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Hot Spots in Knowledge Management

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The increasing complexity of both the environment in which companies operate and of their internal workings combined with an increasingly high pressure for innovation make knowledge and its efficient management central to business success today. The management of knowledge is more than directly managing knowledge as a resource. It is more concerned with providing knowledge-friendly environments in which knowledge can flourish and develop. The development of such environments can be addressed from many different perspectives, which makes knowledge management a very interdisciplinary field of research. It concerns human resources management, organizational development and information technology management to mention just the three most important fields.

This special issue on hot spots in knowledge management offers the reader a broad overview of the leading edge developments, technologies and applications in knowledge management. The issue serves two distinct purposes: (1) It may help shaping the reader's thinking in the way required for a successful implementation of knowledge management in an organization; (2) It may serve as a stimulus for the reader's research in knowledge management. The following 13 papers fall in four categories:

(1) Knowledge Management in Business
(2) Knowledge Mining
(3) Knowledge Representation
(4) Convergence of Knowledge Management with other Domains

The first category - ***knowledge management in business*** - addresses knowledge management from a more business-oriented perspective. In more detail, the papers of this group address the following topics:

Peter Schütt from IBM Stuttgart (Germany) presents in his paper *The post-Nonaka Knowledge Management* a new generation of knowledge management that can be divided in three categories (1) processes, (2) organization and culture, and (3) information technology. The objective of the paper is to provide solutions for increasing the productivity of knowledge workers through knowledge management.

He argues that in order to increase productivity we need to understand the work environment of knowledge workers. To provide guidance, P. Schütt identifies 11 factors which help understanding and improving a knowledge worker's environment. This factors fall in the following three groups work processes, organisation and culture, and information technology.

Klaus North and Tina Hornung from the University of Applied Sciences in Wiesbaden (Germany) entitled their paper *The Benefits of Knowledge Management – Results from the German award "Knowledge Manager 2002"*. Based on the evaluation of almost 40 companies the authors present which added-value and benefit knowledge management can generate. The benefits are grouped in the following five perspectives: learn and growth, business processes, customer satisfaction, financial results, and employee satisfaction. The results of the study revealed that knowledge management can generate the highest benefit in business processes (e.g. acceleration and higher transparency), customer satisfaction (e.g. better response times), and employee satisfaction (e.g. improved team work and increased motivation).

The paper *Managing Operation Knowledge for the Metal Industry* written by Sheng-Tun Li and Huang-Chih Hseih from the National Kaohsiung First University of Science Technology (Taiwan) presents a three-stage life cycle for the ontology design. The application of the resulting ontology in a metal industry company proves the effectiveness and efficiency of their approach.

In the paper *Filters in the Strategy Formulation Process* Leena Ilmola and Anna Kotsalo-Mustonen from Helsinki University of Technology (Finland) present a new software tool supporting strategy formulation processes. Based on three different types of filters that hinder effective knowledge flows in companies a software tool is introduced that helps overcome these filters.

Matteo Bonifacio and Alessandra Molani from University of Trento (Italy) are the authors of the paper *The Richness of Diversity in Knowledge Creation: an Interdisciplinary Overview*. They propose theoretical, practical and technological arguments supporting a distributed approach to knowledge management. Knowledge diversity in theory, practice, and technology is considered an important source of value for the approach of the authors.

The last paper in this category has the title *SCBS Social Capital Benchmarking System Profiting from Social Capital when Building Network Organisations*. José María Viedma from Polytechnic University of Catalonia (Spain) argues that the competitive advantage of a company does not only rely on a company's internal intellectual capital but also on the external intellectual capital of other companies, organisations and institutions. The author presents a social capital benchmarking system which serves as a new management method and a new management tool which identifies, audits and benchmarks the resources and capabilities existing in cluster organisations.

Knowledge mining including retrieval, classification and discovery constitutes another main stream in knowledge management. The papers of this second category address the following topics:

The paper *Unified Access to Heterogeneous Audiovisual Archives* is written by Y. Avrithis, G. Stamou, and M. Wallace from National Technical University of Athens (Greece), F. Marques, P. Salembier, X Giro from Technical University of Catalonia

(Spain) and W. Haas, H. Vallant, M. Zufferey from Joanneum Research (Austria). The authors present an integrated information system that offers enhanced search and retrieval capabilities to users of heterogeneous digital audio-visual archives. The idea is to extract semantic information from audio/video and text data taking into account context information of a user.

Pruning-based Identification of Domain Ontologies is the title of a paper co-authored by Raphael Volz, Rudi Studer, and Alexander Maedche from FZI Research Center for Information Technologies (Germany) and Boris Lauser from FAO of the UN (Italy). This paper introduces a new pruning-based approach of extracting a domain ontology from large-scale thesauri. In this context pruning presents a completely automatic bootstrapping approach for ontology development. The aim of pruning is to automatically extract from an existing vocabulary a subset of the conceptualization which is relevant to the target domain. In a later stage, the automatically identified initial domain ontology can easily be refined by experts.

Christian Biemann, Uwe Quasthoff, Karsten Böhm from University of Leipzig (Germany) and Christian Wolff from Chemnitz University of Technology (Germany) are the authors of the paper *Automatic Discovery and Aggregation of Compound Names for the Use in Knowledge Representations*. They argue that the treatment of multiword terms as single semantic entities is an inherent problem of automatic acquisition of information structures (e.g. Topic Maps). As a solution to this problem the authors present a method for learning multiword terms from large text corpora.

The following two papers belong to an evergreen category in knowledge management, namely ***knowledge representation***.

Kai Mertins, Peter Heisig, and Kay Alwert from Fraunhofer IPK (Germany) are the authors of the paper *Process Oriented Knowledge Structuring*. The paper presents three different types of knowledge structures and their visualization (e.g., Topic Maps, Knowledge Navigator) which support the structuring and maintenance of complex knowledge bases.

Towards the Semantic Grid: Putting Knowledge to Work in Design Optimisation is a paper authored by Fang Tao, Liming Chen, Nigel Shadbolt, Graeme Pound and Simon Cox from the University of Southampton (UK). They present a knowledge-based approach which uses existing sources to acquire knowledge needed for engineering design search and optimization. In order to reuse this knowledge and to provide guidance at knowledge intensive points, a knowledge advisor is proposed. This advisor gives a context-aware critique to guide users through effective operations of building domain workflows.

The last paper category – ***convergence of knowledge management with other domains*** – reflects signals indicating that research of other domains converges with research in knowledge management. Such converging fields include problem solving, eLearning, linguistics etc.

The paper *Knowledge Management for Computational Problem Solving* written by D.T. Lee, G.C. Lee and Y.W. Huang from Academia Sinica (Taiwan) argues that algorithmic research is an established knowledge engineering process allowing researchers to identify significant problems, to better understand existing approaches and to obtain new, effective and efficient solutions. To support researchers in this

process a problem-centred collaborative knowledge management architecture associated with computational problem solving is presented.

Lilia Efimova and Janine Swaak from the Telematica Instituut (The Netherlands) discuss in their paper entitled *Converging Knowledge Management, Training and e-Learning: Scenarios to Make it Work* the added value of using knowledge management methods to support human resource learning management efforts and vice versa of using human resource training instruments to support knowledge management. Examples for existing practices of joint work include linking communities of practice and formal learning programmes or fostering the cooperation between a Chief Knowledge Officer and Human Resource teams.

I hope that the broad variety of 13 contributions provides the reader with a comprehensive overview of the most intriguing hot spots in knowledge management in 2003.

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