

## Preface

Enterprise Information Systems (EIS) such as the Enterprise Resource Planning (ERP), Electronic Data Interchange (EDI), World Wide Web (WWW), E-Commerce (EC) and Radio Frequency Identification (RFID) automate business processes and provide access to data from global operations. These systems have been used to integrate business processes along the supply chain. Technologies such as the Internet, WWW, EDI, and RFID have tremendous applications in the advanced enterprise information systems. In the 21<sup>st</sup> Century global market, companies heavily rely on global operations which obviously need an advanced enterprise information system such as ERP, EDI, EC, RFID, and WWW. Considering the importance of ERP in operations and competitiveness of companies in global markets, this edited book focuses on the global implications of modern EIS on the physically distributed enterprise environments.

Effective communication along the supply chain is essential to provide a high level of customer service by delivering the right products at the right time, and in the quantity and price. In order to avoid any quality and delivery problems of materials, a real-time and shared enterprise information system such as ERP, EDI, WWW, EC, and RFID are important. The objective of EIS is to facilitate a smooth flow of information along the supply chain. Global supply chain operations, virtual enterprise, outsourcing, and physically distributed enterprise environments force companies to implement modern EIS such as ERP. This edited book presents the global implications of modern EIS and corresponding technologies and applications. It is our hope that both academic researchers and practitioners will benefit from the technology and application strategies, tactics and tools of EIS. An overview of the chapters is presented hereunder.

**Chapter I**, “Examining the Factors Affecting Project and Business Success of ERP Implementation” by Emad M. Kamhawi responds to the need for a better understanding of the factors that explain ERP systems implementation success. This chapter used a field study to collect data from managers working in Bahraini enterprises that use ERP systems to examine the influence of some selected factors on two perspectives: project and business success of such systems. Results support the impact of factors such as project planning, organizational resistance, and ease of use on ERP project success metrics. Also, this study shows that project planning, business process reengineering, and organizational fit have significant influence on business success metrics. However, no significant impact was found for some classical success factors such as top management support, technical fit, training, competitive pressure, and strategic fit on both project and business success.

**Chapter II**, “Evolution of Enterprise Resource Planning” by Ronald E. McGaughey and Angappa Gunasekaran, argues that business needs have driven the design, development, and use of the enterprise-wide information systems we call ERP systems. Intra enterprise integration was a driving force in the design, development, and use of early ERP systems. Changing business needs have brought about the current business environment, wherein supply chain integration is desirable if not essential, thus current and evolving ERP systems demonstrate an expanded scope of integration that encompasses limited inter-

enterprise integration. This chapter explores the evolution of ERP, the current status of ERP, and future of ERP, with the objective of promoting relevant future research in this important area. If researchers hope to play a significant role in the design, development, and use of suitable ERP systems to meet evolving business needs, then their research should focus at least in part on the changing business environment, its impact on business needs, and the requirements for enterprise systems that meet those needs.

**Chapter III**, “Information Technology Usage in Maquila Enterprises,” by Purnendu Mandal and Mohan P. Rao, claims that much of the Mexican maquila operations and jobs, have gone to China and other low-wage countries. Are maquiladoras technologically competent to ward-off competitive forces from China and other parts of the world? This chapter presents an exploratory study of IT usage and managerial perceptions of IT-related costs and benefits in maquiladoras. The relevant data was gathered through a survey questionnaire. The results show that IT had a positive impact on maquila business performance. These findings will be useful to managers in assessing their organization and taking corrective actions to become further competitive.

**Chapter IV**, “Performance and Cost Analysis of Service-Oriented Enterprise Architecture,” by Henk Jonkers and Maria-Eugenia Iacob, addresses the integration of functional models with non-functional models in the context of service-oriented architectures. Starting from the observation that current approaches, to model-driven development, have a strong focus on functionality; they argue the necessity of including non-functional aspects as early as possible in the service design process. The authors distinguish two modelling spaces, the design space and the analysis space, which can be integrated by means of model transformations. A framework for incorporating non-functional analysis into methodological support for e-service development is presented. Also, they propose an approach for performance and cost analysis of layered, service-oriented architecture models, which consists of two phases: a “top-down” propagation of workload parameters, and a “bottom-up” propagation of performance or cost measures. By means of an example, they demonstrate the application of the approach, and show that a seamless integration with detailed quantitative analysis methods (e.g., queuing analysis for performance predictions) can be achieved.

**Chapter V**, “Significance of Analytical Hierarchy Process (AHP) and Nominal Group Technique (NGT) in ERP Implementation,” by S. Parthasarathy, argues that the objective of customization in ERP implementation is to achieve a fit between the ERP system and the business process that the system supports. Literature review reveals that the customization is the major annoyance in most of the ERP projects. In this chapter, a solution is proposed using a process framework that incorporates participatory learning and decision-making processes based on Nominal Group Technique (NGT) and the evaluation methodology adopting the Analytical Hierarchy Process (AHP). A case study is presented to illustrate its applicability in practice. The main focus of the study is the identification of various customization possibilities for ERP implementation.

**Chapter VI**, “Specifying Software Models with Organizational Styles” by Manuel Kolp, Yves Wautelet, and Stéphane Faulkner proposes organizational patterns motivated by organizational theories intended to facilitate the construction of organizational models. These patterns are defined from real-world organizational settings, modeled in *i\** and formalized using the Formal Tropos language. Additionally, the chapter evaluates the proposed patterns using desirable qualities such as coordinability and predictability. The research is conducted in the context of *Tropos*, a comprehensive software system development methodology.

**Chapter VII**, “Towards Identifying the Most Important Attributes of ERP Implementations,” by Piotr Soja and Dariusz Put, identifies the most important characteristics of ERP implementation which affect project success. This study builds on data gathered using a questionnaire directed toward people playing leading roles in ERP implementations in a few dozen companies. Twelve attributes were identified

and divided into three sets representing: effort, effect, and the synthetic measure of success calculated on the basis of the obtained data. Two agglomeration methods were employed to identify exemplar and anti-exemplar groups and objects. These elements were thoroughly analysed, which led to identifying the most and the least desired attributes of an ERP implementation project.

**Chapter VIII**, “A Voice-Enabled Pervasive Web System with Self-Optimization Capability for Supporting Enterprise Applications,” by Shuchih Ernest Chang, used mobile phone as the pervasive device for accessing an Internet application prototype, a voice-enabled Web system (VWS), through voice user interface technology. Today’s Web sites are intricate but not intelligent, so finding an efficient method to assist user searching is particularly important. One of these efficient methods is to construct an adaptive Web site. This chapter shows that multimodal user-interface pages can be generated by using XSLT stylesheet which transforms XML documents into various formats including XHTML, WML, and VoiceXML. It also describes how VWS was designed to provide an adaptive voice interface using an Apache Web server, a voice server, a Java servlet engine, and a genetic algorithm-based voice Web restructuring mechanism.

**Chapter IX**, “The Impact of Culture on the Perception of Information System Success,” by Dafid Agourram, showed that social and socio-technical concepts are influenced by culture. This study explores how the socio-technical concept of information system success is defined and perceived by a group of French managers. The results show that culture does influence IS success perception. The study has many implications for both academic and practice communities. The results are especially important to multinational organizations that standardize IS in different cultures, including France. The research case is a multibillion dollar Canadian multinational organization which decided to standardize an ERP system in all its worldwide subsidiaries.

**Chapter X**, “Achieving System and Business Interoperability by Semantic Web Services” by John Krogstie, Csaba Veres, Guttorm Sindre, and Oyvind Skytoen, claims that much of the early focus in the area of Semantic Web has been on the development of representation languages for static conceptual information; while there has been less emphasis on how to make Semantic Web applications practically useful in the context of knowledge work. To achieve this, a better coupling is needed between ontology, service descriptions, and workflow modeling, including both traditional production workflow and interactive workflow techniques. This chapter reviews the basic technologies involved in this area to provide system and business interoperability, and outlines what can be achieved by merging them in the context of real-world workflow descriptions.

**Chapter XI**, “Integrated Research and Training in Enterprise Information Systems” by Cheng-Yang Cheng, Vamsi Salaka, and Vittal Prabhu, claims that the success of implementing Enterprise Information System (EIS) depends on exploring and improving the EIS software, and EIS software training. However, the synthesis of the EIS implementation approach has not been investigated. They propose an integrated research and training approach for students and employees about enterprise information systems (EIS) that are encountered in an organization. Their integrated approach follows the different stages of a typical EIS project from inception to completion. These stages, as they identified, are modeling, planning, simulation, transaction, integration, and control. This ensures that an employee who’s trained by this plan has an acquaintance with the typical information systems in an organization. Further, for training and research purposes they developed prototype information systems that emulate the ones usually found in organizations.

**Chapter XII**, “Service-Oriented Middleware for Managing Inter-Enterprise Collaborations,” by Lea Kutvonen, Toni Ruokolainen, Sini Ruohomaa, and Janne Metso, argues that participation in electronic business networks has become necessary for the success of enterprises. The strategic business needs for participating in multiple networks simultaneously and for managing changes in these networks are

rejected as new requirements for the supporting computing facilities. The Pilarcos architecture addresses the needs of managed collaboration and interoperability of autonomous business services in an inter-organizational context. The Pilarcos B2B middleware is designed for lowering the cost and effort of collaboration establishment and to facilitate the management and maintenance of electronic business networks. All business services are developed independently, and the provided B2B middleware services are used to ensure that technical, semantic, and pragmatic interoperability is maintained in the business network. This chapter discusses the concepts provided for application and business network creators, and the supporting middleware-level knowledge repositories for interoperability support.

**Chapter XIII**, “Training and User Acceptance in a University ERP Implementation: Applying the Technology Acceptance Model,” by Joseph Bradley and C. Christopher Lee, investigates the relation between training satisfaction and the perceptions of ease of use, the perception of usefulness, effectiveness, and efficiency in implementing an ERP system at a mid-sized organization. The authors view training satisfaction as a necessary condition for technology acceptance. Their surrogates for training satisfaction are (1) training level prior to implementation, (2) training level when measured after implementation, (3) understanding of features and functions, and (4) perceived need for more training because these factors contribute to perceived ease of use and usefulness. A survey of 143 employees involved in the implementation of ERP in a mid-sized university was conducted. ANOVA and t-tests were used to explore differences in training satisfaction among groups of users by gender, job type, and education level. They found that training satisfaction differed based on job type and gender but not education level. Multiple regression analysis suggests that (1) post implementation training satisfaction is related to ease of use and (2) current training satisfaction and user participation are related to our variables for usefulness, which are perceived efficiency and effectiveness of the ERP systems in doing respondents’ jobs.

**Chapter XIV**, “Measuring and Diffusing Data Quality in a Peer-to-Peer Architecture,” by Diego Milano, Monica Scannapieco, and Tiziana Catarci, focuses on Cooperative Information Systems (CISs), for which it is very important to declare and access quality of data. The chapter describes a general methodology for evaluating quality of data, and the design of two architectural components: (i) a component named Quality Factory, that implements quality evaluation of XML data; and (ii) a component named Object Matcher, that implements object identification of XML data. The detailed design and implementation of a further service, named Data Quality Broker, are presented. The Data Quality Broker accesses data and related quality distributed in the CIS and improves quality of data by comparing different copies present in the system. The Data Quality Broker has been implemented as a peer-to-peer service and a set of experiments on real data show its effectiveness and performance behavior.

**Chapter XV**, “Modeling Buyer-Supplier Relationships in Dynamic Supply Chains: A Negotiation-to-Coordinate (N2C) Mechanism,” by Vipul Jain, S. Wadhwa, and S.G. Deshmukh, presents a novel Negotiation-to-Coordinate (N2C) mechanism to explore the interactive nature of the buyer-supplier relationships for dynamic environments. The proposed N2C mechanism uses prioritized fuzzy constraints to represent trade-offs among the different probable values associated with the negotiation issues and to signify how agents should make concessions. Supervisor agent in the N2C mechanism takes into account the conflicts of interest of buyer’s agent and supplier’s agent, and the proposal and plan generated by supervisor agents helps in resolving the true and potential conflicts of interests for buyer’s agent and supplier’s agent. The proposed computational framework based on fuzzy constraints is suited for capturing the dynamics by modeling trade-offs between different attributes of a product, leading to a fair and equitable deal for both suppliers and buyers. The proposed approach models the intricacies in the face of the imprecise, uncertain, and conflicting nature of objectives.

**Chapter XVI**, “Enterprise Systems, Control and Drift,” by Ioannis Ignatiadis and Joe Nadhakumar, argues that an Enterprise System, once installed, seems to enable or constrain certain actions by users, which have an impact on organizational operations. Those actions may result in increased organizational control, or may lead to organizational drift. The processes that give rise to such outcomes are investigated in this chapter, which is based on a field study of five companies. By drawing on the theoretical concepts of human and machine agencies, as well as the embedding and disembedding of information in the system, this chapter argues that control and drift arising from the use of an Enterprise System are outcomes of the processes of embedding and disembedding human actions, which are afforded (enabled or constrained) by the Enterprise System.

Enterprise information systems have become an essential part of global supply chain. Global implications of ERP and other similar systems have tremendous role in the integration of global supply chain operations. An outstanding collection of the latest research associated with the implications of global market, operations, and modern enterprise information systems on technologies and applications, “Advances in Enterprise Information Systems—Volume III on Global Implications of Modern Enterprise Information Systems: Technologies and Applications”, provides insight and assistance in learning how to understand and evaluate the global implications of modern enterprise information systems.

My sincere thanks go to all the authors of this edited book whose timely submissions and revisions of chapters have made this book possible. I am thankful to Dr. Medhi Khosrowpour, President of IGI Global, Ms. Kristin Roth, Managing Editor, and Ms. Deborah Yahnke, Editorial Assistant, for their constant support throughout editing the book.

I am grateful to my wife, Latha Parameswari and son, Rangarajan, for their support and understanding during this book project.

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*Advances in Enterprise Information Systems (AEIS) Book Series*