A Method for Modeling and Analyzing Business Processes for Knowledge Carriers

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Abstract Driven by external changes, organizations have to adapt and improve their business processes more often and at short notice. Thus, there is a need for effective and efficient methods for business process management. The modeling and analysis of existing business processes thereby represents the basis for the subsequent adjustment process and is significant for its later realization. Existing and current approaches attempt to support the modeling and analyzing of the processes in order to make them more effective and efficient in many different ways, for example through the definition of more extensive languages, new perspectives, or by developing new supporting software systems. Nevertheless, the modeled processes often do not comply with the expectations of the parties involved. Unlike the existing approaches, the presented method should allow to shift the modeling process towards the knowledge carriers, so that workflows and business prcesses can be modeled more precisely.

1 Motivation

Organizations are increasingly influenced by external conditions and changes such as the global competition, complex business models and greater customer focus, and must respond flexibly to them. Therefore, specific strategies and flexible business processes are needed to adapt quickly to continuously changing internal and external conditions. Usually business processes are modeled, analyzed, adjusted and established iteratively in the company. A major challenge is to make this "process of change" manageable. Different methods, tools and techniques have been developed in the field of business process management to support the change process. When modeling a business process, the manual and (semi-)automatic activities, which are carried out by and with specific resources for a particular purpose, are documented [9].

The strategies of most existing approaches attempt to use the implicit knowledge of the resources involved in the modeling and adjustment processes. This is usually done through a process analyst, who observes knowledge carriers during their work and asks questions about their activities. To successfully complete this process step, the process analyst must have a lot of knowledge about the methods, models and languages of business process modeling.

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Apart from the obvious problems that occur due to the continuous observation of the process participants, a lack of knowledge about the activities can lead to inaccurate or incomplete business process models [7].

2 Solution

Thus, the here presented idea is to shift the modeling activities towards the knowledge carriers, because only the knowledge carriers themselves have complete information about input, sequence and output of their own activities. The paper proposes a new method for modeling business process through knowledge carriers.

In order to enable the knowledge carriers to model their own processes without having the knowledge of the process analyst about business process modeling techniques, the modeling process needs to be supported by a software system in a way, that the knowledge carriers are capable to model their business processes in an appropriate form on their own. To achieve this goal, the following three major research questions have been identified:

1. What information must be retrieved from the knowledge carriers in order to yield significant process models?

Similar to classical methods (e.g. the expert interviews), information about required resources, people involved in the process and the intermediates and final products must be identified.

2. How can a process model be created without knowledge about modeling languages and modeling patterns?

The method used to answer research question 2 combines three techniques:

- First, the knowledge carriers get a set of requirement templates for the corresponding modeling patterns, which enable them to describe their activities in natural language. The natural language is restricted to the syntax of the requirement templates.
- Secondly, a software tool receives the sentences, created with the help of the requirement templates. The sentences can be typed in or can be recorded and analyzed by a voice recognition tool. The (recognition) tool then transforms the sentences into the corresponding modelling patterns used in the process model.
- Thirdly, to avoid errors, the tool displays both the entered text and the recognized patterns. Using this approach, every knowledge carrier models only his own activities. The ability to know and use a modeling language is not required at all. Techniques from the field of Natural Language Processing, a formal model for the pattern transformation, and software engineering design principles are used to achieve this goal. This technique aims abstract process models for documentation.

3. How can the process models be analyzed?

The idea is here to use a formal object model for roles, resources, intermediate and final products. Based on this model, an algorithm should be able to link the created process models with each other semi-automatically using similarity-based analysis methods. This enables the business process analyst to identify higher-level business processes and analyze these on schema level.

3 Conclusion

The paper proposes a new method for modeling and analyzing business processes through knowledge carriers. The topic as such is not new and subject to various types of research. The paper proposes using natural language processing techniques to transform domain knowledge text into abstract process models. The presented method should increase the information content of the business process models of an organization and thus the documented process knowledge, too. Problems of classical process documentation should be reduced through the simplified modeling and analysis process. Moreover, it is conceivable that the total cost of process modeling and analysis can be reduced by this method, and thus the demand for better methods and shorter adaptation cycles is fulfilled. This can be a costeffective support for change processes for small and medium sized enterprises.

4 Related Work

Existing and current approaches attempt to improve the modeling and analyzing of business processes in several ways.

Some, for example, present a more extensive language to standardize basic processes through new symbols in the process model [10]. In fact, some evaluations describe this approach as making the modeling process even more complex through too many rules and symbols [11].

Another approach is to discover business processes from other sources than the knowledge carriers. With Process Mining [1] it's possible to discover business processes from log files. But the prerequirements to make Process Mining work are not always fulfilled. For many Use Cases, when information is only available from knowledge carriers, Process Mining is not practicable.

Fleischmann [2] changes the point of view on the business process. He places the subject into the center of the modeling process and discovers inputs and outputs from this point of view. But still much effort is necessary to interview the knowledge carriers and model correct business process models.

Other research groups develop lightweight and agile software systems [12,6] to provide a more effective and efficient process modeling, which is the right way from our point of view.

One more approach is, to bring process modeling experts and knowledge carriers on one table like [8,5].

But in contrast to our approach, none of these try to really give the knowledge carriers the ability to model business processes independently. Shifting the modeling activities towards the knowledge carriers and making the interviewing and observing process unnecessary is the central idea of our approach. Research in the field of Natural Language Processing like [3,4] enables this method.

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