Effective Healthcare Information Systems
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Effective Healthcare Information Systems
Adi Armoni, Editor
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Healthcare informatics encompasses a very broad field that is developing rapidly in terms of both research and practices. Information systems are critical to the safety, efficacy, and quality of healthcare services delivery; to the strategic, tactical, and operational impacts of healthcare organizations; and to the enhancement of performance efficiencies and effectiveness of healthcare providers. Effective Health Information Systems attempts to provide a comprehensive outlook that cuts across a wide variety of trends, issues, and challenges related to healthcare informatics and information systems. Each selected article provides some insight into specific aspects of information technology applications and management in the healthcare industry. Although the disciplines are multi-dimensional and complex, the editor tried to put a special emphasis on issues dealing with the more recent challenges, such as Web-based technology, intelligent data mining systems, expert systems and artificial intelligence, computer-based telemedicine and the Canadian experiences, as well as national health services implementation projects. Accordingly, several cases on the implementation of these technologies are shared to highlight both the reasons for success and for failure in the design, development, and implementation of various healthcare information systems. Altogether, the 20-chapter collection of the book may be grouped roughly into four broad themes, although the readers, if they so desire, may treat each chapter to stand on its own.

The first theme (Chapters I through V, XVII, and XVIII) centers prominently on the discussion of strategies and selective technologies to support healthcare services. Chapter I addresses the issues of why many large-scale implementations of healthcare information systems have not come to fruition. The authors introduce five broad themes and argue that the healthcare systems are a realistic laboratory for information and communication technology scientists to do research. Chapter II reports on a research project with a longitudinal focus on the implementation of Case-Mix in four UK hospitals. Based on what they found in these cases, the author was able to detail an implementation cube to guide future strategic IS implementation projects in the UK and provided an interesting discussion of its implications for future healthcare research and practices at the end of the chapter. Chapter III examines how Web technology is affecting patient-physician relationships through its impact on players and processes both inside and outside the traditional hospital setting. This is purported to be one of the most promising areas for future research.
Chapter IV moves on to present an overview of artificial intelligence and its various applications to the healthcare domain. The review concentrates on AI applications to radiology, robotically operated surgical procedures, and different kinds of expert systems. Chapter V then shifts focus to the types of healthcare fraud and a discussion on using data mining methodology to detect current frauds. The authors effectively illustrate how automated data mining can improve current challenges in the healthcare informatics field. Chapter XVII introduces two middleware service frameworks for information system; namely, CORBAMed and DHE in detail. The middleware can satisfy the various requirements of a distributed healthcare information system by common services and a set of standard interfaces. Chapter XVIII presents a physician order entry system in the ward for medication prescriptions by using the scanning and image processing (SIPS). Doctors’ handwritten images and other order information can be transmitted to the system electronically and can reduce human effort and errors. The authors surmise that SIPS not only meet the needs of a hospital that requires paper-and-pen operations but also many other operations.

The third theme of the book (Chapters XI through XIV) changes to data and communication infrastructure and related aspects. Chapter XI uses the Swiss HIV Cohort Study (SHCS) as the core community and starting point of its analysis. Because the technical infrastructure included various legacy and new systems, all data (including electronic data) were processed manually, thereby delaying the creation and dissemination of new knowledge. To overcome this challenge, the authors suggest the use of a Web-based platform designed and implemented via the concept of knowledge medium supported by the applied SGML/XML standard. Chapter XII discusses the rationale of the Department of Defense (DOD) to utilize telemedicine in order to meet increasing global crises and for the U.S. military to find ways to manage manpower and time more effectively. The authors discuss and assess the mobile telemedicine infrastructure that has been developed by the DOD on how to collect and transmit near-real-time, far-forward medical data and to enhance medical management of the battle space. Chapter XIII reports on a survey of 511 physician-practice Web sites in order to assess how the promise of the technology com-
pares to reality. The researcher finds that not only were the professional credentials of the healthcare providers lacking, but the use of online forms to collect data by these caregivers was notably low. Besides, only a few sites incorporated legal disclaimers or provided a secure connection for patients. Thus, Web technology infrastructure is not yet being generally accepted or utilized in physician practices. Chapter XIV provides an overview of some of the criteria that can be used to assess the disclosure of medical information on the World Wide Web. The author laid out a simple set of easy-to-apply criterion: categories of information accuracy, objectivity, privacy, currency, and authority. Finally, the author also advocates a checklist for Web page assessment and scoring system.

The last theme of the book (Chapters VI through VII, XV, XIX through XX) generally covers the healthcare information systems implementation practices. Chapter VI begins with a discussion of findings on information systems implementations projects in Canada, as reported over the years. After reviewing 50 projects and interviewing 24 of these project champions, the author concludes that there is a need for organizational commitment, training and management support, systems capability, effective communications and user participation, quality of information, and positive outcomes. In Chapter VII, the researchers propose the role of user ownership and positive user attitudes as critical factors in the successful adoption of information systems. Based on the results of five cases, they show that user ownership and positive user attitudes were mediating variables that were crucial to the success of a community information system. Chapter XV reports on a root cause analysis following an information system failure that compromised the organization’s ability to capture clinical documentation for a 33-hour period. The lack of adequate communication and tested procedures was identified as the root cause. Chapter XIX chooses a case in an intensive care unit of a UK hospital to show that the implementation was complex and that it involved organizational issues related to the cost of healthcare, legal and purchasing requirements, system integration, and staff expertise, as well as relationships with suppliers. The authors also discuss several issues and suggestions in order to integrate information systems with the business. Chapter XX explores ways in which innovative information systems projects take on a life of their own. Three approaches are reviewed, and a theoretical framework for viewing the transformations in an information systems project is proposed. The framework then is applied to the case of the NHSnet project in the UK. By using the language of sociology translation, the authors consider the underlying stakeholder relations in the case study and draw more general conclusions for the responsibilities of stakeholders involved in an information systems lifecycle.

The chapters in Effective Health Information Systems are easy to read, even without knowledge of preceding or subsequent chapters, although a novice who is unaware of health information systems issues will have problems trying to piece together the different themes of the work. However, the concepts, theories, methodologies, and technologies among chapters are not complicated, even for a beginner, and in this sense, it is a useful introductory book for information systems professionals trying to understand the application of IT in healthcare organizations, systems, and environments. The wide range of topics is written by a selected list of contributors, each sharing a piece of their many years of expertise and experiences doing research in this area. The book, therefore, serves as a source of reference for those lacking knowledge in healthcare information systems, especially for those who are just entering the field but are overwhelmed easily by the number of stakeholders and the growing number of publications in this arena. The book therefore serves as a source of reference for those lacking knowledge in healthcare information systems, especially for those who are just entering the field but are easily overwhelmed by the number of stakeholders and the growing number of publications in this arena.
Yet, the editor of the book could have done a better job, if only he had taken the effort to group the chapters more logically into major themes instead of ordering the pieces haphazardly for the readers. Fortunately, as this review has shown, most of the related chapters in a theme are placed closely together. It is hoped that this review will help other intended readers to bring those healthcare information systems research and practice together in a more meaningful framework and will enable them to expand beyond ideas, concepts, theories, and data presented in the book. Even so, this book still provides a valuable resource for professionals and students, and the topics discussed are emerging and of growing popularity. Obviously, a variety of issues covered in this book is of great importance, but with a better organization and flow, the book could be more useful for educators and students. We believe that it is the total effort of all information systems researchers that would help us to enrich our understanding of research and practices in this emerging field.

Joseph Tan, PhD, serves on various journal editorial review boards and is editor-in-chief of the International Journal of Healthcare Information Systems and Informatics. He has been tenured at the University of British Columbia, Canada for 14 years and has served as professor and head of Information System and Manufacturing Department, School of Business Administration, Wayne State University in the last three years. Currently, he is leading an interdisciplinary e-health research team across the WSU campus to investigate effects and impacts of e-technologies on reducing health disparities among urban adults and elders in Wayne and surrounding areas. Professor Tan has also served as adjunct professor of the School of Health Informatics, the University of Victoria in 2002-2003 and as a visiting professor and research fellow with British Columbia Institute of Technology, where he implemented several online courses and assessment modules in the areas of health information systems and informatics from 1999 through 2001. In the summer of 1998, Dr. Tan was a Distinguished Faculty Member for Continuing Medical Education & Radiology Department, Texas Tech Health Sciences Center, Lubbock, and an instructor for the Doctoral of Business Administration and Doctoral in Engineering programs in the Canada-US-Mexico Trilateral Partnerships for CETYS University. Professor Tan has been nominated to be one of the council members of the BC Ministry of Health Standards Council for Health Information by UBC President, and was appointed one of the advisory members for the Council of Canadian Health Services Executives (CCHSE), Ottawa, Canada. His research interests cuts across a wide spectrum of domains, including: health informatics; critical success factors; electronic health networks, e-health system security, privacy and confidentiality; quality healthcare services; waiting lines; health ergonomics; health graphics; health decision support systems; health informatics education; health services management research; data mining in healthcare; e-technologies in health promotion and lifestyle changes; and endangered languages and digital libraries. His most recent work, E-Health Care Information Systems, published by Jossey-Bass, July 2005, touches on the cutting-edge theories, methods and practices in e-health care.

Fuchung Wang is a PhD candidate in the Department of Management Information Systems of National Chengchi University in Taiwan. His bachelor's is in industrial engineering and his MBA is in management information systems. Because had been working in the Bureau of National Health Insurance in Taiwan as a chief of information system and hospital claim for many years, he is expanding his field of concentration by linking the practice with research. His research in the field of national health information infrastructures is on going. He is also working in the research area of e-health, e-government, supply chain management, knowledge management, and data mining.