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PROCESSES, SYSTEMS, AND INFORMATION
An Introduction to MIS
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Preface

Since the emergence of ERP and EAI systems in the early 1990s, the MIS discipline has undergone a slow but persistent change. Whereas the early emphasis of MIS was on the management and use of information systems per se, emerging cross-functional systems began to place the focus on processes that utilize such systems. We believe that existing MIS textbooks, particularly those at the introductory level, do not sufficiently recognize this change in emphasis. Hence, we offer this textbook that provides a strong process orientation.

Why This Third Edition?

We have made a number of changes to this third edition; these are listed in Table 1. While Table 1 spells out the changes in detail, there are several significant changes that warrant a short explanation.

First, the technology landscape has changed rapidly from the time the second edition was written. At that time, Uber, Blockchain, Smartphone payments, group messaging, and the Internet of Things were not on the scene. Robotics, Big Data, and SAP HANA S/4 were just beginning. Further, security was not the priority it is now. These changes led to updates of many of the chapters. In addition, we decided to introduce Extensions in this third edition to provide more coverage of new topics without making existing chapters too long.

These Extensions include completely new discussions of technologies such as Location Based Data, AI, and Robots. They also include some topics that no longer fit in chapters such as hardware, software, and systems development. Finally the extensions include a discussion of IS careers.

We also wanted to expand the opportunity for students to gain more first-hand practice with SAP. We added a Production tutorial in Appendix A based on the same Chuck’s Bikes case used in the Procurement and Sales tutorials.

One of the biggest challenges to any SAP tutorial is ensuring students understand the underlying business processes, that they not blindly enter data into on-screen forms. To that end, Pearson has introduced a new app called MySAP Lab. This browser app runs independently from SAP but is synced to the tutorial so that as a student works through the tutorial this app periodically poses questions about the underlying process. It also provides the instructor an opportunity to passively observe assignment completion, notice where students encounter difficulty, and record student responses to questions.

Another significant change is our coverage of security. Security is becoming more essential for all business students. Often the only exposure business students get to security is in an MIS class. For this reason we greatly expanded our discussion of security, gave it its own chapter, and moved it earlier in the semester next to the other technical topics.

Another change is that MyLab MIS is now integrated with the 3rd Edition. At the end of each chapter students are directed to MyLab MIS for short answer questions as well as essay questions.

Many colleagues have told us they are “flipping” their class rooms and are using more student engagement activities during class meeting times. As a result, we updated half of the MIS InClass exercises and improved the instructions on the others.

At times introductory classes like MIS can devolve into a mastery of vocabulary lists. We’ve tried to counter this by helping the student see the value of using the vocabulary and the usefulness of the models presented in the text by consistently applying the course vocabulary to familiar domains such as a hospital, a bicycle company, and a university. We also ask students to self-inspect; we don’t ask them to memorize the definition of collaboration and experimentation—we ask them to evaluate themselves and find ways to improve. Just as important, we tried to identify key themes for entire chapters highlighting them in the introduction and returning to them at various points in the chapters. For example, the security chapter theme is that security is a tradeoff; a tradeoff between freedom and security and between cost and security. All these changes seek to make student engagement more natural and frequent.

Finally, to improve currency and readability all the chapters were updated, and many new figures added or repurposed. In addition, 8 opening vignettes, 10 end of chapter cases, and 7 application exercises were completely rewritten. We also tried to be more efficient with page use, reducing the length of chapter opening vignettes, cases, and ethical guides.
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<td>7 new figures&lt;br&gt;New chapter opening vignette describes poor hospital process&lt;br&gt;Expanded discussion of importance of processes to business&lt;br&gt;New end of chapter collaboration exercise&lt;br&gt;New ethics guide on the ethics of automation&lt;br&gt;New Electronic Dance Music case&lt;br&gt;Emphasis on KPI rather than measures for processes&lt;br&gt;New discussion of the importance of process feedback</td>
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Added personal examples to motivate students  
New end of chapter collaboration exercise  
New MIS InClass  
New AF ERP Bonfire case describes implementation disaster  
New emphasis on upgrades not initial implementation of ERP  
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Discussion of new concepts—Fiori, SAP HANA S/4  
Expanded discussion of ERP system challenges  
Updated goals of Tier 1 ERP vendors |
| 8       | 11 new figures  
Expanded discussion of supply chain early to provide procurement ERP context  
Implications for student job skills added  
New 2028—A/R, robots, 3-D printing, and Worldwide Internet |
| 9       | 14 new figures  
Expanded discussion of marketing early to provide sales ERP context  
A consideration of Salesforce discussion added  
Implications for student job skills added  
New 2028—Blockchain, Amazon buttons, darknet, and smartphone payment |
| 10      | New chapter opening vignette hospital collaboration  
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Updated descriptions of Google Drive and Microsoft OneDrive  
New MIS InClass  
New Miracle on the Hudson case  
New 2028—collaboration with AI and robots  
Expanded motivation to students to apply collaboration topics |
| 11      | 7 new figures  
New chapter opening vignette examines negative social media posts  
New Airbnb case  
New section on the sharing economy and trust added  
Added new section on group messaging apps and Reddit  
New vocabulary: Reddit, sharing economy, unicorns, collaborative consumption  
New vocabulary: click-through rate, conversion rate, Enterprise 2.0, privacy  
Expanded discussion of common social media measures  
Updated business uses of social media  
New 2028—analysis of social media data and privacy  
Impact of social media on hiring process added  
Expanded discussion of challenge of measuring financial results |
| 12      | 9 new figures  
New discussion of data marts, Excel PowerPivot, text mining  
Expanded descriptions of prediction markets, urban applications  
New Privacy case  
New 2028—mobile BI, unstructured data, IoT, and privacy  
New vocabulary: data marts, text mining, sentiment analysis, IoT, GDPR  
Big Data section updated on NoSQL, MapReduce, Hadoop, SAP HANA  
New discussion on skepticism of analysis added |
| New     | Extensions  
1 IS Careers  
2 Software and Hardware  
3 Process Management and IS Design  
4 Robots and AI  
5 Location Based Data Information Systems  
Appendix A: SAP Production Tutorial |
Importance of MIS

Chapter 1 claims that MIS is the most important class in the business curriculum. That's a bold statement, and every year we ask whether it remains true. Is there any discipline having a greater impact on contemporary business and government than IS? We continue to doubt there is. Every year brings important new technology to organizations, and many of these organizations respond by creating innovative applications that increase productivity and otherwise help them accomplish their strategies. In the past year, Blockchain, IoT, and new security challenges are posing new opportunities and requirements on organizations. More sophisticated and demanding users push organizations into a rapidly changing future, one that requires continual adjustments in business planning. To participate, our graduates need to know how to apply emerging technologies to better achieve their organizations' strategies. Knowledge of MIS is critical to this application.

The effects of changing technology and new user demands fall on processes and information systems at all levels—workgroup, organizational, and inter-enterprise. The impact on the latter is especially dramatic because cloud-based hosting and mobile devices enable independent organizations to work together in ways previously unimaginable.

As stated, we continue to believe we can enter the classroom with the confidence that we are teaching the single most important course in the business school—an argument that relies on two observations. First, because of nearly free data storage and data communications, businesses are increasingly finding and, more important, increasingly required to find innovative applications for information systems. The incorporation of Facebook and Twitter into marketing systems is an obvious example, but this example is only the tip of the iceberg. For at least the next 10 years, every business professional will, at a minimum, need to assess the efficacy of proposed IS applications. To excel, business professionals will need to not only assess but define innovative IS applications. These applications will increasingly take advantage of advances in Big Data and analytical software.

Such skills will not be optional. Businesses that fail to create systems that take advantage of nearly free data storage and communication will fall prey to the competition that can create such systems. So, too, will business professionals.

The second premise for the singular importance of the MIS class relies on the work of Robert Reich, former Secretary of Labor for the Clinton administration. In *The Work of Nations*, Reich identifies four essential employability skills for knowledge workers in the 21st century:

- Abstract reasoning
- Systems thinking
- Collaboration
- Experimentation

For reasons set out in Chapter 1, beginning on page 2, we believe the MIS course is the single best course in the curriculum for learning these four key skills.

While most Introduction to MIS textbooks address technical innovation and nonroutine skills, *Processes, Systems, and Information, Third Edition*, uniquely enables the Intro course to also address business processes. The process view of business is the dominant view of business today; students need a consistent, extended opportunity to master the language and apply it. The Introduction to MIS class that uses this textbook can expose both IS and non-IS students to process concepts and appropriately place IS in its vital role of supporting and improving processes. With this process foundation, students are better able to understand the benefits and challenges of ERP systems.

Background on Processes and IS

The relationship between business processes and information systems is complex. They are not one and the same; a given process might use several different information systems, and, at the same time, a given information system might support many different processes. So, we cannot

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say that a process encapsulates all of its information systems, nor can we say that an information system encapsulates all of its processes.

In part because of this complex relationship, we define MIS as creating, monitoring, and adapting processes, information systems, and information to help organizations achieve their strategy (Chapter 1). The fabric of this text is woven around and through these definitions.

Potential adopters of this textbook are departments that make business processes a key component or thread throughout their curricula. This group includes all of the universities that are part of the SAP University Alliance, those that are part of the Microsoft Dynamics Academic Alliance, and other institutions for which a business process orientation is important. Chapters 8 and 9 provide specific examples of the use of SAP, and the cases that conclude each of those chapters provide tutorial exercises that use the SAP University Alliance’s Global Bikes Inc. (GBI) case. This is the same case and client data used in University Alliance training, so it will be familiar to many instructors.

In our opinion, a text must go beyond the operational processes that comprise Chapters 8 and 9. Of course, operational processes are most important, and five chapters and an Appendix of our text include or are devoted to them. However, other dynamic processes, such as collaboration, project management, problem solving, business intelligence, and social networking, are also important. Hence, we believe that this text should include much more than SAP-oriented processes.

**Text Features**

A challenge of teaching the Introduction to MIS course from a process orientation is the lack of business knowledge and experience on the part of most students. Many universities offer the Introduction to MIS course at the sophomore and even freshman levels. Most of these students have completed few business courses. Even when this course is taught to higher-level students, however, few of them have significant business or process experience. They have been lifeguards or baristas. When we attempt to talk about, for example, the impact of process change on departmental power, that discussion goes over the heads of students. They may memorize the terms, but they often lose the essence of the discussion. The features of this text are designed, in part, to address this problem.

**Question-Based Pedagogy**

Research by Marilla Svinicki in the Psychology Department of the University of Texas indicates that today’s students need help managing their time. She asserts that we should never give homework assignments such as “read pages 75–95.” The problem, she says, is that students will fiddle with those pages for 30 minutes and not know when they’re done. Instead, she recommends that we give our students a list of questions and the assignment that they be able to answer those questions. When they can answer the questions, they’re done studying. We have used this approach in our classrooms, and we believe that it is most effective. Students like it as well. Hence, we have organized each chapter as a list of questions.

**Opening Vignettes**

Each chapter opens with a short vignette of a business situation and problem that necessitates knowledge of that chapter. We use two different fictitious organizational settings:

1. Wood Hospital, a local hospital
2. Chuck’s Bikes, Inc., a bicycle manufacturer that competes with Global Bikes

Each of these vignettes presents a situation that illustrates the use of the chapter’s contents in an applied setting. Most contain a problem that requires knowledge of the chapter to understand and solve.

**MIS InClass Exercises**

Every chapter includes a student group exercise that is intended to be completed during class. These exercises are designed for teachers who seek to use active learning exercises, also called flipping the classroom. The purpose of the exercise is to engage the student with knowledge
gained from the chapter. These exercises are part lab and part case study in nature. In our experience, some of them lead to spirited discussions, and we could have let them run on for two or three class periods, had we had that luxury.

**SAP Tutorial Exercises**

The appendices to Chapters 8 and 9 as well as Appendix A contain process exercises that involve the SAP Alliance’s Global Bike case. Professors at institutions that are members of the alliance can use these with their students. Because not every department that uses this book is a member of that alliance, we have made these exercises optional appendices. You can omit the exercises without any loss of continuity.

The exercises are, we hope, purposeful yet simple to do. Our goal is to make it possible for them to be conducted by teaching assistants and faculty who have not yet attended the SAP university training. To that end, we provide extensive instructor support materials. Instructors who have had training by the SAP University Alliance will immediately recognize that these tutorials use exactly the same data and screens they used during training.

Earl McKinney, the author of the tutorial exercises, has been teaching SAP for 12 years at Bowling Green State University. The tutorial exercises included in this book have been tested extensively with Introduction to MIS students in a BGSU lab setting. In addition to the exercises, Earl has written a detailed teaching guide on how to best use the exercises as well as tips and pointers about their use and his experience about where students are most likely to struggle.

A fourth tutorial is offered at the end of the Chapter 12 on Business Intelligence. This tutorial uses SAP’s Lumira to analyze Global Bike Inc. data. While a particular set of data is specified in the tutorial, students and instructors can also simply read the tutorial, learn how the operations like slicing and filtering are done, and use these skills on any dataset.

Over these years, Earl learned that when doing SAP exercises, it is far too easy for students to slip into “monkey-see, monkey-do” mode without any clear understanding of what they are doing or why. Based on this classroom experience, we believe that the setup to procurement and sales in Chapters 8 and 9, together with the exercises themselves, help students move beyond simple copy mode, in which they learn the SAP keystrokes, to learn the nature of process-oriented software and its role in organizations.

Like all who have used the GBI case, we are grateful to the SAP Alliance and to the case’s authors. In accordance with both the letter and spirit of the SAP Alliance community’s policy, we have placed these exercises on the SAP University Alliance Web site. We hope you will find sufficient value in this text to use it in your classroom, but please feel free to use these exercises even if you do not adopt this text.

By the way, the body of Chapters 8 and 9 uses the example of Chuck’s Bikes, Inc., rather than GBI. We made this change at the request of the SAP Alliance. The alliance prefers that authors not add new material to GBI, change any characters, make videos, and so forth. We created CBI so as to comply with that request while at the same time providing more detailed business scenarios that are compatible with GBI.

**Ethics Guides**

We believe that business ethics are a critically important component of the Introduction to MIS course and that the best way to teach ethics is in the context of case-like situations. We also believe that ethics ought not to be relegated to a single chapter or chapter section. Including ethics in one place leads to the inoculation theory of education: “We don’t need to discuss ethics, we’ve already done that.” Accordingly, each chapter contains one two-page spread called an Ethics Guide. They are shown in the table of contents; to sample just one of them, turn to page 20.

In recent years, we believe there has been a shift in students’ attitudes about ethics. Many students seem to be increasingly cynical and callous about ethical issues. As a result, when we try to raise interest with them about unethical behavior, we find ourselves interjecting and defending a particular set of values, a role that strikes many students as inappropriate. A common attitude seems to be, “We should think for ourselves, thank you anyway.”

In frustration about the situation, we turned to a good friend of many years, Dr. Chuck Yoos, emeritus professor from the U.S. Air Force Academy. We told him our goals for presenting
the Ethics Guides and asked him what criteria he would use with his students if he only had 20 minutes per guide. His response was that while there are many ways of addressing ethics in business, Kant’s categorical imperative and the utilitarianism of Bentham and Mill would be at the top of his list. We investigated both and decided to use them with this edition.

Our goal in doing so is to ask students, whose ethical standards may be immature, to learn and apply the categorical imperative and utilitarianism perspectives. By doing so, students are asked to “try on” those perspectives and in the process think more deeply about ethical principles than when we allow them simply to apply their personal ethical standards.

The Ethics Guide in Chapter 1 introduces the categorical imperative, whereas the Ethics Guide in Chapter 2 introduces utilitarianism. If you choose to use these perspectives, you will need to assign both of those guides.

**Collaboration Exercises**

As stated in Chapter 1, collaboration is a key skill for today’s business professionals. Accordingly, we believe that teaching collaboration, collaboration processes, and collaboration information systems is an important component of this course. To that end, each chapter includes a collaboration exercise to be accomplished by a student team. In our opinion, it is not possible for students to complete all of these in one term. Instead, we recommend using three or four of them throughout the term.

In doing these exercises, we recommend that students not meet face to face, at least not most of the time, but use modern collaboration tools for their meetings. Google Docs and related tools are one possibility. We prefer requiring students to use Microsoft OneDrive.

**End-of-Chapter Cases**

The chapter-opening vignettes are based on real-life experience, but the organizations they describe are fictitious. We use fictitious companies because we want students to learn from organizational mistakes and, at times, even organizational foolishness. We have not found many real companies that will allow us to share their laundry in this way, and, in any case, it seems unfair to ask for an organization’s cooperation and then turn around and publish its problems.

However, we do believe students need to see examples of the role of MIS in actual organizations to help them bridge the chapter content to the real world. Hence, each chapter concludes with a case that illustrates some aspect of the chapter’s contents in a real-world company.

**Active Reviews**

Each chapter includes an Active Review at the end. These reviews help students ensure that they have learned the most essential material. They also serve as a list of potential exam questions and thus help students prepare for exams.

**Application Exercises**

For courses that involve a Microsoft Office component, we have developed a set of Excel and Access exercises for all chapters. These exercises, which assume the student has beginner’s level expertise with these products, appear beginning on page 448. They are listed approximately in increasing order of difficulty.

**What We Left Out**

We chose to keep this book to the traditional 12-chapter length because we find that this number of chapters fits best into the number of class lessons of most courses. Because we are adding substantial process-oriented material, however, that meant we needed to remove some content from the typical Introduction to MIS text.

In this text, we have reduced and simplified the discussions of hardware, software, and data communications. Furthermore, we simplified and shortened the discussion of information systems development. Finally, you will find no mention of IS departmental management in this text. It is not that we believe the shortened and omitted content is unimportant; rather, we think the opportunity cost is the least for these topics.

This text includes some material that has been previously published in David Kroenke’s text *Using MIS*. The two texts differ in that *Using MIS* makes information systems primary, whereas
this text makes business processes primary. Both texts will continue to be published. Because of this difference, however, every sentence that was brought over was examined from the perspective of business processes and much of that content was changed in both minor and major ways. The discussion of collaboration, for example, is reframed into the context of dynamic business processes. That said, the majority of the material in this text is new.

Chapter Outline

This text is organized into four parts: Introduction, Technology, Structured Processes, and Dynamic Processes.

Introduction

Chapter 1 sets the stage by illustrating the need for this course and especially for the behaviors and skills that students gain in the course. It defines MIS and summarizes the means by which organizations obtain goals and objectives. Porter’s industry, five forces, and value chain models are presented.

Chapter 2 defines and illustrates processes, information systems, and information. It uses a common fast food restaurant to illustrate the relationship of processes and information systems. It also defines information using the Gregory Bateson definition that information is a difference that makes a difference.

Technology

Chapters 3, 4 and 5 address technology. Chapter 3 provides a quick summary of networks and the cloud. Chapter 4 discusses database processing. Security is the topic of Chapter 5. These chapters serve as a technology platform for the discussions in the remaining chapters.

Structured Processes

Chapters 6 through 9 discuss structured processes and related information systems and information. Chapter 6 provides an overview of the scope and objectives of business processes. It also discusses process adaptation and improvement and the use of process objectives and measures in making process changes. Chapter 7 is a survey of ERP information systems, their benefits, and their challenges.

Chapters 8 and 9 are “applied” chapters. They show how SAP is used in two representative processes: procurement and sales. Two processes were chosen so that students could begin to see what is common to all processes and what might differ between processes. These two processes, buying and selling, are fundamental to business and are widely used. Each chapter includes a student lab exercise appendix that uses the Global Bikes case from the SAP Alliance’s curriculum.

Dynamic Processes

Chapters 10 through 12 address what we term dynamic processes. Such processes are neither as structured nor as rigid as the more structured operational processes. We dislike the term unstructured processes because we believe that such processes do have structure, at least at a meta-level. Each of the three chapters follows a similar flow: The IS that supports each process is discussed first, followed by the activities in the process, and concluding with the business processes supported by the dynamic process.

Chapter 10 discusses collaboration processes for both project management and workflow applications. Chapter 11 addresses the use of social media in organizations. We discuss Lin’s theory of social capital, apply that theory to organizational use of social media systems, and survey the processes supported by social media systems. Chapter 12 considers business processes supported by business intelligence (BI) systems and discusses BI systems, data warehouses, data mining, and Big Data.
Extensions
We added 5 new Extensions to this edition of the textbook. These extensions discuss, in order, IS Careers, Software and Hardware, Process Management and IS Design, Robots and AI, and Location Based Data IS.

Appendix
With this edition we added a third structured process SAP tutorial. This tutorial takes a student through the SAP inputs required to accomplish the Production process.

Supplements
The following supplements are available at the Online Instructor Resource Center, accessible through www.pearsonhighered.com/kroenke.

Instructor’s Manual
The Instructor’s Manual, prepared by Hasan Bassam of the University of Toledo, includes a chapter outline, list of key terms, suggested answers to the MIS InClass questions, and answers to all end-of-chapter questions.

Test Item File
This Test Item File, prepared by Noreen Power of Bentley University, contains more than 1,500 questions, including multiple-choice, true/false, and essay questions. Each question is followed by the correct answer, the learning objective it ties to, page reference, AACSB category, and difficulty rating.

PowerPoint Presentations
The PowerPoints, prepared by Nancy Lamm of N. Lamm Consulting Associates, Ltd., highlight text learning objectives and key topics and serve as an excellent aid for classroom presentations and lectures.

Image Library
This collection of the figures and tables from the text offers another aid for classroom presentations and PowerPoint slides.

TestGen
Pearson Education’s test-generating software is available from www.pearsonhighered.com/irc. The software is PC/MAC compatible and preloaded with all of the Test Item File questions. You can manually or randomly view test questions and drag and drop to create a test. You can add or modify test bank questions as needed. Our TestGens are converted for use in BlackBoard, WebCT, Moodle, D2L, and Angel. These conversions can be found on the Instructor’s Resource Center. The TestGen is also available in Respondus and can be found on www.respondus.com.

CourseSmart
CourseSmart eTextbooks were developed for students looking to save on required or recommended textbooks. Students simply select their eText by title or author and purchase immediate access to the content for the duration of the course using any major credit card. With a CourseSmart eText, students can search for specific keywords or page numbers, take notes online, print out reading assignments that incorporate lecture notes, and bookmark important passages for later review. For more information or to purchase a CourseSmart eTextbook, visit www.coursesmart.com.
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About the Authors

Earl McKinney Jr. Teaching the introduction to MIS course has been Earl McKinney’s passion for 20 years. He first caught the bug at his alma mater, the U.S. Air Force Academy, and has continued his addiction during his tenure at Bowling Green State University. While teaching that class and other undergraduate and graduate classes, Earl has also introduced a half dozen new courses on security, social media, ERP, and information. He has been awarded a number of department and college teaching awards by students and fellow faculty. His interest in the broader context of the business curriculum is reflected in several of his publications and by the Decision Science Institute’s National Instructional Innovation Award.

Earl’s research in e-commerce, small team communication during a crisis, and theoretical work on the notion of information has been published in Behaviour and Information Technology, Human Factors, Information and Management, and MIS Quarterly. He consults with James Hall, the former head of the NTSB for British Petroleum, the U.S. Forest Service, and several Air Force agencies on human factors and aviation communication issues.

He holds an undergraduate economics degree from the Air Force Academy, a Master’s of Engineering from Cornell University, and a PhD in MIS from the University of Texas. A former Air Force fighter pilot, Earl lives in Bowling Green with his wife and has two grown sons.

David Kroenke David Kroenke has many years of teaching experience at Colorado State University, Seattle University, and the University of Washington. He has led dozens of seminars for college professors on the teaching of information systems and technology; in 1991 the International Association of Information Systems named him Computer Educator of the Year. In 2009, David was named Educator of the Year by the Association of Information Technology Professionals-Education Special Interest Group (AITP-EDSIG).

David worked for the U.S. Air Force and Boeing Computer Services. He was a principal in the start-up of three companies. He also was vice president of product marketing and development for the Microrim Corporation and was chief of technologies for the database division of Wall Data, Inc. He is the father of the semantic object data model. David’s consulting clients have included IBM, Microsoft, and Computer Sciences Corporations, as well as numerous smaller companies. Recently, David has focused on using information systems for collaboration in education and industry.


To Susan, James, and Daniel — Earl McKinney

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