Mark G. Simkin Jacob M. Rose Carolyn S. Norman

Core Concepts of ACCOUNTING INFORMATION SYSTEMS

Thirteenth Edition

WILEY

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In memory of my father, Edward R. Simkin (Mark G. Simkin)
Chase your big dreams! (Jacob M. Rose)
Thank you to my students –you're the best! (Carolyn S. Norman)

ABOUT THE AUTHORS

Mark G. Simkin received his A.B. degree from Brandeis University and his M.B.A. and Ph.D. degrees from the University of California, Berkeley. Before assuming his present position of professor in the Department of Information Systems, University of Nevada, Professor Simkin taught in the Department of Decision Sciences at the University of Hawaii. He has also taught at California State University, Hayward, and the Japan America Institute of Decision Sciences, Honolulu; worked as a research analyst at the Institute of Business and Economic Research at the University of California, Berkeley; programmed computers at IBM's Industrial Development—Finance Headquarters in White Plains, New York; and acted as a computer consultant to business companies in California, Hawaii, and Nevada. Dr. Simkin is the author of more than 100 articles that have been published in journals such as *Decision Sciences, JASA, The Journal of Accountancy, Communications of the ACM, Interfaces, The Review of Business and Economic Research, Decision Sciences Journal of Innovative Education, Information Systems Control Journal,* and the *ISACA Journal.*

Jacob M. Rose received his B.B.A., M.S. in accounting, and Ph.D. in accounting from Texas A&M University, and he has passed the CPA exam in the state of Texas. Dr. Rose holds the position of trustee professor at Bentley University. He has also taught at Bryant University, Southern Illinois University, the University of New Hampshire, the University of Oklahoma, the University of Tennessee, and Victoria University of Wellington, and he was an auditor with Deloitte and Touche, LLP. Professor Rose has been recognized as the top instructor in accounting at multiple universities, and he has developed several accounting systems courses at the graduate and undergraduate levels. He is also a prolific researcher, publishing in journals such as *The Accounting Review*; *Accounting, Organizations and Society*, *Behavioral Research in Accounting*; *Journal of Business Ethics, Journal of Information Systems*, *International Journal of Accounting Information Systems*, *Journal of Management Studies*, and *Accounting Horizons.* Professor Rose has been recognized as the top business researcher at three universities, and he has received the Notable Contribution to the Information Systems Literature Award from the American Accounting Association.

Carolyn Strand Norman received her B.S. and M.S.I.A. degrees from Purdue University and her Ph.D. from Texas A&M University. Dr. Norman is a Certified Public Accountant, licensed in Virginia, and also a retired Lieutenant Colonel from the United States Air Force. At the Pentagon, she developed compensation and entitlements legislation, working frequently with House and Senate staffers. Prior to assuming her current position, Dr. Norman taught at Seattle Pacific University where she co-authored the book, *XBRL Essentials* with Charles Hoffman, and was selected as Scholar of the Year for the School of Business and Economics. Dr. Norman has published more than 50 articles in such journals as *The Accounting Review, Accounting, Organizations and Society, Behavioral Research in Accounting, Journal of Accounting and Public Policy, Behaviour & Information Technology, Journal of Information Systems, Advances in Accounting Behavioral Research, Issues in Accounting Education,* and *Journal of Accounting Education.* She is currently the Chair of the Accounting Department at Virginia Commonwealth University.

PREFACE

Information technologies affect every aspect of accounting, and as technologies advance, so does our accounting profession. For example, today's accountants use the many helpful features in spreadsheet software to build, analyze, and update spreadsheet models. Similarly, the Internet and mobile devices continue to change the way accountants work, communicate, obtain training, and access professional information.

Because most accounting systems are computerized, accountants must understand how hardware, software, and human procedures turn data into decision-useful financial information and also how to develop and evaluate internal controls. Business and auditing failures continue to force the profession to emphasize internal controls and to rethink the state of assurance services. As a result, the subject of accounting information systems (AIS) continues to be a vital component of the accounting profession.

The purpose of this book is to help students understand basic AIS concepts. Exactly what comprises these AIS concepts is subject to some interpretation, and it is certainly changing over time, but most accounting professionals believe that basic AIS concepts consist of the knowledge that accountants need for understanding and using information technologies and for knowing how an accounting information system gathers and transforms data into useful decision-making information. In this edition of our textbook, we include the core concepts of Accounting Information Systems. The book is flexible enough that instructors may choose to cover the chapters in any order.

ACCOUNTING INFORMATION SYSTEMS COURSE CONTENT AREA COVERAGE

AIS Applications	10, 11, 12
IT Auditing	15
Database Concepts	7, 8, 9
Internal Control	13, 14
Management of Information Systems	4, 5, 6
Management Use of Information	1, 2, 5, 10, 11, 12
Systems Development Work	6
Technology of Information Systems	All chapters

About This Book

The content of AIS courses varies widely from school to school. Some schools use their AIS courses to teach accounting students how to use computers. In other colleges and universities, the course focuses on business processes and data modeling. Yet other courses emphasize transaction processing and accounting as a communication system that has little to do with the technical aspects of how systems gather, process, or store underlying accounting data.

Given the variety of objectives for an AIS course and the different ways that instructors teach it, we developed a textbook that attempts to cover the core concepts of AIS. In writing the text, we assumed that students have completed basic courses in financial and managerial accounting and have a basic knowledge of computer hardware and software concepts. The text is designed for a one-semester course in AIS and may be used at the community college, baccalaureate, or graduate level.

Our hope is that individual instructors will use this book as a foundation for an AIS course, building upon it to meet their individual course objectives. Thus, we expect that many instructors will supplement this textbook with other books, cases, software, or readings. The arrangement and content of the chapters permits *flexibility* in covering subject materials and allows instructors to omit chapters that students have covered in prior courses.

Special Features

This edition of our book uses a large number of special features to enhance the coverage of chapter material as well as to help students understand chapter concepts. Thus, each chapter begins with a list of learning objectives that emphasize the important subject matter of the chapter. This edition of the book also includes many new real world Cases-in-Point, which we include to illustrate a particular concept or procedure. Each chapter also includes a more-detailed real-world case as an end-of-chapter *AIS-at-Work* feature.

Each chapter ends with a summary and a list of key terms. To help students understand the material, each chapter includes multiple-choice questions for self-review with answers. There are also three types of end-of-chapter exercises: (1) discussion questions, (2) problems, and (3) case analyses. This wide variety of review material enables students to examine many different aspects of each chapter's subject matter and also enables instructors to vary the exercises they use each semester.

The end-of-chapter materials include references and other resources that allow interested students to explore the chapter material in greater depth. In addition, instructors may wish to assign one or a number of articles listed in each chapter reference section to supplement chapter discussions. These articles are also an important resource for instructors to encourage students to begin reading such professional journals as *Strategic Finance*, *The Journal of Accountancy*, and *The Internal Auditor*. We also included a selection of current videos at the end of each chapter.

Supplements

There are a number of supplements that accompany this textbook. One is an instructor's manual containing suggested answers to the end-of-chapter discussion questions, problems, and case analyses. There is also a test bank consisting of true-false, multiple-choice, and matching-type questions, as well as short answer problems and fill-in-the-blank questions, so that instructors have a wide variety of choices. In addition, PowerPoint lecture slides accompany the text, and all of these materials can be accessed from the book's companion website at www.wiley.com/college/simkin.

What's New in the Thirteenth Edition?

This edition of our book includes a number of changes from prior editions.

- An expanded section in Chapter 1 describes career paths for accountants interested in predictive analytics, where acute shortages exist for qualified individuals.
- A new color—both inside and on the cover! This edition uses **red** to highlight information and to make the book more interesting to read.

- The book offers expanded coverage of important topics, such as big data, cloud computing, and the 2013 COSO Report, as well as updated information on the importance of XBRL and new uses of IT in the sales and purchasing processes.
- New material addresses topics such as e-accounting, accounting uses of social media, fraud detection with accounting data, virtual currencies, decision trees, and systems acquisition of small-scale ERP systems.
- Many new *Case-in-Points* illustrate the concepts discussed in the textbook and give students a better grasp of the material.
- New *AIS at Work* features at the end of many chapters help students better understand the impact of systems in a wide variety of contexts.
- More Test Yourself multiple choice questions help students assess their understanding of the chapter material.
- Many new discussion questions, problems, and cases at the end of chapters give instructors more choices of comprehensive assignments for students.
- New links to video clips and recommended readings highlight important topics.

The end of the book contains an updated glossary of AIS terms.

Acknowledgements

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Mark G. Simkin
Jacob M. Rose
Carolyn S. Norman

CONTENTS

Chapter 1

Accounting Information Systems and the Accountant

After reading this chapter, you will:

1. *Better understand* the huge impact information technology (IT) has on the accounting profession and why you need to study accounting information systems.
2. *Be familiar with* career opportunities that combine accounting and IT knowledge and skills.
3. *Learn* how IT influences accounting systems.
4. *Understand* how financial reporting is changing with advances in IT, such as XBRL.
5. *Appreciate* how accountants use business intelligence for decision-making.
6. *Be aware of* what is new in the area of accounting information systems.
7. *Be able to* distinguish between such terms as "systems," "information systems," "information technology," and "accounting information systems."

"*Cloud computing ... It's about reallocating the IT budget from maintenance—such as keeping servers running, performing upgrades, and making backups—to actually improving business processes and delivering innovation to the finance organization.*"

Gill, R. 2011. Why cloud computing matters to finance. *Strategic Finance* 92(7): 43–47.

1.1 INTRODUCTION: WHY STUDY ACCOUNTING INFORMATION SYSTEMS?

This chapter begins by answering the question "why should you study accounting information systems?" There are many reasons, but one of the most important is because of the special career opportunities that will enable you to combine your study of accounting subjects with your interest in computer systems. In today's job market, accounting employers expect new hires to be computer savvy. A large number of specialized and highly compensated employment opportunities are only available to those students who possess an integrated understanding of accounting and information systems and can bring that understanding to bear on complicated business decisions.

Think about it. When is the last time you went into a bank, filled out a piece of paper to withdraw cash from your bank account, and then stood in line waiting for a teller to help you? When is the last time you went to a travel agency to ask someone to find you an airline ticket for your spring break vacation to Florida or the Virgin Islands?

Or when is the last time you stood in line to fill out paperwork for the courses you wanted to take for next semester? Most likely, the answer to each of these questions is "never." And that is because of IT. Information technology is so pervasive today that it is nearly impossible to do anything that does not in some way involve technology. So ask yourself the question, "how can you possibly be a successful accountant if you do not have a basic understanding of how technology influences the profession?"

1.2 CAREERS IN ACCOUNTING INFORMATION SYSTEMS

Our introductory remarks to this chapter suggest a variety of reasons why you should study **accounting information systems (AISs)**. Of them, perhaps the most interesting to students is the employment opportunities available to those who understand both accounting and information systems.

Traditional Accounting Career Opportunities

Certainly, a number of traditional accounting jobs are available to those who choose to study accounting as well as accounting information systems. Because technology plays such a strong role in internal auditing, public accounting, managerial accounting, auditing, and taxation, AIS majors enjoy the advantage of understanding both traditional accounting concepts and information systems concepts. Recognizing the importance to accountants of knowledge about information systems, the American Institute of Certified Public Accountants (AICPA) developed a new designation: **Certified Information Technology Professional (CITP)**, which accountants can earn if they have business experience and if they pass an examination.

Systems Consulting

A consultant is an outside expert who helps an organization solve problems or who provides technical expertise on an issue. **Systems consultants** provide help with issues concerning information systems—for example, by helping an organization design a new information system, select computer hardware or software, or reengineer business processes so that they operate more effectively.

One of the most important assets a consultant brings to the job is an objective view of a client's organization and its processes and goals. AIS students who are skilled in both accounting and information systems are particularly competent systems consultants because they understand how data flow through accounting systems as well as how business processes function. Systems consultants can help a variety of organizations, including professional service organizations, private corporations, and government agencies. This broad work experience, combined with technical knowledge about hardware and software, can be a valuable asset to CPA clients. Because it is likely that a newly designed system will include accounting-related information, a consultant who understands accounting is particularly helpful. Many systems consultants work for large professional service organizations, such as Accenture or Cap Gemini Ernst & Young. Others may work for specialized organizations that focus on the custom design of accounting information systems.

Consulting careers for students of accounting information systems also include jobs as **value-added resellers (VARs)**. Software vendors license VARs to sell a particular

software package and provide consulting services to companies, such as help with their software installation, training, and customization. That is, VARs are individuals who take a product and add value to the product for their customers, which might include such services as strategic planning, system design and implementation, technical support, database development, and other similar services. A VAR may set up a small one-person consulting business or may work with other VARs and consultants to provide alternative software solutions to clients.

Case-in-Point 1.1 American Management Technology (AMT) is a locally owned computer business in Chesterton, Indiana and provides both computer products and services to small businesses. It is especially focuses on providing network systems and services to small and medium-sized businesses. Its services include design and installation of network systems, training, and support. The staff at AMT consists of several technicians with over a combined 70 years of experience serving the Northwest Indiana computing community.[1]

Certified Fraud Examiner

Due to increased concerns about terrorism and corporate fraud, forensic accounting is an important area for accountants to study and develop their skills. An accountant can acquire the **Certified Fraud Examiner (CFE)** certification by meeting the qualifications of the Association of Certified Fraud Examiners. To become a Certified Fraud Examiner, an individual must first meet the following qualifications: have a bachelor's degree, at least two years of professional experience in a field either directly or indirectly related to the detection or deterrence of fraud, be of high moral character, and agree to abide by the bylaws and code of professional ethics of the ACFE. If these are met, then the individual may apply for the CFE examination.

You might be asking yourself what sort of professional experience might be useful if you wish to satisfy the two-year requirement for certification. Not surprisingly, these jobs may be located within CPA firms across the Unites States, as well as within international public accounting firms. Other such positions might include working within a for-profit organization as an internal auditor, with a valuation expert in a law firm, with an FBI or CIA agent, or as an auditor for Medicaid, Medicare, or many other government organizations.

The salary ranges and possible job locations are varied. Most positions will likely be located in larger metropolitan areas, but may also be found in mid-sized cities. From the chart below (Figure 1-1) you can see that the salary ranges include several levels of positions in the internal audit area. Why do you think that might be the case?

Job Title	Salary Range
Fraud Investigator	$39,551–91,715
Senior Internal Auditor	$53,424–90,613
Internal Auditing Manager	$74,441–111,778
Internal Auditor	$42,971–76,480
Senior Auditor	$50,848–95,600

FIGURE 1-1 Examples of job titles and pay range for CFEs. Source: PayScale.com, Average Salary for Certification: Certified Fraud Examiner (CFE), accessed March 2014.

[1] AMT Computers, Chesterton, Indiana, accessed from www.amtcomputers.com, March 2014.

Assurance Services
- Financial statement attestation
- Internal control reporting
- Assess procedures and controls concerning privacy and confidentiality, performance measurement, systems reliability, outsourced process controls, information security

Business Risk Services
Fraud Investigation and Dispute Services
Technology and Security Risk Services
Specialty Advisory Services

FIGURE 1-2 A sample of the many types of services offered by Ernst & Young LLP, one of the largest international professional service organizations.

Essentially, fraud occurs where there are weak internal controls or when a manager or employee circumvents the internal controls that are in place. A more detailed explanation of internal controls is contained in Chapters 13 and 14.

Information Technology Auditing and Security

Information technology (IT) auditors focus on the risks associated with computerized information systems. These individuals often work closely with financial auditors to assess the risks associated with automated AISs—a position in high demand because almost all systems are now computerized. Information systems auditors also help financial auditors decide how much time to devote to auditing each segment of a company's business. This assessment may lead to the conclusion that the controls within some portions of a client's information systems are reliable and that less time need be spent on them—or the opposite. Due to the growing need for this type of auditor, we devote an entire chapter to IT auditing—Chapter 15.

IT auditors are involved in a number of activities apart from assessing risk for financial audit purposes. Many of these auditors work for professional service organizations, such as Ernst & Young, PricewaterhouseCoopers, or KPMG. Figure 1-2 identifies a partial listing of the types of services offered by Ernst & Young.

IT auditors might be CPAs, or they might be licensed as **Certified Information Systems Auditors (CISAs)**—a certification given to professional information systems auditors by the **Information Systems Audit and Control Association (ISACA)**. To become a CISA, you must take an examination and obtain specialized work experience. Many CISAs have accounting and information systems backgrounds, although formal accounting education is not required for certification. IT auditors help in documenting and evaluating IT controls.

According to the ISACA website, there is a growing demand for employees who have IS audit, control, and security skills. The CISA certification is therefore in high demand worldwide because these individuals: (1) are qualified, experienced professionals; (2) provide the enterprise with a certification for IT assurance that is recognized by multinational clients, lending credibility to the enterprise; (3) have proficiency in technology controls; (4) demonstrate competence in five domains, including standards and practices; organization and management; processes; integrity, confidentiality, and availability; and software development, acquisition, and maintenance; (5) demonstrate a commitment to providing the enterprise with trust in and value from information