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TELECOMMUNICATIONS *In Business*

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TELECOMMUNICATIONS IN BUSINESS

Strategy and Application

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Both of the University of Canterbury

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PREFACE

Introduction

In the world of flexible markets, rapid-response management, stringent quality requirements, and increasingly global competition, there is a strong need for management education in the arena of telecommunications-based information technology (TBIT). This enabling technology, based on local and wide area computer networks, acts as a lever to gain efficiency and effectiveness while targeting new competitive advantage through cooperative efforts. Given the tremendous spread of global networks and rapid rise of the Internet, there is a need for concise and practical management education in this dynamic field. It is the purpose of this textbook to address these issues with contemporary teaching materials. Our observations of the current availability of textbooks in this field now follow.

- There are many computer science and engineering textbooks that address technical topics in the area of local and wide area networking technologies. These books are concerned with the bits and bytes as well as the details of protocol standards and other technical aspects. However, they are often mathematical in their orientation, which makes them less appropriate for the needs of many business or commerce students.
- There are many MIS textbooks that address various management, marketing, and other business issues in the area of computing, but which (at the most) only include a single chapter on networking. Such coverage is frequently superficial and inadequate.
- There are few books that address the crucial, timely issue of how computer networks can be used to make business more competitive.

Audience

This textbook is suitable for students taking upper-level undergraduate business courses in information systems, or for MBAs needing a strong managerial grasp of this critical field of technology. The text assumes that the student has taken an introductory computing course and has a basic knowledge of computing and simple jargon and terminology, but it makes no assumption on students' knowledge of computer networks. The book also is suitable for managers who require more information on how they can use networks to make their businesses more efficient and competitive. This book often uses techniques of strategic

analysis and decision making, and the various exercises address a wide range of examples in which networks have the potential to make business more competitive.

Objectives of the Book

Upon completion of the study of this book, the reader should be able to

1. Describe and evaluate the computer network as part of an organization's strategic plan.
2. Identify and describe the wide range of network applications in business.
3. Explain what the Internet is and how it can be used for business applications in a competitive environment.
4. Describe the key principles and components required to support wide area networking applications in business.
5. Describe the key principles and components required to support local area networking applications in business.
6. Apply tools and techniques for analyzing and assessing computer network opportunities.
7. Analyze opportunities and formulate strategies for sustaining organizational success.
8. Analyze network opportunities and formulate strategies for achieving personal goals in a business setting.
9. Evaluate the computer network requirements for a business.
10. Properly evaluate alternative network solutions and select the most appropriate.
11. Explain the functions and requirements of network management and security.
12. Discuss emerging and future network applications, and their implications for business opportunities.

Outline of the Book

The book is divided into 12 chapters, the titles of which will now be given together with a brief outline.

The chapters are:

Chapter 1	Strategic planning and network technology
Chapter 2	Networked business applications
Chapter 3	The Internet—a global communications resource
Chapter 4	Wide area networks (WANs): principles and components
Chapter 5	Local area networks (LANs): principles and components
Chapter 6	Techniques for analyzing and assessing network opportunities
Chapter 7	Networking opportunities for improving organizational performance
Chapter 8	Networking opportunities for improving personal performance
Chapter 9	Determining business networking requirements
Chapter 10	Evaluation and selection of alternatives
Chapter 11	Network management and security
Chapter 12	Future developments in business networking

Chapter 1 introduces the concepts of strategic planning and computer networking and discusses how they are an important part of an organization's strategic plan. This chapter shows how competitive advantage can be gained through business networking, and how an organization's strategic direction can benefit through networking.

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Chapter 1 also demonstrates how information technology can be used to increase an organization's responsiveness to internal strengths and weaknesses as well as to external opportunities and threats.

Chapter 2 looks at the business applications that can benefit from both wide and local area networks. Examples of many familiar wide area network applications are discussed, including telemarketing, teleshopping, travel reservation systems, order entry systems, point-of-sale and stock management systems, and financial services (including electronic funds transfer, foreign exchange, and investment services). A variety of other topics, such as manufacturing systems, electronic messaging systems, and teleconferencing, are also included. Chapter 2 covers how local area networks also play an important part in many of the ways in which we do business; a number of the examples in this chapter illustrate the use of local area networks to access and process information in the wider area.

Chapter 3 is concerned with the Internet, its technology, supporting applications, and its business use. Commercial access to the Internet as well as to its related services and facilities available are covered in this chapter along with a discussion of the user tools available for gaining access to Internet resources (FTP, Telnet, Archie, Gopher, WAIS, World Wide Web, and its browsers). Issues of Internet security and performance are also covered, as well as the emerging range of business uses for this "network of networks."

Chapters 4 and 5 are primarily concerned with the principles and components of local and wide area networks, such as the various building blocks comprising these networks, as well as the purchased or leased equipment needed to set up and use such networks. These chapters discuss a number of technical terms such as cables, switches, modems, multiplexers, software, servers, workstations, hubs, repeaters, bridges, routers, and gateways in only as much detail as is necessary to understand how they work and what they are used for. Chapters 4 and 5 will also look at the variety of network services available from service providers, such as the local telecom suppliers and other international operators, as well as a variety of the well-known local area network systems (including NetBIOS, Novell/NetWare, UNIX, Windows NT, Banyan/VINES, and Appleshare).

Chapter 6 covers the analyses and assessment of network opportunities within organizations using a range of models and techniques, such as a strategic planning model, critical success factors, data and process modeling, association matrices, and models of business operation.

Chapter 7 examines network opportunities for sustaining organizational success, including analyzing and measuring organizational performance, opportunities for business process reengineering, and support for organizational groups with groupware and workflow applications. Also covered are topics such as taking advantage of short-term opportunities, niche marketing via computer networks, and turning risk and uncertainty into organizational advantage.

Chapter 8 looks at network opportunities for achieving personal goals in a business setting with improved communications, assistance in better utilization of time and support for research activities and other business tasks, including personal productivity improvements.

Chapters 9 and 10 are concerned with the determination of business computer network requirements and the evaluation and selection of alternatives, and it describes how factors such as user requirements and performance parameters, including response time, up-time, data quality, and storage, all have an important effect in the determination of these requirements. Chapters 9 and 10 also discuss techniques such as cost-benefit analysis, and they evaluate factors such as reliability, maintenance, flexibility, risk conditions, as well as acquisition factors.

Chapter 11 discusses the management and security of networks and also the fundamentals of network management in light of the open, mixed vendor, distributed, and integrated systems currently in operation by many businesses. Security is

discussed in terms of risk analysis, disaster recovery, computer security models, and encryption standards.

Finally, Chapter 12 looks at the emerging as well as the potential future developments in computer networking that will affect business in the early 21st century. Topics include the paperless office, integrated electronic commerce, and enterprise integration. Chapter discussion includes developments in high-speed networking systems with a focus on ATM. The chapter concludes with seven key trends thought to shape the future of this dynamic field.

Support material

An instructor's manual is available to those instructors adopting the text. This manual includes solutions to end-of-chapter questions and cases, teaching suggestions, lecture outlines, and suggestions for use of the Power Point presentation slides. The manual also includes two longer cases and their solutions, which are suitable for use as projects in the course. Strategic planning, organizational analysis, network design, system selection and security, and management are all addressed. The manual will also be available on disk and will contain a Power Point presentation disk. A Test Bank containing over 1200 true-false, multiple choice, fill-in-the-blank, and other test questions will be available to adopters. It is available as a test manual and in computerized form (Computest IV).

About the Authors

John Vargo and **Ray Hunt** bring complementary backgrounds and skills to the arena of telecommunications for business—Ray from the computer science perspective, and John from the business or commercial view.

John is a member of the Faculty of Commerce at the University of Canterbury, Christchurch, New Zealand, and is a senior lecturer in information systems. Originally trained in accounting and business consulting, he has worked as a consultant for industry and government in both New Zealand and the United States, especially in the areas of strategic planning and the effective use of information technology. John's specialty areas include business information systems and strategic advantage of information technologies, and he has addressed conferences in Europe, the United States, Australia, and New Zealand. John's broad background in commerce, accounting, and information systems development has given him exceptional insight into the integration of new technologies into competitive organizations.

Ray is a senior lecturer in the department of computer science at the University of Canterbury, New Zealand. He has worked as a telecommunications consultant in both the private and public sectors and has been responsible for the design of a number of major networks. He has given numerous courses on data communications and network architecture for industry in New Zealand, Singapore, and Hong Kong, and has addressed conferences in Australia, Singapore, Hong Kong, the United States, and the United Kingdom. Currently he works in conjunction with various telecommunications companies on aspects of network design, performance, security, and management, and he is the supervisor for a number of industry-sponsored research projects in these areas.

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CHAPTER

1

STRATEGIC PLANNING AND NETWORK TECHNOLOGY

Chapter Outline

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Achieving Competitive Advantage through Business Networking 11
Enhancing Strengths and Overcoming Weaknesses through Networking 17
Applying IT to Increase Responsiveness 23

Learning Objectives

By the end of Chapter 1, you should be able to

1. *Describe* how modern telecommunication systems can significantly support the organization's vision and **goals.**
2. *Identify* examples of leading-edge applications that have produced dynamic competitive advantage.
3. *Discuss* how networking the major functions can help an organization use its strengths and overcome its weaknesses.
4. *Explain* how the use of networks may increase an organization's responsiveness to opportunities and threats from the business environment.

Introduction

Appropriate application of **information technology (IT)** is one of the primary keys to efficient and effective business operation as we move into the 21st century. Yet merely having this technology is no guarantee of survival; the technology must be successfully integrated with the organization's strategic plan and diligently implemented in its daily operations. A structured procedure for discovering user and system

requirements, analyzing system components, evaluating results and alternatives, and making recommendations to management should be followed. Many organizations are now nationally and globally based and thus require the appropriate use of computer networks and other telecommunications-based technologies. Both small and large firms are dealing with issues that demand better application of technology both internally and externally.

Chapter 1 looks at the **strategic leverage** a business may gain through the integration of network and IT planning with organization-wide strategy. Through the appropriate integration of information technology, organizations can successfully respond to customer needs with quality products and services in a competitive local and international marketplace. This area is further expanded in Chapter 6—Techniques for Analyzing and Assessing Network Opportunities—and Chapter 7—Networking Opportunities for Improving Organizational Performance.

Words that are printed in **boldface type** are listed at the end of each chapter and are defined in the Glossary at the end of this text. This method will be used to describe technical words and phrases that appear throughout this book.

Strategic Direction in Business through Networking

The following case, based on a real-life situation, illustrates the potential for integrating information technology planning with organizational **strategic planning**. In this case you will see how organizational goals can be achieved through telecommunications-based systems.

Smith & Jones Company

Frank Thomas, company comptroller, sat back in his desk chair, shaking his head as he thought over the events of the past four years. Smith & Jones Company(S&J), a manufacturer of wholesale and retail electronic products, had slowly lost market share and profitability up until four years ago. With the arrival of the new CEO, George Yeo, all that had changed. The first thing George did was call a staff meeting of all middle and top managers. He asked one question: "Why are you here?" On that one question hung the future of the company and the futures of many of the managers in the room. In the following weeks we met often, both formally and informally, to discuss that simple question. By the time we were finished, our conclusion was published as the "Smith & Jones Company **Mission Statement**." It consisted of one deceptively simple statement:

> Our business exists to provide quality electronic products to the wholesale and retail trade with the best service available and highly competitive prices, all in the best interests of our customers, employees, and shareholders.

After taking that first step, the company began a lengthy process of strategic planning to fulfill that statement of our purpose in the international economy. During meetings over

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