Enterprise resource planning (ERP) system is an enterprise-wide information system. ERP systems automate business processes and provide access to data from global operations. These systems have been used to integrate business processes along the supply chain. It is hard to imagine a well-integrated supply chain without the application of ERP. Techniques and tools play a major role in the design, development and implementation of enterprise information systems (EIS). In the past, many companies have reported failures with reference to the implementation of ERP systems. Most companies had problems with the design and implementation of ERP due to lack of adequate techniques and tools to design and implement the EIS. Considering the importance of ERP in global enterprise environments, and the competitiveness of companies in global markets, this edited book focuses on the techniques and tools for the design, development and implementation of EIS.
Effective communication along the supply chain is essential to provide high-level customer service by delivering the right products, at the right time and in the right quantity and price. In order to avoid any quality and delivery problems of materials, a real-time and shared information system such as ERP is important. The objective of EIS is to facilitate a smooth flow of information along the supply chain. Many companies have failed in their attempt to successfully implement ERP due to lack of proper planning and having the right techniques and tools for the design and implementation of EIS. Implementation of ERP starts with whether a company needs such a system and then selecting the right system considering the nature of its business and the overall scope of the market. Hence, there is a need to carefully align the business model with information model or system. For this, companies need suitable techniques and tools for the development and implementation of ERP systems. This edited book presents some useful strategies, techniques and tools for the design, development and implementation of EIS. It is our hope that both academic researchers and practitioners will benefit from the strategies, techniques and tools presented for the design and implementation of EIS. An overview of the chapters is presented hereunder.

**Chapter I**, Applying Collaboration Theory for Improving ERP System-User Interaction, by Lucas, Babaian, and Topi argues that ERP systems remain difficult to learn and use, however, despite the vast resources devoted to employee training and the reams of documentation provided by their manufacturers. To enhance the usability, and thereby increase the usefulness of ERP systems in organizations, it proposes the application of collaboration theory to ERP system design. Conceptualizing the relationship between the user and the system as one in which the system works in partnership with the user provides a development framework targeted at helping users achieve their system-related goals.

**Chapter II**, A Component-Based Tool Architecture for Performance Modelling and Optimization, by Syrjakow, Syrjakow, and Szczerbicka elaborates on the design of a powerful optimization component and its integration into existing modelling and simulation tools. For that purpose, it proposes a hybrid integration approach, being a combination of loose document-based and tight invocation-based integration concepts. Beside the integration concept for the optimization component, it also gives a detailed insight into the applied optimization strategies.

**Chapter III**, The Critical Success Factors Across ERP Implementation Processes, by Lai reports a study that consists of two phases: (i) a questionnaire survey among experienced ERP consultants in order to identify the key
successful factors of each step within ERP implementation models and (ii) experienced ERP consultants are interviewed to examine why these factors are important at each of the implementation steps and what are the difficulties of using Western ERP implementation models in China. This study provides guidance to ERP consultants on how to utilize their limited resources by considering these factors at each step within the ERP implementation models.

**Chapter IV,** *Integrated Design System: An Information Processing Approach for Knowledge-Based Product Development*, by Yang and Reidsema discusses the structure and development of a design information system that can convert descriptive information into forms that are suitable for embedding within decision-making algorithms. Information in such a system is sorted in terms of its nature into three groups: input data information, constraint information and objective information, all having different representations. Information is also mapped to the relevant design objectives and ranked in importance to facilitate the trade-off analysis after a series of processing activities.

**Chapter V,** *Behavioral Aspects in Strategic Transformation of Organizations*, by Mandal stresses on behavioral issues, particularly how human behavior impacts on transforming organizations through implementing large IT systems such as ERP systems. The current business environment is forcing IT managers to use more and more “collective thinking power,” generated by team activities, to make strategic decisions, or even to run day-to-day operations. Here, the chapter focuses on broader issues managed through people’s cooperation and efforts.

**Chapter VI,** *Decisional DNA and the Smart Knowledge Management System: A Process of Transforming Information into Knowledge*, by Sanin and Szczerbicki shows how Decisional DNA is constructed through the implementation of the Smart Knowledge Management System (SKMS). SKMS is a hybrid knowledge-based decision support system that takes information and sends it through four macro-processes: diagnosis, prognosis, solution, and knowledge, in order to build the Decisional DNA of an organization. The SKMS implements a model for transforming information into knowledge by using Sets of Experience Knowledge Structure. Fully developed, the SKMS will improve the quality of decision-making, and could advance the notion of administering knowledge in the current decision-making environment.

**Chapter VII,** *Organizational Readiness to Adopt ERP: An Evaluation Model for Manufacturing SMEs*, by Raymond, Rivard, and Jutras presents the results of a study that proposes and validates a framework for evaluating the level of readiness for ERP adoption in manufacturing SMEs. The framework conceptualizes readiness to adopt an ERP as including four dimensions:
the organizational context, external forces, perception of ERP, and business processes. A field study of eleven manufacturing SMEs was conducted. The framework led to the classification of these firms in three clusters: “committed adopters,” “uncommitted adopters,” and “late adopters.”

Chapter VIII, *Design and Development of ISO 9001:2000-Based Quality Management Information System*, by Sakthivel, Devadasan, Vinodh, Raghu Raman, and Sriram reports on a quality management information system (QMIS) that has been designed by referring to clause 4 of ISO 9001:2000. After designing this QMIS, its development in real-time environment was examined by conducting a study at an ISO 9001:2000 certified high technology oriented company. Also, a validation study was conducted by gathering the opinions and assessment of the managing partner of the company on QMIS. These studies revealed the feasibility and possibility of implementing QMIS in ISO 9001:2000 certified companies.

Chapter IX, *Motivational Aspects of Legitimate Internet File Sharing and Piracy*, by Smith examines potential and active customers’ intrinsic and extrinsic values associated with selected legal, ethical, and economic impacts of file sharing, especially in relationship to potential impacts on customer relationship management (CRM). The pros and cons of file sharing are highlighted in a conceptual model and empirically tested through graphical and statistical analysis through hypothesis testing, via factor analysis and principal component analysis (PCA) techniques. Recommendations on the potential growth of file sharing industry, through the lens of price, competition, increased selection, and regulation, are included.

Chapter X, *The Next Generation of Customer Relationship Management (CRM) Metrics*, by Shea, Brown, White, Curran, and Griffin contends that the limitations of mostly internally-focused, marketing-based, efficiency-oriented CRM metrics has hindered both the understanding of why CRM systems often fail as well as led to the perception of failed CRM implementations. Only through the development, application and use of CRM metrics can organizations hope to better understand CRM implementations or achieve their CRM goals. To make matters more difficult, the growing capabilities of CRM applications over the past few years has been raising the expectations and sophistication of customers. A new generation of CRM metrics is needed—a generation of relevant, enterprise-wide, and customer-centric metrics.

Chapter XI, *Development of Intelligent Diagnosis and Maintenance System using JESS: Java Expert System Shell Technology*, by Yao, Lin, and Trappey describes the development of a rule-based intelligent equipment troubleshooting and maintenance system using JAVA Expert System Shell (JESS)
technology. The main modules of the system include diagnosis knowledge management, project or case management and system administration. Further, a Thin-Film Transistor Liquid-Crystal Display (TFT-LCD) production equipment diagnosis and maintenance system is designed and implemented to demonstrate the intelligent maintenance capability.

**Chapter XII, Measuring of Web Performance as Perceived by End-Users**, by Borzemski presents a Wing free service that has been developed for the purpose of Web transaction visualization. Its Web client that probes a target Web site is a real Web browser (MS IE), so the user can observe how a particular browser uses the network. Wing can be a good analysis tool for Web page and network application developers. It also introduces the MWING system, which is based on their experiences from Wing project. MWING is a generic automated distributed multiagent-based measurement framework for running different measurement, testing and diagnosing tasks related to the Internet; for example, in Internet topology discovering, Web benchmarking, or grid services performance studies. One of possible agents can be Wing-like agents downloading different Web pages in periodic experiments from many agent locations.

**Chapter XIII, Information System Development: Using Business Process Simulation as a Requirements Engineering Tool**, by Elliman, Hatzakis, and Serrano discusses the idea that even though information systems development (ISD) approaches have long advocated the use of integrated organisational views, the modelling techniques used have not been adapted accordingly and remain focused on the automated information system (IS) solution. This chapter uses the findings from three different case studies to illustrate the ways BPS has been used at different points in the ISD process, especially in the area of requirements engineering. It compares the results against IS modelling techniques, highlighting the advantages and disadvantages that BPS has over the latter. The research necessary to develop appropriate BPS tools and give guidance on their use in the ISD process is also discussed.

**Chapter XIV, Selfish Users and Distributed MAC Protocols in Wireless Local Area Networks**, by Guha and Rakshit considers the effect of “selfishness” on distributed MAC protocols in wireless local area network (WLAN). The inherently contention-based medium access in distributed systems is modelled as a non-cooperative game: “access game.” Both quality of service (QoS) and battery power (BP) are incorporated in modelling the game. It is shown that the Nash equilibrium (NE) for incomplete information games is usually inefficient compared to the NE of complete information games. It investigates whether fairness can be achieved by selfish users. Then it computes the constrained NE (CNE) for the access game.
Enterprise information systems have become an essential part of the global supply chain. Effective design, development and implementation of ERP will make a great difference in organizational performance and competitiveness. Nevertheless, suitable techniques and tools are critical for the successful development and implementation of ERP in real-life enterprises. An outstanding collection of the latest research associated with the effective techniques and tools for the development and implementation of ERP systems, “Advances in Enterprise Information Systems,” provides insight and assistance in learning how to design and develop enterprise information systems with suitable techniques and tools.

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