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Measuring Information Content Change in EPC to BPMN Business Process Model Transformation

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ABSTRACT

Business process models are components of efficient and structured management of organizations and enterprises. There are different incentives to model business process in enterprises. Nonetheless, creation and maintenance of business process models requires significant effort by the enterprise or organization in terms of personal resources, time and costs (Tscheschner 2006). Therefore, process models constitute a valuable asset for the enterprise that needs to be preserved and maintained.

Numerous modeling notations were designed to capture different process aspects for process documentation and visualization. One of the popular modeling notations for business process modeling is the EPC (event-driven process chain). More recently, due to the movement towards international collaboration between enterprises and the need for a common modeling language, Business Process Modeling Notation (BPMN) has been developed and standardized. Being an international standard, BPMN is gaining importance in the context of international collaboration between enterprises. Hence, enterprises that have put the effort to model their processes using EPC and are supposed to change to BPMN due to the external or internal incentives need to address the question what effects will the process transformation to BPMN have. This is the research question of this paper: Does information content change when a business process model designed in EPC is remodeled in BPMN? A subsequent question that arises is: which of the two process modeling notations provides the more information efficient process representation?

This research addresses these questions by analyzing changes in the information content of the model that are induced by structural transformation between languages using information theoretical approach. Applying the definition by (Hartley 1928) and (Shannon 1948), information is considered here as a technical unit. Its content can be quantitatively perceived based on the ideas of information transmission. This notion allows not only to quantify the information content of a message, but also to define data or elements that are redundant as their occurrence does not add any additional or unexpected meaning to the message perception. (Hartley 1928) considered communication as an exchange of symbols that belong to a specified set and are enriched by a semantic meaning that is known to the communicating parties. Shannon enriched this approach by introducing the probabilistic view on information. He defined information as the probability of certain sequences of elements from a defined set. In this paper the set of symbols is the set of elements of the modeling notation under consideration, i.e. EPC and BPMN. The message is the business process model. Here an empirical analysis of 30 business process models that were modeled using EPC and then transformed to BPMN (version 1.2) are analyzed using accordant hypothesis tests.

Empirical results presented here show that the hypothesis that transferring business process descriptions from EPC-notation in BPMN does not significantly affect its information content could not be rejected, iff the transformation is performed according to the original model, i.e. the aspects covered (mapped) in the original model are re-modeled using the new notation. This result indicates that the difference in the information content of the original and the transformed model is present but not significant. Furthermore, analysis results indicate that EPC is providing a more information efficient alphabet (i.e. set of modeling elements) than BPMN, whilst BPMN provides a more efficient use (i.e. modeling guidelines) of the elements for information content representation. Diversity of used EPC-alphabet elements resulted also in decline of information content per alphabet element used, thus reflecting the findings by (Recker et al. 2009).

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