# Contents

## 1 Introduction

1.1 From Product Variety to Postponement ........................................ 1
   1.1.1 Product Variety ............................................. 1
   1.1.2 Mass Customization ........................................... 2
   1.1.3 Postponement Strategy ....................................... 3

1.2 Classification of Postponement ............................................. 3
   1.2.1 Pull Postponement ........................................... 4
   1.2.2 Logistics Postponement ...................................... 6
   1.2.3 Form Postponement ........................................... 7
   1.2.4 Price Postponement .......................................... 8
   1.2.5 Implications .................................................. 8
   1.2.6 Advantages and Disadvantages of Postponement ............... 9
   1.2.7 Prerequisites for Postponement Strategy Development ...... 10

1.3 Cost Models for Analyzing Postponement Strategies .................... 11
   1.3.1 Stochastic Models ............................................ 11
   1.3.2 Heuristic Models ............................................. 12
   1.3.3 Descriptive Models .......................................... 13
   1.3.4 Performance Measures ....................................... 14

1.4 A Literature Review for Model Development ................................ 14
   1.4.1 EOQ and EPQ Models .......................................... 15
   1.4.2 Lot Size-Reorder Point Model ................................ 16
   1.4.3 Markov Chain .................................................. 16

1.5 Concluding Remarks ....................................................... 17

## 2 Analysis of Pull Postponement by EOQ-based Models .................... 19

2.1 Postponement Strategy for Ordinary (Imperishable) Items ............. 19
   2.1.1 Proposed Model and Assumptions ............................. 19
   2.1.2 Case 1: Same Backorder Cost ................................ 22
   2.1.3 Case 2: Different Backorder Costs .......................... 26
   2.1.4 A Numerical Example ......................................... 30

2.2 Postponement Strategy for Perishable Items ............................. 32
   2.2.1 Notation and Assumptions .................................... 33
   2.2.2 Model Formulation ............................................ 34
2.2.3 The Postponement and Independent Systems .......... 38
2.2.4 Numerical Examples .................................. 39
2.3 Concluding Remarks ....................................... 41

3 Analysis of Postponement Strategy by EPQ-based Models .... 43
   3.1 Analysis of Postponement Strategy by an EPQ-based Model without Stockout .......... 43
      3.1.1 Proposed Model and Assumptions ................... 43
      3.1.2 2 Machines for 2 End-Products .................... 46
      3.1.3 n Machines for n End-Products ..................... 56
   3.2 Analysis of Postponement Strategy by an EPQ-based Model with Planned Backorders ........ 62
      3.2.1 Proposed Model and Assumptions ................... 63
      3.2.2 Demands Are Met Continuously ..................... 65
      3.2.3 Demands Are Met After Production Is Complete .... 71
   3.3 Concluding Remarks .................................... 78

4 Evaluation of a Postponement System with an (r, q) Policy .... 81
   4.1 The Proposed Models and Assumptions ................... 81
   4.2 System Dynamics for a Non-postponement System ........ 83
   4.3 The Algorithm for Finding a Near Optimal Total Average Cost of an (r, q) Policy .......... 84
      4.3.1 The Markov Chain Development ...................... 84
      4.3.2 The Algorithm for Finding a Near Optimal Total Average Cost ......................... 99
   4.4 System Dynamics for a Postponement System ............. 102
   4.5 Average Cost Comparison of the Two Systems When L = 0 ........ 103
   4.6 Average Cost Comparison of the Two Systems When L ≥ 1 ...... 104
      4.6.1 An Overview of the Simulation Results ................ 104
      4.6.2 Impacts of Parameters on Average Cost .............. 106
   4.7 Concluding Remarks .................................... 107

5 Simulation of a Two-End-Product Postponement System .......... 109
   5.1 Proposed Model and Assumptions .......................... 110
      5.1.1 Notation ........................................... 111
      5.1.2 Model Assumptions .................................. 111
   5.2 Methodology ............................................ 112
      5.2.1 System Dynamics .................................... 112
      5.2.2 The Simulation Model ................................ 114
      5.2.3 Customer Demand Distribution ....................... 114
      5.2.4 Order Quantity and Reorder Point ................... 115
      5.2.5 Summary of Parameters ............................... 115
      5.2.6 Initial Conditions .................................. 115
   5.3 Simulation Results for Non-cost Parameters ............... 117
6 Application of Postponement: Examples from Industry

6.1 A Case Study from Hong Kong

6.1.1 An Overview of the Company

6.1.2 Implementation of Postponement

6.1.3 Benefits of Using Postponement

6.1.4 Implications

6.2 The Case of Taiwanese Information Technology Industry

6.2.1 The Hypothesis

6.2.2 Methodology

6.2.3 Results

6.2.4 Implications

6.3 Concluding Remarks

7 Conclusions, Implications and Future Research Directions

7.1 Conclusions

7.2 Implications and Further Research Directions

A Simulation Results (Uniform Distribution)

B Simulation Results (Poisson Distribution)

C Simulation Results (Normal Distribution I)

D Simulation Results (Normal Distribution II)

E Simulation Results for Cost Analysis

References

About the Authors

Index
Postponement Strategies in Supply Chain Management
Cheng, T.C.E.; Li, J.; Wan, C.L.J.; Wang, S.
2010, XVIII, 166 p., Hardcover