Comparative Analysis of Contemporary Modeling Languages Based on BPM4KI Meta-Model for Sensitive Business Processes Representation

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ABSTRACT

This article presents a set of Sensitive Business Process (SBP) modeling requirements and proposes a multi-criteria evaluation framework to appraise the expressiveness of currently widely used business process modelling formalisms to select the most suitable for SBP representation. The modelling of SBPs, be they process oriented or knowledge oriented, presents special requirements dictated by several factors: the highly dynamic complexity and flexibility of the processes; the high number of critical activities requiring intensive acquisition, sharing, storage and (re)use of very specific crucial knowledge; the specificity and diversity of information and knowledge sources; and the high degree of collaboration and interaction (intra/inter-organizational) among participants (who apply, create and share a great amount of very important tacit organizational knowledge, in order to achieve collective objectives and create value). As SBP models get more complex, the selection of the appropriate modeling formalism gains in importance to improve the identification of crucial knowledge that is mobilized and created by these processes. Furthermore, the result of the evaluation led us to justify the choice of the better one positioned nowadays, the standard BPMN 2.0. Besides, the authors have illustrated the practical applicability of this specification on a medical process in the context of the organization of protection of the motor disabled people of Sfax-Tunisia.

KEYWORDS

Business Process Modeling, Comparative Analysis, Core Ontology, Knowledge Management, Modeling Formalisms, Sensitive Business Process

1. INTRODUCTION

The necessity to formalize and manage knowledge produced and used in organizations has rapidly increased in the last few years. To improve their competitive advantage, organizations have been increasingly conscious of the necessity to formalize and capitalize knowledge produced and mobilized by their Sensitive Business Processes (SBPs). Accordingly, Business Process Modeling (BPM) has become a crucial concern for successful organizations seeking to improve the identification, acquisition, storage, dissemination, sharing, creation and re-use of their individual and organizational knowledge.

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Considering the large amount of knowledge to be preserved and enhanced, modern organizations must first identify and model the SBPs which are likely to mobilize and capitalize on crucial knowledge. In fact, the more an organization’s BPs are sensitive to crucial knowledge, the more it should mobilize the use of its crucial knowledge. There is relatively little research on Knowledge Management (KM)-BPM focusing on the identification, analysis and modeling of SBPs in able to localize and identify crucial knowledge. Notable examples are:

- The Global Analysis Methodology (GAMETH) proposed by Grundstein (Grundstein, 2000);
- The identifying crucial knowledge methodology proposed by Saad (Saad et al., 2009); and
- The Sensitive Organization’s Process Identification Methodology (Turki et al., 2014).

However, these methods do not explicitly and conveniently address the critical operation of “SBP modeling.” A SBP typically lacks a description and a representation that allow to explicit the rich semantics embedded into a SBP. So, the specification of a precise conceptualization, with a subjacent representation notation, that explicitly and adequately integrates the knowledge dimension within SBP actions and other relevant SBP aspects, is still an open issue. In fact, a SBP has its own characteristics that distinguishes it from classical BPs. In fact, a SBP commonly mobilizes a high number of critical activities with very specific knowledge—crucial (tacit and explicit) knowledge. It is genuinely knowledge, information and data centric and presents a diversity of knowledge sources. Besides, it possesses a high degree of dynamism in the realization of its objectives, and high complexity. So, choosing the appropriate modeling formalism for SBP modelling has become a difficult task because of the availability of a large number BPM languages and notations and due to the lack of helpful guidelines on evaluating and comparing formalisms when selecting the most appropriate one.

Some examples of conventional graphical BPM formalisms that have been adapted to allow the representation of the intrinsic elements of knowledge within BPs include:

- The Specification Language (PSL) (Schlenoff et al., 2000)
- (Extended) Event-driven Process Chains (eEPC) (Korherr et al., 2006) (ARIS Expert Paper, 2007)
- Role Activity Diagram (RAD) (Weidong and Weihui, 2008)
- The Process Business Process Modelling Ontology (BPOM) (Cabral et al., 2009)
- The UML 2.0 Activity Diagram (OMG, 2011)
- Business Process Modeling Notation (BPMN 2.0.2) (OMG, 2013)
- Case Management Model and Notation (CMMN) (OMG, 2016)

The above languages and notations do not however include all the required features to describe a SBP.

Some authors have proposed to develop process-oriented knowledge modeling approaches in which the basic phenomenon is knowledge. These include:

- DECOR (Abecker, 2001)
- CommonKADS (Schreiber et al., 2002)
- PROMOTE (Woitisch and Karagiannis, 2005)
- GPO-WM (Heisig, 2006)
- Knowledge Transfer Agent (KTA) Modeling Method (Strohmaier et al., 2007)
- The work of Donadel (Donadel, 2007)
- DCR Graphs (Hildebrandt and Mukkamala, 2010)
- Knowledge Modeling Description Language (KMDL 2.2) (Gronau et al., 2005; Arbeitsbericht, 2009)
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