Today, various m-commerce applications are increasingly enhancing enterprises’ abilities to offer mobile services that are easily accessed by a mobile device anytime and anywhere. With the unique advantages of emerging mobile communications and wireless technologies, m-commerce applications are generally used to fulfill some tasks that are not suitable for Web-enabled e-commerce applications, such as mobile inventory tracking and dispatching, mobile transactions and payments, mobile messaging, mobile gaming, mobile healthcare, mobile portal, global positioning, mobile ticketing, etc.

The crucial challenge or success factor to modern organizations is whether they are able to provide enough useful m-commerce applications that consumers can access and are willing to use. However, constructing mobile applications has some inherent complexities and architectural issues as m-commerce embraces many emerging technologies.

This book addresses and explores the critical architectural issues in constructing m-commerce applications and in applying mobile technologies in different areas, including methodologies, enabling technologies, models, paradigms, architectures, standards, and innovations.

It is not feasible for one author to cover many architectural issues with a required degree of quality, depth, and width. Therefore, we adopted another approach. We identified key topics and invited a wide range of professionals across the globe to each contribute a chapter in the area of their expertise. We also gave adequate time for completing the project, spending months of preparation and consultation with the publishers, authors, and reviewers, in order to yield qualified outcomes.

Experts in various related disciplines from different parts of the world responded to this project enthusiastically. The success of this book is largely due to the collective efforts of the wonderful team, which not only includes experts from information and communications technology (ICT) areas like fac-
ulty of computer science, information systems, telecommunication networks, software engineering, and information technology, but also includes professionals from business and management fields such as college of business administration, faculty of management, graduate school of management, and other kinds of business schools. Some chapters are outcomes of joined forces, with both ICT and business experts presenting cross perspectives.

The inclusion of the authors in the blind review process improved the quality of the book and also served as an incentive to each author to strengthen his or her write-up. Although we initially received many proposals and manuscripts, the stringent quality control measures taken permitted us ultimately to include only 14 chapters, contributed by 29 authors from different parts: Australia, Canada, Denmark, Germany, Malaysia, Russia, Singapore, the United Kingdom, and the United States.

**READERSHIP**

The primary readers of this book are professionals, researchers, executives, m-commerce application architects/designers, and graduate and postgraduate students in information and communications technology (ICT) and business areas who have strong interest in mobile commerce.

Readers will find this book is a rich, informative introduction for understanding architectural issues and solutions regarding mobile business applications and services. This is mainly because this book consists of qualified study outcomes from multiple disciplines. The rich findings, methodologies, architectures, recommendations, arguments, and references presented by these authors will assist readers to pursue further studies in many particular aspects.

Readers may refer to *Wireless Communications and Mobile Commerce*, another book published by Idea Group, to understand unique characteristics of wireless communications and m-commerce.

**ORGANIZATION**

This book is organized in five sections, with the following major themes:

1. Constructing Mobile Commerce Systems and Applications
2. Knowledge Management in a Mobile Computing Context
3. Mobile Message and Data Services
4. Mobil Financial Services
5. Quality of Service for Mobile Commerce Applications
OVERVIEW

As the book is devoted to a very diverse range of topics written by a large number of professionals and academics, it is necessary for the editor to provide a bird’s eye view of the contents of the chapters at the expense of a longer than a usual preface.

Section 1 deals with Constructing Mobile Commerce Systems and Applications and consists of five chapters.

Chapter 1, Mobile Commerce Systems, by Wen-Chen Hu, Chung-wei Lee, and Jyh-haw Yeh, focuses on constructing an m-commerce system, an arduous task that involves a wide variety of disciplines and technologies. To facilitate understanding and constructing an m-commerce system, this chapter divides an m-commerce system into six components: (i) mobile commerce applications, (ii) mobile stations, (iii) mobile middleware, (iv) wireless networks, (v) wired networks, and (vi) host computers. This chapter describes elements in these components specifically related to the subject in detail and provides lists of technologies for component construction. Finally, it also discusses other important issues, such as mobile security.

Chapter 2, Contract-Based Workflow Design Patterns in M-Commerce, by V. K. Murthy, describes an object-based workflow paradigm to support long and short duration transactions in an m-commerce environment. It argues that in the mobile computing environment, the traditional transaction model needs to be replaced by a more realistic model (called a workflow model) between several clients and servers that interact, compete, and cooperate, realizing an intergalactic client-server program (ICSP).

Chapter 3, Java 2 Micro Edition for Wireless Enterprise Applications, by Kin Choong Yow and Nadia Nalaningrum Moertiyoso, examines and develops one enterprise scenario, a customer support system with Java 2 Micro Edition (J2ME). This chapter describes the development of a complete model of the customer support system, including the wireless application, the back-end system, and the Web site interface for other users to interact with the system. This chapter outlines the design of a relational database using J2ME and discusses the various synchronization issues. The chapter also offers solutions to various problems faced by wireless applications, such as wireless network unreliability, working offline, and two-way communication between the server and the device. For better interoperability with various platforms of the back-end system, this chapter also describes the usage of XML for the data exchange format.

In Chapter 4, Configuring M-Commerce Portals for Business Success, Nikhilesh Dholakia and Morten Rask review key differences between traditional e-commerce and the emergent m-commerce, and core concepts of personalization, permission, as well as content specification as they apply to e-commerce and m-commerce. They argue that the ability to connect end customers
and service providers through a mobile portal (m-portal) is a key element for the success of m-commerce as m-customers accessing m-commerce applications often rely on specific m-portals. Finally, the authors propose a framework for developing effective business strategies for developing and managing m-portals.

Chapter 5, *Multimedia Computing Environment for Telemedical Applications*, by V.K. Murthy and E.V. Krishnamurthy, describes the system design for a multimedia telediagnostic computing environment (MMTE) for telemedical applications, and appropriate software and hardware tools for the design of the cooperative environment. This chapter describes that such an environment requires the design of: (i) a wired-in or wireless computing facility based on currently available technology with a high bandwidth for fast, reliable, and efficient communication of data, voice, and image, (ii) a database query system to access data, voice, and medical images from a fixed server to the mobile or fixed hosts, and (iii) suitable audiovisual software communication tools among the cooperating fixed and mobile hosts to help visualize pointer movements remotely and for teleconferencing.

Section 2 is concerned with **Knowledge Management in a Mobile Computing Context** and consists of two chapters.

Chapter 6, *Knowledge Discovery in Mobile Business Data*, by Richi Nayak and Lawrence Seow, explores some examples of usage and the process of data mining in m-business. The increasing number of mobile device users is creating a huge amount of useful data, which can help a business with further developments and strategies if people can turn the data into knowledge with the use of data mining. This chapter argues that the mindful use of data mining allows organizations to increase customer satisfaction, to determine new consumer groups for marketing purposes, to detect fraudulent activities, and to find future usage of mobile technology. This chapter also discusses some of the forthcoming problems of applying data mining in the m-business domain and possible solutions.

Chapter 7, *OntoQuery—An Evolutionary Approach for Query Formation and Information Retrieval*, by Sheng-Uei Guan, Chang Ching Chng, and Fangming Zhu, proposes the establishment of OntoQuery in an m-commerce agent framework. OntoQuery represents a new query formation approach that combines the usage of ontology and keywords. The authors argue that this approach takes advantage of the tree pathway structure in ontology to form queries visually and efficiently. They propose an information retrieval scheme that focuses on using genetic algorithms to improve computational effectiveness. Query optimization techniques used by the authors include query restructuring by logical terms and numerical constraints replacement.

Section 3 deals with **Mobile Message and Data Services** and comprises three chapters.
In Chapter 8, *Modeling the Dynamics of Emerging Mobile Data Services Markets*, Arthur Lee Gilbert and Hilda Han Mei Ian examine the evolving mobile data services (MDS) phenomenon and recommend a multimodal approach to research in emergent MDS markets based on recent findings. This work draws on field research by Nanyang Business School’s Information Management Research Center (IMARC) that focused on the application of innovation diffusion theory to market segmentation. The authors also describe the enabling technology and applications, as well as discuss the value propositions and propose a model to segment the MDS market.

In Chapter 9, *Short Message Service (SMS) and its Applications*, Maizatul A. Ismail, Rafidah Md-Noor, and Mazliza Othman provide an overview of how short message service (SMS) is provided and discuss various SMS applications offered to the users. The authors explore the reasons behind success of SMS and the issues that must be addressed to provide these SMS applications and also examine future trends and the challenges that must be overcome in order to enhance this service. This chapter will give people a better understanding of how SMS applications are provided and what may be expected in future applications, given the enhancement of the current SMS and technology advancement.

Chapter 10, *Multimedia Messaging Peer*, by Kin Choong Yow and Nitin Mittal, discusses the development of a multimedia messaging client for personal digital assistants (PDA) and a kiosk providing multimedia messages composition, search, share, and sending capabilities. This chapter also discusses the various messaging technologies, enabling wireless technologies, and the peer-to-peer model, which were studied during the development of the application. The peer-to-peer technology used was Jxta, an XML-based and language-agnostic peer-to-peer platform specification from Sun Microsystems. The peers (PDA client and the kiosk) were implemented using the application programming interfaces provided by the Personal Java reference implementation and the Jxta platform’s Personal Java port.

Section 4 is concerned with *Mobile Financial Services* and consists of two chapters.

Chapter 11, *Mobile Banking—A Strategic Assessment*, by Sunny Marche and Carolyn Watters, examines the strategic considerations of mobile banking from technical, business, and regulatory perspectives. This chapter concludes that there are very different challenges influencing the evolution of this application, depending on the particular economy and culture in which the opportunity is located.

Chapter 12, *Agent-Based Secure E-Payment System in E-Commerce*, by Sheng-Uei Guan, Sin Lip Tan, and Feng Hua, explores electronic payment aspects of the Secure Agent Fabrication, Evolution and Roaming (SAFER) architecture to further facilitate m-commerce using agent technology. This chapter shows various modules of the payment system and how they interface with
each other. This chapter also elaborates an implemented application that incorporates agent roaming functionality and the ability to conduct m-commerce transactions and carry out corresponding e-payment procedures.

Section 5 deals with **Quality of Service for Mobile Commerce Applications** and consists of two chapters.

In Chapter 13, by G. Ghinea and M.C. Angelides, on *Quality of Perception in M-Commerce*, developments in the area of QoS-dependent multimedia perceptual quality are reviewed and are integrated with recent work focusing on QoS for e-commerce. Based on previously identified user perceptual tolerance to varying multimedia QoS, the authors show that enhancing the m-commerce B2C user experience with multimedia, far from being an idealized scenario, is in fact feasible if perceptual considerations are employed.

Chapter 14, *QoS-Oriented Medium Access Control for All-IP/ATM Mobile Commerce Applications*, by Alexander Markhasin, Stephan Olariu, and Petia Todorova, describes a novel paradigm for future m-commerce multimedia communications and applications that can be integrated with other multifunctional multimedia e-applications (e.g., e-learning, e-health, e-culture, e-work, etc.) in a cost-effective manner. The authors also propose an implementation of this paradigm based on their novel QoS-oriented medium access control (MAC) technology and the fully distributed all-IP/ATM architecture, which will provide cost-effective broadband communication multiservices for mobile and geographically distributed users anytime and anywhere.