# Contents

1 Introduction ........................................... 1

2 The Principles of Logistics .............................. 3
   2.1 Definitions and Significance of Logistics ........ 4
   2.2 Logistical System of Services .................... 7
   2.3 Agents and Elements of Logistics .............. 10
   2.4 Distinction between Procurement Logistics, Production Logistics and Distribution Logistics .... 12
   2.5 Service Level .................................. 14
   Additional Literature ............................... 18

3 Logistics Systems ...................................... 19
   3.1 Logistics and Corporate Strategy ............ 20
   3.2 Supply Chains and Networks .................... 21
   3.3 Management of Logistics Systems ............ 24
       3.3.1 Basic Management Systems .............. 24
       3.3.2 System Leadership ........................ 26
   3.4 Organizational Variables in Logistics Systems 26
       3.4.1 Organizational and Operational Structures of Logistics ... 26
       3.4.2 Inter-Organizational Optimization Through Supply Chain Management .................. 31
       3.4.3 Intra-Organizational Behavior and Changed Staff Requirements ...................... 33
   Additional Literature ............................... 35

4 Logistical Infrastructure ............................ 37
   4.1 Basic Terminology, Types and Functions .... 38
   4.2 Transport Infrastructure and Suprastructure ... 39
       4.2.1 Transport Routes and Transport Networks . . 39
       4.2.2 Airports ................................... 40
       4.2.3 Sea Ports and Inland Ports ................ 41
       4.2.4 Rail Stations and Railroad Systems ....... 42
       4.2.5 Terminals and Transshipment Facilities .. 43
4.2.6 Logistics Real Estate, Logistics Parks, and Freight Villages ................................. 47
4.3 Information Infrastructure and Communication Infrastructure .......................... 49
  4.3.1 Telecommunication Infrastructure ...................................................... 49
  4.3.2 Satellite Systems and Satellite Navigation ........................................... 51
Additional Literature ...................................................................................... 52

5 Transport Systems and Logistics Services .................................................. 53
  5.1 Transport Basics ....................................................................................... 54
  5.2 Significance and Development ................................................................. 54
  5.3 Modes of Transport and Transport Technologies ...................................... 56
    5.3.1 Transport Value and Transport Affinity .............................................. 56
    5.3.2 Road Freight Transport .................................................................... 58
    5.3.3 Rail Freight Transport .................................................................... 60
    5.3.4 Sea Freight Transport .................................................................... 65
    5.3.5 Inland Waterway Transport ............................................................. 69
    5.3.6 Air Freight Transport .................................................................... 73
    5.3.7 Pipeline Transport ........................................................................ 75
  5.4 Transport Systems and Means of Transport ............................................ 78
    5.4.1 Transport Chain .............................................................................. 78
    5.4.2 Means of Transport ........................................................................ 80
  5.5 Logistics Service Providers ..................................................................... 87
    5.5.1 Carriers and Forwarders ................................................................. 87
    5.5.2 Courier, Express, Parcel and Mail Service Providers ...................... 89
    5.5.3 Systems Service Providers and Contract Logistics Providers ............ 91
Additional Literature ...................................................................................... 94

6 Warehousing, Handling, and Picking Systems ............................................. 95
  6.1 Warehousing Basics ............................................................................... 96
  6.2 Storage Facilities .................................................................................... 97
    6.2.1 Static Storage Systems ............................................................... 98
    6.2.2 Dynamic Storage Systems .......................................................... 101
  6.3 Conveyors ............................................................................................ 105
    6.3.1 Discontinuous Conveyors .............................................................. 106
    6.3.2 Continuous Conveyors ................................................................. 112
    6.3.3 Sorters ......................................................................................... 117
  6.4 Packages, Loading Units, and Load Carriers .......................................... 119
  6.5 Picking and Handling ............................................................................ 123
    6.5.1 Picking ......................................................................................... 123
    6.5.2 Handling ...................................................................................... 127
  6.6 Warehouse Organization ....................................................................... 128
Additional Literature ...................................................................................... 137
7 Inventory, Stock and Provisioning Management

7.1 Inventory Basics

7.1.1 Contents and Objectives

7.1.2 Determination of Requirements

7.1.3 Functions of Inventory

7.1.4 Inventory Cost

7.2 Inventory Planning and Management

7.2.1 Disposition Procedures

7.2.2 Warehousing Strategies

7.2.3 Safety Stocks

7.3 Provisioning of Goods

7.3.1 Individual Procurement and Bulk Procurement

7.3.2 Production Synchronized Provisioning

7.3.3 Just-In-Time Concepts

7.3.4 Goods Receiving Functions

7.4 Transport, Warehouse, and Location Concepts

7.4.1 Regional Freight Carrier Concept

7.4.2 External Provisioning Warehouse

7.4.3 Supplier Settlements and Supplier Parks

7.5 Cooperation Concepts of Inventory and Provisioning Management

7.5.1 Efficient Consumer Response

7.5.2 Vendor Managed Inventory

7.5.3 Collaborative Planning, Forecasting and Replenishment

Additional Literature

8 Logistics Network Planning

8.1 Strategic Network Planning

8.2 Overview Logistics Networks

8.2.1 Representation of Logistics Networks

8.2.2 Domains of Decision Making in the Network Design

8.2.3 Structures of Logistics Networks

8.3 Warehouse Networks

8.3.1 Warehouse Network Planning

8.3.2 Degree of Centralization

8.3.3 Capacity Planning

8.3.4 Layout Planning

8.4 Transport Networks

8.4.1 Transport Network Planning

8.4.2 Transport Network Configurations

8.4.3 Transport Consolidation

8.4.4 Transport Logistics Concepts

8.5 Outsourcing, Tendering and Placing of Transport and Logistics Services

Additional Literature
9 IT in Logistics ........................................... 189
  9.1 Electronic Data Transmission .......................... 190
    9.1.1 Communication Standards ....................... 190
    9.1.2 Identification Standards ......................... 197
  9.2 Identification Technology ............................ 198
  9.3 Stock Management and Warehouse Control .............. 204
    9.3.1 Classification of IT in the Fields of Inventory
      and Warehousing ...................................... 204
    9.3.2 ERP Systems ...................................... 205
    9.3.3 Warehouse Management Systems .................... 207
    9.3.4 Material Flow Systems and Lower-Level Control
      Systems ............................................... 208
  9.4 Transport Planning and Controlling .................... 209
  9.5 Strategic and Operative Planning Systems ............. 212
    9.5.1 Site and Network Planning ........................ 212
    9.5.2 E-procurement .................................... 213
    9.5.3 Enterprise Resource Planning ..................... 214
    9.5.4 Supply Chain Planning ............................ 215
Additional Literature ....................................... 223

10 Investment and Financing in Logistics .................. 225
  10.1 The Basics ........................................ 226
    10.1.1 Managing Capital Requirement, Origin of Capital
      and Capital Utilization .............................. 226
    10.1.2 Managing Fixed Assets and Current Assets ........ 228
    10.1.3 Financial Supply Chain Concept .................. 230
  10.2 Financing Deliveries of Goods and Inventory .......... 233
    10.2.1 Overdraft Facilities and Supplier’s Credit ....... 233
    10.2.2 Factoring, Forfaiting, Cash Forwarding .......... 234
    10.2.3 Inventory Management and Off-Balance
      Sheet Inventory Financing .......................... 236
  10.3 Financing of Logistics Real Estate .................... 237
    10.3.1 Self Financing and External Financing .......... 237
    10.3.2 Rent and Leasing ................................ 238
  10.4 Financing of Logistics Movables ....................... 239
    10.4.1 Internal and External Financing .................. 239
    10.4.2 Leasing .......................................... 240
    10.4.3 Build-Operate-Transfer Models ................... 241
Additional Literature ....................................... 243

11 Logistics Controlling ................................... 245
  11.1 Conceptual Basics .................................. 246
  11.2 Logistical Costs and Performance Accounting ......... 249
  11.3 Key Figure Systems ................................ 252
11.4 Further Controlling Concepts ...................................................... 261
  11.4.1 Process Cost Accounting ................................................. 261
  11.4.2 Supply Chain Controlling ............................................... 262
11.5 Costs and Cost Effects; Performance and Performance Effects ...................................................... 262
Additional Literature ................................................................. 265

12 Business Models and Industry Solutions ........................................... 267
  12.1 Business Models ................................................................. 268
  12.2 Logistical Industry Solutions ................................................ 268
    12.2.1 Industry Solutions in Manufacturing .................................... 268
    12.2.2 Industry Solutions in Trade ............................................. 273
    12.2.3 Industry Solutions in the Service Sector ............................... 276
    12.2.4 Industry Solutions in E-Business ....................................... 277
  12.3 International and Global Business Models .................................... 279
  12.4 Development of Logistics Services Offers .................................... 281
Additional Literature ................................................................. 283

13 Outline Solutions to Case Studies .................................................. 285
  13.1 Solution to Case Study 6-1 ................................................... 285
  13.2 Solution to Case Study 6-2 ................................................... 286
  13.3 Solution to Case Study 6-6 ................................................... 286
  13.4 Solution to Case Study 8-2 ................................................... 286
  13.5 Solution to Case Study 8-5 ................................................... 286
    13.5.1 Selective Inventory ....................................................... 286
    13.5.2 Regional Warehouses ...................................................... 287
    13.5.3 C Articles Management .................................................... 287
    13.5.4 Direct Supply ............................................................. 287
  13.6 Solution to Case Study 11-2 ................................................... 289

Erratum to: Logistics Systems ......................................................... E1

Bibliography ................................................................. 293

Index ................................................................. 303
Logistics
Basics — Exercises — Case Studies
Gleissner, H.; Femerling, J.C.
2013, XXI, 311 p. 156 illus., Hardcover
ISBN: 978-3-319-01768-6