


Lecture Notes in Business Information Processing

421

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Enterprise, Business-Process and Information Systems Modeling

22nd International Conference, BPMDS 2021
and 26th International Conference, EMMSAD 2021
Held at CAiSE 2021, Melbourne, VIC, Australia, June 28–29, 2021
Proceedings

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Preface

This book contains the proceedings of two long-running events held along side the CAiSE conference relating to the areas of enterprise, business-process, and information systems modeling: the 22nd International Working Conference on Business Process Modeling, Development and Support (BPMDS 2021) and the 26th International Working Conference on Exploring Modeling Methods for Systems Analysis and Development (EMMSAD 2021).

The two working conferences had a joint keynote given by Didar Zowghi, Professor of Software Engineering at the Faculty of Engineering and IT at the University of Technology Sydney. The two events also shared an industrial talk given by Nigel Adams, a consultant researching process mining and business process compliance.

This year both conferences, originally planned to be held in Melbourne, Australia, during June 28–29, 2021, took a virtual form. More information on the individual events and their selection processes can be found on the following pages.

BPMDS 2021

BPMDS has been held as a series of workshops devoted to business process modeling, development, and support since 1998. During this period, business process analysis and design have been recognized as a central issue in the area of information systems (IS) engineering. The continued interest in these topics on behalf of the IS community is reflected by the success of the previous BPMDS events and the recent emergence of new conferences and workshops devoted to the theme. In 2011, BPMDS became a two-day working conference attached to the International Conference on Advanced Information Systems Engineering (CAiSE).

The goals, format, and history of BPMDS can be found on the website <http://www.bpmds.org/>.

The BPMDS working conference deals with and promotes research on business process modeling, development, and support, and has been a platform for a multitude of influential research papers. In keeping with its tradition, the working conference covers a broad range of theoretical and application-based research on BPMDS.

In 2021, BPMDS took place virtually as an online event, whilst keeping the general spirit and principles of BPMDS.

The intention of BPMDS is to solicit papers related to business process modeling, development, and support in general, using quality as the main selection criterion. As a working conference, we aim to attract papers describing mature research, but we still give place to industrial reports and visionary idea papers. To encourage new and emerging challenges and research directions in the area of business process modeling, development, and support, we have a unique focus theme every year. Papers submitted

as *idea papers* must be relevant to the focus theme, thus providing a mass of new ideas around a relatively narrow but emerging research area. *Full research papers* and *experience reports* do not necessarily need to be directly connected to this theme (although they still needed to be explicitly relevant to BPMDS).

The focus theme for the BPMDS 2021 idea papers, *Business Process Improvement*, originates from the opportunities unleashed by the advancements in the fields of machine-learning and artificial intelligence, which enable the transition from the traditional process improvement led by human-experts to new process improvement methods based on intelligent software and systems, with the goal of reducing the effort and time required to achieve process improvements.

BPMDS 2021 received 26 submissions from authors in 12 countries (Australia, Austria, Belgium, France, Germany, Indonesia, Israel, Italy, Portugal, Spain, Sweden, Uruguay). The management of paper submission and reviews was supported by the EasyChair conference system. Each paper received at least three reviews from the members of the international Program Committee. Eventually, 10 high-quality full papers and 1 short paper were selected, which included one experience report.

The accepted papers cover a wide spectrum of issues related to business process development, modeling, and support, and also fit with this year's focus theme, *Business Process Improvement*, even though none of these papers were submitted as an idea paper. They are organized under the following section headings:

- Improving event data quality in coherence with business requirements
- Enhancing the value of data in processes improvement
- Event stream and predictive monitoring
- Modeling languages and reference models

We wish to thank all the people who submitted papers to BPMDS 2021 for having shared their work with us, as well as the members of the BPMDS 2021 Program Committee, who made a remarkable effort in reviewing submissions.

We also thank the organizers of CAiSE 2021 for their help with the organization of the event, particularly adjusting to the changing circumstances during the global COVID-19 crisis and facilitating the transformation to a virtual event. We would have liked to visit the lovely city of Melbourne. We also thank IFIP WG8.1 for its sustainable support and Springer, in particular Ralf Gerstner and Christine Reiss for their assistance during the production of the proceedings.

May 2021

Selmin Nurcan
Rainer Schmidt
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EMMSAD 2021

The objective of the EMMSAD conference series is to provide a forum for researchers and practitioners interested in modeling methods for Systems Analysis and Development (SA&D) to meet and exchange research ideas and results. The conference aims to provide home for a rich variety of modeling paradigms, including software modeling, business process modeling, enterprise modeling, capability modeling, service modeling, ontology modeling, and domain-specific modeling. These important modeling paradigms, and specific methods following them, continue to be enriched with extensions, refinements, and even new languages, to address new challenges. Even with some attempts at standardization, new modeling paradigms and methods are constantly being introduced, especially in order to deal with emerging trends and challenges. Ongoing changes significantly impact the way systems are analyzed and designed in practice. Moreover, they challenge the empirical and analytical evaluation of the modeling methods, which contributes to the knowledge and understanding of their strengths and weaknesses. This knowledge may guide researchers towards the development of the next generation of modeling methods and help practitioners to select the modeling methods most appropriate to their needs.

This year, EMMSAD 2021 continued its tradition and accepted papers in five tracks that emphasize the variety of EMMSAD topics: (1) Foundations of modeling and method engineering – chaired by Mahdi Fahmideh, Jolita Ralyté, and Janis Stirna; (2) Enterprise, business process, and capability modeling – chaired by Dominik Bork, Jānis Grabis, and Paul Grefen; (3) Information systems and requirements modeling – chaired by Aneesh Krishna, Roman Lukyanenko, and Marcela Ruiz; (4) Domain-specific and ontology modeling – chaired by Georg Grossmann, Dimitris Karagiannis, and Arnon Sturm; and (5) Evaluation of modeling approaches – chaired by Lubna Alam, Oscar Pastor, and Geert Poels. More details on the current and previous editions of EMMSAD can be found at <http://www.emmsad.org/>.

In total, 34 submissions were received from authors in 24 countries (Australia, Austria, Belgium, Canada, China, Colombia, Estonia, France, Germany, Greece, Israel, Italy, Japan, Latvia, Morocco, Netherlands, Norway, Pakistan, Qatar, Spain, Sweden, Switzerland, UK, USA). The division of submissions between the tracks was as follows: 4 submissions related to foundations of modeling and method engineering, 10 related to enterprise, business process, and capability modeling, 10 related to information systems and requirements modeling, 5 related to domain-specific and ontology modeling, and 5 related to evaluation of modeling approaches. After a rigorous review process, which included three reviews per submission, 14 high-quality papers, comprising 13 long papers and 1 short paper, were selected. They have been divided into four sections as follows:

1. Enterprise Modeling:

- Anne Gutschmidt, Birger Lantow, Ben Helmanzik, Ben Ramforth, and Matteo Wiese. *Participatory Modeling From A Stakeholder Perspective: On the*

Influence of Collaboration and Revisions On Psychological Ownership and Perceived Model Quality.

- Daniela Pöhn and Peter Hillmann. *Reference Service Model for Federated Identity Management.*
- Wilco Engelsman, Roel Wieringa, Jaap Gordijn, Marten van Sinderen, and Timber Haaker. *Traceability from the Business Value Model to the Enterprise Architecture: A Case Study.*
- Hasan Koç, Kurt Sandkuhl, and Janis Stirna. *Design Thinking and Enterprise Modeling: An Investigation of Eight Enterprise Architecture Management Projects.*

2. Handling Models and Modeling Methods:

- Victoria Döller and Dimitris Karagiannis. *Formalizing Conceptual Modeling Methods with MetaMorph.*
- Sebastian Gottschalk, Enes Yigitbas, Alexander Nowosad, and Gregor Engels. *Situation-specific Business Model Development Methods for Mobile App Developers.*
- Maxim Bragilovski, Yifat Makias, Moran Shamshila, Roni Stern, and Arnon Sturm. *Searching for Class Models.*
- Wolfgang Maass, Roman Lukyanenko, and Veda C. Storey. *From Mental Models to Machine Learning Models via Conceptual Models (short paper).*

3. Threat and Evidence Modeling:

- Nicklas Hersén, Simon Hacks, and Konrad Fögen. *Towards Measuring Test Coverage of Attack Simulations.*
- Dirk van der Linden, Hava Dayan, Anna Zamansky, and Irit Hadar. *Murder, She Modeled: Modeling to Support Crimino-Forensic Processes.*

4. Model-Driven Engineering and Applications:

- Charlotte Verbruggen and Monique Snoeck. *Model-Driven Engineering: a State of Affairs and Research Agenda.*
- Flavio Corradini, Arianna Fedeli, Fabrizio Fornari, Andrea Polini, and Barbara Re. *FloWare: an Approach for IoT Support and Application Development.*
- José Fabián Reyes Román, Alejandro Marco Palomares, Alberto García, and Oscar Pastor. *A Model-based Application for the Effective and Efficient Management of Data associated with Retina-Macula Pathology.*
- Michiel Overeem, Slinger Jansen, and Max Mathijssen. *API Management Maturity of Low-Code Development Platforms.*

We wish to thank all the authors who shared their work with us, as well as the members of EMMSAD 2021 Program Committee for their valuable reviews in the difficult times of the COVID-19 pandemic. Special thanks go to the track chairs for their help in EMMSAD advertising and the review process. Finally, we thank the

organizers of CAiSE 2021 for their help with the organization of the event, IFIP WG8.1 for its support, and Springer staff (especially Ralf Gerstner and Christine Reiss).

May 2021

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