Methods for the Analysis of Supply Network Processes at European SMEs

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Abstract. Business Process Modelling (BPM) is a well-understood method to analyse enterprise processes. As today more and more essential processes are conducted across the enterprise borders, this induces additional challenges in terms of different languages, process types and ontology. This paper indicates techniques which support such cross-enterprise BPM. The work reported has been conducted in three company networks including SMEs within different European regions, identifying potentials and constraints for a more sophisticated supply chain control.

1 Introduction

The SPIDER-WIN project (with financial contribution of the European Commission, IST Project 507 601) [1] aims to achieve efficient, simple and context-aware SME co-operation in supply networks with low-level local software requirements, focussed on the exchange of order status changes. This is achieved by an ASP platform with asynchronous data exchange between the platform and the enterprises.

In order to prepare the definition of the required functionalities and interfaces, three supply networks from different European regions have been analysed. In the *preparation phase*, reference models and documents have been developed as the base for the local studies. In the *analysis phase*, similarities between the different workflows have been identified.

2 Modelling Techniques Applied

Due to the process orientation of the project's subject, a process oriented approach is required. Therefore, the Integrated Enterprise Modelling (IEM) Method [2] has been applied. Through the object oriented approach of the IEM the use of reference classes is very efficient, simplifying the task of defining common terms, structures and attributes.

Reference models are a very efficient means to increase the efficiency of modelling, to raise the quality level of the developed models, and to improve the reusability of the models. Such reference should include class structures, template models and a manual which describes the correct and efficient use of the reference models as well as the validity and constraints of the model [3]. Especially for distributed systems,

where different persons perform the modelling task at different locations, reference models can improve the work, significantly [4]. The Supply Chain Operations Reference Model (SCOR) is a reference model, too, as it incorporates additional elements like standard descriptions of processes, standard metrics and best-in-class practices [5].

Before starting interviews, a *reference model* based on IEM methodology and SCOR terminology was developed, in order to guarantee that all information and requirements detected can be systematically documented within one single, consistent model. A *Guideline Document Suite* includes a description of the processes, variables and metrics to be considered as well as supporting documents and document templates. The guidelines supported the structure and completeness of the interview as well as the comparison of the results from the different supply networks.

3 Results

First, the single company models have been established. They have then been merged to models of the three different supply networks, thereby identifying additional potentials and challenges at the company interfaces. In total, 103 sub-models ("levels") have been established, with a total of 1852 process elements.

Based on the study results, a "general model" of the as-is-situation could be extracted from the three network models, which describes general and specific process elements, systematically documented within one single, consistent model. It contains the SCOR compliant process names, specific "information categories", relations between processes and information categories and further application rules. Therefore, by comparison of a specific supply chain model with the general model, the specifics of the supply chain can be identified.

The study has demonstrated, that a well-adapted reference model is an important base for the conduction of cross-enterprise business process studies. The IEM Method turned out to be a very efficient means for this purpose, allowing to switch the terms between two languages (the native interview language and English). The reference class trees significantly improved the development of models with comparable structures, without urging the interviewers into pre-defined processes. SCOR was a good base to establish common understanding between the coaches.

References

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