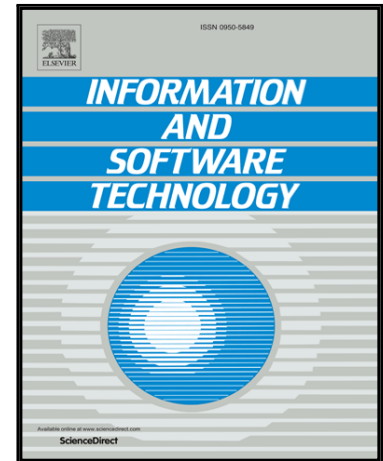


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# A Method for Generation and Design of Business Processes with Business Rules

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## Abstract

*Context:* Business Processes provide a universal method of describing operational aspects of business. Business Rules, in turn, support declarative specification of business domain knowledge. Although there is a difference in abstraction levels between these both modeling techniques, rules can be complementary to processes. Rules can be efficiently used to specify process low-level logic, while processes can serve as a procedural specification of the workflow, including the inference control.

*Objective:* One of the research problems in this area is supporting business analytics in the modeling of processes integrated with rules. Such a support can take advantage of new design method for such models.

*Method:* We describe a model of procedural Business Process as well as the model and method of creating Attribute Relationship Diagrams. Based on these two representations, we provide a formalized model combining a process model with rules. Using these models, we introduce an algorithm that generates an executable process model along with decision table schemas for rules (rule templates for rule sets grouped in decision tables).

*Results:* The paper provides an automated approach for generation of Business Process models from Attribute Relationship Diagrams. The approach was evaluated based on the selected benchmark cases, which were deployed and tested in the provided modeling and execution environment for such integrated models.

*Conclusion:* The paper presents an efficient and formalized method for design of processes with rules that allows for generating BPMN models integrated with the rules from the Semantic Knowledge Engineering approach. Such a model can be treated as a structured rule base that provides explicit inference flow determined by the process control flow.

*Keywords:* Business Process Modeling, Business Rules, Process with Rules Integration

## 1. Introduction

Business Process Management (BPM) [1, 2] is a holistic approach for improving organization's workflow in order to align processes with client needs. It focuses on reengineering of processes to obtain optimization of procedures, increase efficiency and effectiveness by the constant process improvement.

In this approach, a Business Process (BP) can be simply defined as a collection of related tasks which produces a specific service or product for a customer [3]. Models of BPs are intended to be a bridge between technical and business people. They are simple and visualizations make them much easier to understand than using a textual description. Thus, modeling is an essential part of BPM. For the purpose of this paper, we focus on procedural process models [4].

Since a properly designed model should not require major changes or enhancements, it is important to provide an efficient modeling approach. According to Friedrich et al. [5], the acquisition of process models can consume up to 60% of the time spent on process management projects. It is so because BPs are mostly modeled manually by a designer. This time can be shortened if models are generated automatically.

Another important aspect of Business Process Management

is Business Process Enactment [2]. It focuses on executing BP models in order to support BPM with the IT system. In practice, manually designed process models have to be complemented with additional configuration and implementation in order to be executed in the BP runtime environment.

Although processes provide a universal method of describing operational aspects of business, detailed aspects of process logic should be described on different abstraction levels. Business Rules (BR) can be successfully used to specify process low-level logic [6, 7]. What is important, the BR approach supports the specification of knowledge in a declarative manner.

There is a difference in abstraction levels of BP and BR; however, rules can be to a certain degree complementary to processes. BR provide declarative specification of domain knowledge, which can be encoded into a process model. On the other hand, a process can be used as a procedural specification of the workflow, including the inference control [8].

The use of BR in BP design also helps to simplify complex decision modeling. Although rules should describe business knowledge in a formalized way that can be further automated, there is no common understanding how process and rule models should be structured in order to be integrated [9].

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