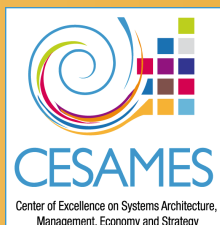


Pierre-Jean Benghozi
Daniel Krob
Antoine Lonjon
Hervé Panetto *Editors*

Digital Enterprise Design & Management

Proceedings of the Second International
Conference on Digital Enterprise Design
and Management DED&M 2014



Advances in Intelligent Systems and Computing

Volume 261

Series editor

Janusz Kacprzyk, Polish Academy of Sciences, Warsaw, Poland
e-mail: kacprzyk@ibspan.waw.pl

For further volumes:

<http://www.springer.com/series/11156>

About this Series

The series “Advances in Intelligent Systems and Computing” contains publications on theory, applications, and design methods of Intelligent Systems and Intelligent Computing. Virtually all disciplines such as engineering, natural sciences, computer and information science, ICT, economics, business, e-commerce, environment, healthcare, life science are covered. The list of topics spans all the areas of modern intelligent systems and computing.

The publications within “Advances in Intelligent Systems and Computing” are primarily textbooks and proceedings of important conferences, symposia and congresses. They cover significant recent developments in the field, both of a foundational and applicable character. An important characteristic feature of the series is the short publication time and world-wide distribution. This permits a rapid and broad dissemination of research results.

Advisory Board

Chairman

Nikhil R. Pal, Indian Statistical Institute, Kolkata, India
e-mail: nikhil@isical.ac.in

Members

Emilio S. Corchado, University of Salamanca, Salamanca, Spain
e-mail: escorchado@usal.es

Hani Hagras, University of Essex, Colchester, UK
e-mail: hani@essex.ac.uk

László T. Kóczy, Széchenyi István University, Győr, Hungary
e-mail: koczy@sze.hu

Vladik Kreinovich, University of Texas at El Paso, El Paso, USA
e-mail: vladik@utep.edu

Chin-Teng Lin, National Chiao Tung University, Hsinchu, Taiwan
e-mail: ctlin@mail.nctu.edu.tw

Jie Lu, University of Technology, Sydney, Australia
e-mail: Jie.Lu@uts.edu.au

Patricia Melin, Tijuana Institute of Technology, Tijuana, Mexico
e-mail: epmelin@hafsamx.org

Nadia Nedjah, State University of Rio de Janeiro, Rio de Janeiro, Brazil
e-mail: nadia@eng.uerj.br

Ngoc Thanh Nguyen, Wroclaw University of Technology, Wroclaw, Poland
e-mail: Ngoc-Thanh.Nguyen@pwr.edu.pl

Jun Wang, The Chinese University of Hong Kong, Shatin, Hong Kong
e-mail: jwang@mae.cuhk.edu.hk

Pierre-Jean Benghozi · Daniel Krob
Antoine Lonjon · Hervé Panetto
Editors

Digital Enterprise Design & Management

Proceedings of the Second International
Conference on Digital Enterprise Design
and Management DED&M 2014

Editors

Pierre-Jean Benghozi
CRG
Ecole Polytechnique
Palaiseau Cedex
France

Antoine Lonjon
MEGA International
Paris
France

Daniel Krob
LIX / DIX
Ecole Polytechnique
Palaiseau Cedex
France

Hervé Panetto
University of Lorraine
Vandoeuvre-les-Nancy Cedex
France

ISSN 2194-5357

ISBN 978-3-319-04312-8

DOI 10.1007/978-3-319-04313-5

Springer Cham Heidelberg New York Dordrecht London

ISSN 2194-5365 (electronic)

ISBN 978-3-319-04313-5 (eBook)

Library of Congress Control Number: 2013957361

© Springer International Publishing Switzerland 2014

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed. Exempted from this legal reservation are brief excerpts in connection with reviews or scholarly analysis or material supplied specifically for the purpose of being entered and executed on a computer system, for exclusive use by the purchaser of the work. Duplication of this publication or parts thereof is permitted only under the provisions of the Copyright Law of the Publisher's location, in its current version, and permission for use must always be obtained from Springer. Permissions for use may be obtained through RightsLink at the Copyright Clearance Center. Violations are liable to prosecution under the respective Copyright Law.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

While the advice and information in this book are believed to be true and accurate at the date of publication, neither the authors nor the editors nor the publisher can accept any legal responsibility for any errors or omissions that may be made. The publisher makes no warranty, express or implied, with respect to the material contained herein.

Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.springer.com)

Welcome from Françoise Mercadal-Delasalles, Head of Corporate Resources and Innovation Division, Société Générale

Société Générale is proud to welcome the second edition of the DED&M conference as a partner of this event.

This year the Société Générale Group celebrates its 150th anniversary.

150 years of development, international expansion, diversification but also many years of crises, turbulence and intense mutations that the company and its environment have been touched and changed by.

As many other large corporations, over many decades, we have demonstrated the strength and resilience of our enterprise culture.

But we also realize that the challenge of the digital age is the dawn of a new era and an unprecedented shift in our future that needs to drive us towards reinvention.

To tackle this change of age, we, as companies, need to simplify our different approaches, open ourselves up to the outside, create innovative ecosystems and form new partnerships.

All of the links with the academic world are particularly useful and fruitful in order to feed our ideas about digital transformation and leave behind our organizational complexity to design and manage the digital enterprise of tomorrow. I hope this conference will give us the opportunity to come together to share promising insights about this digital challenge that inspires us all.

Preface

Introduction

This volume contains the proceedings of the Second International Conference on « Digital Enterprise Design & Management » (DED&M 2014 ; see the conference website for more details: <http://www.dedm2014.dedm.fr/>).

The DED&M 2014 conference was jointly organized by the Dassault Aviation – DCNS – DGA – Thales – Ecole Polytechnique – ENSTA ParisTech – Télécom ParisTech “Engineering of Complex Systems” chair, the Orange – Ecole Polytechnique – Télécom ParisTech “Innovation & Regulation” chair and the C.E.S.A.M.E.S. (Center of Excellence on Systems Architecture, Management, Economy and Strategy) non-profit organization from February 4 to 5, 2014 at the Société Générale in Paris (France).

The conference benefited of the permanent support of many academic organizations such as CEISAR, Ecole Centrale de Paris, Ecole Polytechnique, Ecole Supérieure d’Electricité (Supélec) and Télécom ParisTech, which were deeply involved in its organization.

Our special thanks go to Société Générale which hosted freely the DED&M 2014 conference. We also thank Air France, Orange and MEGA International companies which were the main professional sponsors of the conference. All these institutions contributed to the success of the conference.

Why a DED&M Conference?

Digital enterprises are emerging, but real transformations that will bring digital concepts, uses and processes at the heart of organizations and of their business models are still to come. There is a real stake, on one hand for companies that must understand this evolution and appropriate it as a genuine new enterprise paradigm and on the other hand, for the academic world to develop suitable research activities and adapted skills. That is why mastering digital systems requires an integrated understanding of professional practices as well as sophisticated theoretical techniques and tools.

To do so, we believe that it is crucial to create an annual *go-between* forum at international level, opened to all academic researchers and professional practitioners who are interested in the design and the governance of digital systems from an Enterprise Architecture perspective. The “Digital Enterprise Design & Management” (DED&M) conference meets exactly this objective. It aims to become a key place for international presentations, debates, meetings and exchanges on the Enterprise Architecture dimension of the digital transformation. For its second edition, our event intended again to put digital issues at the heart of its program, but also to bring together business and technological stakeholders of the Digital Enterprise.

The DED&M conference scope consequently integrates both the digital customer & business dimensions (new digital customers’ behaviors, digital strategies, proposal and distribution of digital value, digital marketing, digital resources management and governance, digital corporate partnerships, etc.) and the underlying technological dimension (information & communication technology, information systems architecture, database & software engineering, systems and networks engineering, etc.).

The DED&M Academic-Professional Integrated Dimension

To make the DED&M conference this convergence point of the digital enterprise academic and professional communities, we based our organization on a principle of parity between academia and business (see the conference organization sections in the next pages). This core principle was implemented as follows:

- the different Organizing, Program and Strategic Committees of the conference are formed equally both of academic and professional members,
- the Invited Speakers come both from academic and professional environments.

The set of activities of the DED&M 2014 followed the same principle which leads us to propose a mix of research seminars & experience sharing and academic articles & professional presentations during the conference. The DED&M topics cover in the same way the most recent trends in the field of digital enterprise fundamentals and practices from a professional and an academic point of view, including the main professional domains and scientific & technical areas.

The DED&M 2014 Edition

For this second DED&M edition, 34 papers were submitted and the conference Program Committee selected among them 9 regular papers to be published in the conference proceedings. Only the best papers were selected in order to guarantee the high quality of the presentations. 10 complementary abstracts, presented as

posters during the conference, were also integrated in the proceedings in a specific dedicated part.

Each submission was assigned to at least two Program Committee members who carefully reviewed it (in many cases with the help of external referees). These reviews were discussed by the Program Committee during a physical meeting held in C.E.S.A.M.E.S. in October 2013 and via the EasyChair Conference management system.

A special focus was put this year on how digital transformation can lead to the emergence of new digital business models. We choose 8 outstanding speakers with various professional and scientific expertises who gave a series of invited talks on this topic. The first day was in particular dedicated to these 8 high-profile invited presentations in order to give to the participants a clear, synthetic and large vision of the domain. An open discussion followed by posters presentations completed this first day that ended into the conference dinner in “Les Ateliers de Renault” on the Champs Elysées in the very center of Paris. The second and last day of the conference was devoted to all contributed talks as well as to two Enterprise Architecture tutorials. "Best papers awards" were announced at the end of the day by the Program Committee chairmen as well as by the president of C.E.S.A.M.E.S. A farewell cocktail finally ended the conference.

Acknowledgements

We would like finally to thank all members of the Program, Organizing and Strategic Committees for their time, effort and contributions to make DED&M 2014 a top quality conference. A special thank is addressed to the team of the Center of Excellence on Systems Architecture, Management, Economy & Strategy (C.E.S.A.M.E.S. ; website: <http://www.cesames.net/en>), the non-profit organization which managed permanently with an huge efficiency all administration, logistics and communication of the DED&M 2014 conference.

The organizers of the conference are also greatly grateful to the following sponsors and partners without whom the DED&M 2014 would not exist:

Academic Sponsors

- Ecole Polytechnique
- ENSTA ParisTech
- Télécom ParisTech

Professional Sponsors

- Air France
- BiZZdesign
- Dassault Aviation

- DCNS
- DGA
- MEGA International
- OBEO
- Orange
- Société Générale
- Thales

Institutional Partners

- Digiteo Labs
- Ministère de l'Enseignement Supérieur et de la Recherche
- Ministère du redressement productif, des petites et moyennes entreprises, de l'innovation et de l'économie numérique

Supporting Partners

- AIM
- Cap Digital
- CEISAR
- CNAM
- Ecole Centrale de Paris
- IRT-SystemX
- Ecole Supérieure d'Electricité (Supélec)
- Systematic
- The Open Group
- Université de Lorraine

Paris, February 2014

Pierre-Jean Benghozi – Ecole Polytechnique
Daniel Krob – Ecole Polytechnique & C.E.S.A.M.E.S.
Antoine Lonjon – MEGA International
Hervé Panetto – Université de Lorraine

Conference Organization

Conference Chairs

General Chair

Daniel Krob, institute professor

Ecole Polytechnique, France

Organizing Committee Chair

Pierre-Jean Benghozi, professor

Ecole Polytechnique France

Program Committee Chairs

Hervé Panetto
(academic co-chair)

University of Lorraine, France

Antoine Lonjon
(professional co-chair)

MEGA International, France

Program Committee

The Program Committee consists of 28 members (academic and professional): all are personalities of high international visibility. Their expertise spectrum covers all the conference topics. Its members are in charge of rating the submissions and selecting the best of them for the conference.

Members

Co-Chairs

Hervé Panetto
(academic co-chair)

University of Lorraine, France

Antoine Lonjon
(professional co-chair)

MEGA International, France

Members

Denis Attal
 Ian Bailey
 Marc Bidan

Brian H. Cameron, Ph.D.
 Michele Dassisti
 Dominique Ernadote
 Ulrich Frank

Ronald Giachetti

Ricardo Goncalves
 Ted Goranson
 John Gotze
 Matthew Hause
 Wolfram Kleis
 Jean-Yves Lignier
 Florian Matthes
 Juan-Carlos Mendez
 Eric Monnoyer
 Etienne Noiret
 Ovidiu Noran
 Angel Ortiz Bas

Hervé Pacault
 Yves Pigneur
 Colette Roland
 Frantz Rowe
 Dinesh Ujoodah
 Lawrence Whitman

Thales, France
 Model Futures, Great-Britain
 Association Information &
 Management, France
 Pennsylvania State University, USA
 Politecnico di Bari, Italy
 EADS CASSIDIAN, France
 Universität Duisburg, Essen,
 Germany
 The Naval Postgraduate School
 (NPS) in Monterey, California,
 USA
 New University of Lisbon, Portugal
 Earl Research and Sirius-Beta, USA
 EA Fellows, Danemark
 Atego, USA
 SAP AG, Germany
 Club MOA, France
 TUM, Germany
 AdN International, Mexico
 ERM Consultant, France
 IBM
 Griffith University, Australia
 Universidad Politécnica de Valencia,
 Spain
 ORANGE, France
 Université de Lausanne, Switzerland
 Université Paris 1, France
 Université de Nantes, France
 Société Générale, France
 Wichita State University, USA

Organizing Committee

The Organizing Committee consists of 8 members (academic and professional) in charge of the logistical organization of the Conference.

Chair

Pierre-Jean Benghozi, professor

Ecole Polytechnique, France

Members

Christophe Longepé
 Jean-Luc Lucas

BNP Paribas, France
 Ex Orange / France Telecom, France

Jean-René Lyon

Jacques Printz

Michalis Vazirgiannis

Alain Vallee

Sylvie Vignes

MphasiS Wyde & CEISAR, France

CNAM, France

École Polytechnique, France

Télécom ParisTech, France

Télécom ParisTech, France

Strategic Committee

The Strategic Committee helps to define the strategic orientations of the conference. All its members are coming from top executive management of worldwide leading organizations.

Chair

Jean-Christophe Lalanne

Deputy CIO, Air France, France

Members

Marc Alinat

CEO Yunano, SVP Atos

International, France

Jean-Max Arbez

Boost, Switzerland

François Bourdoncle

EXALEAD, France

Nicolas Colin

Inspection Generale des Finances,

France

Daniel Dardailler

W3C, France

Marko Erman

Thales, France

Hervé Gouëzel

BNP Paribas, France

Françoise Mercadal-Delasalles

Société Générale, France

Grégoire Postel-Vinay

DGSIC, France

Elizabeth Pugeat

Crédit Agricole, France

Thierry Souche

Orange, France

Conference Organization

Invited Speakers

Transformation of Existing Digital Models

Technology : Nils Fonstad , e-Lab director, INSEAD ex-MIT - United States

Medi : Olivier Abecassis, General Director, e-business TF1 - France

Communication: Jullien Ampollini, General Director Digital & Marketing Business, PAGESJAUNES - France

Finance : Xavier Terrasse, Digital Working Program Director, BNP Paribas – France

Emergence of New Digital Models

Pharmaceutical : Sabine Safi and Cedric O'Neill, co-founders, 1001 Pharmacies - France

E-Commerce : William El Kaim, COO, Carlson Wagonlit - France

Information Technologies : Marc Alinat, SVP, Atos International & CEO, Yunano - France

Software Technologies for Business Information Systems : Florian Matthes, Professor, TUM – Germany

Contents

Section A: Regular Papers

1	Designing Future Enterprises.....	3
	<i>Milan Guenther, Dennis Middeke</i>	
1	The Relationship Challenge	3
2	The Enterprise Design Idea	4
3	Strategic Design	6
4	Enterprise Aspects.....	7
5	Case Study: The United Nations UNISDR Agency	12
	References	14
2	The Customer Relationship Management at the Era of Smartphones: Study of the Project Mobile-Dinar within the Arab International Bank of Tunisia	15
	<i>Emna Ben Romdhane, Yosri Bouchioua</i>	
1	Introduction.....	15
2	Theoretical Background	16
2.1	Factors of Success and Failure of the Customer Relationship Management.....	16
2.1.1	The Factors of Success of the Customer Relationship Management.....	17
2.1.2	The Factors of Failure of the Customer Relationship Management.....	18
3	Operating and Statistical Framework	18
3.1	Presentation of the Mobile-Dinar	19
3.2	Methodology	19
3.3	Results of the Data Analysis Resulting from the Questionnaire	20
3.4	Results of the Exploratory Interviews	21
3.5	Summary of the Results and Recommendations	22
4	Conclusion	22
	References	23

3 A Journey from Big Data to Smart Data..... 25
Fernando Iafrate

1 Introduction..... 25

2 A Journey from Big Data to Smart Data 26

 2.1 What Is? 26

 2.2 What For..... 27

 2.3 Key Issues 27

 2.4 What You Need to Know 27

3 Use Cases 28

4 Conclusion 32

 4.1 What Are the Main Features Links to the Big Data to Smart Data Closed Loop 32

 4.2 What Are the Main Risks of Not Implementing a Strong Business Intelligence Practice for the Enterprise? 33

References 33

4 Harnessing Multimodal Architectural Dependencies for IT-Business Alignment and Portfolio Optimization: A Statistical Approach 35
Zenon Mathews, Livio Kaeslin, Bernhard Rytz

1 Introduction 35

 1.1 Related Work 37

 1.2 The SBB Information Systems Landscape 37

2 Methods 39

 2.1 From Metamodel to Dependency Graphs 39

 2.2 The Markov Chain Monte Carlo (MCMC) Gibbs Sampler 39

 2.3 Tools..... 42

3 Results 42

 3.1 Project Indirect Impacts in the Application Landscape 42

 3.2 Inter-Project Dependencies 43

4 Discussion 44

References 46

5 Towards a Model-Driven-Architecture Process for Smart Grid Projects 47
Christian Dänekas, Christian Neureiter, Sebastian Rohjans, Mathias Uslar, Dominik Engel

1 Introduction..... 47

2 Approach..... 49

3 Case Studies 50

3.1	INTEGRA	51
3.2	DISCERN.....	53
3.3	Comparison	55
4	Conclusions and Future Work.....	57
	References	58
6	SP-AHP: An IT System for Collaborative Multi-criteria Decision-Making.....	59
	<i>Thomas Reichel, Gudula Rünger</i>	
1	Introduction	59
2	The Analytic Hierarchy Process.....	60
3	Collaborative Decision-Making with SP-AHP	61
3.1	Assessment Configuration	62
3.2	Assessment Execution	63
4	Example: Assessment of Manufacturing Process Chains	65
5	Functionalities and Software Architecture of SP-AHP	66
6	Conclusion	69
	References	70
7	Blueprinting for Technology-Based Service: Decoupling of Physical-Virtual Layers	71
	<i>Jieun Kim, Yongtae Park</i>	
1	Introduction.....	71
2	Technology-Based Service.....	73
3	Decoupling Physical-Virtual Layers	75
3.1	Conceptualization.....	75
3.2	Visualization	75
3.3	Illustration	76
4	Discussion and Conclusion	80
	References	81
8	Urbanization of Information Systems: An Outdated Method?	83
	<i>Emmanuel Bertin, Noel Crespi</i>	
1	Introduction.....	83
2	The Assumptions of Urbanization.....	84
2.1	Urbanization, in a Nutshell.....	84
2.2	The Metaphor of the City	85
2.3	The Functional Model for the IS, Some Consequences	86
3	A New Urbanization Paradigm, The Multipolar City	87
4	From a Function-Based to a Flow-Based Urbanization	88