

1 Introduction – Chances and Challenges in Business Networking

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1.1	Networked Enterprise: The Vision	2
1.1.1	Business Networking and the New Economy	2
1.1.2	Five Phases Towards Business Networking	2
1.2	Networking the Enterprise: The Transformation	4
1.2.1	Closing the Gap Between Strategy and Reality	4
1.2.2	Achieving Networkability	5
1.2.3	Part One: Building the Foundation.....	6
1.2.4	Part Two: Business Concepts	7
1.2.5	Part Three: Information System Concepts.....	8
1.2.6	Part Four: Key Success Factors	8
1.3	Research Approach	9
1.3.1	Applied Research: Providing Practical Guidelines	9
1.3.2	Action Research: Balancing Rigor and Relevance.....	10
1.3.3	Competence Centers in Business Networking.....	11

1.1 Networked Enterprise: The Vision

1.1.1 Business Networking and the New Economy

We see that many businesses today are hoping to find the rules which govern the new economy [cf. Kelly 1998], also referred to as the digital economy (cf. [Negroponte 1995], [Tapscott 1995]), the networked economy [cf. Shaprio/Varian 1999], the information economy [cf. Varian 1994], the Internet economy [cf. Zerdick et al. 1999] or the information age [cf. Lane 1998]. Information and communication technology (IT)¹ enables and shapes the new economy in the same way that steam, gas, and electricity transformed the agricultural economy into the industrial economy a hundred years ago.

Business Networking is not the only feature of enterprises in the information age, but certainly the most important. In the past, Business Networking was the basis for the division of labor in agricultural as well as in industrial society, and a prerequisite for increasing prosperity. As already stated by [Smith 1776], the division of labor is limited by the geographical reach of the market. Before the emergence of local farming markets, every farmer produced everything he or she needed to live. With the introduction of new transportation technologies, the market span grew and consequently led to the specialization of the industrial economy. In our time, IT is pushing the physical disintegration of markets and enterprises to its global limits and thus enabling the maximal specialization of enterprises.

Business Networking in the new economy can be seen as the coordination of processes within and across companies. More precisely, we define Business Networking as the management of IT-enabled relationships between internal and external business partners. So far, there has been no clear vision of the business units and processes nor of the coordination mechanisms that Business Networking has in store for the economy. Disintegration, specialization, reintegration, centralization, etc. are certainly among the current trends that present a growing challenge for business management and science.

1.1.2 Five Phases Towards Business Networking

Looking back, the importance of Business Networking grew with the integrated support of business processes. In the early phase, the integration area² was rather

¹ Due to the convergence of information processing and communication, we will refer to the combination of information and communication technologies as IT.

² The integration area describes the number of tasks of an enterprise implemented in an integrated information system [Österle et al. 1993].

small. As technology developed, the integration area grew. In this development, we distinguish five phases (see Figure 1-1).³

Phase 1 (1970s): The aim of *computerizing single 'island' functions* was to automate individual business functions, such as invoicing. Manual operations were generally transferred to the computer without any modification [cf. Alpar et al. 1998, 29]. This led to isolated solutions which efficiently supported individual operations.

Phase 2 (1980s): The *computerization of functional areas*, such as production, financial accounting or distribution, achieved integration within the most important business function areas [cf. Raffée 1993] and improved the efficiency of whole departments. For the first time, IT made it possible to apply new methods, such as production or financial planning, which transform business processes and present new challenges for employees.

Phase 3 (1990s): The development of systems for enterprise resource planning (ERP) enabled companies to implement *integrated processes* across various departments and/or functions. Hence it was possible to set up pervasive processes (e.g. order processing) from the customer (e.g. sales, order receipt) to the customer (e.g. distribution, invoices, payment receipt). ERP systems (cf. Chap. 2.3.1) soon became the nerve center of enterprises since they guarantee that every (authorized) employee has real-time access to all operational information.

Phase 4 (1990s): Concurrently with the implementation of ERP systems, some enterprises went for link-ups with their customers or suppliers. For instance, they would use electronic data interchange (EDI) systems in order to handle high-volume transactions efficiently. However, what they did was merely to set up rather expensive 1:1 or 1:n relationships. This was one important reason why a broad diffusion of EDI was not taking place as anticipated.⁴

Phase 5 (ca. 1990-2005): Here we see a new stage in customer orientation. Following Reverse Engineering ideas, companies will adapt and be built to suit customer needs and processes. Standardized systems for supply chain management (SCM) and electronic commerce (EC) enable quick and efficient linkages among business partners. The Internet plays a key role in improving these n:m networking capabilities, since it provides a standardized technological infrastructure. Taking the analogy of the road network, we can look forward to the growth of this networking infrastructure in the years to come, with all its standards (e.g. road width, signs, traffic regulations), coordination technologies and systems (e.g. traffic lights, GPS systems) and services (e.g. police, highway maintenance, fees,

³ For further models (cf. [Venkatraman 1991], [Lane 1998], [Clark 1999] or [Nolan/Croson 1995]). For the technical development of informatization from mainframe computing in the 1960s to today's electronic business [cf. Schnedl/Schweizer 1999].

⁴ For reasons to explain the disappointing diffusion of EDI (cf. [Kalakota/Whinston 1997], [Christiaanse et al. 1996] and [Alt/Klein 1999]).

tolls, automobile clubs). Various initiatives (e.g. Bolero, Uddi) are underway to establish this standardized networking infrastructure which we refer to as the ‘business bus’ (cf. Chap. 2.3.4). It forms the core of the business collaboration infrastructure which eventually will evolve from marketplaces.

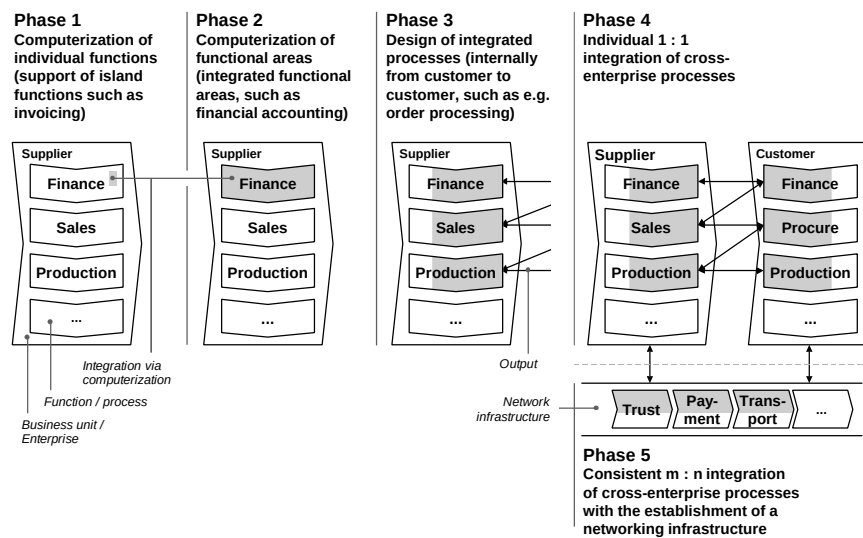


Figure 1-1: Development of Business Networking

1.2 Networking the Enterprise: The Transformation

1.2.1 Closing the Gap Between Strategy and Reality

Today, researchers and managers are overwhelmed by the large number of publications on the new economy. Most authors delve into the economic aspects and arrive at a highly aggregated view. Important scientific contributions have come from transaction cost theory [cf. Williamson 1989], organizational theory (cf. [Sydow 1992], [Snow et al. 1992], [Müller-Stewens 1997], [Ruigrok et al. 1999]), institutional economy [cf. Williamson 1991], coordination theory [cf. Malone/Crowston 1994], business networks and information management (cf. [Malone et al. 1987], [Klein 1996], [Wigand et al. 1997]) and economics [cf. Varian 1994]. Together with anecdotal management literature, these provide valuable insights at a rather strategic level. For instance, they help to set up strategic

partnerships between enterprises, to position an enterprise within a supply chain, or to understand the long-term impact of IT on organizational structures.

However, what companies are regularly faced with is the challenge of actually implementing Business Networking strategies. It is our research partners in industry - about ten globally active enterprises – to whom we are indebted for in-depth information on the less frequently discussed hurdles encountered in trying to translate Business Networking strategies into practice.

This book is designed to supply some ‘building blocks’ to close the gap between networking strategies and the nuts and bolts of, say, an up-and-running EC or SCM system. On the one hand, our intention is to help translate strategies into business process networks that can be implemented by IT means. On the other hand, it is hoped that we shall assist users in finding new processes and strategies based on new IT.

We propose to close the gap by introducing a *business process* view on Business Networking. We conceive of Business Networking as the logical result of a consistent process orientation. Business process redesign represents an enterprise-internal focus on processes. However, processes start and end with customers. While enterprise borders are alien to processes, the business network provides processes with a playground [cf. Venkatraman 1991].

1.2.2 Achieving Networkability

The main goal of the book is to show how enterprises can achieve networkability⁵. We define networkability as the ability to cooperate internally as well as externally [Wigand et al. 1997, 11]. Networkability refers to (a) resources, such as employees, managers and information systems, (b) business processes, e.g. the sales process, and (c) business units, e.g. an enterprise in a supply chain. Networkability describes the ability to rapidly establish an efficient business relationship.

[Klein 1996] presents an extensive framework along which he discussed multiple aspects of Business Networking. The fact that our focus is on processes as well as information and communication technology compels us to ignore many of these important aspects here. In discussing networkability, we will concentrate instead on the processes around the supply chain, electronic commerce and relationship management, and on transaction-oriented information systems. For content-oriented Business Networking literature see ([Bach/Österle 2000], [Bach et al. 2000]).

This book is intended to address two main audiences: the scientific community and the business community. It is divided into four parts. Part 1 builds the foun-

⁵ Also referred to as ‘Net Readiness’ [cf. Hartman et al. 2000].

dation for the book and thus provides the reader with our process-oriented framework for Business Networking. Part 2 discusses business concepts in Business Networking, Part 3 deals with IT issues and Part 4 collates the experiences reported in order to deduce the critical success factors and management techniques (see Figure 1-2).

Chapter 1: Introduction - Chances and Challenges in Business Networking

Part One: Building the Foundation

Chapter 2: Enterprise in the Information Age
Chapter 3: The Networked Enterprise

Part Two: Business Concepts

Chapter 4: Strategies for Business Networking
Chapter 5: Business Networking Lessons Learned: Supply Chain Management at Riverwood International
Chapter 6: Electronic Commerce and Supply Chain Management at 'The Swatch Group'
Chapter 7: Knowledge-enabled Customer Relationship Management

Part Three: Information System Concepts

Chapter 8: Future Application Architecture for the Pharmaceutical Industry
Chapter 9: Overview on Supply Chain Management Systems
Chapter 10: Electronic Commerce in the Procurement of Indirect Goods
Chapter 11: Templates: Standardization for Business Networking
Chapter 12: eServices for Integrating eMarkets

Part Four: Key Success Factors

Chapter 13: Key Success Factors for Business Networking Systems
Chapter 14: Towards a Method for Business Networking
Chapter 15: Application of the Business Networking Method at SAP
Chapter 16: Architecture Planning for Global Networked Enterprises

Chapter 17: Business Networking - Summary and Outlook

Figure 1-2: Content Structure

1.2.3 Part One: Building the Foundation

In Chapter 2, *Enterprise in the Information Age*, Business Networking is seen as one of seven trends that will ultimately lead to the enterprise of the new economy. With Business Networking viewed within a broader perspective, Chapter 2 establishes a rich context for evaluating findings that are specific to Business Networking. The other trends discussed are enterprise relationship management, knowledge management, smart appliances, electronic services, customer processes and value management.

Chapter 3, *The Networked Enterprise*, details the trend of Business Networking to the level of business processes and provides a process-oriented framework as an aid to understanding and managing the diversity of Business Networking. With reference to several disparate practical cases, different forms of networking are discussed and the tools of coordination theory applied to derive a generic model of a networked enterprise. According to this model, every networked enterprise is part of multiple internal and external networks and called upon to manage networking scenarios, in some cases simultaneously, such as supply chain manage-

ment, relationship management, innovation, enterprise infrastructure and organizational development. The concept of networkability is introduced to support 'classical' companies to transform into networked companies.

1.2.4 Part Two: Business Concepts

Part 2 concentrates on the business-oriented aspects of Business Networking. Chapter 4, *Strategies for Business Networking*, describes how Business Networking can link up to corporate strategy and how it can sustain core competencies and future market segments. Three organizational strategies (outsourcing, insourcing and virtual organizing) are distinguished. Implementation and process-orientation are introduced with three networking strategies (electronic commerce, supply chain management and customer relationship management). Based on numerous practical cases, Chapter 4 provides some insights into how it is feasible to influence market position through Business Networking.

Chapter 5, *Business Networking Lessons Learned: Supply Chain Management at Riverwood International*, concentrates on the Business Networking strategy for supply chain management. In the style of a management paper, it presents the challenges, benefits and conclusions drawn from Riverwood International's 'Strategic Enterprise Partnership' project. The lessons learned then serve as the basis for Part 4.

In Chapter 6, *Electronic Commerce and Supply Chain Management at 'The Swatch Group'*, the complementarity of supply chain management and electronic commerce is discussed. Whereas some authors view electronic commerce as part of the implementation of supply chain management (cf. Chap. 2), this Chapter takes a closer look at the interrelationships of both concepts. A case study from 'The Swatch Group' is used to illustrate the results and the benefits of an integrated strategy. Again, the lessons learned serve as the basis for Part 4.

Although this book concentrates on transaction-oriented processes and information systems in Business Networking, Chapter 7 looks into aspects of *Knowledge-enabled Customer Relationship Management*. It shows that cross-enterprise processes, such as customer relationship management, may depend heavily on unstructured data or, more precisely, unstructured knowledge. Electronic commerce is often described as covering the transactional part of customer relationships. Since knowledge management covers the non-transactional part, customer relationship management requires both concepts, i.e. electronic commerce and knowledge management. Chapter 7 links knowledge-enabled customer relationship management with Business Networking and comes up with a process-oriented customer relationship management reference model.

1.2.5 Part Three: Information System Concepts

Part 3 balances business requirements with the potentials and restrictions of information systems. Chapter 8 *Future Application Architecture for the Pharmaceutical Industry* translates the seven trends and the Business Networking model (cf. Chaps. 2 and 3) into an application architecture for a pharmaceutical company. It discusses processes to be supported, deduces requirements to be fulfilled, structures future software components and combines processes and components into an application architecture of the information age.

Chapter 9, *Information Systems for Supply Chain Management: An Overview*, focuses on the software components for supply chain management. Business goals and processes to be supported by the components are discussed and an overview is given of some classes of systems, such as MRP I, MRP II or APS. Finally, the class of APS systems is discussed in greater detail and some insights provided into the most important functions, vendors and products.

Chapter 10, *Electronic Commerce in the Procurement of Indirect Goods*, concentrates on software components for the procurement of indirect goods. We believe that these so-called desktop purchasing systems have the potential to become a killer application in Business Networking. On the basis of a business process model for the procurement of indirect goods, the authors look into the potentials of and ideas behind desktop purchasing systems. Again, a brief overview is given of the most important functions, vendors and products.

Chapter 11, *Templates: Achieving Standardization for Business Networking*, shows that achieving standardization is the key challenge for Business Networking. Chapter 11 presents some definitions and dimensions of standardization and then focuses on templates as a technique for standardization. The authors develop a template handbook and demonstrate its successful application within the Robert Bosch Group to achieve networkability.

Chapter 12, *eServices for Integrating ERP and eMarkets*, focuses on the cross enterprise integration of business processes, another key challenge of Business Networking. For linking (external) eMarkets with (internal) enterprise resource planning (ERP) systems, it discusses the concept, architecture, and implementation of external integration services along the real live case study Triaton.

1.2.6 Part Four: Key Success Factors

Part 4 translates the lessons learned from Chapters 2 through 12 into management guidelines. Chapter 13, *Key Success Factors for Business Networking Systems*, analyses what are considered to be the key success factors in implementing Business Networking systems on the basis of three different cases. Two techniques are

then developed (partner profiling and creation of win-win situations) which helped enterprises to manage the key success factors.

Chapter 14, *Towards a Method for Business Networking*, translates the key success factors of Chapter 13 into a robust method which guides managers in designing and implementing cooperation-intensive business networks. The proposed method covers aspects from strategy to implementation, takes into account the new business logic as outlined in Chapter 2, and follows the principles of method engineering. Cases in eProcurement and supply chain management illustrate the method in practice.

Chapter 15, *Application of the Business Networking Method*, applies the method proposed in the previous chapter to an fictitious case with many real world nuts and bolts. It shows that implementing networking strategies such as EC, CRM, or SCM, may lead to significant interdependencies on process and IT level. In this Chapter we also show how SAP incorporates the Business Networking method into its method framework (so-called Accelerated SAP).

Chapter 16, *Architecture Planning for Global Networked Companies*, directs attention to the information system level. The authors show how to deduce an application architecture from a business architecture by introducing a methodology for architecture planning, referred to as PROMET eBN.

Finally, Chapter 17, *Business Networking - Summary and Outlook*, summarizes the findings of the book and outlines the next steps proposed in Business Networking research. Future work in the field of Business Networking is certain to include such topics as the advent of numerous electronic services and networked real-life assets.

1.3 Research Approach

1.3.1 Applied Research: Providing Practical Guidelines

Our research approach to Business Networking combines insights from practice and theory. The applicability of these findings in practice is our primary research goal. Four aspects can be mentioned to describe what distinguishes our approach to Business Networking from others.

- *Practice relevance.* The goal of this book is to ensure the applicability of findings, concepts and methods in practice. Action research principles based on established literature are used. Case studies have been undertaken at ETA SA, Riverwood International, Deutsche Telekom, Robert Bosch Group, new-

tron/Triaton, Commtech and others to elaborate and explain Business Networking.

- *Engineering perspective.* We believe that Business Networking concepts have to provide management support in strategic as well as technological areas. To ensure this holistic management approach, we follow the systematic principles of method engineering (cf. Chap. 14.1.3) which provide a structured framework for developing information age strategies. This engineering approach clearly differentiates Business Networking from models that focus on unspecific high-level advice, and is valuable in transferring knowledge from previous projects.
- *Process orientation.* This book presents a process-oriented view of networking that sees cooperation between business partners as networks of processes. We follow coordination theory to present a model of networked processes which embrace resources shared between two (or more) processes (cf. Chap. 3.3.1). We will apply and test this model in cases throughout the book. Process orientation not only reflects the fact that Business Networking solutions need to have close links with business processes, but also that they have to establish a very specific starting point for shaping underlying applications.
- *Single enterprise view.* Finally, it should be noted that we see Business Networking from the point of view of an individual company. Contrary to existing networking literature which focuses on the network per se as the design object, the underlying theorem of this book is that all decisions that lead to action have to be performed by a specific actor, i.e. a company.

1.3.2 Action Research: Balancing Rigor and Relevance

To study the time-dependent, complex and social phenomena of Business Networking, we designed our research process in accordance with the *action research* guidelines proposed by Checkland.⁶ Within the action research process, the researcher becomes part of the experiment, and thus the mental models or, as [Checkland/Holwell 1998] puts it, the ‘Weltanschauung’ of the researcher colors the results. Evidently, every researcher in the same research situation would produce different results that would not be reproducible elsewhere since it is unlikely that any two researchers would apply exactly the same mental models.

Results will only be truly scientific if different individuals can successfully apply them in different situations. Scientific results have to be *reproducible*. And scientific results must differ from anecdotal story-telling which often produces not reproducible but merely *plausible* results.

⁶ A good overview on action research is provided by ([Checkland 1991], [Checkland 1997] and [Checkland/Holwell 1998]).

To design action research processes which lead to reproducible as well as more than plausible results, [Checkland 1997] introduced the criterion of recoverability. Recoverability postulates that a research process should enable a reasonably educated person to reproduce or *recover* results achieved elsewhere. If recoverability is to be maintained, researchers must declare their research themes, their research methods and their areas of concern *ex ante*. Research themes in action research correspond to hypotheses in the natural sciences.

Our book reflects major results from the Competence Centers for electronic Business Networking (CC eBN) and inter-Business Networking (CC iBN). Team members participated in the projects undertaken by the partner companies of CC eBN and conducted regular workshops and steering committee meetings. The team was and still is aware of the benefits and drawbacks of action research. By carefully managing the recoverability of its results, we try to maximize both rigor and relevance: Today, the main results of both research projects, the methodologies PROMET eBN and iBN are being used in companies to solve different problems. Parts of the methodologies are incorporated in other methodologies, the eBN method (cf. Chap. 16) in SAP's Global ASAP [SAP 1999b] and the iBN method (cf. Chap. 14) in SAP's ASAP for APO 2.0a.

1.3.3 Competence Centers in Business Networking

The Competence Center for eBN (March 1996 until March 1998) was funded by and operated in collaboration with four partner companies (see Table 1.2). One of the goals of CC eBN was to develop a robust methodology for distributing processes and information systems within an enterprise. The Competence Center for iBN (March 1998 until February 2000) concentrated on the extended supply chain and the management of customer / supplier relationships and shifted the focus from ERP to SCM and EC systems. Our partner companies are shown in Table 1.2. In parallel with the Competence Centers, the project Business Network Redesign (BNR)⁷ was conducted, which focuses on similar aspects to those of CC iBN. Following successful conclusion of the CC iBN, the work has been continued in the Competence Center for Business Networking (March 2000 until March 2002) which focuses on developing an architecture and method for new approaches in Business Networking, such as eServices, eMarkets and portals.

All projects are part of the 'Business Engineering HSG' research program. This program relies on teamwork and field research rather than on typical academic, single-person desk research. In every project, a research team covering the roles of (a) project leader, (b) steering committee and (c) work group members design and execute research plans. Four to six doctoral students from the Institute of Infor-

⁷ This project was supported by the Swiss National Fund for the Promotion of Scientific Research (Project No. 5003-045377).

mation Management at the University of St. Gallen (IWI-HSG) and six to twelve managers from the partner companies form the work group. The project is led by an experienced post-doc (Rainer Alt/Elgar Fleisch) who regularly reports the work group results to the steering committee. This consists of the professor in charge of the project (Hubert Österle), a senior executive from each partner company and the project leader. For a list of steering committee members and work group members of CC eBN, CC iBN, CC BN and the BNR project see Table 1-1.

Partner Company	Steering Committee Member	Work Group Members
Competence Center electronic Business Networking (CC eBN)		
Deutsche Telekom AG Bonn, Germany	Karl-Heinz Schelhas	Klaus Basten Wolfgang Kilian
Henkel KgaA Düsseldorf, Germany	Eckhard Dieckmann	Jens Kalke Franz-Josef Thissen
Hewlett Packard GmbH Böblingen, Germany	Georg Illert	Armin Schneider Ulrich Modler
SAP AG Walldorf, Germany	Heinz-Ulrich Roggenkemper	Cay Rademann
Competence Center inter-Business Networking (CC iBN)		
Bayer AG Leverkusen, Germany	Andreas Klosson	Rolf Guntermann Gisela Schmitz
Deutsche Telekom AG Bonn, Germany	Karl-Heinz Schelhas	Jörg Fuhr
ETA SA Fabriques d'Ebauches Grenchen, Switzerland	Ernst Martin	Rudolf Zurmühlen
F. Hoffmann-La Roche Ltd., Basel, Switzerland	Vladimir Barak	Martin Wyss
HiServ GmbH Frankfurt, Germany	Norbert Kaltenmorgen	Mark Pietzner
Riverwood International Corporation Atlanta, USA	Robert Betts	Chuck Lawrence Jim Vrieling
Robert Bosch GmbH Stuttgart, Germany	Günter Lehmann	Martin von Ehr Sandra Hausmann
SAP AG Walldorf, Germany	Thomas Reiss	Andreas Pfadenhauer

Competence Center Business Networking (CC BN)		
DaimlerChrysler AG, Stuttgart, Germany	Frank Appenzeller	Günter Kapusta Erich Haase
Deutsche Telekom AG Bonn, Germany	Karsten Schweichart Torsten Minkwitz	Axel Meckenstock Rainer Scheibehenne Karl-Heinz Schelhas
emagine GmbH, Eschborn, Germany	Roland Härtner	Elmar Sängler Werner Sobek
ETA SA Fabriques d'Ebauches Grenchen, Switzerland	Kaspar Glatthard	Thomas Bühler Rudolf Zurmühlen
F. Hoffmann-La Roche Ltd., Basel, Switzerland	Vladimir Barak	Thomas Huber
Hewlett-Packard GmbH, Switzerland	Hans-Peter Furrer Mark Gasteen	Michel Benard Mark Gasteen
HiServ GmbH, Frankfurt, Germany	Norbert Kaltenmorgen	Oliver Adamczak Moni Meltke
Robert Bosch GmbH Stuttgart, Germany	Günter Lehmann	Christine Bondel Dirk Sassmannshausen
SAP AG Walldorf, Germany	Thomas Reiss	Axel Luther

Table 1-1: Research Projects and Partners

It should be noted that this book presents only a fraction of the work undertaken and the results recorded by the Competence Centers. Further information can be obtained by visiting www.iwi.unisg.ch.

