With the number of mobile device users exceeding that of PC users, conducting business and services over these mobile devices, which is known as mobile commerce, is becoming real and attractive. Although mobile commerce shares many similarities with traditional electronic commerce, it extends the latter by offering a wide range of personalized and location-aware services to users by integrating a myriad of technologies together. Some of these technologies are required to realize new mobile business opportunities, while others are needed to overcome the operating constraints within the mobile environment, such as limited screen size, less reliable and smaller bandwidth communication channel, shorter battery lifespan, and keyboardless input.

This book discusses mobile commerce with emphasis on both theory and application and serves as a good introductory guide for both researchers and practitioners. It consists of a collection of chapters on mobile commerce addressing a wide spectrum of technology and application issues. These chapters are essential to understanding the current state of mobile commerce applications and services. The book is structured into three parts.

Part I reviews the current trends and future development in mobile commerce applications and technology.

The article “Mobile Commerce: Current States and Future Trends,” by Keng Siau, Ee-Peng Lim, and Zixing Shen presents an overview of mobile commerce development by examining the features of mobile commerce, the value-added applications, the enabling technologies, the business implications, and the challenges in implementing mobile commerce. The paper also provides an agenda for future research to enhance mobile commerce. The article provides the necessary background knowledge for readers to understand the rest of the book.

Part II focuses on the technological challenges facing mobile commerce.

In the chapter “Mobile E-Commerce on Mobile Phones,” Do van Thanh describes the protocol and security issues involved in using mobile phones to conduct business-to-consumer transactions. The author explains the fundamental differ-
ences between mobile commerce and e-commerce in B2C transactions and identifies the limitations of Wireless Application Protocol (WAP) in mobile commerce. The author also proposes a solution known as Mobile ePay to provide authentication and micropayment services using mobile phones. A mobile commerce receipt system enabling instantaneous delivery is also described in detail.

The chapter on “Transactional Database Accesses for M-Commerce Clients,” by Hong Va Leong, discusses the required generic architecture and appropriate mechanisms to be supported by database servers in the mobile environment. In particular, it focuses on the transaction processing component of the database server that ensures the atomicity and other desirable correctness criteria of the database accessing activities. The concept of transaction processing is generalized to encompass accessing multiple databases, while staying within the context of a mobile computing platform. Relevant issues on the broadcast database and the disconnected processing of transactions are also considered.

To overcome bandwidth and energy limitations resulting from short battery life of mobile devices, it is necessary to provide an energy-efficient wireless data dissemination architecture that supports broadcasting applications. The chapter “Techniques to Facilitate Information Exchange in Mobile Commerce,” by Aslihan Celik and Anindya Datta, presents such an architecture. The chapter discusses the energy cost and access time of some proposed data broadcast and access protocols. It finally describes how secure data broadcasts can be achieved by incorporating encryption into the proposed protocols.

In the chapter “Digital Rights Management for Mobile Multimedia,” Sai Ho Kwok proposes a digital rights management framework for mobile commerce. In the proposed framework, operations on digital rights, security, and payment are addressed. The framework can be adopted for the current 2.5G and 3G mobile technologies and even for 4G technologies.

For the chapter “Predicate Based Caching for Large Scale Mobile Distributed On-line Applications,” the three authors, Abhinav Vora, Zahir Tari, and Peter Bertok, describe their experience in designing a predicate-based caching technique for mobile object-based middleware that optimizes the performance of the mobile medium by better utilizing the available bandwidth.

Part III covers the application studies and information systems issues in mobile commerce.

In the chapter “Modeling Static Aspects of Mobile Electronic Commerce Environments,” by Jari Veijalainen and Mathias Weske, an object model that describes the fundamental static aspects of the mobile commerce environment and their relationships is presented. It distinguishes four spheres of concern: Regulatory Frameworks, Business Models, Enabling Technologies, and the Global Infrastructure. The spheres provide us a mean to understand and classify the development of mobile commerce applications and environment.

With location information about users and business entities, new kinds of mobile commerce applications can be developed. Stuart J. Barnes, in his chapter
“Known By the Network: The Emergence of Location-Based Mobile Commerce,” examines the technologies, applications, and strategic issues associated with the commercialization of location based services.

The chapter “Usable M-Commerce Systems: The Need for Model-Based Approaches,” by John Krogstie, Petter Bae Brandtzæg, Jan Heim, and Andreas L. Opdahl, discusses new challenges and possible solutions for developing and evolving usable mCommerce systems. The chapter focuses on model-based approaches. The authors summarize the main challenges on using model-based approaches to support the development of usable mCommerce systems and highlight research issues in this very dynamic area.

In the chapter “Managing the Interactions between Handheld Devices, Mobile Applications, and Users,” by Maristella Agosti and Nicola Ferro, several issues related to managing the interactions between handheld devices, mobile applications, and users are discussed. The chapter suggests some approaches to overcome the constraints imposed by the mobile environment and to enhance the interactions between handheld devices and mobile applications.

Susy Chan and Xiaowen Fang, in the chapter “Mobile Commerce and Usability,” analyse the usability issues that have great impact on the interface design, development, deployment and adoption of m-commerce applications. The chapter also highlights some usability topics for future research.

The chapter “Using Continuous Voice Activation Applications in Telemedicine to Transform Mobile Commerce” by James Rodger describes the use of mobile technologies in telemedicine efforts in defense. A strategy for implementing mobile telemedicine is given.

Finally, the chapter “Mobile Applications for Adaptive Supply Chains: A Landscape Analysis” by Ravi Kalakota, Marcia Robinson and Pavan Gundepudi examines the changes to supply chains brought about by mobile technologies.

The above collection of chapters provides a good mix of views on the technological and application aspects of mobile commerce. Mobile commerce is still in its infancy. More developments in this area are expected to take place in the near future. There will certainly be new technologies that will render some of the existing ideas obsolete. Nevertheless, this book will provide the necessary foundation for readers to understand the mobile commerce area and inspire more research work on mobile commerce-related technologies.