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# Introduction: Advances in E-Business Engineering

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### Repository Citation

Xu, Shoubo; Xu, Li Da; and Basl, Josef, "Introduction: Advances in E-Business Engineering" (2012). *Information Technology & Decision Sciences Faculty Publications*. 17.  
[https://digitalcommons.odu.edu/itds\\_facpubs/17](https://digitalcommons.odu.edu/itds_facpubs/17)

### Original Publication Citation

Xu, S. B., Xu, L. D., & Basl, J. (2012). Introduction: Advances in E-business engineering. *Information Technology & Management*, 13(4), 201-204. doi:10.1007/s10799-012-0146-5

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## Introduction: advances in E-business engineering

Shoubo Xu · Li Da Xu · Josef Basl

Published online: 26 September 2012  
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E-business is one of the most exciting and challenging research areas [9, 10, 14]. Today, not only large companies, but also medium or small-sized companies are learning that e-business is a required component of doing business. E-business has rapidly evolved in the last decade and this trend will continue. In this rapid process, a variety of e-business engineering methods and techniques have been developed [28]. There are many research issues needed to be addressed. As a result, there is a growing demand for insights into challenges, issues, and solutions related to the design, implementation, and management of e-business systems.

To respond to the needs from both academic researchers and practitioners for communicating research results on e-business engineering and related topics, a number of related conferences organized by the IFIP TC8 WG8.9, IEEE SMC Society Technical Committee on Enterprise

Information Systems, and other major research institutions have been held in the past years. Such conferences include IFIP International Conference on Research and Practical Issues of Enterprise Information Systems (Confenis), IEEE SMC International Conference Special Session on Enterprise Information Systems, International Forum of Information Systems Frontiers (IFISF), International Conference on Natural Language Processing and Knowledge Engineering, GCIS, and WCSE [19]. These conferences plus workshops organized by IFIP and IEEE have provided an international forum for researchers in academia and industry to present their most recent findings in e-business engineering.

This special issue of *Information Technology and Management* presents expanded versions of 20 papers from the above-mentioned conferences held recently, authored by scholars from Austria, China, Japan, Russia, UK, and US. The purpose of this special issue is to report on the state-of-the-art of, and emerging trends in, research and practice in e-business engineering. To prepare for this issue, all authors were asked to respond to at least two rounds of peer review. Each paper emphasizes the importance of e-business engineering from a unique perspective.

IoT is an emerging Internet-based industrial information architecture that can be employed to facilitate information flow in global supply chain networks [36]. An effective strategy of IoT can help firms to grasp the emerging opportunities from the IoT and improve competitive advantages. In the paper entitled “Towards a theoretical framework of strategic decision, supporting capability and information sharing under the context of Internet of Things”, Li et al. of Shanghai Jiaotong University provide a theoretical framework which classifies IoT strategies into four archetypes from two dimensions of managers’ strategic intent and industrial driving force, and propose that market-based

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exploratory capabilities play a more important role for firms adopting get-ahead strategy, and market-based exploitative capabilities play a more important role for firms adopting catch-up strategy in market [16].

IIIE (Industrial Information Integration Engineering) is a term coined in recent years [15, 37, 45]. IIIE consists of the study and application of scientific and engineering methods to industrial information integration. In the paper entitled “Information flow in reverse logistics: an industrial information integration study”, in the framework of IIIE, researchers investigate the process of reverse logistics of used batteries, with an emphasis on the information integration of reverse logistics of used batteries [26].

The concepts in systems science can be applied to e-business systems and relevant enterprise architecture and integration. Numerous researches on enterprise architecture and integration in e-business systems have their theoretical findings and effective practices influenced by systems theory and relative methodologies. The paper entitled “E-business systems integration: a systems perspective” by Wang et al. of Harbin Institute of Technology reviews the contribution of systems science to enterprise architecture and integration [31].

The concepts in natural sciences can be applied to social science research including information systems research [27]. In the paper entitled “The cooperative effect between technology standardization and industrial technology innovation based on Newtonian mechanics”, authored by Jiang et al. of Jilin University, proposes a new conceptual model consisted of a relative motion model of technology standard and technology innovation, and a volatility model of technology standardization and industrial technology innovation, based on Newtonian mechanics [12].

The paper entitled “Segmentation modeling algorithm—a novel algorithm in data mining” presents a new algorithm for data segmentation which can be used to build time-dependent customer behavior models. The proposed model has the potential to solve the optimization problem in data segmentation [3].

In the paper entitled “An analysis on the macroscopic growth process and stage of information systems development in Chinese enterprises”, the authors discuss the macroscopic growth process of information systems development in Chinese enterprises. Based on the classical study by Nolan, the historical data for information systems development in China was analyzed. Discussion in this paper illustrates a macroscopic growth process of information systems development in Chinese enterprises [2].

Many research papers have been published on the effect of customer satisfaction and customer loyalty on customer profitability which is related to customer lifetime value (CLV). However, there is limited research on the impact of cross-cultural factors on the effect of customer satisfaction

and customer loyalty on CLV. In the paper entitled “Are customer satisfaction and customer loyalty drivers of customer lifetime value in mobile data services”, this topic is studied by a joint research team from the University of Washington, USA, and BUPT of China. This research has important implications for firms about how to enhance CLV in mobile data services [20].

In the paper entitled “Business intelligence in enterprise computing environment”, the authors from the Institute of Computing Technology, Chinese Academy of Sciences, review BI in an enterprise computing environment, with an emphasis on the algorithms and methods. The review points out the challenges to the broad and deep deployment of BI systems, and provides proposals to make BI more effective [43].

In the paper entitled “Strategy for technology standardization based on the theory of entropy”, the authors apply the theories of entropy to technology standardization and analyze the interrelationship between technology standards and industrial innovations. The authors found that applying the theory of entropy to the analysis of technology standardization can help firms to better understand the interrelationship between technology standards and industrial innovations [13].

A growing body of research suggests that affective computing has many valuable applications in e-business [19, 22]. In the paper entitled “Linguistic-based emotion analysis and recognition for measuring consumer satisfaction—an application of affective computing”, the authors from the University of Tokushima, Japan, propose a linguistic-based emotion analysis and recognition method for measuring consumer satisfaction [22].

The paper entitled “The impact of team task and job engagement on the transfer of tacit knowledge in e-business virtual teams”, authors from USTC focuses on the initiative to integrate team task and job engagement as related to the transfer of tacit knowledge. The study is to investigate if team task and job involvement enhances the overall work efficiency through transfer of tacit knowledge between e-business virtual teams. A model that is based on the relationship between tacit degree of knowledge, job engagement, team tasks, and their effect on knowledge transfer was developed [4].

Both knowledge and human resources are valuable assets for enterprises; therefore, effective management of these assets becomes inevitably critical for business success. The paper entitled “Knowledge management component in managing human resources for enterprises” by Zhang et al. examines the use of intelligent information processing and knowledge management in human resource management [42].

The paper entitled “Group decision-making in an unconventional emergency situation using agile Delphi

approach” by Xie et al. presents a group decision-making approach for managing unconventional emergency situations using the Internet. The research aims at developing a fast response approach to the unconventional emergency events [8, 33, 34].

The paper entitled “Modeling of emergency response decision-making process using stochastic Petri net: an e-service perspective” by Shan et al. addresses the emergency response decision-making process based on stochastic Petri net from an e-service perspective [23]. The process is modeled based on stochastic Petri net and a solution methodology is proposed to solve the model [5, 18]. In addition, an isomorphic Markov chain model and a service performance model are developed for measuring and evaluating the service performance of emergency response decision-making process.

Web mashups have received attention recently as more enterprises are engaged in enterprise 2.0 initiatives [30]. The paper by Bader et al. of the Technical University of Vienna, Austria, proposes a context-aware enterprise mashup readiness assessment framework to help enterprise managers and decision makers determine their needs and readiness for enterprise mashups [1].

Safety is arguably the primary concern for consumer products. It is challenging to acquire and integrate the information from all of the sources involved in the supply chain to assess the risk level of a product [26]. The use of enterprise systems has become increasingly popular in both manufacturing and service industries [11, 32, 35, 38–41]. An enterprise system, especially its QMS (Quality Management System), can be a promising solution to this problem. The paper entitled “An application of enterprise systems in quality management of products” by Shi et al. discusses the application of QMS in risk assessment of consumer products [25].

Distributed and parallel data mining algorithms were developed rapidly in recent years [6, 7, 17]. In the paper by Zeng et al. the authors survey the-state-of-the-art algorithms and applications in distributed data mining and discuss the future research opportunities [44].

In the paper entitled “An emergency response decision support system framework for application in e-government”, the authors propose a framework that consists of ten functional modules. The study demonstrates that the proposed system framework can provide theoretical and practical guidance for designing and developing effective emergency response systems [24].

The paper by Qin et al. studies the risks around IT outsourcing in Chinese financial institutions. The authors proposed a framework that explains the conduction paths from risk factors to risks and from risks to resulting losses [21].

As a new computing paradigm, cloud computing has received attention recently. The paper by Wang et al.

surveys the state of the art of enterprise cloud service architectures [29]. Specifically, this paper discusses enterprise cloud service architectural requirements, design approaches, emerging cloud service platforms, applications, and challenges.

As the organizers of the above-mentioned conferences, we are delighted to share this sampling of the conferences with the readership of *Information Technology and Management*. We hope that this special issue will serve our *Information Technology and Management* readers as an avenue to gain a new perspective on e-business engineering. We would specially like to thank the Editors-in-Chief, Professor H. Pirkul and Professor V.S. Jacob, for their encouragement and guidance throughout this endeavor. We are also deeply grateful to the many individual reviewers who worked with us so diligently. Without their time, effort, and support, this issue would never have come to be.

**Acknowledgments** This project was partially supported by the NSFC (National Natural Science Foundation of China) Grant 71132008 and the Changjiang Scholar Program of the Ministry of Education of China.

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