

Preface

ABOUT THE SUBJECT

Business integration is an emerging need of every organization, with increased importance, as information and communication technologies (ICT) advance, efficiency and competitiveness are a must, and collaboration becomes indispensable. Business integration is becoming more and more complex due to the increased complexity of products and processes, increased incorporation of knowledge and skills, fast technological change, globalization and competition. It is, thus, a main organizational challenge gaining increased relevance during recent years. If in the past integration was associated mainly with engineering (processes and operations) integration, today it pervades from the engineering level to the whole organization and inter-organizational aspects.

Organizations integrate resources: people, equipment, software tools, knowledge, skills, technology, opportunities, markets, suppliers, partners. Resources used by organizations, besides being heterogeneous, are supposed to work together effectively and efficiently. The correct orchestration of their integration determines the ability of producing the goods and services that dictate the organization's competitiveness. In this context, business integration is one of the most important, if not the most important, requirements for making any business truly competitive. Business integration assures that all the resources propel increased performance.

Integration between any sort of process, product or technology, means the ability of two or more systems to work together. When thinking about business integration, it means also the management of human, information and technology resources that together support the organization itself and its relation with partners, suppliers, supply chain ... whatever organizational model by which the organization is structured.

But integration is difficult, challenging and, many times, a failure! Adaptive technologies for information and application integration, like Webservices, SOAP, WML and so forth, appear as a robust solution and readily available, but *de per si* do not solve current needs. Integration models and architectures, technology management and knowledge management are also technologies that must be specially understood and managed to fully achieve business integration objectives.

During recent years we have assisted a huge development effort, addressing the need to share information between processes or within enterprise systems, the need to make information available through the *Web*, the need to participate in electronic marketplaces, to integrate the supply chain and so forth. The importance of these developments is widely known; however, their implementation is not immediate, as it requires an information technology strategic activity of planning and coordination involving performance management, business processes management, business intelligence, knowledge management, database integrity, workflow, accountability and many other fields of knowledge.

ORGANIZATIONS FACE NEW TRENDS, BOTH AT THE INTRA- AND INTER-ORGANIZATIONAL LEVELS

This book addresses the development of adaptive strategies and technologies to enable business integration, covering both intra- and inter-organizational integration levels, from three dimensions: managerial, social and organizational. It presents a collection of different but complementary aspects, from business integration models and architectures, knowledge management, socio-technical approaches, and standards and integration protocols, all of these contributing to make intra- and inter-organizational integration possible.

In 16 chapters authored by 40 internationally renowned and experienced researchers and professionals of the business integration world, this book collects the recent models and solutions advanced both by academe and business. It addresses the following four dimensions (or perspectives) of business integration:

1. The organizational dimension, which includes ontological and organizational approaches—concepts, organizational models and business integration models.
2. The management dimension, which includes integration management, relationship management, process integration, knowledge management, technology integration management and information integration.
3. The technological dimension, which includes application integration and integration technologies, technological infrastructure and standards.
4. The human resources dimension, which includes human resources management, human resources integration, competence management and so forth.

The mission of this book is to discuss the main issues, trends and opportunities related to business integration from the above-mentioned dimensions, and to disseminate practical solutions.

This book is both for an academic audience (teachers, researchers and students, mainly of post-graduate studies) and professionals (managers, organizational and system developers, and information technology (IT) specialists in terms of explaining requirements and frameworks for the development of solutions).

ORGANIZATION OF THE BOOK

The book contains 16 chapters written by a group of internationally renowned and experienced authors in the business integration field, as well as a set of younger authors showing a high potential for research and development. Contributions came from the United States, Latin America, several countries of Eastern and Western Europe, Australia, and New Zealand. At the same time, the book integrates contributions from academe, research institutions and industry, representing a good and comprehensive representation of the state-of-the-art adaptive technologies to address the several dimensions of this fast evolutionary problem of business integration.

The chapters are organized in five sections:

Section I, *Business Requirements and Organizational Modeling*, introduces current business requirements and organizational models as requirements for business integration. Why integrate? What to integrate? Which are the integration enablers? The first four chapters of the book contribute to answering to these questions.

Chapter I, *Enterprise Reconfiguration Dynamics and Business Alignment*, discusses the phenomenon of the enterprise organizational reconfiguration and its dynamics as a business alignment enabler. By *business alignment*, it will be understood the enterprise's actions undertaken to gain synergy between the business—that is, the market opportunity and the provision of the required, or innovative, product—with the required, or designed, specifications at the required, or proper, time with the lowest cost and best possible return (financial or other). The enterprise's organization “fast reconfiguration,” either as a proactive or reactive action, or “fast adaptation” or “flexibility” (as a “reactive” action), is seen as the main enabler of business alignment and the main require-

ment for achieving competitiveness. The need to keep a close alignment with a dynamic market environment in permanent change implies the high dynamics of the organizations' organization, or organizational structure, reconfiguration. The first part of the text presents an enterprise's requirements for competitiveness and business alignment, while the second part discusses the phenomenon of enterprise reconfigurability as the business alignment enabler. In the third part, an analysis of some organizational and management approaches is presented from the reconfigurability point of view.

Chapter II, *Co-Engineering the Business, Information Use, and Operations Systems for IT-Enabled Adaptation*, introduces the Adaptive Complex Enterprise architecture, an enabler to deal with an externally driven environment and increasing complexity among entities. This holistic Adaptive Complex Enterprise architecture is based on *complete dynamic performance traceability* of interacting entities as they produce value. The architecture is operationalized through the related co-engineering methodology introduced in this chapter. Traceability enables business agents to accede the information for decision-making and adaptation, using IT as needed. The unified business-IT architecture approach introduced is easier than applying a plethora of disconnected business, system engineering and IT frameworks.

Chapter III, *Dynamic Enterprise Modeling for Knowledge Worker Industries*, presents a case study of the empirical development and implementation of a commercially successful enterprise modeling framework and associated constructs. The chapter discusses the objectives from a practical business and management viewpoint and provides a guide for the implementation of the empirical framework in real enterprises. It presents the successful integration of standard theoretical frameworks with empirical business and management models, including areas that previously have not been covered in an integrated fashion, such as strategic management capability, the ability to integrate the framework with various management paradigms and partial automation of model data capture.

Chapter IV, *Enterprise Systems: Innovation, Development, and Advantages*, discusses the relevance of information management capacity and its impact on organizations' development and competitiveness. The current increase in information management capacity generates new opportunities, making it critical for companies to significantly increase information, intelligence and technology management competences to successfully exploit these new opportunities. However, IT development has, in many cases, not been balanced by an enhancement of information *management* competences within organizations. This chapter discusses how to successfully exploit opportunities through the business philosophy of Enterprise Systems, which has helped streamline business processes and improve the overall performance of organizations; and introduces and discusses the development of Enterprise Systems and its role in creating competitive advantage.

Section II, *Integration Models and Architectures*, is composed of three chapters that contribute through addressing the specification and development of models and architectures to support business integration. These chapters discuss the questions: How to efficiently and effectively integrate? and How can integration bring competitive advantages?

Chapter V, *Competence Management for Business Integration*, discusses that business integration requires that each partner can guarantee not only the quality of its products, but also the qualification and competence of its workforce. The usual models, such as those included in the human resource management modules of Enterprise Resource Planning (ERP) systems, are not sufficient in highly constrained domains like aeronautics. The chapter discusses how a generic competence management model needed to be modified and enlarged to satisfy such constraints, introducing a model based on a software application, which may ensure that only competent people have been involved in the various steps of the manufacturing process and also may improve the way operational competences are managed in the company.

Chapter VI, *Business Integration in the Insurance Industry: The Intermediary Side of the Question*, introduces the main concerns and constraints felt in the insurance industry, which is heavily based on data, information and knowledge processing and requires a large connectivity and articulation between the entities in the business.

ICT and information systems can provide that connectivity, both intra- and inter-organization, making it possible for participants to come closer and dialog better, reducing response times and costs, improving the service to their clients and, possibly, creating new business opportunities. The chapter exposes the problems faced by intermediaries and insurance companies in this industry all over the world when trying to integrate their business and how they can be overcome. It also explains, by using a case study, how far the business of an intermediary integrates with other entities, using an electronic business platform built on Internet technologies.

Chapter VII, *SCOntology: A Formal Approach Toward a Unified and Integrated View of the Supply Chain*, points out the various challenges associated with supply chain management, which involves coordinating and integrating material, information and money flows both within and across several companies. The integration of these flows is perceived in quite distinct ways by different communities, raising some semantics-related problems. The chapter introduces a new ontology, *SCOntology*, to describe a supply chain at various abstraction levels by sharing a precise meaning of the information exchanged during the communication among the many stakeholders involved. Moreover, *SCOntology* provides a foundation for the specification of information logistics processes and also sets the grounds for measuring and evaluating a supply chain by stating different metrics and performance-related concepts.

Section III, Business Integration Management, addresses the organizational and managerial tools to enable business integration implementation (or integration processes). The three chapters of this section present several organizational and managerial solutions and contribute to the answer of these questions: How to enable business integration? How to manage to fully exploit business integration opportunities and advantages?

Chapter VIII, *Holistic Approach to Align ICT Capabilities with Business Integration*, proposes a holistic approach for the alignment of business integration with necessary ICT capabilities. This holistic approach encompasses the setup of an interdisciplinary forum, whose task is to align the business strategy with the resource strategy. The chapter discusses the authors' view on Enterprise Architecture (integrating a business architecture, information architecture, application architecture and infrastructure architecture), how it relates to the interdisciplinary forum, and the impact of business integration on Enterprise Architecture.

Chapter IX, *Managing Information Systems Integration in Corporate Mergers and Acquisition*, focuses the role of information systems integration in the context of corporate mergers and acquisitions. The topic is addressed from a management perspective and especially targets the consequences that information systems integration has for the acquisition initiative. Based on a literature review, the chapter presents a framework for describing, explaining and managing information systems integration in mergers and acquisitions. The usefulness and validity of this framework is shown by a case study on acquisition and information systems integration.

Chapter X, *The Impact of the Process Integration on Business Management: Case Studies using Six Sigma Methodology*, shows the power of the process integration in increasing the performance level of industrial systems using the Six Sigma methodology. The chapter explains how successful theories about process integration can be implemented in different industrial fields by introducing a rigorous methodology. Starting from the consideration that processes must be managed in order to achieve customer satisfaction, the companies need to change their old paradigms and focus on an integrated management of their functions. Six Sigma methodology is the solution proposed by the authors, which can be applied to every industrial field, anywhere there is a need for a global, shared objective and improvement. Additionally, three case studies are discussed to better illustrate the opportunities and advantages associated with implementation of Six Sigma.

Section IV, Knowledge Management for Business Integration, presents three contributions to this indispensable technology for business integration, covered by three chapters that discuss: What is the knowledge management role? What is the impact of knowledge management? How can knowledge resources be integrated in organizations?

Chapter XI, *New Business Requirements in the Knowledge-Based Society*, explains knowledge management's role for competitive advantage as a means of a new business requirement in the knowledge-based society. It argues that knowledge management, combined with new IT, determines new approaches of the business strategy, knowledge leadership, culture, management content, organizational structure, technology and innovation, which are key enablers for competitive advantage. In addition, these are discussed in the case of a virtual organization (Network of Excellence) for building the knowledge-sharing culture, based on the interaction of management functions and stages of the knowledge creation process. To the authors, understanding the main issues and trends of knowledge management, as an essential element of business integration, will assist in developing new approaches for attending efficiency in the new global virtual organizations.

Chapter XII, *Intelligent Organizations: Knowledge Computing Management*, is concerned with conceptualizing and getting results on topics that contribute to the understanding of the Knowledge Society we are going through, focusing the area of computer administration of knowledge, with the purpose of obtaining sustainable intelligent organizations. The chapter introduces an approach for organizations to carry out methodologically a diagnostic and outline of solutions. The contents are related with the information and obtaining of knowledge through tools of business intelligence of and technology management. The purpose is to facilitate the tools and concepts to recognize the strategic value of information as an effective form to achieve the prospective results. This purpose is achieved by an appropriate structure of knowledge, human resources and technology that crosses the organization in an integral and integrated form.

Chapter XIII, *Integration of Knowledge Resources in R&D Organizations: The Case of Mihajlo Pupin Institute*, introduces a business integration framework suitable for knowledge management in R&D organizations in the high technology sector. The knowledge management platform design is based on the latest technological trends and standards. Two main constituents of the proposed system are: the document warehouse layer, based on data warehousing methodology, and the semantic layer, based on the latest semantic technologies of ontologies and *Web services*. The initial results of introducing such a platform in an R&D institute (the Mihajlo Pupin Institute) in accordance with ISO 9001 Quality Assurance standards, are presented and discussed. Its utilization at the Mihajlo Pupin Institute will facilitate reusability of knowledge items and enhance creativity and innovation.

Section V, Technologies and Infrastructures, consists of three chapters describing and discussing the development of solutions for information and application integration. It helps answer the question: Which are the main infrastructures enabling information and application integration?

Chapter XIV, *Business Information Integration from XML and Relational Databases Sources*, introduces different alternatives to storing and managing jointly relational and XML data sources. Today, businesses are transformed in e-business and have to manage large data volumes and from heterogeneous sources. To manage large amounts of information, database management systems continue to be one of the most used tools, and the most extended model is the relational one. On the other side, XML has reached the *de facto* standard to present and exchange information between businesses on the Web. Therefore, it could be necessary to use tools as mediators to integrate these two different data to a common format like XML, since it is the main data format on the Web. The chapter makes a classification of the main tools and systems where this problem is handled, presenting their advantages and disadvantages; and proposes a new system to solve the integration business information problem.

Chapter XV, *Ontology Mapping Techniques in Information Integration*, provides an overview of the approaches to information integration developed by researchers in the community of ontology mapping. Besides introducing the background and concepts of ontology mapping, it presents a comprehensive and detailed treatment of different ontology mapping schemes. Closely related aspects of ontology mapping, such as mapping result description, similarity measures, algorithm performance evaluation and so forth, are also addressed. Ontologies are means to conceptualize and structure knowledge; however, ontologies themselves do not provide semantic interoperability, since a single ontology cannot be used to represent all kinds of domains and applications. Ontology mapping, therefore, is introduced to achieve knowledge sharing and semantic integration in an environment

with different underlying ontologies. The emphasis of the chapter is to present an actualized snapshot of this fast-growing technology.

Chapter XVI, *Integration Platform for De-Centralized Investment Projects Appraisal*, discusses a few software architectures and platforms in relation with their ability to cope with business integration problems in large and geographically dispersed companies. Of these architectures, the three-tier architecture has reached maturity and proved its usefulness in solving these problems. For solving more complex business integration problems, Service Oriented Architecture (SOA), based on an agent or Web services approach, is recommended. This chapter provides concise information about architectures and platforms, and an insight into two complex applications based on them, that will be useful in developing other complex applications that face similar business integration problems.

EXPECTATIONS

The book provides researchers, scholars and professionals with some of the most advanced research developments, solutions and implementations. It is expected to provide a better understanding of business integration and its adaptive technologies from an organizational and technological perspective. We expect the book to be read by academics (i.e., teachers, researchers and students), technology solutions developers and enterprise managers (including top-level managers). The book is also expected to help and support teachers of graduate and postgraduate courses from management to IT.

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Editors

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