INTRODUCTION TO THE SPECIAL SECTION ON BUSINESS COLLABORATION SUPPORT FOR MICRO, SMALL, AND MEDIUM-SIZED ENTERPRISES

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1 PREFACE

Over the past decades, industry has been evolving from a vertically integrated environment into an ecosystem of collaborating companies [1], each providing specialized products, technologies, and services. Tight business collaboration [2] is now

a fundamental concern and the key to success in today's dynamic business environment.

Although the vast majority of European enterprises are SMEs, enterprise interoperability research and solutions have been successfully employed only in large organizations. Business and communication assistance systems for SMEs face two main challenges [3]. First, SMEs lack resources to invest in full-blown solutions and integrate them in their local IT landscape. Subsequently, SMEs usually employ a set of non-standardized, custom-tailored ERP and communication systems to engage in B2B and B2C relations [4]. Second, SMEs need to remain flexible and responsive quickly to changing market needs [5]. Most interoperability solutions today, however, are rigidly configured and require considerable adaptation efforts to keep up-to-date with business requirements. In an environment of loosely-coupled, dynamically adapting SMEs, business collaboration support tools need to remain light-weight, flexible, and to automatically adapt to certain degree to changing context.

This special section focuses on latest research in models, architectures, protocols, and algorithms that support SMEs in inter-organizational collaboration and the corresponding enterprise integration. This special section highlights three main research areas:

1. exploitation and integration of unstructured and semi-structured communication means such as web-interfaces, email [6], or social media [7] such as twitter or facebook,

2. automated semantic analysis and mapping of business artifacts [8], and

3. people-driven flexible workflow support mechanisms [9].

Particular focus is on research that promises to lower the entry bar for SMEs to employ business collaboration and assistance solutions. This explicitly includes mechanisms, algorithms, and protocols for self-organizing, self-configuring, self-learning, and self-adjusting behavior.

Specifically, papers in this section bring together diverse research domains such as collaborative working environments, semantic rule systems, information retrieval, social network analysis, business collaboration patterns, BPMN, ontology negotiation algorithms, process self-tuning, and business document alignment.

The first paper in this special section addresses the challenge of semantic-aware collaborative working environments (CWE). Maria Antonia Martinez Carreras et al. make the case for an integrated CWE as an effective way to share information between experts as well as between SMEs. At the core of their proposed architecture, a unified collaboration ontology brings together and extends existing ontologies such as FOAF, SIOC, and OPO. The management tier applies an inference system to reason on knowledge and ultimately to provide interoperability between heterogeneous services.

The work by Cesar Marin et al. similarly addresses semantic interoperability. The authors, however, focus on devolved ontologies as the main tool to drive seam-

less semantic alignment in a dynamic collaboration network of SMEs. In their approach, SMEs agree merely on a very basic, fundamental set of core components that describe information tokens such as organizations, addresses, or product items. An aggregation of multiple tokens creates a business document. Each SME in the network matches the content of business documents to their current set of documents, and extends the set by simply adding relations between documents and information tokens. For disagreements between SMEs a negotiation protocol can determine the best replacement document type.

Michal Laclavik et al. focus on the most used communication means between SMEs: email. Their work centers around information extraction from emails and subsequent structural analysis of information links and the emerging social network. The authors combine regular expressions, gazetteers, and layout structure to extract the basic information such as addresses, persons, and products and add them to a semantic tree. Identifying items are placed in a multipartite graph together with email identifiers, web links, and structural data. An algorithm based on spread activation can then determine dependencies (e.g., organizations and their respective contact details) from the resulting information network.

Recommendations for dynamic people-driven processes are addressed by Thomas Burkhart et al. The authors describe a flexible approach to self-adapting recommendations through a feedback loop. Users receive recommendations what immediate process step to execute for an incoming business message and what to continue working on afterwards. Based on explicit feedback by the user on the correctness of the first recommendation, and execution of subsequent process steps (implicit feedback) their proposed system learns deviations from the underlying process model and adapts it accordingly.

This special section concludes with a work on collaboration process modeling through design patterns by Anna Lisa Guido et al. Based on a case study, the authors identified five key business process collaboration patterns. These patterns are mapped to BPMN notation and therefore simplify the design of processes which specifically encourage collaboration and data exchange between involved knowledge workers.

We hope this special section provides the reader an interesting insight into current research efforts on collaboration support for SMEs. We are looking forward to future upcoming research results, as we believe this domain will continue to receive a lot of attention both from academia and industry.

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He has published some 250 scientific papers as conference-, journal-, and book contributions. He co-organized several scientific workshops and conferences (such as ICSOC 2007 and BPM 2006) and has been serving on more than 200 international program committees as well as on editorial boards of 10 scientific journals. His research interests include collaborative computing, workflow systems, Internet technologies, software architecture, distributed systems, distributed multimedia systems, and mobile collaboration systems.

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