## Table of Contents

Preface xi
Organization xiii

### Keynote papers

- The future forces of change for the construction sector - a global perspective 3
  *R. Flanagan*

- Vectors, visions and values 11
  *P.S. Brandon*

- Help wanted: project information officer 19
  *T.M. Froese*

- The next generation of eBusiness and eWork — what is needed for the systemic innovation? An executive summary of the EU supporting research and innovation. 25
  *B. Salmelin*

### Product modelling technology

- Virtual building maintenance: enhancing building maintenance using 3D-GIS and 3D laser scanner (VR) technology 29
  *V. Ahmed, Y. Arayici, A. Hamilton & G. Aouad*

- Supporting standard data model mappings 35
  *R.W. Amor*

- Virtual building environments (VBE) — applying information modeling to buildings 41
  *V. Bazjanac*

- A persistence interface for versioned object models 49
  *D.G. Beer, B. Firmenich, T. Richter & K. Beucke*

- Semantic parameterized interpretation: a new software architecture for conceptual design systems 59
  *A. Eir*

- Harmonization of ISO 12006-2 and IFC - a necessary step towards interoperability 67
  *A. Ekholm*

- A novel modelling approach for the exchange of CAD information in civil engineering 77
  *A. Firmenich*

- Integration of product models with document-based information 85
  *T.M. Froese*
Aligning IFC with the emerging ISO10303 modular architecture. Can AEC community take advantages from it?
R. Jardim-Gonçalves, F. Farinha & A. Steiger-Garçao

Optimization of project processing in the steel construction domain
E. Holtzhauer & H. Saal

Location sensing for self-updating building models
O. Icoglu & A. Mahdavi

Modeling cast in place concrete construction alternatives with 4D CAD
R.P.M. Jongeling, T. Olofsson & M. Emborg

Pilot implementation of a requirements model
A. Kiviniemi & M. Fischer

A combined product-process model for building systems control
A. Mahdavi

FIDE: XML-based data model for the spanish AEC sector
J.M. Molina & M. Martinez

A framework for concurrent structure analysis in building industry
A. Niggl, R. Romberg, E. Rank, R.-P. Mundani & H.-J. Bungartz

IFC supported distributed, dynamic & extensible construction products information models
M. Nour & K. Beucke

Product definition in collaborative building design and manufacturing environment
H. Oumeziane, J.C. Bocquet & P. Deshayes

Implementation of the ICT in the Slovenian AEC sector
T. Pazlar, M. Dolenc & J. Duhovnik

Adding sense to building modelling for code certification and advanced simulation
I.A. Santos, F. Farinha, F. Hernández-Rodriguez & G. Bravo-Aranda

Towards engineering on the grid

Managing long transactions in model server based collaboration
M. Weise, P. Katranuschkov & R.J. Scherer

A software generation process for user-centered dynamic building system models
G. Zimmermann & A. Metzger

Process modelling technology

Embedded commissioning for building design
Ö. Akin, M. T. Turkaslan-Bulbul, I. Gursel, J.H. Garrett Jr, B. Akinci & H. Wang

The development of a technical office organization structure for enhancing performance and productivity in fast track construction projects
T.A.H. Barakat, A.R.J. Dainty & D.J. Edwards

Innovative production planning system for bespoke precast concrete products
V. Benjaoran, N. Dawood & R. Marasini
Process and information flow in mass customisation of multi-story housing  
T. Olofsson, L. Stehn & E. Cassel-Engqvist

RoadSim: an integrated simulation system for road construction management  
S. Castro & N. Dawood

Connet Turkey — gateway to construction in Europe  
A. Dikbas, S. Durusoy, H. Yaman, L. Tanagan & E. Tas

Modelling collaborative processes for Virtual Organisations in the building industry  
M. Keller, P. Katranuschkov & K. Menzel

Process modelling in building engineering  
M. König, A. Klinger & V. Berkahn

Space competition on construction sites: assignment and quantification utilising 4D space planning tools  
Z. Mallasi & N Dawood

Project planning: a novel approach through a universal e-engineering Hub - a case study of seismic risk analysis  
G. Augenbroe, Z. Ren, C.J. Anumba, T.M. Hassan & M. Mangini

A decision support model for material supply management for the construction industry  
J. Perdomo, W. Thabet & R. Badinelli

Modeling processes and processing product model information based on Petri Nets  
U. Rueppel, U.F. Meissner & S. Greb

A building material information system: BMIS - in the context of CONNET-Turkey project  
E. Tas, L. Tanaçan, H. Yaman & A. Dikbaş

Ontologies

Managing changes in the AEC industry - how can ontologies help?  
Q.Y. Cai & F.F. Ng

An ontology-driven approach for monitoring collaborative design knowledge  
Y-C. Lai & M. Carlsen

Setting up the open semantic infrastructure for the construction sector in Europe - the FUNSIEC project  
C. Lima, B. Fiès, C. Ferreira da Silva & S. Barresi

Practical use of the semantic web: lessons learned and opportunities found  
R.V. Rees, W.V. Vegchel & F. Tolman

Supporting ontology management through self-describing concepts  
T.E. El-Diraby

eWork and eBusiness

An assessment methodology for eBusiness and eCommerce in the AEC sector  
A. Grilo, P Maló & R. Jardim-Gonçalves

The digital dormer - applying for building permits online  
J.P. van Leeuwen, A.J. Jessurun & E. de Wit
An inquiry into building product information acquisition and processing
A. Mahdavi, G. Suter, S. Häusler & S. Kernstock

Usefulness and ease-of-use assessment of a project management tool for the construction industry
B. Otjacques, G. Barrère, F. Feltz & M. Naaranoja

Development and implementation of a functional architecture for an e-engineering Hub in construction
Z. Ren, C.J. Anumba, T.M. Hassan & G. Augenbroe

Legal and contractual issues - are they considered in RTD achievements
M.A. Shelbourn, T.M. Hassan & C.D. Carter

Modeling of ERP system solutions for the construction industry
M.O. Tatari, B-Y. Ryoo & M.J. Skibniewski

Construction informatics themes in the framework 5 programme
Ž. Turk

Collaborative working

Virtual pools of resources eliminate idle or missing equipment in AEC companies
G. Antoniadis & K. Menzel

DIVERCITY: distributed virtual workspace for enhancing communication and collaboration within the construction industry
Y. Arayici & G. Aouad

Cooperation and product modelling systems
S. Blokpoel, R.P.M. Jongeling & T. Olofsson

Linking early design decisions across multiple disciplines
R. Drogemuller, J. Crawford & S. Egan

State of the art of the implementation of Information Management Systems in the construction industry in Spain
N. Forcada, M. Casals & X. Roca

Agent-enabled Peer-To-Peer infrastructure for cross-company teamwork
A. Gehre, P. Katranuschkov & R.J. Scherer

Virtual communities: design for collaboration and knowledge creation
I.L. Kondratova & I. Goldfarb

The design framework - a web environment for collaborative design in the building industry
M. Huhn

Collaborative work practices in Turkey, five case studies
A. Sanal

Architecture for collaborative business process management - enabling dynamic collaboration
R. Zang, O. Adam, A. Hofer, C. Hammer, M. Jerrentrup & S. Leinenbach

Comprehensive information exchange for the construction industry
J. Díaz
Mobile computing

Mapping site processes for the introduction of mobile IT 491
S.L. Bowden, A. Dorr, A. Thorpe & C.J. Anumba

Mobile field data entry for concrete quality control information 499
I.L. Kondratova

Issues of context sensitivity in mobile computing: restrictions and challenges in the construction sector 505
K. Menzel, K. Eisenblätter & M. Keller

A context based communication system for construction 515
D. Rebolj, A. Magdič & N. Č. Babič

MOBIKO — mobile cooperation in the construction industry based on wireless technology 521
R. Steinmann

Knowledge management

Support for requirement traceability in design computing: an integrated approach with building data modeling 529
I. Özkaya & Ö. Akin

Interlinking unstructured text information with model-based project data: an approach to product model based information mining 539
S.-E. Schapke & R.J. Scherer

Live capture and reuse of project knowledge in construction: a proposed strategy 547
C.E. Udeaja, J.M. Kamara, P.M. Carrillo, C.J. Anumba, N. Bouchlaghem & H. Tan

Development of product family structure for high-rise residential buildings using industry foundation classes 553
T. Wallmark & M.M. Tseng

Construction site and project management

Assistance to building construction coordination by images 563
R. Kubicki, G. Halin & J.-C. Bignon

Gesprecons: eSafety and risk prevention in the construction sector 569
J.M. Molina, M. Martinez & I. García

Intelligent Construction Sites (ICSs) 577
T. Mills, Y. Jung & W. Thabet

Organizational point of view for the use of information technology in construction projects 583
P. Praper

Virtual reality at the building site: investigating how the VR model is experienced and its practical applicability 587
S. Woksepp, O. Tullberg & T. Olofsson

Evaluating competitiveness in construction industry: an alternative frame 595
A.Y. Toprakli, A. Dikba & Y. Sey
Seismic risk and environmental management

Analyses of Izmit earthquake by means of remotely sensed data: a case study, Yalova city
S. Kaya, F. Bektas, C. Goksel & E. Saroglu

Do phased Environmental Management Systems actually benefit SMEs?
L.L. Hopkinson & C. Snow

Software based knowledge integration for seismic risk management
R. Pellegrini & P. Salvaneschi

Real-time earthquake prediction algorithms
S. Radeva, R.J. Scherer & D. Radev

IT supported architectural design

Hybrid approach to solve space planning problems in building services
G. Bi & B. Medjdoub

A computational architectural design approach based on fractals at early design phases
Ö. Ediz & G. Çağdaş

APSIS architectural plan layout generator by exhaustive search
B. Kisacikoglu & G. Çağdaş

Architectural parametric design and mass customization
S. Boer & K. Oosterhuis

A model for hierarchical floorplan geometries based on shape functions
G. Zimmermann & G. Suter

E-learning and education

Parametric representation of functional building elements with reference to architectural education
M. Aygün & I. Çetiner

Life long learning for improved product and process modeling support
P. Christiansson

E-learning with puzzle collages
C-H. Lin, T-W. Chang, L-C. Yang & S-C. Chen

Author index