

Lecture Notes in Business Information Processing

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Integrating Business Process Models and Rules

Empirical Evidence and Decision Framework

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This book is a revised version of the PhD dissertation written by the author at the School of Information Technology and Electrical Engineering of the University of Queensland, Australia.

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To my beloved parents and relatives
谨以此书献给我亲爱的父母和亲人们

Preface

This book encompasses a revised version of the PhD dissertation written by the author, at the School of Information Technology and Electrical Engineering of the University of Queensland (Australia). In 2018, the PhD dissertation won the “CAiSE PhD Award,” granted to outstanding PhD theses in the field of information systems engineering.

Over the past two decades, the need to model business rules in an integrated manner with business process models has been argued theoretically as well as validated empirically, and a variety of integration methods have been developed. However, several open research questions remained.

First, while researchers have argued that integrated modelling of business process models and business rules can improve user understanding of business processes, this proposition has neither been theoretically analyzed nor empirically evaluated. Second, there are situations in which a business rule is better modelled independently of a business process model, but also situations in which it is more appropriate to integrate the rule with a business process model. An important aspect of integrated modelling is the understanding of such situations and how they influence business rule representation.

To address these open questions, the research has the following three objectives: (1) theoretically analyze and empirically evaluate if and when business rule integration can improve business process model understanding, (2) identify and evaluate factors that will influence the decision of whether or not a business rule should be integrated with a business process model, and (3) develop a decision framework that guides modellers on whether or not, and if so how, to integrate a business rule with a business process model. Accordingly, three studies were carried out to fulfill each of these objectives.

The first study is an experiment empirically evaluating whether business rule integration can improve business process model understanding. This study used an experiment investigating the effect of process model understanding of a specific rule integration approach, rule linking, which uses graphical links to connect process model symbols with rules. We used traditional measurements to test the understanding performance and used neurophysiological measurements to observe the cognitive load and other cognitive behaviors. The study results showed that rule integration via rule linking can improve the understanding of process models, thus empirically evaluated the arguments of rule integration introduced in Chapters 1 and 2, and provided motivation for the second study.

The second study is an exploratory study identifying and evaluating factors that influence the decision of whether or not a business rule should be integrated with a business process model. In Study 2, a systematic process of identification of factors that are thought to influence the integration decision was conducted. A systematic literature review was conducted to identify these factors, resulting in 12 factors being identified.

The evaluation, via a survey with experts, resulted in the identification of four factors that affect the integration decision.

The third study follows a design science research to develop a decision framework that guides modellers on whether to integrate a business rule with a business process model. The decision framework is designed based on the synthesis of literature and insights from Study 1 and Study 2.

This book combines multiple research methods, experiment, survey, and design science, as well as traditional measurements and neurophysiological techniques that can capture a variety of cognitive behaviors in human information processing, providing more solid and comprehended research findings. While the focus of the book is the modelling of process models and rules, the methods and techniques used in this book can also be adopted and applied to broader conceptual modelling research incorporating a variety of notations (e.g., UML, ER diagrams) or ontologies.

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Contents

1 Introduction	1
1.1 Overview	1
1.2 Background	2
1.3 Aim and Objectives.	4
1.4 Outline of the Book	7
2 Literature Review	9
2.1 Overview	9
2.2 Business Process Models	9
2.3 Business Process Understanding	14
2.4 Business Rules	18
2.5 Business Process Model and Business Rule Integration	22
2.6 Integration Approaches	24
2.7 Chapter Summary	28
3 Methodology	29
3.1 Research Method of Study 1 – Experiment	30
3.2 Research Method of Study 2 – Systematic Literature Review and Survey.	31
3.3 Research Method of Study 3 – Design Science.	32
3.4 Chapter Summary	33
4 Rule Integration and Model Understanding: A Theoretical Underpinning. . .	34
4.1 Overview	34
4.2 Related Theories.	34
4.3 Process Models and Rules Understanding	38
4.4 Chapter Summary	41
5 The Effect of Rule Linking on Business Process Model Understanding. . . .	42
5.1 Overview	42
5.2 Hypotheses Development.	42
5.3 Approach.	44
5.4 Result Analysis.	50
5.5 Chapter Summary	59
6 Identification of Factors Affecting Business Process and Business Rule Integration	60
6.1 Overview	60
6.2 Approach.	60
6.3 Business Rule Modelling Factors	63
6.4 Empirical Validation of Factors	66

6.5 Business Rule Embedding Guidelines	68
6.6 Chapter Summary	72
7 A Business Rule Modelling Decision Framework	73
7.1 Overview	73
7.2 Problem Identification and Definition of Objectives	74
7.3 The Design and Development of the Decision Framework	75
7.4 The Decision Framework Demonstration	87
7.5 The Decision Framework Evaluation	90
7.6 Chapter Summary	93
8 Conclusion	94
8.1 Overview	94
8.2 Summary of Contributions	94
8.3 Research Limitations and Future Work	97
Appendix A: Online Survey	101
Appendix B: Experiment Materials	115
References	119