

---

# Contents

---

<b>Foreword</b> .....	xix
<b>Preface</b> .....	xxi
<b>Acknowledgments</b> .....	xxv
<b>About the Author</b> .....	xxvii
<b>1 Eight Steps</b> .....	<b>1</b>
Prologue.....	1
Name Your Supply Chain Scenario.....	4
An Entrepreneur Starts a New Business.....	5
A Business Merger Jeopardizes the Operating Model.....	7
An Established Manufacturer Depends Too Much on One Customer...8	
Let's Get Started.....	9
Complete This Eight-Step Approach.....	10
Build and Validate Layer by Layer.....	10
The Eight-Step Approach.....	11
An Important Note to the Reader about Enterprise Resource Planning, Quality, and Sustainability.....	12
Set a Focused Objective to Connect the Market and Product.....	14
Market Demand.....	15
Product Supply.....	16
"Show Stoppers" in Connecting Market Demand with Product Supply.....	17
Write a Supply Chain Construction Requirements Specification.....	18
The Structure of the SCCRS.....	18
How to Draw the Supply Chain Echelon Map.....	20
Specifying the Network Container.....	22
Specifying the Product Contents.....	25
Study the Blueprint before Beginning Construction.....	29
In Summary.....	29

<b>2</b>	<b>The Blueprint—“Make It Work”</b> .....	<b>31</b>
	You Don't Know What You Don't Know.....	31
	Follow the Blueprint .....	34
	Blueprint to Construct the Network Container .....	34
	Blueprint to Fill the Network Container with Product Contents.....	36
	Build a Forward Supply Chain—A Comprehensive Example.....	38
	Step A: Set the Business Objective Connecting the Market Segment and Product (Chapter 1).....	39
	Step B: Staff the Construction Project, Develop the Timeline, and Plan the Budget (Chapters 3, 4).....	39
	Step 1: Write the Network Container SCCRS (Chapters 1, 11) .....	40
	How to Estimate Throughput.....	41
	How to Estimate Price/Landed Cost .....	41
	How to Estimate Cash-to-Cash Velocity .....	41
	Step 2: Budget Price/Landed Cost End-to-End Echelon by Echelon (Chapters 1, 3, 4) .....	44
	Step 3: Start Midstream with the Factory-to-Midbound Logistics-to-Distributor Material Flow (Chapters 5, 7).....	45
	Step 4: Detail the Upstream Supply Base-to-Inbound Logistics-to-Factory Material Flow (Chapter 6).....	45
	Step 5: Detail the Distributor-to-Outbound Logistics-to-Downstream Delivery Material Flow (Chapter 7).....	46
	Step 6: Add Any Service Element (Chapter 7) .....	47
	Step 7: Connect Demand Broadcast Information with Material Flow and Test (Chapters 7, 9) .....	47
	Step 8: Connect Requests for Payment with Cash Payments and Test (Chapters 4, 7) .....	49
	Step 9: Detail the Factory and Distributor Steady-State Cash-to-Cash Cycle (Chapter 4) .....	51
	Step 10: Plot a Value Circle to Validate Network Container Performance Measures (Chapter 11) .....	53
	Step 11: Write the Product Contents SCCRS (Chapters 1, 11).....	54
	How to Estimate Inventory Value.....	54
	How to Estimate Delivery Lead Time.....	55
	How to Estimate ROIC for the DC.....	57
	Step 12: Decide the Operating Strategy and Locate the Push/Pull Boundary (Chapter 9).....	58
	Step 13: Compile the Composite Bills of Materials (Chapters 6, 10) ...	59
	Step 14: Forecast Demand (Chapter 9) .....	59
	Step 15: Budget Inventory Echelon by Echelon (Chapters 1, 3, 10)... Ordering Cost and Inventory Holding Cost Estimates.....	61 62

Shipping Buffer Is Push/Pull Boundary Is Distributor Cycle Stock.....	62
Step 16: Plan and Control the Push Zone (Chapter 10).....	63
Step 17: Plan and Control the Pull Zone (Chapter 10).....	63
Step 18: Plot a Value Circle to Validate Product Contents Performance Measures (Chapter 11) .....	64
Step 19: Stabilize Supply Chain Operations and End the Construction Project (Chapters 11, 12).....	65
Step 20: Manage Supply Chain Risk (Chapter 12) .....	66
In Summary.....	66
<b>3 Building Relationships.....</b>	<b>67</b>
Staffing the Dream Team.....	67
Sign Up for the Journey .....	70
Know When to Start and End a Supply Chain Construction Project .....	71
Supply Chain Life Cycle Event Triggers.....	71
How to Get Started...Ask These Three Questions.....	71
Organize the Supply Chain Construction Project.....	73
Project Objective .....	74
Project Statement of Work.....	74
Project Team.....	74
Project Timeline with Milestones .....	76
Project Budget .....	78
Build Strong Project Team Relationships.....	79
Educate and Train .....	79
Build Trust within Parent Organization Relationships .....	81
Organization Charts and Politics.....	82
A Clash in Cultures .....	82
Supply Chain Construction Project Communications Plan.....	83
Develop Network Relationships.....	84
Understanding Network Vocabulary .....	85
Forward Network Relationships .....	85
Service Network Relationships .....	87
Reverse Network Relationships.....	87
Build Trust with External Relationships .....	88
Trading Partner Communications .....	89
Bridging Cultural Differences.....	89
Some Common Causes of Mistrust .....	90
Pricing Contracts.....	92
In Summary.....	94

<b>4</b>	<b>Cash Flow</b> .....	<b>95</b>
	A Dollar Wise and \$10 Million Foolish .....	95
	Get a Handle on the Balance .....	98
	Balance Sheet Basics .....	99
	Cash In on the Cash-to-Cash Cycle .....	101
	Common Forms of Orders, Deliveries, and Payments .....	101
	Supply Side ODC Cycle .....	103
	Operations That Turn Inventory .....	104
	Operations That Fund Cash Flow .....	104
	Demand Side ODC Cycle .....	105
	Cash-to-Cash Cycle .....	106
	Example Cash-to-Cash Cycle .....	107
	Cash Gets Tied to Inventory... Forever .....	108
	Let the Velocity and Variability Principles Guide Construction .....	109
	Velocity Principle .....	110
	Variability Principle .....	111
	Combining Variability in Parallel and Series .....	111
	Bigger and Slower... A Story of Misguided Business Controls .....	112
	Build an Information Backbone .....	113
	Every Business Has Two “Inventories” .....	113
	Elements of the Information Backbone .....	114
	Profit from the Margin .....	115
	Income Statement Basics .....	115
	Top Line Revenue for Forward Supply Chain Networks .....	117
	Top Line Revenue for Reverse Supply Chain Networks .....	117
	Price Based on Cost .....	118
	Cost-Based Pricing .....	119
	Volume Assumption in Cost-Based Pricing .....	120
	Budgeting Price/Landed Cost across the Supply Chain Network ...	121
	The One Dollar Product .....	124
	Forecast Cash Replenishment .....	125
	Working Capital and Fixed Capital .....	126
	Start with Accounts Receivable and Accounts Payable .....	126
	How to Construct the Cash Forecast .....	128
	Budget Cash for the Supply Chain Construction Project .....	129
	The Supply Chain Construction Project Budget .....	129
	A Virtual Enterprise Plans Its Start-Up Cash Flow .....	130
	An Existing Business Upgrades Its Supply Chain .....	132
	Fund the Construction Project .....	135
	Cash Flow Statement Basics .....	135
	Equity and Debt Financing .....	137
	In Summary .....	138

<b>5</b>	<b>Make.....</b>	<b>141</b>
	Connecting the Dots .....	141
	Know What Your Customer Values .....	144
	This Customer Valued Flexibility.....	145
	That Customer Valued Capability.....	146
	Understand What Makes a Good Factory .....	147
	Manufacturing Transformational Process Flow .....	147
	Manufacturing Documentation Requirements .....	150
	Manufacturing Organizational Structure .....	151
	Select the Best Factory .....	153
	A Case of Misguided Assumptions .....	153
	Factory Selection Decision Criteria.....	155
	Compare Factory Price/Landed Costs for Distribution.....	156
	Prepare the RFQ.....	160
	Describe Your Business Scenario.....	160
	Specify the RFQ Response Format.....	161
	Evaluate First Samples .....	161
	Optimize Midbound Logistics Costs.....	163
	Three Rules for Palletization .....	163
	Cost Drivers versus Transportation Mode .....	164
	Transportation Fuel Efficiency.....	166
	Beware the Hidden Costs of Offshore Manufacturing.....	168
	Making the Investment .....	168
	Managing the Risk.....	169
	A Case of Chinese Manufactured Cables.....	169
	In Summary.....	171
<b>6</b>	<b>Source.....</b>	<b>173</b>
	When You Care Enough to Source the Very Best .....	173
	Start with Part Numbering.....	176
	A Simple Part Number Scheme .....	177
	Stock Keeping Units Are Different .....	178
	Translate the BOM into Requirements for a Supply Base .....	178
	BOM: Item Master File .....	178
	BOM: Product Structure File .....	180
	Composite BOM Item Master .....	181
	Mapping the BOM to a Supply Base .....	184
	Practice Commodity Management .....	187
	Unmanaged and Out of Control .....	188
	How to Group Suppliers and Commodities.....	188
	Five Triggers for Reviewing the Supply Base and Commodity Groupings.....	189

Determine a Material Budget before Shopping for Suppliers .....	190
Types of Pricing Agreements.....	190
How to Determine an Affordable Budget for Direct Materials .....	191
How to Make Direct Material Landed Costs Fit Competitive Customer Pricing.....	192
Select the Best Supplier .....	194
Supplier Selection .....	195
Supply Base Rationalization.....	195
Optimize Inbound Logistics Costs .....	197
Domestic Inbound Logistics.....	198
International Inbound Logistics and Importing.....	199
Outsourcing the Supply Base: A Case Study .....	201
Defining the Metal Fab Shop Outsourcing Project .....	201
Identifying Potential Suppliers.....	202
An Outsourcing Strategy Evolves.....	203
Part Transfer Process .....	204
Human Costs .....	205
Piece Part Quality.....	205
Piece Part Cost .....	206
Tradeoffs of Warehouse Space, Inventory Investment, and Freight Expense .....	206
Sale of the Metal-Forming Machinery and Environmental Expense .....	207
In Summary.....	207
<b>7 Deliver.....</b>	<b>209</b>
Where in the World Has My Product Gone? .....	209
Know the Nature of Market Demand.....	212
Market Segmentation .....	213
Consumer Goods Demand Patterns versus Industrial Products Demand Patterns.....	213
Use Customer Preferences to Define Delivery Channels.....	214
Delivery Channel Descriptions.....	214
Fewer Delivery Channel Echelons Drive Lower Product Landed Cost .....	216
How to Specify a Delivery Channel.....	217
Understand What Makes a Good Distributor.....	221
Basic Distribution Capabilities .....	221
DC Process and Inventory Flow .....	221
DC Physical Layout Considerations .....	225
A Liability Case from a Missed Inventory Rotation .....	228
A Case of Non-Value-Added Distribution .....	229
DC Organizational Structure .....	230

- Embrace Specialized IT .....232
- Select the Best Distribution Network .....233
- Optimize Outbound Logistics Costs .....235
  - Domestic Outbound Logistics.....236
  - International Outbound Logistics and Exporting.....237
  - Not Knowing Is No Excuse.....239
- In Summary.....239
  
- 8 Return .....241**
  - No Deposit, No Return .....241
  - Accommodate Returns in the Forward Network ..... 244
    - Warranty .....245
    - Component and Raw Material Returns.....245
    - Forward Network Returns Infrastructure..... 246
    - Product Returns ..... 246
  - Build a Reverse Supply Chain—A Comprehensive Example .....247
    - Step A: Set the Business Objective Connecting the Market Segment and Product (Chapter 1).....247
    - Step B: Staff the Construction Project, Develop the Timeline, and Plan the Budget (Chapters 3, 4) .....248
      - Step 1: Write the Network Container SCCRS (Chapters 1, 11) .....248
        - How to Estimate Throughput.....249
        - How to Estimate Cash-to-Cash Velocity .....250
        - How to Estimate Price/Landed Cost .....250
      - Step 2: Budget Price/Landed Cost End-to-End Echelon by Echelon (Chapters 1, 3, 4).....251
      - Step 3: Start with Remanufacturer-to-Midbound-to-Distributor Material Flow (Chapters 5, 7) .....253
      - Step 4: Detail the Supply-Base-to-Inbound-to-Remanufacturer Material Flow (Chapter 6) .....254
      - Step 5: Detail Remanufacturer-to-Outbound-to-Delivery-Channel Material Flow (Chapter 7).....258
      - Step 6: Add Any Service Element (Chapter 7) .....259
      - Step 7: Connect Demand Broadcast Information with Material Flow and Test (Chapters 7, 9) ..... 260
      - Step 8: Connect Request for Payment with Cash Payments and Test (Chapters 4, 7) .....261
      - Step 9: Detail the REMAN Steady-State Cash-to-Cash Cycle (Chapter 4) .....262
      - Step 10: Plot a Value Circle to Validate Network Container Performance Measures (Chapter 11) .....265

Step 11: Write the Product Contents SCCRS (Chapters 1, 11).....	266
How to Determine Inventory Value.....	266
How to Estimate Delivery Lead Time.....	268
How to Estimate Return on Invested Capital.....	269
Step 12: Decide the Operating Strategy and Locate the Push/Pull Boundary (Chapter 9).....	270
Step 13: Compile the Composite BOM (Chapters 6, 10).....	272
Step 14: Forecast Demand (Chapter 9).....	272
Step 15: Budget Inventory Echelon by Echelon (Chapters 1, 3, 10).....	275
Ordering Cost and Inventory Holding Cost Estimates.....	275
Distributor Cycle Stock (Shipping Buffer).....	276
Remanufacturer Finished Goods Inventory (Push/Pull Boundary).....	277
Remanufacturer Component Inventory.....	278
Step 16: Plan and Control the Push Zone (Chapter 10).....	279
Step 17: Plan and Control the Pull Zone (Chapter 10).....	279
Step 18: Plot a Value Circle to Validate Product Contents Performance Measures (Chapter 11).....	280
Step 19: Stabilize Supply Chain Operations and End the Construction Project (Chapters 11, 12).....	282
Step 20: Manage Supply Chain Risk (Chapter 12).....	282
In Summary.....	283

<b>9 Demand Planning.....</b>	<b>285</b>
All Forecasts Are Wrong.....	285
Focus on Consistent, Reliable Delivery.....	288
Good Intentions but Poor Performance.....	289
Delivery Lead Time.....	290
Taking Variability Out of Delivery Lead Time.....	291
Building Reliability into Delivery Lead Time.....	292
Let the Vocalize and Visualize Principles Guide Construction.....	292
Vocalize Principle.....	292
Visualize Principle.....	293
Work from the Big Picture.....	293
Push Zone and Pull Zone.....	293
Four Operating Strategies.....	294
Locating the Push/Pull Boundary.....	295
Forecast the Order.....	296
Forecast the Right Thing.....	297
Three Kinds of Forecasts.....	298



Forecast Things Right.....	300
Forecasting Techniques.....	301
Tracking Forecast Accuracy for Continuous Improvement.....	305
Capture the Order.....	307
Sources of Revenue.....	307
Scrolling through the Customer Order States.....	308
Revenue Reporting.....	309
Information Technology Applied to Order Capture.....	311
Broadcast the Order.....	312
Bullwhip Effect.....	313
How to Synchronize the Replenishment of BTS Products.....	313
How to Fulfill BTO Products.....	316
How to Fulfill Services.....	317
In Summary.....	318
<b>10 Inventory Management.....</b>	<b>319</b>
In Stock, No Problem.....	319
Ask These Eight Inventory Questions.....	322
Get the Lay of the Land.....	324
Forward Network Inventory Locations.....	325
Inventory Items by Location.....	327
Driving Inventory Turns.....	328
Push Inventory into the Push/Pull Boundary.....	333
An Overview of the Push Planning Methodology.....	333
S&OP and RCCP.....	335
Reconcile Three Forecasts and the S&OP.....	338
Distribution Requirements Planning.....	338
Master Production Schedule.....	341
Planning Horizons and Available-to-Promise.....	344
Material Requirements Planning.....	345
Capacity Requirements Planning.....	347
Set Lot Size, Reorder Point, Lead Time, and Safety Stock.....	348
How to Estimate Ordering Cost and Inventory Holding Cost.....	348
How to Determine Lot Size.....	350
How to Determine the Reorder Point.....	352
How to Determine Safety Stock.....	353
An Inventory Model.....	355
Pull Inventory Out of the Push/Pull Boundary.....	359
Pulling Inventory under a Synchronized BTS Scenario.....	359
Pulling Inventory under a Postpone-to-Order Scenario.....	363
In Summary.....	364

<b>11</b>	<b>Performance Measures—“Make It Work Well”</b> .....	<b>365</b>
	You Get What You Measure .....	365
	Measure KPIs .....	368
	Work with This Basic Performance Measurement System .....	369
	Throughput (Chapter 4) .....	370
	Landed Cost (Chapter 4) .....	371
	Cash-to-Cash Velocity (Chapter 4) .....	372
	Cash-to-Cash Variability (Chapter 4) .....	373
	Inventory (Chapter 10) .....	374
	Delivery Lead Time Vocalize Pull (Chapter 9) .....	377
	Visualize Push (Chapter 10).....	378
	Return on Invested Capital (Chapter 2).....	379
	Use a Value Circle to Make Comparisons .....	381
	How to Draw a Value Circle.....	382
	How to Scale Each Value Circle Axis.....	383
	How to Make Relative Comparisons Using the Value Circle .....	383
	How to Calculate the Enclosed Area on a Value Circle.....	383
	A Value Circle Comparison Example.....	384
	Validate Performance to Gain Customer Acceptance.....	385
	Always Document What the Customer Expects (Chapter 1) .....	385
	External and Internal Customer Acceptance.....	387
	Performance Diagnostics .....	388
	Throughput Diagnostic.....	388
	Price from the Seller as Landed Cost to the Buyer Diagnostic .....	390
	Inventory Turns Diagnostic .....	390
	Improve the Margin.....	393
	Consider Each Income Statement Line Item as an Opportunity.....	393
	How to Accelerate Cash Reimbursement from the Bottom Line .....	394
	Decrease the Network Inventory Investment .....	397
	Track Project Team Progress against the Plan .....	400
	Keep the Focus .....	400
	Communicate, Communicate, Communicate .....	400
	How to Know When Your Project Is Off the Rails .....	401
	Iterate or “Plan B” .....	401
	Keep at Least One Degree of Freedom.....	401
	Performance Measurement Comparisons...When to End the Project .....	402
	Celebrate Success .....	402
	In Summary.....	403
	Appendix: Using Excel to Plot a Value Circle .....	403

<b>12 Risk Management—“Make It Work in a Flexible, Risk-Tolerant Manner”</b> .....	<b>407</b>
Risky Business .....	408
Complete the Current Supply Chain Construction Project.....	410
Separate What You Can Control from What You Cannot Control.....	414
Shooting from the Hip .....	415
Normal Response Strategies.....	415
Resource Management during Periods of Rapid Growth.....	416
Resource Management during Periods of Rapid Decline.....	417
Abnormal Response Strategies to External Events and Threats.....	417
Change the Product...If You Can.....	419
Change the Product Feature Set .....	420
Change the Product Price Point.....	421
A Dynamic Pricing Example .....	422
Change the Network...If You Can .....	425
Ensure Continuity of Supply .....	426
Trade Information for Inventory.....	427
Temporary Disaster Recovery through Redundancy.....	429
Change the Business Model...If You Can.....	430
Risk Management.....	430
How to Build a Risk-Tolerant Supply Chain.....	430
Environmental Scanning .....	431
Scenario Planning.....	432
In Summary.....	435
Epilogue.....	435
<b>Bibliography</b> .....	<b>437</b>
<b>Index</b> .....	<b>441</b>