Towards the Meta-Modeling of Complex Inter-Organisationnel Collaborative Processes

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ABSTRACT

Enterprises are progressively embedded in business to business atmospheres, in order to achieve their common business objectives. Such collaborations lead to Inter-Organizational Business Processes. Therefore, IOBP modeling involves new challenges, mainly the ability to deal with autonomy, privacy, heterogeneity. As a contribution in this area, a IOBP meta-model was designed. This model takes into account the maximum concepts related to the collaboration. Where, the process is complex, and its model in a global way affects its vision and complicates its implementation and hence the idea of its analysis into sub-IOBP to reduce the complexity of the global collaborative process, to streamline information exchange and to facilitate the understanding of the process by partners. A set of Atlas Transformation Language (ATL) transformation rules has been defined to convert Unified Modeling Language (UML) models to Business Process Model and Notation. Finally, the application of our approach has been demonstrated through a framework which can solve the problem of generic IOBP.

KEYWORDS

ATL, BPMN, Collaborative Process, Inter-Organisational Collaborative Process, Inter-Organisational, MDA, Meta-Modeling, UML

INTRODUCTION

Nowadays, the organisations operate in a dynamic environment that is increasingly scalable, competitive and requires technological development. It has become almost impossible for organizations to evolve individually. In this regard, these organisations need to collaborate in order to meet market requirements, ensure their survival and improve the quality of their products and/or services. Collaboration between organisations usually takes the form of resources, services or knowledge sharing which is done between their different business processes. The business process approach has expanded to describe and manage relationships between multiple organisations (Rafik et al., 2017). This collaborative process must be beneficial but also well planned, so that partners engage in the collaboration and seek to maintain it. As a result, it must be well modeled. It is referred to as the inter-organisational collaborative process.

Process modelling has many benefits for organisations seeking to improve their performance (Andres et al., 2018). It facilitates the communication between organisations, allows the alignment between strategy and operation for a better governance, allows the control and improvement of

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processes and sub-processes for a continuous progress of the organisation’s overall processes as well as optimizing the automation of activities in order to facilitate the collaboration between functional structures of the same or different organisation(s) (Bauche, 2010).

A thorough review of research studies, conducted in this domain last decade, focusing on the inter-organisational collaborative process modeling was performed. Collaboration is found to be a very complex system which is constantly evolving resulting in higher complexity in modeling the collaborative process itself.

Collaboration modelling as well as the collaborative process modeling have attracted interest of researchers whose works aimed to solve issues in the modeling.

By defining an inter-organisational and contractual specification language using Protegé, which they named eSourcing, the authors in (Norta et al., 2015) focus on the automation of socio-technical collaboration between companies. A formal approach was proposed by Authors in (Eshuis et al., 2016) for the purpose to support suppliers decision on whether or not modifications of private internal process will be spread to its public view; and in case it does, how can the internal process and its view remain coherent. In the work of (Narendra et al., 2016), the authors focus on the virtual enterprises (VE) modeling issue; they proposed a conflict ontology to implement a three-steps approach that aims to: 1) conflict detection; 2) discovery of the conflict type and the implementation of an appropriate negotiation; and 3) conflict resolution strategy. The work in (Norta, 2015) focused on model verification methods. The authors used an association of formal semantics and graphic notation to evaluate a smart contract model which manage collaboration across organizations. The authors in (Eshuis et al., 2015) propose a Business Process Execution Language (BPEL) specification to support services subcontracting collaboration type in which a company plays the role of service provider, as part of its business processes.

Although these research work have contributed a lot for collaboration modeling and management, with the rise new technologies as well as environments new issues emerge and flexibility in modeling becomes required; the proposed techniques and models face limitation in their implementation. This flexibility and reuse ability (Coleman et al., 2008) is highly guaranteed by Model Driven Architecture (MDA) (Miller et al., 2003). The aim of the project in which the present work is inserted is to transform the collaboration knowledge regarding collaboration environment, partners, goals, etc. to inter-organizational collaborative process model using the Model Driven Architecture. To do so, we are interested in research based on MDA, such as (Villarreal et al., 2007) (Lazarte et al., 2010).

The author in (Touzi, 2007), proposed to generate a Collaborative Information System (CIS) through transformation of models. According to (Touzi, 2007), partners can collaborate through their Information Systems (IS). This system emphasizes the combination of different partners IS in a single system. In this work, author proposed an approach that transforms the Business Process Modeling Notation (BPMN) (OMG 2011: http://www.bpmn.org) (Chinois et al., 2012) collaboration process into a collaborative information system represented in Unified Modeling Language (UML) (OMG 2010: http://www.uml.org) (Muller et al., 2000). It assumes that the organizations involved can provide the collaborative process model.

An ontology-based approach for the design of CBPM was introduced by (Rajsiri et al., 2010), this CBPM was considered as specific of needs in order to develop a collaboration information system (CIS) for network of organizations. A knowledge-based system (KbS) was developed comprising three main parts namely: knowledge gathering, knowledge representation and reasoning, and collaborative business process modeling. In addition, the theoretical aspects of each part of this KbS was presented and discussed as well as the tools was developed in order to support its functionalities.

(Hoyer et al., 2007), proposed a concept for transforming internal private processes to publicly visible processes in a semi-automatic way. This transformation is made by hiding the modelling complexity from the users, and evaluated on the basis of Event-Driven Process Chains (EPC) for private process view and the Business Process Modelling Notation (BPMN) for public process view.
Gender Divide in the Use of Internet Applications
[www.igi-global.com/article/gender-divide-use-internet-applications/1839?camid=4v1a](www.igi-global.com/article/gender-divide-use-internet-applications/1839?camid=4v1a)

Sources of Trust and Consumers' Participation in Permission-Based Mobile Marketing
[www.igi-global.com/chapter/sources-trust-consumers-participation-permission/19553?camid=4v1a](www.igi-global.com/chapter/sources-trust-consumers-participation-permission/19553?camid=4v1a)