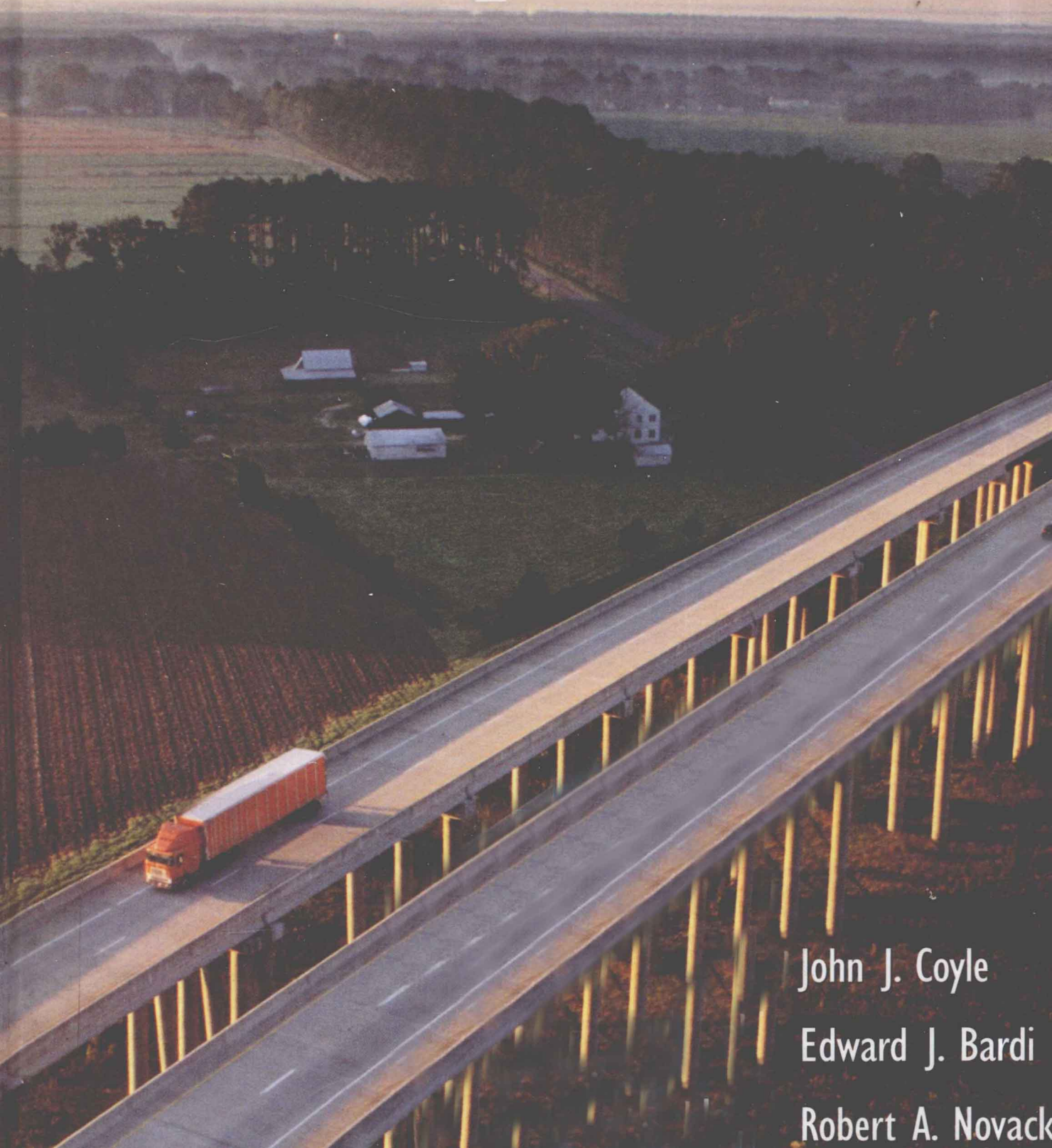


FIFTH EDITION

# *Transportation*



John J. Coyle

Edward J. Bardi

Robert A. Novack

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# Preface

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Many trends that stem from the economic deregulation of transportation during the last two decades are intensifying as we enter the new millenium. The buying and selling of transportation services today occurs in a highly complex and rapidly changing environment. That the transportation marketplace has undergone volatile changes is evidenced in the evolution of third-party providers, partnerships between shippers and carriers, an increase in intermodal movements, and a decrease in logistics expense as a percent of GDP.

Since the last edition of our book, government regulation of the modes of transportation has continued to be eliminated. The ICC has been replaced by the Surface Transportation Board, whose major responsibility is economic regulation of the railroad industry and significant changes have taken place in international ocean regulation. All modes of transportation must now be compliant with antitrust regulations.

These changes in government intervention allow carriers and shippers to do business in a market that is ruled by the laws of supply and demand while outsourcing continues to grow. Third-party providers, both asset and non-asset based, are beginning to offer shippers more than just transportation services. Some third parties offer expanded services in warehousing, inventory management, order management information technology, financial services, and consulting that enable them to more completely manage the activities in the supply chain. With these expanded services, third parties and shippers are beginning to develop more sophisticated and complex relationships.

Technology used in the transportation industry has also expanded rapidly. Carriers and third parties find that many technologies no longer provide a competitive advantage and are needed simply as a basic requirement for doing business. Satellite technology, bar coding, global positioning systems, and locator systems for vehicles are now commonplace for many carriers.

Innovations in routing and asset utilization technology have allowed many carriers to eliminate operating costs from their fleets. The use of enterprise resource planning (ERP) and transportation requirements planning (TRP) systems by shippers has allowed them to share forecasts and timely shipment information with carriers to further improve asset productivity.

Another major change since the last edition of ***Transportation*** is the consolidation of carriers in several modal markets. Mergers and acquisitions in the rail industry include the joining of the Union Pacific and Southern Pacific into a single entity. Parts of Conrail were bought by the Norfolk Southern with the remainder being purchased by CSX, basically eliminating the once government-owned entity. Federal Express purchased RPS, Roberts, Express, and Caliber Logistics from Roadway creating a formidable competitor in the small package express industry with UPS and the U.S. Postal System.

Finally, deregulation has given carriers the incentive to understand their costs. The development and implementation of activity-based costing (ABC) systems by many carriers allows them to understand both market and customer profitability. This knowledge gives carriers the tools to more effectively price their services and manage their overall profitability.

With all of these changes, transportation still provides the basic service of moving people and freight. This movement creates time, place, and quantity utilities for the commodities moved. With the explosion of supply chain management over the last several years, the utilities created by transportation have taken on heightened meaning. The management of product, information, and cash flows in the supply chain are all influenced by transportation cost and quality. Sophisticated carriers and shippers no longer evaluate the role of transportation in the supply chain by price alone. The new standard used is transportation value: the relationship between service and least total cost. Increased prices for better service are more than offset by reductions in inventory and loss and damage. Transportation has become a critical cost and service component in the supply chain.

Change in the transportation industry has been dramatic and revolutionary during the last two decades. **Transportation** is an important tool for understanding this dynamic field for both students and professionals alike. At the same time, this book provides readers with a solid background and history of transportation that emphasizes the fundamental role and importance the industry plays in our society. This is a text written for students at the undergraduate and graduate levels, but it is equally suitable as a reference for business practitioners in the transportation industry.

## NEW TO THIS EDITION

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- While continuing to use a managerial approach in the fifth edition, we pay special attention to both perspectives of the marketplace—that of carriers and of shippers. This increased emphasis is evident in three new chapters:

“Relationship Management” (Chapter 12), explores managing relationships between carriers and shippers in today’s logistics environment (especially significant given the growth of third-party providers). This chapter introduces the different types of relationships found in transportation/logistics as well as ways to manage these relationships.

“Information Management and Technology” (Chapter 13), highlights the importance of managing information in successful supply chain implementation. Special attention is given to information and technology used to manage the transportation process. This chapter covers basic data gathering techniques for transportation management, data transmission technologies, and decision tools for optimizing the transportation process for both carriers and shippers.

“Shipper/Carrier Network Strategies” (Chapter 14), focuses on the shipper/carrier transportation infrastructure and processes used to successfully complete the transportation transaction. An important topic examined in this chapter is how shippers can help carriers reduce their operating expenses in transporting freight. This follows in the spirit of supply chain management of eliminating costs, rather than shifting them to other supply chain partners. This chapter also discusses how shippers manage their transportation process and how carriers design and operate their transportation networks.

- **New organization** of the book. The fifth edition of **Transportation** is divided into four parts and includes a total of 14 chapters. **Part 1** features the role and importance of transportation. **Part 2** presents an overview of the five major modes of transportation as well as intermodal carriers and international trans-

portation. **Part 3** focuses on carrier management and **Part 4** discusses topics pertinent to both shippers and carriers and technology.

- **Walter Weart**, new member of the writing team, has added more recent tables, examples and recommended readings, assuring that this edition is as up-to-date as possible.

- To support the instructor, Walter Weart has written a **new instructor's manual** with a test bank (ISBN 0-324-00752-3). This supplement includes Learning Objectives, key terms and a detailed chapter outline for each chapter. There are notes for the cases, Internet activities, and other additional teaching materials. The testing material is comprised mainly of multiple choice, short answer and essay questions.

- Also new to this edition is an **appendix with URL listings** for all companies and organizations related to transportation that we mention in the text.

While making changes to the new edition, we retained features of the book that made previous editions successful: "Stop Offs" that expand chapter material and deepen students' understanding with real life examples, thorough chapter outlines, and summaries along with suggested readings and cases.

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The authors and South-Western College Publishing also wish to acknowledge the exceptional contribution of Walter Weart. Walter's academic affiliations include the University of Northern Colorado, Oakton Community College, where he served as department chair, College of Du Page, and William Harper College. Having used various editions of **Transportation** in his teaching experience, Walter has stepped forward to offer his invaluable assistance based on knowledge garnered as both academician as well as an executive and specialist in transportation in the business community. He has tirelessly researched, updated, and reworked articles and tables, rewritten portions of the text that were outdated, and has coordinated the materials of all authors to ensure 2000 copyright publication. Mr. Weart has also written the instructor's manual with the test bank that accompanies this text. Thank you, Wally, for all of your help.

John J. Coyle  
Edward J. Bardi  
Robert A. Novack

# Contents

*Preface* xiii

## **PART ONE THE ROLE AND IMPORTANCE OF TRANSPORTATION 1**

### **CHAPTER ONE Transportation, the Supply Chain, and the Economy 2**

The 1990s: A Decade of Change 3  
The Logistics Concept 7  
The Supply Chain Concept 9  
Total-Cost Analysis 10  
Stop Off: Supply Chain Black Holes 11  
Business Logistics Activities 12  
Quality, Value, and Customer Satisfaction 14  
    *Dimensions of Logistics and Transportation*  
        *Quality* 15  
        *Logistics Value* 17  
        *Customer Satisfaction and Attitude* 18  
Transportation and the Economy 19  
Historical Significance 20  
Economic Significance 22  
    *Value of Goods* 22  
    *Utility of Goods* 24  
    *Transportation Patterns* 26  
    *Gross Domestic Product* 28  
Environmental Significance 30  
    *The Environment* 30  
    *Safety* 32  
    *Substance Abuse* 33  
Social Significance 33  
Political Significance 34  
    *Governmental Responsibility* 34  
Overview of Modern Transportation 36  
Overview of Transportation Trends 36  
Stop Off: Challenges and Opportunities 37  
Demand for Transportation 38  
Demand Measurement Units 40  
Level of Aggregation 40  
Demand Elasticity 40  
Freight Transportation 41  
Value of Service 42

Passenger Transportation 46  
Stop Off: Georgia-Pacific Unlocks Door  
    to Doublestacks 47  
Role of the Travel Agent 50  
Summary 51  
Case 1.1 Soup to Nuts, Inc. 54  
Case 1.2 Fly-By-Night Helicopter Service 55

### **CHAPTER TWO Transportation Regulation and Public Policy 57**

Regulation of Transportation 58  
    *Nature of Regulation* 58  
    *Common Law* 59  
    *Role of the Independent Regulatory*  
        *Commission* 60  
    *Role of the Courts* 61  
    *Safety Regulations* 62  
    *State Regulations* 62  
Development of Regulation 63  
Current Economic Regulations 63  
Antitrust Laws in Transportation 66  
Transportation Policy 67  
Stop Off: Cutting Regulations 68  
Why Do We Need a Transportation Policy? 68  
Declaration of National Transportation  
    Policy 69  
    *Policy Interpretations* 71  
    *Who Establishes Policy?* 73  
Public Promotion 75  
    *Transportation Project Planning in the Public*  
        *Sector* 76  
    *Air* 78  
    *Motor and Highway* 80  
    *Rail* 81  
    *Domestic Waterway Operations* 81  
    *International Water Carriage* 82  
    *Pipeline* 83  
    *Miscellaneous Forms of Promotion* 83  
Transportation Promotion in Perspective 83  
    *User Charges* 84  
    *Nationalization* 84  
Transportation Safety 85

Summary	86
Case 2.1 Quart Trucking	89
Case 2.2 The U.S. Ocean Carrier Industry's Financial Plight	90
Appendix 2-A Department of Transportation	91

## **PART TWO OVERVIEW OF CARRIER OPERATIONS 95**

### **CHAPTER THREE Motor Carriers 96**

Brief History	97
Industry Overview	98
<i>Significance</i>	98
<i>Types of Carriers</i>	98
<i>Number of Carriers</i>	100
<i>Market Structure</i>	102
<i>Competition</i>	103
Operating and Service Characteristics	103
<i>General Service Characteristics</i>	103
<i>Equipment</i>	104
<i>Types of Vehicles</i>	105
<i>Terminals</i>	106
Cost Structure	108
<i>Fixed Versus Variable Cost Components</i>	108
<i>Economies of Scale</i>	110
Current Issues	113
<i>Safety</i>	113
<i>Technology</i>	114
Stop Off: Schneider National, Inc.	115
<i>LTL Rates</i>	115
<i>Financial Stability</i>	116
Summary	117
Case 3.1 JEI Carrier Corporation	120
Case 3.2 Retirement Funds	121

### **CHAPTER FOUR Railroads 122**

Brief History	123
Industry Overview	123
<i>Number of Carriers</i>	123
<i>Competition</i>	124
Operating and Service Characteristics	128
<i>General Service Characteristics</i>	128
<i>Constraints</i>	129
<i>Strengths</i>	129
<i>Equipment</i>	130
<i>Service Innovations</i>	132
Cost Structure	135
<i>Fixed Costs</i>	135

<i>Semivariable Costs</i>	136
<i>Variable Costs</i>	136
<i>Economies of Scale</i>	138
Financial Plight	139
<i>Legislation Reform</i>	139
<i>Improved Service to Customers</i>	140
Current Issues	141
<i>Alcohol and Drug Abuse</i>	141
<i>Energy</i>	141
<i>Technology</i>	142
Summary	143
Case 4.1 CBN Railway Company	147

### **CHAPTER FIVE Domestic Water Carriers 148**

Brief History	149
Industry Overview	149
<i>Significance of Water Transport</i>	149
Stop Off: Ocean Carriers Sail the Electronic Sea	150
Types of Carriers	150
Market Structure	154
<i>Number and Categories of Carriers</i>	156
<i>Competition</i>	156
Operating and Service Characteristics	158
<i>Commodities Hauled</i>	158
<i>Length of Haul</i>	159
<i>Load Size</i>	159
<i>Low-Cost Service</i>	159
<i>Speed of Service</i>	160
<i>Service Disruption</i>	161
<i>Other Characteristics</i>	161
Equipment	161
<i>Types of Vehicles</i>	161
<i>Terminals</i>	162
Cost Structure	163
<i>Fixed Versus Variable Cost Components</i>	163
<i>Infrastructure</i>	163
<i>Labor</i>	165
<i>Fuel</i>	165
<i>Economies of Scale</i>	165
Current Issues	166
<i>Drug and Alcohol Abuse</i>	166
<i>Port Development</i>	166
Summary	167

### **CHAPTER SIX Air Carriers 170**

Brief History	171
Industry Overview and Significance	171
Types of Carriers	172

<i>Private Carriers</i>	172
<i>For-Hire Carriers</i>	172
Market Structure	173
<i>Number of Carriers</i>	173
Stop Off: The World is Getting Smaller	174
Competition	175
<i>Intermodal</i>	175
<i>Intramodal</i>	175
<i>Service Competition</i>	177
<i>Cargo Competition</i>	177
Operating and Service Characteristics	177
<i>General</i>	177
<i>Speed of Service</i>	178
<i>Length of Haul and Capacity</i>	179
<i>Accessibility and Dependability</i>	180
Equipment	180
<i>Types of Vehicles</i>	180
<i>Terminals</i>	180
Cost Structure	181
<i>Fixed Versus Variable Cost Components</i>	181
<i>Fuel</i>	181
<i>Labor</i>	182
<i>Equipment</i>	183
<i>Economies of Scale</i>	183
Rates	184
<i>Pricing</i>	184
<i>Operating Efficiency</i>	184
Stop Off: Merger Report: U.S. Airlines and Railroads Reap Benefits of the Continued Decline in the Price of Oil	185
Current Issues	186
<i>Safety</i>	186
<i>Technology</i>	186
Summary	187
Case 6.1 CBN Airways	190
Case 6.2 Southwest Airlines	191

## CHAPTER SEVEN Pipelines 193

Brief History	194
Industry Overview	194
<i>Significance of Pipelines</i>	194
<i>Types of Carriers</i>	195
<i>Ownership</i>	196
<i>Number of Carriers</i>	196
<i>Oil Carriers</i>	196
<i>Natural Gas Carriers</i>	197
Operating and Service Characteristics	197
<i>Commodities Hauled</i>	197
<i>Relative Advantages</i>	199
<i>Relative Disadvantages</i>	199

Competition	200
<i>Intramodal</i>	200
<i>Intermodal</i>	200
Equipment	201
Commodity Movement	201
Cost Structure	204
<i>Fixed Versus Variable Cost Components</i>	204
<i>Rates</i>	205
Current Issues	205
Summary	206
Case 7.1 Bestway Pipeline	209
Case 7.2 BJS Pipeline Case	210

## CHAPTER EIGHT Intermodal and Special Carriers 211

Intermodal Transportation	212
<i>Piggyback</i>	213
<i>Containerization</i>	215
Third-Party Transportation	216
<i>Single Sourcing LTL</i>	218
Special Carrier Forms	218
<i>Surface Forwarders</i>	218
<i>Air Freight Forwarders</i>	219
<i>Freight Brokers</i>	220
<i>Shippers' Associations</i>	222
<i>Shippers' Agents and Consolidators</i>	222
<i>Owner-Operators</i>	223
<i>Express Services and Courier Services</i>	223
Household Goods Industry	224
Stop Off: Quiet Revolution in the Making	225
<i>Shipment Process</i>	226
<i>Problems</i>	226
<i>Legislation</i>	227
Summary	228
Case 8.1 Fast Forward Air Freight	230
Case 8.2 Fragle Van Lines	231

## CHAPTER NINE International Transportation 233

Extent and Magnitude of Trade	234
<i>Overview of the North American Free Trade     Agreement</i>	235
International Transportation Process	236
<i>Buyer-Seller Agreement</i>	236
<i>INCOTERMS</i>	236
<i>Order Preparation</i>	239
<i>Documentation</i>	239
<i>Transportation</i>	241
International Transportation Providers	241
<i>Ocean Transportation</i>	241
<i>Air Carriers</i>	243

<i>Ancillary Services</i>	243
Rate Making in Foreign Transportation	246
Stop Off: Port of Hong Kong Challenged by Transition to China	247
<i>Shipping Conferences</i>	247
<i>International Air</i>	248
<i>Liner Rate Making</i>	249
<i>Tramp Ship Cost Rate Factors</i>	252
International Transportation Problems, Issues, and Policies	254
<i>Federal Maritime Commission Regulation of U.S. Ocean Rates</i>	254
<i>United Nations Conference on Trade and Development (UNCTAD) and Foreign Trade Allocations</i>	254
<i>International Air Regulation</i>	255
Stop Off: Ocean Shipping Reform Act of 1988	256
Role of Port Authorities in International Transportation	258
Future of International Transportation	259
Summary	259
Case 9.1 Natural Footwear Company	261
Case 9.2 Medical Supply Company	262

## **CHAPTER TEN**

### **Private Transportation 264**

What Is Private Transportation?	265
Private Rail Transportation	265
Private Air Transportation	266
Private Water Transportation	267
Private Oil Pipeline Transportation	267
Private Trucking	268
Why Private Trucking?	268
<i>Improved Service</i>	268
<i>Lower Cost</i>	269
<i>Disadvantages</i>	270
Private Trucking Cost Analysis	271
<i>Fixed Costs</i>	271
<i>Operating Costs</i>	272
Stop Off: Why PPG Industries Outsourced Its Fleet	273
Equipment	274
<i>Selection</i>	274
<i>Leasing</i>	276
Fleet Operation and Control	277
<i>Organizing the Private Fleet</i>	277
<i>Controlling the Private Fleet</i>	279
<i>Regulations</i>	280
Summary	282

Case 10.1 Apex Soap Products	284
Case 10.2 Coastal Chemical Company	285

## **PART THREE**

### **CARRIER MANAGEMENT 287**

## **CHAPTER ELEVEN**

### **Costing and Pricing in Transportation 288**

Market Considerations	290
<i>Market Structure Models</i>	290
<i>Theory of Contestable Markets</i>	290
<i>Relevant Market Areas</i>	291
Cost-of-Service Pricing	292
Stop Off: Discount Tariffs	297
Value-of-Service Pricing	297
Rate Systems Under Deregulation	302
Special Rates	304
<i>Character-of-Shipment Rates</i>	304
<i>Area, Location, or Route Rates</i>	306
<i>Time/Service Rate Structures</i>	307
<i>Other Rate Structures</i>	308
Pricing in Transportation Management	310
<i>Factors Affecting Pricing Decisions</i>	310
<i>Major Pricing Decisions</i>	311
Stop Off: Bohman on Pricing	312
<i>Establishing the Pricing Objective</i>	313
<i>Estimating Demand</i>	314
<i>Estimating Costs</i>	314
<i>Price Levels and Price Adjustments</i>	315
<i>Most Common Mistakes in Pricing</i>	315
Summary	317
Case 11.1 Startruck, Inc.	320
Appendix 11-A Cost Concepts	321
Appendix 11-B Ratemaking in Practice	328
Appendix 11-C LTL and TL Costing Models	335

## **CHAPTER TWELVE**

### **Relationship Management 342**

Types of Buyer/Seller Relationships	344
<i>Arm's Length Relationships</i>	344
<i>Type I Partnerships</i>	345
<i>Type II Partnerships</i>	345
Stop Off: Schneider Logistics Targets World Markets	346
<i>Type III Partnerships</i>	347
<i>Joint Ventures</i>	347
<i>Vertical Integration</i>	347
<i>Conclusion</i>	348
Why Enter Relationships?	348

<i>Availability of External Suppliers</i>	349
<i>Cost Efficiencies</i>	349
<i>Third Party Expertise</i>	350
<i>Customer Service</i>	350
<i>Conclusion</i>	351
Third-Party Relationship Characteristics	352
<i>Planning</i>	352
<i>Communications</i>	352
<i>Risk/Reward Sharing</i>	352
<i>Trust and Commitment</i>	353
<i>Scope of the Relationship</i>	353
<i>Financial Investment</i>	355
<i>Future Orientation</i>	355
<i>Organization/Culture Change</i>	355
Stop Off: Mercedes Taps Averitt	356
Relationship Challenges	357
<i>Buyer Challenges</i>	357
<i>Supplier Challenges</i>	358
<i>Conclusion</i>	359
The Negotiation Process	359
<i>Market Power</i>	359
<i>Negotiating Philosophy</i>	361
<i>Goals and Objectives</i>	361
<i>Bargaining</i>	361
<i>Breakdown</i>	361
<i>Agreement</i>	362
The Bidding Process	362
<i>Qualifying Third Parties</i>	362
<i>Providing Information</i>	363
<i>Proposal Elements</i>	364
<i>Evaluate Proposals</i>	364
<i>Contract</i>	364
Third-Party Contracts	364
<i>Disclosure of Goods</i>	365
<i>Responsibility for Goods</i>	366
<i>Routing, Mode, and Method of Operation</i>	366
<i>Term, Termination, and Modification</i>	367
<i>Volume Requirements</i>	367
<i>Scope of Operation</i>	367
<i>Performance Standards</i>	368
<i>Operational Standards — Indemnification</i>	368
<i>Force Majeure</i>	368
<i>Billing and Payment</i>	368
<i>Applicable Law</i>	369
<i>Assignability</i>	369
<i>Breach of Contract</i>	369
<i>Dispute Resolution</i>	369
<i>Confidentiality</i>	369
Contracting Hints	370

<i>Indemnification Clauses</i>	370
<i>Penalty Clauses</i>	370
<i>Service Requirements</i>	370
<i>The “Living” Contract</i>	371
<i>Prices</i>	371
<i>Conclusion</i>	371

Summary 371

Case 12.1 Shipper—Carrier Negotiation  
Project 374

Appendix 12-A The Negotiation Process 377

## **PART FOUR TECHNOLOGY AND STRATEGIES 388**

### **CHAPTER THIRTEEN Information Management and Technology 389**

Information Systems 390

Information Sources 392

*Bill of Lading* 394

*Waybill* 397

*Manifest* 397

*Freight Bill* 397

Information Technology 400

*Areas of Application* 400

*Types of Technology* 401

Stop Off: Copacino on Strategy 402

Stop Off: The Internet 415

Stop Off: Take a Load Off 420

Conclusion 421

Summary 421

Case 13.1 Braxton Stores, Inc. 423

Appendix 13-A Transportation Sites on the  
Internet 425

### **CHAPTER FOURTEEN Shipper/Carrier Network Strategies 433**

Shipper Transportation Strategy 434

*General Strategy* 434

*Small Shipment Strategy* 437

*Bulk Shipment Strategy* 439

*Inbound Transportation Strategy* 440

Traffic Management 440

*What Is Traffic Management?* 441

*Carrier Selection Process* 441

*Line Aspects of Traffic Management* 444

*Staff and Administrative Aspects of Traffic  
Management* 446

Stop Off: A Support System to Boot 450

Carrier Strategies 450

<i>Operations</i>	451
<i>Technology and Equipment</i>	452
<i>The Hub-and-Spoke Route System</i>	454
<i>Marketing</i>	455
<i>Coordination</i>	456
Challenges Affecting Carrier Management	457
The Terminal: The Basic Transportation System	
Component	459
<i>General Nature of Terminals</i>	459
<i>Terminal Ownership</i>	460
<i>Types of Terminals</i>	460
<i>Terminal Management Decisions</i>	464
Summary	468
Case 14.1 Shiner International Transportation	
Company	470
Case 14.2 Southern Products, Inc.	471

**APPENDIX A**  
**Equipment of Domestic Freight**  
**Transportation 472**

**APPENDIX B**  
**Transportation Sites on the**  
**Internet 476**

**APPENDIX C**  
**Selected Transportation**  
**Publications 480**

**APPENDIX D**  
**Transportation-Related**  
**Associations 482**

**Glossary 486**

**Author Index 494**

**Subject Index 497**



# **PART**

# **1**

## **THE ROLE AND IMPORTANCE OF TRANSPORTATION**

Chapter 1

Transportation, the Supply Chain, and the  
Economy

Chapter 2

Transportation Regulation and Public Policy

Appendix 2-A: Department of Transportation

# CHAPTER

## 1

# TRANSPORTATION, THE SUPPLY CHAIN, AND THE ECONOMY

**The 1990s: A Decade of Change**

**The Logistics Concept**

**The Supply Chain Concept**

**Total Cost Analysis**

**Stop Off: "Supply Chain Black Holes"**

**Business Logistics Activities**

**Quality, Value, and Customer Satisfaction**

Dimensions of Logistics and Transportation Quality

Logistics Value

Customer Satisfaction and Attitude

**Transportation and the Economy**

**Historical Significance**

**Economic Significance**

Value of Goods

Utility of Goods

Transportation Patterns

Gross Domestic Product

**Environmental Significance**

The Environment

Safety

Substance Abuse

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**Political Significance**

Government Responsibility

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**Overview of Transportation Trends**

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**Demand Measurement Units**

**Level of Aggregation**

**Demand Elasticity**

**Freight Transportation**

**Value of Service****Passenger Transportation****Stop Off: "Georgia-Pacific Unlocks Doors to Doublestacks"****Role of the Travel Agent****Summary****Key Terms****Study Questions****Notes****Suggested Readings****Cases**

Transportation is a vital activity in moving both freight and passengers around the world. The management of transportation is concerned with the overall purchase and control of this movement service used by a firm in achieving the objectives of its logistics process. **Business logistics** is the process of planning, implementing, and controlling the efficient and effective flow and storage of goods, services, and related information from the point of origin to the point of consumption for the purpose of conforming to customer requirements.<sup>1</sup> This definition specifically includes the importance of transportation in business logistics. Recently, a new term is being used to describe this flow and movement in an organizational environment: supply chain management. **Supply chain management** is an expanded version of the logistics process. Whereas logistics has traditionally focused its attention on coordinating the product, the information movement, and the flow activities of an individual firm, supply chain management is concerned with coordinating the product, information, cash movement, and flow activities in a **logistics channel environment**. The effective and efficient management of transportation has a significant impact on all three types of inter-firm flows and is critical in achieving supply chain integration and objectives.<sup>2</sup>

The objective of this chapter is to place emphasis on the importance of transportation to the individual firm as well as to the economy. Attention is given to how transportation functions within the realm of supply chain management and business logistics. Finally, the nature of transportation demand is discussed.

## **The 1990s: A Decade of Change**

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During the 1990s, many businesses throughout the United States were compelled to reevaluate their approach to doing business and to focus their attention upon some fundamentals to successful business operations, such as customer service, quality, and the value added by service and/or productivity. The external factors that resulted in this reexamination of business practices included intensified global competition and increased involvement in international markets, deregulation of transportation, mergers and acquisitions, and shrinking profit margins.<sup>3</sup>

The focus of attention on basics, such as the **value added** by customer service, attracted increasing management attention to logistics as a source of potential contribution to revitalizing the organizations and making them more competitive again. Although logistics has been a growing area of responsibility in many companies since the 1960s, it is fair to say that the profile of logistics managers in corporate

America was not as high in most companies prior to 1980 as it is today. Logistics managers tended to be regarded as hard-working individuals who played primarily a supporting role to marketing and manufacturing. However, the “back-to-basics” movement helped to change the profile level of logistics in the 1980s, particularly because a growing number of companies recognized the role that logistics is capable of playing *at the margin* in their strategic efforts to gain or regain a sustainable competitive edge.<sup>4</sup> Efficient transportation systems support such logistics practices as “just-in-time” inventory and manufacturing or “effective consumer response” in retail manufacturers such as General Motors and retailers such as Wal-Mart have used such techniques to gain lower cost and competitive market advantage.

The 1990s actually began on a continuing, evolutionary basis for logistics from the decades following World War II but quickly changed because of the exogenous variables mentioned above:

1. Globalization of business
2. Deregulation of transportation and a changing governmental infrastructure
3. Organizational changes in businesses
4. Rapidly changing technology<sup>5</sup>

Because the influence of these factors will continue to be felt throughout the 1990s, a brief explanation is in order here.

The globalization of business has had a tremendous impact on the way companies operate today. The scope of **globalization** runs the gamut from foreign sourcing in the procurement area and/or selective sales in other countries to multifaceted international distribution, manufacturing, and marketing strategies that encompass international production sites, multiple staging of inventory, countertrading in the sale of products, and so on. Whatever the situation, the cost of logistics as a percentage of total cost is greater for international ventures, and the complexity of logistics operations usually increases at a geometric rate in the international arena. Often if procurement is included, logistics is the single most important factor for successful international ventures.<sup>6</sup> Transportation, in particular, has been affected because of the distances involved both inbound to manufacturing from foreign sourcing and outbound for additional manufacturing or delivery to customers. Transportation may account for as much as 50 percent of the total logistics costs.

The changes in the transportation marketplace were accelerated with the advent of **deregulation** of air, motor, and rail carriers in the 1980s. A virtual revolution has occurred in the U.S. transportation system that has resulted in many fundamental changes—some positive, some negative. Overall, it is probably fair to say that the cost and/or quality of transportation service have improved for many shippers with only minor exceptions. In fact, transportation costs on a relative basis declined during the 1990s and played a major role in helping to lower overall logistics costs on a relative basis.

However, changes in government infrastructure have been far more widespread than what occurred in the U.S. transportation system. These changes include the deregulation of banking and communications, the deregulation of motor carrier transportation in Canada, and changes in the European economic community, resulting in more open market structures in the 1990s. The opening up of Eastern Europe and the dissolution of the USSR were additional changes. The North American Free Trade Agreement (NAFTA) is yet another governmental change that will affect transportation and the globalization factor discussed above.

The restructuring of business organizations has also been a factor affecting logistics (mergers, acquisitions, leveraged buyouts [LBOs], employee stock ownership

plans [ESOPs], spin-offs, etc.). In some instances, the logistics functions have been consolidated into one to streamline the organization and gain reduced costs and added efficiencies. The flattening of organizations has also led to other changes, particularly the outsourcing of supplies and/or services and the growth of third-party logistics organizations who supply all or part of the logistics services required. Outsourcing logistics activities has also been a manifestation of the focus upon core competencies.

Another factor is the rapidly changing **technology** and, in particular, the changes in computer hardware and software. The significant price reductions for powerful computer equipment have helped bring about better inventory control, better equipment scheduling, more efficient rating of transportation movements, and so on. The technological changes in communications (such as satellite global positioning systems to maintain contact with motor carrier fleets) have helped to improve service quality to the extent that motor carrier companies are now able to meet narrowly defined time windows for pickups and deliveries. The interface between communication technology and computers is another area that has tremendous potential for logistics. These items are just a tip of the iceberg; many other things could be included in this area, such as bar coding and robotics.<sup>7</sup>

In concluding this section, a few brief comments about the development of logistics prior to the 1980s should be provided. Logistics, as we know it today, began to develop after World War II in response to internal cost pressures associated with expanding product lines and increased product value, as well as external pressures from more competitive market conditions. All of these factors led to activities being revamped in companies on the physical distribution side of logistics. Essentially, what happened in many cases was an **integration** of outbound transportation and field warehousing to more systematically examine trade-offs that would result in overall lower costs (see Figure 1.1). Integration was a key element even during this

**FIGURE 1.1** Typical Logistics Network—Physical Distribution

