Preface

In modern business, information technologies are implemented in several forms of enterprise information systems (EIS) such as enterprise resource planning (ERP), customer relationships management (CRM), supply chain management (SCM), business intelligence (BI), integrated messaging systems, and other forms of business computing. These systems are designed and implemented by using several approaches and methodologies. No matter which EIS design and implementation methodology is used, each enterprise information system is consisted of several information technologies, such as servers, desktop computers, portable/mobile computing devices, systems software, application software, data communication technologies, and computer networks. In addition, enterprise information systems employ several profiles of IT specialists such as application developers, programmers, system and network administrators, and business analysts.

EIS platforms cover business processes and make them possible in today’s e-economy; therefore, there is a high level of correlation between reliability, availability, and scalability of business processes/business operations and IT platforms that enable them. However, several types of IT-related problems such as hardware components’ glitches and failures, operating system or application defects and crashes, disastrous events, IT-specialists’ errors, such as accidental or intentional file deletion, unskilled operations, intentional hazardous activities including sabotage and strikes, can bring the system down for some time and consequently make data unavailable.

Modern enterprise information systems are expected to be resilient (continuous) and operational on an always-on basis, in other words, 24 hours a day, 7 days a week, 365 days a year. This is particularly important for multinational companies as their customers, suppliers, partners, and employees are located in many different time zones. Business critical applications, such as e-commerce applications, financial applications and services, call centers, Web servers, and e-mail servers, must be up at all times. The leading multinational companies and most e-business oriented organizations seek for highly available, reliable, and scalable operating environments in order to achieve always-on, reliable, and scalable operations.

In order to stay competitive, today’s business has to be resilient or continuous with an emphasis on continuous, always-on, and uninterruptible computing support and data availability. The main prerequisite for such a kind of business is an information system or an integrated IT platform which operates on an always-on basis with a 100% system uptime and zero downtime, or which is characterized by a high availability ratio measured in number of nines, for example, four nines—99.99%, five nines—99.999%, and so forth. The term “business continuance” or “business continuity” (BC) emphasizes the ability of a business to continue with its operations even if some sort of failure or disaster on its computing platform occurs. In short, the concept of continuous computing is all about “having IT-systems up and running,” being “always-on” and consequently keeping “business in business.”

The book, *Always-On Enterprise Information Systems for Business Continuance: Technologies for Reliable and Scalable Operations*, aims at providing a number of high quality chapters describing in
more detail the structure of such information systems, enabling technologies, aspects of their implementations, IT/IS governing, risk management, disaster management, interrelated manufacturing and supply chain strategies, and new IT paradigms.

Chapter 1, *IT Governance and IT Risk Management Principles and Methods for Supporting 'Always-On' Enterprise Information Systems*, by Spremic, argues that the development and governance of proper IT infrastructure may have enormous implications for the operation, structure, and strategy of organizations. IT and IS may contribute towards efficiency, productivity, and competitiveness improvements of both interorganizational and intraorganizational systems. Organizations manage risks associated with growing IT opportunities, as well as critical dependence of many business processes on IT and vice-versa. IT risk management issues are not marginal or 'technical' problems and become more and more a 'business problem'. This chapter proposes a corporate IT risk management model and a framework of IT governance and IT audit. In addition, the chapter explains how to model information systems and supporting IT procedures to meet 'always-on' requirements that comes from the business.

Chapter 2, *Risks Evaluation and IT Audit Aspects of Business Intelligence Solutions*, by Ko, emphasizes the fact that today's IT environments are more and more complex and fragmented, which brings additional security risks. The author focuses on business intelligence solutions that can provide assistance in these complex business situations. Their main goal is to assist organizations to make better decisions. Better decisions means that these solutions support the management of risks and that they have a key role in raising revenue and in reducing cost. This chapter provides an overview on business intelligence solutions and its future trends, and demonstrates the most important business intelligence solutions, by highlighting their risks, business continuity challenges, and IT audit issues.

Chapter 3, *Collaborative Systems for Decision Making for Disaster Preparedness and Response*, by Hahn, Block, Keith, and Vinze, points out that collaborative technologies (CT) have an excellent track record for supporting the important processes of preparing and planning before a disaster situation. These technologies can be the right choice for support of strategic approach and training groups before an emergency situation arises. Using CT before a disaster may allow groups to create emergency procedure manuals, which will be invaluable to first responders during a real-time disaster. Finally, collaborative technologies are equally as beneficial for use after an emergency situation. The next generation of collaborative technologies is media rich—expanding into database driven visualization, simulation, semantic analysis, and communication tools to create comprehensive interoperable collaboration systems. Authors present an example of this next generation of collaborative technologies called the “Decision Theater” at Arizona State University.

Chapter 4, *Principles and Experiences: Designing and Building Enterprise Information Systems*, by Aktas, discusses principles and experiences for designing and building of a “novel enterprise information system.” Author introduces a novel architecture for a hybrid information service, which provides unification, federation, and interoperability of major Web-based information services. The hybrid information service is designed as an add-on information system, which interacts with the local information services and assembles their metadata instances under one hybrid architecture. The proposed system differs from “local-as-view” approaches, as its query transformation happens between a unified schema and local schemas. It utilizes and leverages previous work on “global-as-view” approach for integrating heterogeneous local data services. The proposed system addresses the limitations of previous work by introducing an “add-on architecture,” which runs one layer above the implementations of UDDI and its extensions. It leverages previous work on UDDI and improves the quality of UDDI-based metadata systems in terms of fault-tolerance and high-performance.

Chapter 5, *Optimization of Enterprise Information System through a ‘User Involvement Framework in Learning Organizations’*, by Dave and Shrivastava, is an attempt to evaluate the psychological ca-
pabilities of the organization which can largely be evaluated through the mindset of the workforce and the willingness with which they are ready to adopt change. The authors argue that the implementation of any IT enabled operations systems requires a systematic approach which includes the evaluation of the organization’s learning capabilities. They present the results of the study conducted in Bhilai Steel Plant, one of the leading steel manufacturing public companies in India, where ERP is to be adopted.

Chapter 6, *Always-On Enterprise Information Systems with Service Oriented Architecture and Load Balancing*, by Bayram, Kirilidog, and Vayvay, proposes a model that aims at achieving continuous EIS operations in terms of hardware and software components where these components work “in tandem.” The proposed model is based on service oriented architecture (SOA). SOA, which is implemented as the main software component of the model is described, as well as the quality of service (QoS) and enterprise service bus (ESB) concepts of SOA. Hardware component of the model and the load balancer are described separately and within the tandem working system of SOA and load balancer. Unlike the traditional software where components are tightly coupled in a point-to-point architecture, SOA is based on distributed and heterogeneous architecture and offers loose coupling. A case study which employs Oracle SOA Suite has been developed and presented. Distributed computing allows services to be distributed to different resources, thereby enhancing the backup logic, and loose coupling minimizes the impact of modifications and failures on the whole system when there is a problem in one component.

Chapter 7, *Challenges of Data Management in Always-On Enterprise Information Systems*, by Varga, considers some of the most challenging aspects of data management, whether they are classified as data continuity, data improvement or data management. The chapter explores in more details the most challenging aspects of data management classified into three classes. The first combines data availability, data integrity, and data security, which serve as data continuity aspects that are important for the continuous provision of data in business processes and for decision-making purposes. The aspects in the second class enable innovative, more efficient, and more effective data usage. The problems of data overload, data integration, data quality, data degradation, data ownership or stewardship, data privacy, and data visualization are described. Data governance is also important dimension for planning, supervising, and controlling of all management activities exercised to improve organizational data and information. Consequently, data governance will constantly need to discover novel and innovative ways to deal with data management problems.

Chapter 8, *Continuous Database Availability*, by Tomic and Markic, gives an overview of the most widely used solutions for continuous database availability. It provides a set of examples of these standards and their implementations by three main database vendors: Oracle (Oracle 11g), IBM (DB2 Version 9.5), and Microsoft (SQL Server 2008). It identifies the main threats of continuous database availability grouped into four categories: network, hardware, software, and DBMS, having in mind the distinction between planned and unplanned threats (downtime). Solutions from major DBMS vendors such as backup and recovery, clustering, log shipping, stand-by, replication, mirroring, automated software applications, replication, and virtualization are briefly explained. This chapter focuses on the database aspect of continuous data availability. The presented overview of solutions shows that different approaches and techniques can be used for enabling database continuous availability. Main classification of these solutions is based on the differentiation between two approaches: narrow and broad approach. While narrow approach is focused on IT solutions (backup and recovery, clustering, replication, mirroring), a broad approach considers IT solution only as a part of broader context that includes business processes, management of data and information lifecycle, additional education and training of users and IT staff, disaster recovery strategies, and action plans.

Chapter 9, *Some Aspects of Implementing Always-On IT-solutions and Standards in Banking Sector: The Case of Croatia*, by Pejic-Bach, Draganic, and Jakovic, presents the results of an empirical
research that was conducted in order to determine the level of influence of information technologies to
the system of payment transactions in Croatia. The results suggest that the level of influence is important
due to the enlargement of product range and communication channels with clients, expense reduction
for the costumers and the bank, as well as the increase of the business security. The study showed that
information technology can help in reducing risks through data access control and risk management
(data collection and statistical analysis), but can also be a risk source: the risk of an unskilled use of
information technology and the reputation risk (in case of technical failure or employees’ abuse if the
controls are not implemented). As the results of the study suggest, the level of acceptance of the new
distribution channels by the clients depends on the simplicity of the created service and on the stimula-
tion of the clients by lower transaction costs in these channels.

Chapter 10, Leagility in Manufacturing and Procurement: A Conceptual Framework, by Gupta,
Garg, Goh, and Kumar, describes the concept of “leagility” as a combination of well known concepts in
manufacturing: lean and agile manufacturing. The authors argue that the leagility concept can be used
not only in manufacturing, but in procurement as well. Based on their experiences with a world-wide
retailer, they propose a conceptual framework that can be used in applying the principles of leagility
in procurement. In addition, a case study of Dell with regard to this concept is presented. Making the
retail firm’s procurement leagile can benefit the firm by maximizing gross margin return on investment
(GMROI) and the supply chain more efficient and responsive. In identifying the strategies, a retailer
must consider the product’s GMROI as well as total volume traded, the seasonality of the product and
the supply lead time to procure the products. This chapter discusses the framework for identifying the
strategies a retail firm can employ to make its procurement leagile.

Chapter 11, “The Business Knowledge and Information Policy Model, by San, proposes the business
knowledge and information policy model (BKIP). According to this author, the BKIP is a key for the
resilient, continuous, flexible, and operational business and provides greater opportunity for businesses
to create new design models in order to manage knowledge and information (KI) and assets related to
KI (AKI). The BKIP is a kind of lens for business, which obtains the alternative ways for absorbing,
processing, using, servicing, and diffusing KI in the frame of the IBT. It organizes to harmonizingly
operate all of KIAKI in the frame of equality principles. The BKIP makes easier the process of preparing
and integrating enterprise architectures or business models.

Chapter 12, Information Supply Chains: Restructuring Relationships, Chains, and Networks, by
Arora, Raghu, and Vinze, discusses the importance of information supply chains (ISCs) that take an
information-centric view of supply chains, where information is not only used to support supply chain
operations, but also to create value for customers and enable business partners to collectively sense and
respond to opportunities in a networked ecosystem. Creating value in the ISC involves gathering,
organizing, selecting, synthesizing, and distributing information. Authors argue that mitigating supply
chain vulnerabilities requires a mechanism that allows for continuously sensing the environment, detect-
ing existing or anticipated vulnerabilities, and responding to these vulnerabilities in real time through
information sharing and collaboration. This chapter describes how the autonomic computing paradigm
can be used to build resilient information supply chains by restructuring the associated relationships,
chains and networks.

Chapter 13, Sustaining the Green Information Technology Movement, by Miti, Gupta, Goh, and DeS-
ouza, explores the green computing paradigm, the paradigm that is used to describe a movement in the
field of information technology whereby users and information technology professionals are adopting ‘less
environmentally destructive’ practices to mitigate the detrimental effects of excessive computing to the
environment. Environment-friendly practices, such as virtualization, cloud computing, greening of data
centres, recycling, telecommuting, and teleworking are discussed in this chapter. Several measures can
be adopted to provide a sustainable and green computing environment by adopting and implementing old and new ideas. While virtualization and cloud computing are cutting edge technologies, telecommuting, teleworking, and recycling have been accepted by organizations all over the world. The authors argue that governments must work with organizations to chart the right course of action to decrease the carbon footprint. New ideas such as carbon credits traded by companies in international markets can be used to control and regulate the market. Through successful implementation of the green computing paradigm, firms can successfully decrease their carbon footprint and contribute to decreasing the harm wrought to the environment.

Chapter 14, *Swift Trust and Self-Organizing Virtual Communities*, by Ngo-Mai and Raybaut, define the term “swift trust” and propose a research model with different functions of swift trust, which tried to capture both the average preexistent stereotypes in a given opening community and the fragile and cyclical movement of influences depending on relative action during the group lifespan. Contrary to the traditional ‘trust need touch’ concepts based on small steps learning and long history, swift trust basically relies on preexistent stereotypes at the beginning of collaboration and afterward on current action of others agents. It is then well suited to virtual communities characterized by (i) no common history in bilateral relationships and scarce face to face, (ii) uncertainty about viability, and (iii) possible weak involvement. Swift trust demonstrates to be very fragile and on occasion cyclical. The performance or profit index both at individual and community level has been built in such a way as to encapsulate the idea of knowledge creation as a function of bilateral interaction within a network and of the cognitive distance between individuals. A cost function with a learning effect has also been introduced. Finally, the organizational feature of the community has been seized by two indexes which measure the relative number of positive reciprocal influences between individuals and the relative number of positive influence. Simulations of the model with our different swift trust functions using a replicator equation for the dynamics of the community display various organizational structures similar to those described by stylized facts.

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