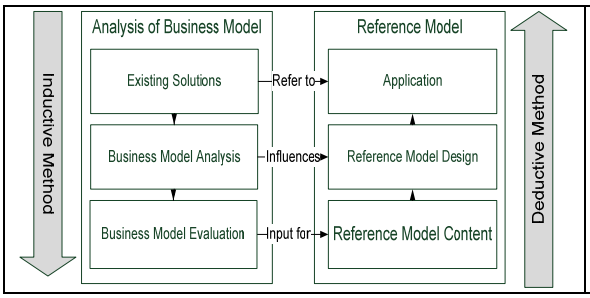

Fig. 1. Reference Model Design

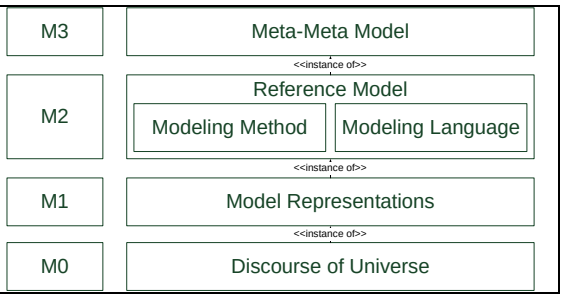

Fig. 2. Functional Specification

In conclusion, the reference model itself is the result of the former analysis of business models. Moreover, the design of new modeling languages leads to a modeling overhead and hinders integration. Instead, semantic technologies seem to be appropriate to combine both modeling levels. Moreover, modeling designers and users are neither confronted with new, cost excessive architectures nor modeling methods. Finally, the bases to enrich business process semantically with value context information requires approved methods, such as the *Value Object Analysis* [18] and the *REA driven business process management* [3,4]. Therefore, it becomes obvious that the understanding of business model representation is essential to achieve value-oriented BPM.

3 Reference Model

The inductive process has shown that a consistent modeling of both perspectives does neither require new modeling approaches nor modeling architectures. Instead, the evaluation has shown that different kinds of users understand the examined business model representations of *e³value* and *REA.* Therefore, the designed reference model addresses a loosely coupled infrastructure and uses the semantic based technologies to annotate business processes with context information. Therefore, the reference model consists of four different components. The modeling of business models and business processes is independently and allows the use of different modeling languages. While modeling is only the first step of a design or analysis project, the second step builds the formalization in model representation ontologies as an "*explicit specification of a conceptualization*" [9]. Formalization is necessary to provide a semantic annotation based on consistency methods. The semantic annotation component is the key to enable an analysis of business process models in the context of value. While the functional annotation process bases on the approaches of [4], [13], [18] **[**19], the technical annotation process bases on the semantic BPM framework of Thomas and Fellmann **[**16]. Figure 3 represents the single components:

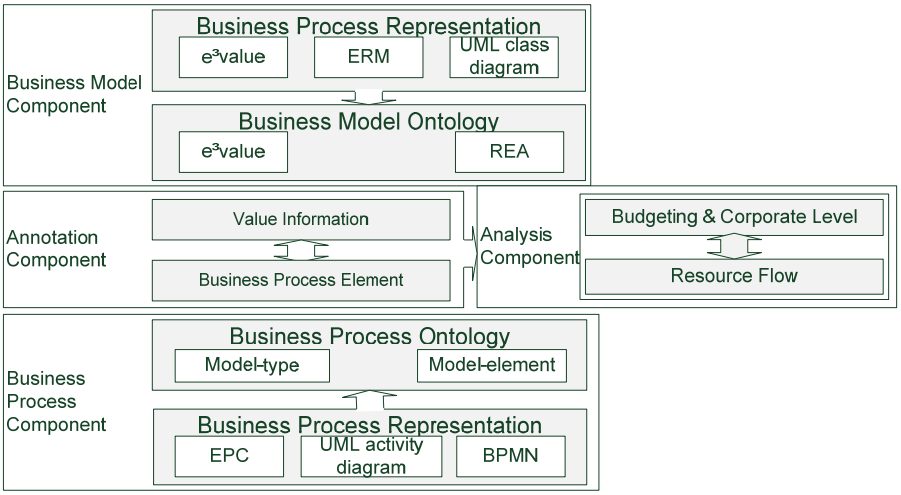

Fig. 3. Reference Model

The result of the annotation provides context information that is used in the analysis component. The contribution of an enhanced analysis is the enrichment of processes beyond activity based costing. It means that it helps users to identify revenue and cash inflows of processes and their contribution to the value of a company. Moreover, the identification of processes and process activities enhance the identification of reference objects of a purpose neutral accounting [15]. Therefore, the reference model contributes also to improved decision making from the accounting perspective. Finally, the reference model provides an architecture enabling the use of open-source tools. It addresses minimized additional cost and allows the use of existing BPM solutions.

In conclusion, the paper presents the development of the reference model for a business model driven BPM. The development builds an inductive process of examining existing solutions and business model representations. The reference model itself constitutes a theorem that has to be tested in a deductive process. Concerning the reference model, its contribution is to get a consistent view on business models and business processes. The goal is to provide facilitated information about cost and revenue structures and value contribution of one or more business processes to their business model.

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