Lecture Notes
in Business Information Processing

Series Editors
Wil van der Aalst
  Eindhoven Technical University, The Netherlands
John Mylopoulos
  University of Trento, Italy
Michael Rosemann
  Queensland University of Technology, Brisbane, Qld, Australia
Michael J. Shaw
  University of Illinois, Urbana-Champaign, IL, USA
Clemens Szyperski
  Microsoft Research, Redmond, WA, USA
Preface

We observe more and more information system development failures (development projects going over time/budget and low user satisfaction), and it is widely agreed that this is largely due to the lack of adequate underlying business/enterprise models. Such models are crucial for understanding and/or (re-)engineering an enterprise. This is needed, in turn, when (partially) automating enterprise processes by means of software systems. Therefore, software generation should stem from corresponding enterprise modeling. This points to the emerging discipline of enterprise engineering that addresses challenges such as agility and adaptability of enterprises. Further, it is essential that enterprise modeling is appropriately bridged to software design, by aligning enterprise modeling concepts and corresponding software specification concepts. Only such an enterprise-software alignment could actually guarantee that: (a) the software system would be properly integrated in its enterprise context; (b) an enterprise-software traceability would be possible allowing not only for software updates driven by new requirements but also for possible enterprise re-engineering activities, inspired by a goal to better fit the enterprise to the IT platform(s) used; (c) re-use could be an issue, counting on enterprise modeling constructs and software components. All this has been dominant for BMSD, the international symposium on Business Modeling and Software Design, bringing together researchers and practitioners interested in business/enterprise modeling and its relationship to software design, and demonstrating for a third consecutive year (in the 2013 edition) a high quality of papers and presentations as well as a stimulating discussion environment. The theme of BMSD 2013 was: “Enterprise Engineering and Software Generation” and the scientific areas of interest to the symposium were: (a) business models and requirements; (b) business models and services; (c) business models and software; (d) information systems architectures. Further, there were three application-oriented special sessions, namely, a special session on e-Health Services and Technologies, a special session on Future Internet Applications for Traffic Surveillance and Management, and a special session on Intelligent Systems and Business Analysis. These special sessions have brought additional practice-driven value to the symposium.

BMSD 2013 was held in Noordwijkerhout, The Netherlands. The symposium was organized and sponsored by the Interdisciplinary Institute for Collaboration and Research on Enterprise Systems and Technology (IICREST), in cooperation with the Dutch Research School for Information and Knowledge Systems (SIKS), the Center for Telematics and Information Technology (CTIT), Aristotle University of Thessaloniki (AUTH), and AMAKOTA Ltd.

This book contains revised and extended versions of a set of selected BMSD 2013 papers. These papers addressed the above-mentioned challenges, by considering a large number of research topics: from more conceptual ones, such
as modeling landscapes, process modeling, declarative business rules, and normalized systems to more practical ones, such as business cases development and performance indicators, from more business-oriented ones, such as value modeling and service systems, to topics related to information architectures.

BMSD 2013 received 56 paper submissions from which 33 papers were selected for publication in the symposium proceedings. From these, 13 papers were selected for a 30-minute oral presentation (full papers), leading to a full paper acceptance ratio of around 23%; this not only shows stable development (the full paper acceptance ratio was 20% in 2012 and 17% in 2011) but also indicates the intention of preserving a high-quality forum for the next editions of the symposium. The eight papers published in the current book were selected from the BMSD 2013 full papers. In all BMSD 2013 selections, a double-blind paper evaluation method was used: Each paper was reviewed by at least two internationally known experts from the BMSD Program Committee.

The high quality of the BMSD 2013 program was enhanced by three keynote lectures, delivered by distinguished guests who are renowned experts in their fields, including (alphabetically): Marco Aiello (University of Groningen, The Netherlands), Kecheng Liu (University of Reading, UK), and Leszek Maciaszek (Wroclaw University of Economics, Poland). Their lectures inspired the participants to gain a deeper understanding of the business/enterprise modeling and software design fields. Further, their active participation in the panel discussion and other discussions provided many participants with valuable feedback on their work.

Inspired by three successful editions of BMSD, namely, Sofia 2011, Geneva 2012, and Noordwijkerhout 2013, we are determined to further develop the symposium, and we hope that you will find these papers interesting and consider them a helpful reference in the future when addressing any of the research areas mentioned here.

February 2014

Boris Shishkov
Symposium Committee

Chair

Boris Shishkov

IICREST, Bulgaria

Program Committee

Hamideh Afsarmanesh
University of Amsterdam, The Netherlands

Marco Aiello
University of Groningen, The Netherlands

Mehmet Aksit
University of Twente, The Netherlands

Antonia Albani
University of St. Gallen, Switzerland

Ognian Andreev
Technical University of Sofia, Bulgaria

Paulo Anita
Delft University of Technology, The Netherlands

Rumen Arnaudov
Technical University of Sofia, Bulgaria

Colin Atkinson
University of Mannheim, Germany

Paris Avgeriou
University of Groningen, The Netherlands

Csaba Boer
TBA, The Netherlands

Boyan Bontchev
Sofia University St. Kliment Ohridski, Bulgaria

Frances Brazier
Delft University of Technology, The Netherlands

Barrett Bryant
University of North Texas, USA

Cinzia Cappiello
Politecnico di Milano, Italy

Jorge Cardoso
University of Coimbra, Portugal

Kuo-Ming Chao
Coventry University, UK

Ruzanna Chitchyan
University of Leicester, UK

Samuel Chong
Capgemini, UK

Dimitar Christozov
American University in Bulgaria - Blagoevgrad, Bulgaria

José Cordeiro
Polytechnic Institute of Setúbal, Portugal

Dumitru Dan Burdescu
University of Craiova, Romania

Joop De Jong
Delft University of Technology, The Netherlands

Jan L.G. Dietz
Delft University of Technology, The Netherlands

Teduh Dirgahayu
Universitas Islam Indonesia, Indonesia

Lyubka Doukovska
Bulgarian Academy of Sciences, Bulgaria

Joaquim Filipe
Polytechnic Institute of Setúbal, Portugal
Chiara Francalanci  
Politecnico di Milano, Italy

Boris Fritscher  
University of Lausanne, Switzerland

J. Paul Gibson  
T&MSP - Telecom & Management SudParis, France

Eduardo Goncalves Da Silva  
University of Twente, The Netherlands

Rafael Gonzales  
Javeriana University, Colombia

Clever Ricardo Guareis De Farias  
University of Sao Paulo, Brazil

Jens Gulden  
University of Duisburg-Essen, Germany

Markus Helfert  
Dublin City University, Ireland

Philip Huysmans  
University of Antwerp, Belgium

Ilian Ilkov  
IBM, The Netherlands

Ivan Ivanov  
SUNY Empire State College, USA

Dmitry Kan  
AlphaSense Inc., Russia

Dimitris Karagiannis  
University of Vienna, Austria

Marite Kirikova  
Riga Technical University, Latvia

Samuel Konnev  
Karlsruhe Institute of Technology, Germany

José Paulo Leal  
University of Porto, Portugal

Kecheng Liu  
University of Reading, UK

Leszek Maciaszek  
Wroclaw University of Economics, Poland

Jelena Marincic  
University of Twente, The Netherlands

Michele Missikoff  
Institute for Systems Analysis and Computer Science, Italy

Dimitris Mitrakos  
Aristotle University of Thessaloniki, Greece

Preslav Nakov  
Qatar Computing Research Institute, Qatar Foundation, Qatar

Ricardo Neisse  
Fraunhofer IESE, Germany

Bart Nieuwenhuis  
University of Twente, The Netherlands

Selmin Nurcan  
University Paris 1 Pantheon Sorbonne, France

Olga Ormandjieva  
Concordia University, Canada

Sietse Overbeek  
University of Duisburg-Essen, Germany

Mike Papazoglou  
Tilburg University, The Netherlands

Robert Parhonyi  
Inter Access, The Netherlands

Marcin Paprzycki  
Polish Academy of Sciences, Poland

Oscar Pastor  
Universidad Politécnica de Valencia, Spain

Henderik A. Proper  
Public Research Centre – Henri Tudor, Luxembourg

Ricardo Queiros  
IPP, Portugal

Jolita Ralyte  
University of Geneva, Switzerland

Gil Regev  
EPFL/Itecor, Switzerland

Ella Roubtsova  
Open University, The Netherlands

Irina Rychkova  
University Paris 1 Pantheon Sorbonne, France

Shazia Sadiq  
University of Queensland, Australia
<table>
<thead>
<tr>
<th>Name</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tony Shan</td>
<td>Keane Inc., USA</td>
</tr>
<tr>
<td>Valery Sokolov</td>
<td>Yaroslavl State University, Russia</td>
</tr>
<tr>
<td>Richard Starmans</td>
<td>Utrecht University, The Netherlands</td>
</tr>
<tr>
<td>Cosmin Stoica Spahiu</td>
<td>University of Craiova, Romania</td>
</tr>
<tr>
<td>Coen Suurmond</td>
<td>RBK Group, The Netherlands</td>
</tr>
<tr>
<td>Bedir Tekinerdogan</td>
<td>Bilkent University, Turkey</td>
</tr>
<tr>
<td>Linda Terlouw</td>
<td>ICRIS B.V., The Netherlands</td>
</tr>
<tr>
<td>Yasar Tonta</td>
<td>Hacettepe University, Turkey</td>
</tr>
<tr>
<td>Roumiana Tsankova</td>
<td>Technical University of Sofia, Bulgaria</td>
</tr>
<tr>
<td>Marten van Sinderen</td>
<td>University of Twente, The Netherlands</td>
</tr>
<tr>
<td>Maria Virvou</td>
<td>University of Piraeus, Greece</td>
</tr>
<tr>
<td>Shin-Jer Yang</td>
<td>Soochow University, Taiwan</td>
</tr>
<tr>
<td>Benjamim Yen</td>
<td>University of Hong Kong, China</td>
</tr>
<tr>
<td>Fani Zlatarova</td>
<td>Elizabethtown College, USA</td>
</tr>
</tbody>
</table>

**Invited Speakers**

- Marco Aiello: University of Groningen, The Netherlands
- Kecheng Liu: University of Reading, UK
- Leszek Maciaszek: Wroclaw University of Economics, Poland
# Table of Contents

Enterprise Modelling Languages: Just Enough Standardisation? .......................... 1  
*Marija Bjeković, Henderik A. Proper, and Jean-Sébastien Sottet*

Overview of Business Process Modeling Languages Supporting Enterprise Collaboration ........................................... 24  
*Hodjat Soleimani Malekan and Hamideh Afsarmanesh*

Creating a Business Case from a Business Model ............................... 46  
*Lucas Onno Meertens, Eelco Starreveld, Maria-Eugenia Iacob, and Bart Nieuwenhuis*

The Business of Business Modeling ........................................... 64  
*Coen Suurmond*

Engineering Business Processes: Comparing Prescriptive Guidelines from EO and NSBP ........................................... 84  
*Dieter Van Nuffel, Philip Huysmans, and Peter De Bruyn*

Transformation of Imperative Workflows to Declarative Business Rules ........................................... 106  
*Lex Wedemeijer*

KPIs and Their Properties Defined with the EXTREME Method .......................... 128  
*Ella Roubtsova and Vaughan Michell*

Designing Value-Oriented Service Systems by Value Map.......................... 150  
*Arash Golnam, Vijay Viswanathan, Christa I. Moser, Paavo Ritala, and Alain Wegmann*

**Author Index** ................................................................. 175