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DECISION SUPPORT SYSTEMS AND INTELLIGENT SYSTEMS

SIXTH EDITION

EFRAIM TURBAN
JAY E. ARONSON

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Dedicated to
my wife Lina,
and my daughters Daphne and Sharon
with love

and to
my wife Sharon,
and my children Marla, Michael, and Stephanie
with love

ABOUT THE AUTHORS

Efraim Turban (M.B.A., Ph.D., University of California Berkeley) is a visiting professor at City University of Hong Kong. Prior to this he was on the staff of several universities including Lehigh University, Florida International University, and the University of Southern California. Dr. Turban is the author of about 100 refereed papers published in leading journals such as *Management Science, MIS Quarterly,* and *Decision Support Systems.* He is also the author of 20 books including *Electronic Commerce: A Managerial Perspective* and *Information Technology for Management.* He is also a consultant to major corporations worldwide. Dr. Turban's current areas of interest are Web-based decision support systems, using intelligent agents in electronic commerce systems, and collaboration issues in global electronic commerce.

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PREFACE

OVERVIEW

As we begin the 21st century, we observe major changes in how managers use computerized support in making decisions. From primarily a personal support tool, as more and more computers become networked, DSS is quickly becoming a *shared commodity* across the organization. Organizations now can easily use intranets and the Internet to deliver high value performance analysis applications to decision makers around the world. Corporations are developing distributed systems, *intranets* and *extranets,* that enable easy access to data stored in multiple locations, and collaboration and communication worldwide. Various information systems are being integrated with each other and/or with other automated systems. Some integration even transcends organizational boundaries. Managers can make better decisions because they have more accurate information at their fingertips.

Today's DSS tools can also create a key interactive user interface that allows users to view and process data and models with standard Web browsers with great flexibility, efficiency, and ease. The easy to use and readily available capabilities of executive information, knowledge, and other advanced systems have migrated to the PC and personal digital assistants (PDAs). Managers can communicate with computers and the Web with a variety of handheld wireless devices, including the cell telephone. Through these devices, managers access important information and useful tools, and collaborate. *Data warehouses* and their analytical tools, such as *online analytical processing* (OLAP), dramatically enhance information access across organizational boundaries. Decision support for groups continues to improve with major new developments in *group support systems* for enhancing collaborative work, anytime and anywhere. *Artificial intelligence* methods are improving the quality of decision support and are becoming embedded in many applications ranging from toasters to intelligent Web search engines. *Intelligent agents* perform routine tasks, freeing up decision makers' time to devote to important work. Developments in *organizational learning* and *knowledge management* deliver the entire organization's expertise to bear on problems anytime and anywhere. The Internet and intranet information delivery systems are enhancing all of these decision support systems.

The purpose of this book is to introduce the reader to these technologies, which we call collectively, *management support systems* (MSS). This book presents the fundamentals of the techniques and the manner in which they are developed and used.

The theme of this totally revised edition is "enterprise decision support, the Web and the role of knowledge management." In addition to the traditional DSS applications, this edition introduces the reader to the world of the Web by providing examples, products, services, and exercises, and by discussing Web-related issues throughout the text. The book is supported by a Web site (www.prenhall.com/turban) that contains additional readings, relevant links, and other supplements. In the specific changes of this sixth edition, most of the improvements concentrate in three areas: knowledge management, supply chain decision support, and Web DSS. Despite the many changes,

we preserved the text's comprehensiveness and user friendliness that made it a market leader. We also reduced the book's size by eliminating generic IT material and by moving material to the book's Web site. Finally, we present accurate and updated material not available in any other text.

DSS and ES courses and portions of courses are recommended jointly by the Association for Computing Machinery (ACM), Association for Information Systems (AIS), and Association of Information Technology Professionals (AITP, formerly DPMA) (see *Data Base,* Vol. 28, No. 1, Winter 1997). This course is designed to cover the decision support and artificial intelligence components of the IS'97 Model Curriculum for information systems. It actually covers more than what is recommended. This text also covers the decision support and artificial intelligence components of the Information Systems 2000 Model Curriculum draft (www.is2000.org). Another objective is to provide the practicing manager with the foundations and applications of DSS, GSS, knowledge management, ES, neural computing, intelligent agents, and other intelligent systems.

THE SIXTH EDITION

The sixth edition of this book presents a major departure from the previous editions conducted for the purpose of improving the text. The major improvements include the following:

- A new chapter on knowledge management (Chapter 9) describing this exciting new decision support methodology.
- Replacing the chapter on executive information systems (EIS) with a new chapter on enterprise decision support systems (Chapter 8) that centers on supply chain management.
- Combining the chapters on artificial intelligence and expert systems into a single chapter.
- Creating a single chapter from those on networked decision support and group support systems (Chapter 7).
- Eliminating the chapter on user interface and moving some of its content to the book's Web site and to other chapters.
- Creating a new section on the use of intelligent agents in electronic commerce.
- Updating a chapter on data warehousing and its role in decision support (Chapter 4).
- Expanding the theoretical material on decision making in Chapter 2. This includes material on alternative decision-making models and personality temperament types.
- Including new, real-world case applications in many of the chapters. These include the IMERYS case applications of Chapters 2, 5, and 6.
- Expanded coverage of the LP packages, Lingo, Lindo, and Solver in Chapter 5.
- Major updating and streamlining of the DSS development process in Chapter 6.
- A new section on distance learning in Chapter 7.
- Moving the updated creativity and idea generation material into Chapter 7.

- Major updating and streamlining of the intelligent systems development process in Chapter 14.
- Including examples of neural network computer runs in BrainCel and BrainMaker in Chapter 15.
- Improving the material on genetic algorithms and fuzzy logic in Chapter 16. This includes an example of an Evolver (genetic algorithm) run.
- Moving the material on qualitative reasoning from knowledge representations to the one containing advanced artificial intelligent systems and applications (Chapter 16).
- Reducing the number of chapters from 21 to 19.

Other improvements and refinements are as follows:

- Moving the book to the Web age. Throughout the book you will find many discussions and references to the Internet, intranets, Web, and other network computing.
- A Web site supports this book: www.prenhall.com/turban. The Web site includes cases, software information, appendices, additional exercises, and more.
- Internet exercises for each chapter. A diversity of exercises provides the students with extensive, up-to-date information and a better sense of reality.
- Hands-on exercises provide opportunities to build decision support applications.
- Expanded group exercises and term projects. These enhance the learning experience by providing activities for small groups and longer term activities. Some term projects involve building systems for real organizations (we have used this approach very successfully for over 15 years in our teaching).
- Updated research findings and references.
- More real-world examples.

THE INSTRUCTIONAL MATERIALS

The instructional package consists of several components (check the Web site for updates).

- **Instructor's Manual and Test Item File (0-13-040633-3).** The *Instructor's Manual* includes learning objectives for the entire course and for each chapter, answers to the questions and exercises at the end of the chapters, teaching suggestions (including instructions for projects), and a software guide. The test item file includes multiple-choice questions for each chapter with answers and many test exercises for both DSS and intelligent systems with solutions.
- **Prentice Hall Test Manager for Windows (0-13-040634-1).** The *Prentice Hall Test Manager* is a computerized test generator with an optional grade book and available online testing.
- **Web site: www.prenhall.com/turban.** The Web site includes additional materials such as pointers to available software and documentation, data files, appendices, cases, additional exercises, and more.

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E.T.
J.E.A.

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