

PhD Thesis

B-KIDE: A Framework and a Tool for Business Process Oriented Knowledge Infrastructure Development

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Preface

This PhD thesis¹ comprises the key results of my intensive research performed at the Know-Center Graz during the last years. Knowledge management as a scientific domain has fascinated me since the very first time I encountered it. The generation of new knowledge about knowledge management appeared to be both a challenging and deeply satisfying task to me. My research was and is based on the hypothesis that understanding knowledge as *the* critical factor in today's economy is key to achieving sustainable success for organizations. Therefore, the Know-Center Graz, Austria's competence center for knowledge based systems and applications, represented a more than suitable environment for me to pursue this PhD.

I would like to thank the people who contributed to and supported me in the realization of this work: Klaus Tochtermann, my professor and advisor, developed a profound infrastructure and a creative environment for researchers at the Know-Center. He was always available for critical and constructive discussions about my ideas and concepts. I value your commitment to my research. Hermann Maurer, initiator of the Know-Center and my second reader, sparked off my interest in research on knowledge infrastructures through the development of the MT-Model for knowledge management systems (also see chapter 1). Stefanie Lindstaedt, my division manager, gave me the opportunity and freedom to establish the domain of business process oriented knowledge management as a key area of research at the Know-Center. All the people from the companies I have

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My parents, Gerda and Walter, taught me that curiosity is a quality. You have always supported me in learning and advancing throughout my life. Thank you.

And Pia - Thank you.

Graz, December 2004

Markus B. Strohmaier

Zusammenfassung (German abstract)

Die Notwendigkeit des effektiven Managements von Wissen wird heute von Unternehmen zunehmend erkannt. Um diesem Anspruch gerecht zu werden, wurden neue vielversprechende und umfassende Technologien von Wirtschaft und Wissenschaft entwickelt. Mit der Verfügbarkeit und Weiterentwicklung dieser Innovationen verstärkte sich auch die Bereitschaft von Unternehmen neue Wissensmanagement-Technologien anzuwenden. Die erfolgreiche Anwendung in Unternehmen stellt jedoch eine komplexe, mehrdimensionale Herausforderung und ein aktuelles Forschungsgebiet dar. Die vorliegende Dissertation nimmt sich deshalb diesem Thema an und stellt einen Framework für die Entwicklung von geschäftsprozessunterstützenden, technologischen Wissensinfrastrukturen vor. Während dabei Geschäftsprozesse den organisatorischen Rahmen für die Anwendung von Wissensmanagement-Technologien bieten, so repräsentieren Wissensinfrastrukturen ein Konzept, dass Wissensmanagement in Organisationen ermöglicht. Der in dieser Dissertation entwickelte B-KIDE Framework bietet Unterstützung in der Entwicklung von Wissensinfrastrukturen, welche innovative Wissensmanagementfunktionalitäten beinhalten und sichtbar organisatorische Geschäftsprozesse unterstützen, an. Das entwickelte B-KIDE Tool erleichtert die Anwendung des B-KIDE Frameworks für Entwickler von Wissensinfrastrukturen. Drei durchgeführte, empirische Studien mit Unternehmen unterschiedlichster Branchen bekräftigen die Relevanz und Viabilität der eingeführten Konzepte.

Schlüsselwörter: Wissensmanagement, Wissensinfrastrukturen, Geschäftsprozesse, Systemanalyse, Systemgestaltung, Entwicklungsinstrumente

Abstract

The need for an effective management of knowledge is gaining increasing recognition in today's economy. To acknowledge this fact, new promising and powerful technologies have emerged from industrial and academic research. With these innovations maturing, organizations are more and more willing to adapt such new knowledge management technologies to improve their knowledge intensive businesses. However, the successful application in given business contexts is a complex, multidimensional challenge and a current research topic. Therefore, this PhD thesis addresses this challenge and introduces a framework for the development of business process-supportive, technological knowledge infrastructures. While business processes represent the organizational setting for the application of knowledge management technologies, knowledge infrastructures represent a concept that can enable knowledge management in organizations. The B-KIDE Framework introduced in this work provides support for the development of knowledge infrastructures that comprise innovative knowledge management functionality and are visibly supportive of an organization's business processes. The developed B-KIDE Tool eases the application of the B-KIDE Framework for knowledge infrastructure developers. Three empirical studies that were conducted with industrial partners from heterogeneous industry sectors corroborate the relevance and viability of the introduced concepts.

Keywords: Knowledge Management, Knowledge Infrastructures, Business Processes, System Analysis, System Design, Development Tools

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List of Acronyms

API Application Programming Interface

ARIS Architektur integrierter Informationssysteme

B-KIDE Business process oriented Knowledge Infrastructure Development

B2B Business to Business

bpoKM business process oriented Knowledge Management

BPR Business Process Re-engineering

CAME Computer Aided Methodology Engineering

CASE Computer Aided Software Engineering or Computer Aided System Engineering

CKO Chief Knowledge Officer

CLR Common Language Runtime

CLS Common Language Specification

CoP Communities of Practice

COTS Commercial Off The Shelf

CPI Continuous Process Improvement

CRC Cooperative Requirements Capture

EDM Engineering Data Management

EU European Union

FAQ	Frequently Asked Questions
HCI	Human Computer Interaction
HTML	Hypertext Markup Language
ICT	Information and Communication Technology
IL	Intermediate Language
ISO	International Standardization Organization
IT	Information Technology
JAD	Joint Application Design
KI	Knowledge Infrastructure
KM	Knowledge Management
KMS	Knowledge Management System
KPQM	Knowledge Process Quality Model
LPP	Legitimate Peripheral Participation
N/A	Not Available
OMIS	Organizational Memory Information System
PhD	Philosophiæ Doctor. Doctor (or Doctorate) of Philosophy
QFD	Quality Function Deployment
R&D	Research and Development
SVG	Scalable Vector Graphics
UI	User Interface
UML	Unified Modeling Language
W3C	World Wide Web Consortium
WFMS	WorkFlow Management System

XML Extensible Markup Language

XSLT Extensible Stylesheet Language Transformations