

# Contents

## Part I Principles, Strategies and Organization

<b>1</b>	<b>Tasks and Aspects of Modern Logistics</b>	<b>3</b>
1.1	Systems and Networks	5
1.2	Tasks and Objectives of Logistics	6
1.3	Structures and Processes	7
1.4	Elementary and Compounded Performance Stations	10
1.5	Structures of Logistic Networks	15
1.6	Functions of Logistic Centers	19
1.7	Process Chains and Logistic Chains	22
1.8	Effects of Logistic Centers	24
1.9	Network Management	29
1.10	Task of Logisticians	32
<b>2</b>	<b>Organization, Scheduling and Control</b>	<b>39</b>
2.1	Orders	40
2.2	Order Management and Logistic Scheduling	41
2.3	Process Organization and Structure Organization	43
2.4	Organization Principles	45
2.5	Software Levels and Computer Configuration	47
2.6	Data Flow and Information Flow	48
2.7	Potentials of Information Technology for Logistics	50
2.8	Risks of Information Technology in Logistics	51
2.9	Organization of Company Logistics	53
2.10	Organization of Scheduling	55
2.11	Physical Localization and Virtual Centralization	58
<b>3</b>	<b>Project Planning and Realization</b>	<b>59</b>
3.1	Possibilities of Action	59
3.2	Planning Phases	62
3.3	Realization Steps	64
3.4	Logistic Goals and Objectives	65
3.5	Frame Conditions	69

3.6	Performance Requirements . . . . .	71
3.7	Determination of Planning Data . . . . .	73
3.8	Presentation of Systems and Processes . . . . .	75
3.9	Selection of the Best Solution . . . . .	78
3.10	Planning and Optimization Tools . . . . .	83
3.11	Technique and Logistics . . . . .	85
<b>4</b>	<b>Potential Analysis . . . . .</b>	<b>89</b>
4.1	Requirement Analysis . . . . .	90
4.2	Performance Analysis . . . . .	91
4.3	Process Analysis . . . . .	93
4.4	Structure Analysis . . . . .	96
4.5	Benchmarking . . . . .	97
<b>5</b>	<b>Strategies of Logistics . . . . .</b>	<b>101</b>
5.1	Target Functions and Target Figures . . . . .	102
5.2	Clustering, Sequencing, Securing . . . . .	105
5.3	System Strategies . . . . .	110
5.4	Methods of Solution and Optimization . . . . .	111
5.5	Solution and Optimization Procedure . . . . .	113
5.6	Segmentation and Classification . . . . .	116
5.7	Specialization and Universality . . . . .	118
5.8	ABC-Analysis . . . . .	119
5.9	Logistic Article Classifications . . . . .	123
<b>6</b>	<b>Logistic Costs and Controlling . . . . .</b>	<b>129</b>
6.1	Cost Accounting and Performance Costing . . . . .	130
6.2	Logistic Cost Calculation . . . . .	132
6.3	Components of Logistic Costs . . . . .	133
6.4	Depreciation and Interests . . . . .	137
6.5	Performance Units and Performance Flows . . . . .	141
6.6	Cost Centers and Cost Drivers . . . . .	144
6.7	Performance Cost Rates . . . . .	146
6.8	Fixed-Costs Dilemma and Utilization Risk . . . . .	149
6.9	Options for Reducing Logistic Costs . . . . .	151
<b>7</b>	<b>Logistic Pricing and Marketing . . . . .</b>	<b>157</b>
7.1	Pricing Principles . . . . .	158
7.2	Performance Costs and Prices . . . . .	159
7.3	Objectives of Remuneration Schemes . . . . .	162
7.4	Standard Remuneration Scheme . . . . .	162
7.5	Project Specific Remuneration Schemes . . . . .	165
7.6	Logistic Tariffs and Discounts . . . . .	169
7.7	Marketing and Pricing Strategies . . . . .	170
7.8	Economics and Logistics . . . . .	181

<b>8</b>	<b>Time Management</b>	185
8.1	Time Points and Time Spans	185
8.2	Operating Time and Working Time	189
8.3	Adaptation, Synchronization and Flexibility	191
8.4	Order Lead Time of Single Stations	193
8.5	Lead Times of Performance Chains	195
8.6	Material Lead Time	198
8.7	Time Scheduling of Single Stations	199
8.8	Time Scheduling of Performance Chains	201
8.9	Just-in-Time	207
8.10	Strategies for Lead Time Reduction	208
8.11	Economic Order Lead Time	210
<b>9</b>	<b>Random Processes and Dynamic Forecasting</b>	213
9.1	Random Processes and Stochastic Flows	214
9.2	Probability Densities and Time Distributions	217
9.3	Frequency Distributions of Discrete Values	221
9.4	Mean Values and Variances in Logistics	224
9.5	Mathematical Forecasting	229
9.6	Demand Planning and Forecasting	234
9.7	Test Functions and Scenario Calculations	238
9.8	Dynamic Forecasting	241
9.9	Demand Forecasting in Logistic Networks	244
<b>10</b>	<b>Order Scheduling and Operating Strategies</b>	247
10.1	Performance and Production Structures	248
10.2	Processing Strategies	253
10.3	Allocation Strategies	256
10.4	Sequencing Strategies	257
10.5	Order Production and Stock Production	259
10.6	Dynamic Scheduling	269
<b>11</b>	<b>Inventory Management</b>	271
11.1	Functions of Stocks	272
11.2	Criteria for Storekeeping	276
11.3	Scheduling of Storage Chains and Networks	279
11.4	Scheduling Parameters	282
11.5	Storekeeping Parameters	284
11.6	Cost Rates for Replenishment and Storing	287
11.7	Storekeeping Costs	290
11.8	Stock Availability and Safety Stock	295
11.9	Demand Dependency of Stock and Storekeeping Costs	306
11.10	Centralization of Stocks	307
11.11	Replenishment Strategies	311
11.12	Cost-Opportunity of Storekeeping	316
11.13	Dynamic Inventory Scheduling	321
11.14	Inventory Optimization	325

<b>12</b>	<b>Logistic Units and Master Data</b>	329
12.1	Functions of Load Units	330
12.2	Filling Units and Filling Orders	332
12.3	Load Units and Load Carriers	335
12.4	Packing Strategies	342
12.5	Filling Strategies and Load Unit Demand	350
12.6	Logistic Master Data	356
12.7	Electronic Kanban	361
<b>13</b>	<b>Limit Performances and Queuing Effects</b>	363
13.1	Throughput and Performance Rates	363
13.2	Limit Performances of Elementary Stations	364
13.3	Operating Strategies	381
13.4	Limit Performance Laws	386
13.5	Waiting Queues and Queuing Laws	393
13.6	Reliability and Availability	406
13.7	Capability Analysis	417
13.8	Acceptance of Plants and Systems	421
<b>14</b>	<b>Purchasing, Sales and Logistics</b>	425
14.1	Core Competencies of Sales and Marketing	426
14.2	Core Competencies of Purchasing	427
14.3	Order Scheduling and Supply Management	427
14.4	Products, Merchandize and Services	428
14.5	Delivery Service and Logistic Quality	430
14.6	Sales Channels and Distribution Structure	430
14.7	Price Calculation and Logistic Costs	431
14.8	Internal Logistic Services	431
 <b>Part II Systems, Networks and Operations</b>		
<b>15</b>	<b>Logistic Networks and Systems</b>	437
15.1	Dynamic Networks	438
15.2	Hierarchy of Logistic Systems	439
15.3	System Planning and System Optimization	441
<b>16</b>	<b>Storage Systems</b>	447
16.1	Storage Requirements	448
16.2	Storeplaces and Storage Types	454
16.3	Storage Technique	466
16.4	Storage Strategies	478
16.5	Place Demand and Filling Degree	481
16.6	Ground Area per Storage Unit	486
16.7	Storeplace Optimization	490
16.8	Storage Planning and Dimensioning	492
16.9	Static Storage Dimensioning	495
16.10	Travel Time Formulas	500

16.11	Dynamic Storage Dimensioning . . . . .	504
16.12	Storage Investments . . . . .	511
16.13	Storage Operating and Performance Costs . . . . .	518
16.14	Procurement of Storage Services . . . . .	527
16.15	Store Allocation and Selection . . . . .	529
<b>17</b>	<b>Commissioning Systems . . . . .</b>	<b>533</b>
17.1	Commissioning Requirements . . . . .	534
17.2	Commissioning Methods . . . . .	540
17.3	Commissioning Technique . . . . .	550
17.4	Commissioning Quality . . . . .	562
17.5	Combined Storage and Commissioning Systems . . . . .	563
17.6	Commissioning Strategies . . . . .	571
17.7	Planning of Commissioning Systems . . . . .	582
17.8	Design Parameters and Strategy Variables . . . . .	583
17.9	Static Design of Commissioning Systems . . . . .	585
17.10	Minimal Tour Length and Optimal Aisle Number . . . . .	589
17.11	Pick Performance and Commissioning Times . . . . .	597
17.12	Order Consolidation and Order-Line Reduction . . . . .	608
17.13	Dynamic Design of Commissioning Systems . . . . .	611
17.14	Commissioning Costs . . . . .	614
17.15	Influence Factors on Costs and Performances . . . . .	618
17.16	Article Allocation and Order Allocation . . . . .	620
<b>18</b>	<b>Transport Systems . . . . .</b>	<b>623</b>
18.1	Classification of Transport Systems . . . . .	624
18.2	Transport Requirements . . . . .	626
18.3	Network Design and System Configuration . . . . .	627
18.4	Transport Control Systems . . . . .	634
18.5	Transport Strategies . . . . .	637
18.6	Conveyor Systems . . . . .	640
18.7	Vehicle Systems . . . . .	648
18.8	Transport Matrix and Number of Transport Units . . . . .	658
18.9	Transport-Unit Demand . . . . .	663
18.10	Designing and Dimensioning Vehicle Systems . . . . .	665
18.11	Optimal Logistic Location . . . . .	670
18.12	Tour Scheduling . . . . .	674
18.13	Transport Costs and Pricing . . . . .	683
18.14	Transport and Traffic . . . . .	689
<b>19</b>	<b>Design of Logistic Halls . . . . .</b>	<b>693</b>
19.1	Requirements and Restrictions . . . . .	693
19.2	Objectives and Design Parameters . . . . .	694
19.3	Mean Transport Lengths . . . . .	695
19.4	Equally Distributed Gates on One Side . . . . .	697
19.5	Transport Optimal Gates on One Side . . . . .	698

19.6	Hall Design Principles . . . . .	700
19.7	Modular Design of Systems and Functional Zones . . . . .	701
19.8	Linking Strategies and Arranging Strategies . . . . .	704
19.9	Efficient Hall Design . . . . .	705
19.10	Size Effects of Logistic Centers . . . . .	706
<b>20</b>	<b>Production Logistics . . . . .</b>	<b>709</b>
20.1	Modes and Types of Production . . . . .	709
20.2	Production Performance . . . . .	710
20.3	Production Planning . . . . .	713
20.4	Production Scheduling . . . . .	717
20.5	Procurement and Dispatch Scheduling . . . . .	720
20.6	Bottleneck Strategies . . . . .	721
20.7	Logistical Optimization of Production . . . . .	723
<b>21</b>	<b>Optimal Networks and Supply Chains . . . . .</b>	<b>725</b>
21.1	Structure Requirements . . . . .	726
21.2	Service and Performance Requirements . . . . .	737
21.3	Options for Action and Design Parameters . . . . .	748
21.4	Delivery Times and Shipment Times . . . . .	757
21.5	Delivery Costs . . . . .	758
21.6	Order Processes and Information Flows . . . . .	760
21.7	Supply Strategies . . . . .	761
21.8	Specification of Supply Chains . . . . .	763
21.9	Optimization of Logistic Networks . . . . .	767
21.10	Transport and Freight Networks . . . . .	771
21.11	Distribution Chains of Consumer Goods . . . . .	778
21.12	Procurement Chains of Retailers . . . . .	780
21.13	Selection of Optimal Transport and Freight Chains . . . . .	783
21.14	Influence Factors of Freight Costs . . . . .	785
21.15	Transport Pricing and Freight Pricing . . . . .	792
21.16	Combined Road-Rail-Cargo Traffic . . . . .	795
21.17	Consumer Oriented Supply Chain Management . . . . .	798
<b>22</b>	<b>Logistic Service Providers . . . . .</b>	<b>801</b>
22.1	Conception of Company Logistics . . . . .	802
22.2	Service Requirements . . . . .	803
22.3	Logistic Service Providers . . . . .	806
22.4	Outsourcing and Contracting Strategies . . . . .	810
22.5	Tendering and Contracting Logistic Services . . . . .	815
22.6	Performance Control and Remuneration Adjustment . . . . .	822
<b>23</b>	<b>Maritime Logistics . . . . .</b>	<b>823</b>
23.1	Fuel Consumption and Bunker Costs . . . . .	825
23.2	Transport Time and Freight Limit Performance . . . . .	827
23.3	Ship Operating Costs and Shipping Freight Costs . . . . .	829
23.4	Cost-Optimal Speed . . . . .	832

23.5	Operating Profits . . . . .	833
23.6	Profit-Optimal Speed . . . . .	835
23.7	Insufficient Freight Demand . . . . .	837
23.8	Ship Operation and Fleet Planning . . . . .	839
23.9	Business Strategies for Shipping Companies . . . . .	840
23.10	Consequences for Economy and Environment . . . . .	841
<b>24</b>	<b>People and Logistics . . . . .</b>	<b>843</b>
24.1	Human Success Factors . . . . .	844
24.2	Recommendations for the Set-up-Phase . . . . .	845
24.3	Recommendations for the Operating Phase . . . . .	848
24.4	Outlook . . . . .	850
	<b>Bibliography . . . . .</b>	<b>853</b>
	<b>Index . . . . .</b>	<b>869</b>



<http://www.springer.com/978-3-642-24366-0>

Comprehensive Logistics

Gudehus, T.; Kotzab, H.

2012, XXI, 912 p. 354 illus., Hardcover

ISBN: 978-3-642-24366-0