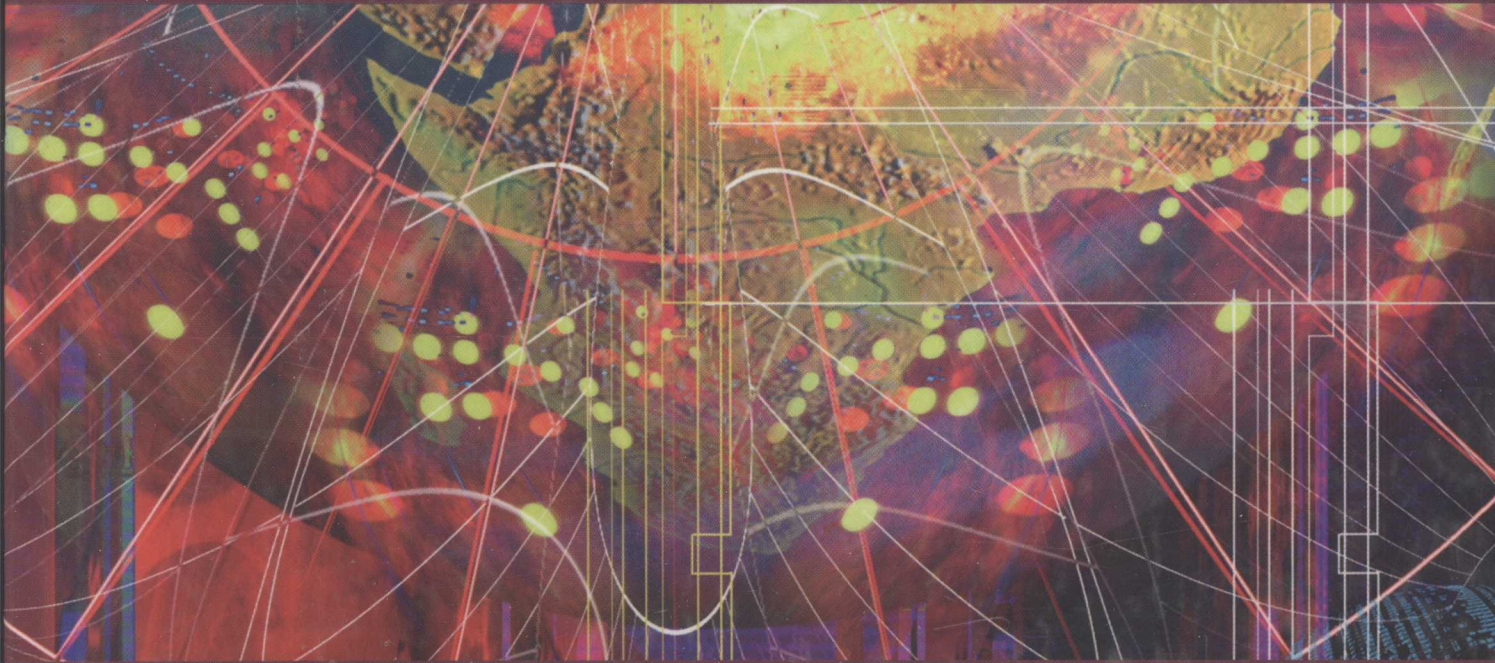


# ***ERP*** *in Distribution*

---



---

***Lawrence Jennings Reynolds***

---



# ***ERP in Distribution***

---

***F. Barry Lawrence***

***Daniel F. Jennings***

***Brian E. Reynolds***

---

**THOMSON**

  
**SOUTH-WESTERN**



### ERP in Distribution

F. Barry Lawrence, Daniel F. Jennings, and Brian E. Reynolds

**VP/Editorial Director:**

Jack W. Calhoun

**VP/Editor-in-Chief:**

George Werthman

**Senior Acquisitions Editor:**

Charles E. McCormick, Jr.

**Developmental Editor:**

Taney H. Wilkins

**Marketing Manager:**

Larry Qualls

**Production Editor:**

Margaret M. Brill

**Technology Project Editor:**

Christine Wittmer

**Media Editor:**

Amy Wilson

**Manufacturing Coordinator:**

Diane Lohman

**Production House:**

Lachina Publishing Services

**Printer:**

Thomson/West  
Eagan, Minnesota

**Internal Designer:**

Chris Miller

**Cover Designer:**

Chris Miller

**Cover Images:**

© Digital Vision

COPYRIGHT © 2005

by South-Western, part of the  
Thomson Corporation. South-  
Western, Thomson, and the  
Thomson logo are trademarks  
used herein under license.

Printed in the United States of  
America

1 2 3 4 5 07 06 05 04

ISBN: 0-324-17872-7

Library of Congress Control

Number:

2004100554

ALL RIGHTS RESERVED.

No part of this work covered by  
the copyright hereon may be  
reproduced or used in any form or  
by any means—graphic, electronic,  
or mechanical, including  
photocopying, recording, taping,  
Web distribution or information  
storage and retrieval systems—  
without the written permission  
of the publisher.

For permission to use material  
from this text or product, submit  
a request online at  
<http://www.thomsonrights.com>.

For more information  
contact South-Western,  
5191 Natorp Boulevard,  
Mason, Ohio 45040.  
Or you can visit our Internet site at:  
<http://www.swlearning.com>

*My sons Alex, Ryan, and Jarrod who are always there to bring joy when I get home.*

Barry Lawrence

*Kay, Courtney, Christopher, Jackson, Cole, and Jim for their support.*

Daniel Jennings

*To the many people I have been privileged to work with who have taught me so much about industrial distribution, and as always to my wife, Suzanne, for her continued love and support.*

Brian Reynolds



# Preface

---

Enterprise Resource Planning (ERP) systems have been praised as a panacea for solving the tremendous human, inventory, facility, and equipment management problems facing all firms today. ERP has also been panned as an impossible dream that, even if realized, will never deliver its promised benefits. It is neither. ERP is a tool designed to work together with other information management processes like e-Commerce, Customer Relationship Management, automation software, supplier and logistics tracking tools, a myriad of other software solutions, and the most significant generators and managers of information in any firm: people.

What does make ERP so significant is that without information automation and connectivity (the definition of ERP) within our firm, we have no chance of communicating effectively with our supply chain partners. Customer expectations are constantly increasing, and firms that are not using information connectivity to better understand their customers (protecting the top line, revenues) and decrease unnecessary costs (protecting the bottom line, profits) are experiencing the kind of margin pressure that will soon destroy many.

ERP is where the information automation/connectivity starts for most firms. This does not mean, however, that buying a large ERP system is the only way to go. As we demonstrate in this book, innovative firms have extended their legacy systems to near ERP status or have built ERP systems from combinations of back office accounting programs and bolt-ons, supporting any shortcomings with well-designed human processes. The essence of ERP is not the system. It is the process of connecting all information flows within the firm and using that connectivity together with analysis programs that both advise decision makers and make routine decisions for the firm.

The challenges associated with ERP are formidable but are becoming less so with each passing year. IT providers are making the systems more stable and more complete (able to meet all business needs across all business categories) and data and process standardization efforts are continuing to overcome connectivity issues. Perhaps most importantly, managers are developing experience and skills with ERP successes leading to environments that are better prepared for information automation, are more able to understand the benefits, and are more willing to accept change.

As with our previous work on information automation, “e-Distribution,” this book represents the experiences and thoughts of many industry practitioners and a few academics. We want to thank the business partners of the Texas A&M University’s Industrial Distribution Program without whose vision and support we could not have written this work. In particular we wish to thank IBM, Master

Halco, Prelude Systems Inc., PeopleSoft, Silvon, Selltis, Intuit Eclipse, and Dimasys for their continued support and desire to solve information connectivity issues.

There are more people to thank than can be included in this preface, but the efforts of our many business partners are thoroughly interwoven into this text. A special thanks goes to our good friend Bharani Nagarathnam whose wisdom and management skills in bringing these projects to their successful conclusion touches every part of this book. We also want to thank Charles McCormick, Taney Wilkins, and all the helpful and supportive people of South-Western Publishing Company for their hard work in making this book a reality.

# About the Authors

---

## **F. Barry Lawrence**

Dr. Barry Lawrence is the director of the Information Systems Consortium and holder of the prestigious 3M Fellows Award at Texas A&M University. As a faculty member of the Industrial Distribution Program and Thomas and Joan Read Center for Distribution Research and Education, he is involved in graduate, undergraduate, and professional continuing education teaching activities, funded research projects, journal publication, academic society meetings and publications, service, and industry contact. His teaching activities surround classes in logistics, Supply Chain Management, distribution information systems, and distribution strategy. He is a frequent speaker for distribution associations and private firms on topics ranging from logistics and inventory management to information systems for distribution channels (e-business). He has also served as an advisor to the Professional Association of Industrial Distribution (PAID), student chapter, since 1997.

Dr. Lawrence's research interests include ERP/e-business implementation and logistics (inventory and other asset management) redesign for distribution operations. He has worked on many large industry projects generating millions of dollars in funding for the university and its students. Some of his major initiatives include the Information Systems Consortium for Supply Chain Integration, the Supply Chain Information Systems Laboratory, and the Consortium for ERP Benchmarking and Standardization. These initiatives have enjoyed high visibility and enormous success in increasing the understanding of e-business and in forging significant strategic partnerships with more than 20 information technology and supply chain solution providers.

Dr. Lawrence holds a Ph.D. in Information and Operations Management from Texas A&M University, an M.B.A. from Southwest Texas State University, and a B.B.A. in Finance from the University of Texas at Austin. He has more than 10 years of industry experience in sales and distribution business.

## **Daniel F. Jennings**

Dr. Jennings is a full professor at Texas A&M University and was formerly the Industrial Distribution Program Coordinator and Director of the Thomas and Joan

Read Center for Distribution Research and Education at Texas A&M University. He has held three endowed professorships in his academic career.

Jennings' corporate career includes engineering, corporate planning, and managerial positions with Armstrong World Industries, Kaiser Aluminum and Chemical Corporation, Olinkraft, Inc., Boise Cascade Corporation, and Certainteed Corporation in the United States, Canada, and South America. His industry experience involves manufacturing and distribution activities.

Dr. Jennings has served as a visiting professor at universities in Russia, France, Canada, Mexico, and Australia and has conducted executive development programs in the U.S., Canada, France, Mexico, and Italy. Dr. Jennings has performed consulting assignments for a variety of firms, labor unions, and governmental agencies in five areas: strategy formulation and implementation, value chain analysis, management development, organizational change, and human resource issues that are vital to a client's business. He also conducts economic loss analysis for a variety of organizations as well as participating in numerous workshops, programs, and seminars for industrial distributors, manufacturers, and trade associations.

Dr. Jennings has published over 130 articles in academic and practitioner journals and has authored 10 textbooks. His research has been described in both *The Wall Street Journal* and *The New York Times*, and he has received several best paper awards from the Academy of Management, New York University, Baylor University, Prentice-Hall Publishing, and McGraw-Hill Publishing. He also received the Outstanding Researcher Award while a faculty member at Baylor University. Dr. Jennings received a B.S. in Industrial Engineering (with honors) from the University of Tennessee, an M.B.A. in Finance from Northeast Louisiana University, and a Ph.D. in Strategic Management from Texas A&M University and is a Registered Professional Engineer.

### ***Brian Reynolds***

Brian Reynolds is the associate director of the Thomas and Joan Read Center for Distribution Research and Education, a part of the Texas Engineering Experiment Station. He holds a B.S. in Management from Pepperdine University and an M.B.A. from Texas A&M's Lowry Mays Graduate School of Business. Brian is affiliated with Texas A&M University's Industrial Distribution academic program.

He has more than 20 years of experience in the distribution industry, ranging from field sales and branch management to general sales management for a \$75 million industrial distributor. He served as the director of the Quality Process and, following that, as director of marketing and integrated supply for a \$200 million distributor. He was also the project team leader for selecting and implementing new distribution software and hardware, which went live on schedule and under budget.

Brian has designed and conducted training in field sales, sales management, branch operations, quality improvement, database marketing plans, statistical process control, and integrated supply. He has served in several volunteer capacities on industry trade association committees and task forces, including serving as a co-chair



on a joint Industrial Distribution Association–Industrial Supply Manufacturers Association committee on Total Quality Process.

He has made presentations to the Industrial Distribution Association (IDA), the Industrial Supply Manufacturers Association (ISMA), the Institute for Supply Management (ISM), formerly NAPM, the International Quality & Productivity Center, the Institute for International Research, the National Association of Steel Pipe Distributors, and the Construction Equipment Manufacturers Association. He has also made numerous presentations, and conducted workshops, for industrial distributors and manufacturers.

# Contents

<i>Preface</i>	<i>xiii</i>
<i>About the Authors</i>	<i>xv</i>

---

## **part 1**

### **Chapter 1**

#### **The Roots of Distribution Information Management 2**

<i>Introduction</i>	<i>3</i>
<i>File Cabinets and the Black Hole of Information</i>	<i>4</i>
<i>The Distribution Operation: The Nexus of an Information Tidal Wave</i>	<i>5</i>
Problem: Integration of Information	<i>6</i>
Adding Functionality: Pre-Y2K Systems	<i>7</i>
<i>The “Valley of Despair”: Early ERP Applications in Distribution</i>	<i>9</i>
Phasing It In	<i>10</i>
ERP Can Go Live	<i>12</i>
<i>Riding the Wave: Information Automation</i>	<i>12</i>
<i>Conclusion</i>	<i>13</i>
<i>Case Study: Life Before ERP</i>	<i>15</i>
<i>Case Challenges</i>	<i>18</i>

### **Chapter 2**

#### **Strategic Use of Distribution ERP Systems 19**

<i>Introduction</i>	<i>20</i>
<i>The New Supply Chain Manager</i>	<i>21</i>
<i>Information Power and Use</i>	<i>25</i>
Using IM Power to Advantage	<i>27</i>
Realizing Cost Savings	<i>27</i>
The Strategy and Structure of the Information-Driven Distributor	<i>29</i>
<i>Justifying the ERP Investment</i>	<i>33</i>
Quantifying the Benefits	<i>33</i>
<i>Conclusion</i>	<i>35</i>

---

<i>Case Study: ROI and Justifying the ERP System</i>	37
<i>Case Challenges</i>	39
<b>Chapter 3</b>	
<b><i>Information System Tactical Planning</i></b>	<b>40</b>
<i>Introduction</i>	42
<i>Process Mapping for Information Automation</i>	42
<i>Distribution Process Drivers</i>	44
Changing Processes to Suit Information Systems	46
Same Tasks, Multiple Processes	46
Gatekeepers	47
<i>Laying Out a Tactical Plan</i>	48
<i>Automating Processes</i>	50
<i>Process Mapping Distribution Functions</i>	53
<i>When to Modify Your Processes and When to Modify the System</i>	57
<i>Process Planning</i>	57
<i>Conclusion</i>	58
<i>Case Study: Matching Your Processes to the ERP System</i>	60
<i>Case Challenges</i>	64

---

**part 2**

<b>Chapter 4</b>	
<b><i>The Selection Process</i></b>	<b>66</b>
<i>Introduction</i>	67
<i>Forming the Selection “Delta Team”</i>	68
<i>Defining the Mission Statement of the Delta Team</i>	69
<i>Conducting Needs Analysis</i>	72
<i>Creating Process Flow Models</i>	73
<i>Establishing System Selection Criteria</i>	74
<i>Initial Product Demos</i>	76
<i>Technical Support Resources</i>	77
<i>Channel-Specific Consultants</i>	77
<i>Creating a Test Database and Test Order Type</i>	78
<i>Current User Site Visits</i>	79
<i>Making the Decision</i>	81
<i>Conclusion</i>	81

<i>Case Study: ERP Selection</i>	83
<i>Case Challenges</i>	86

## **Chapter 5**

### **ERP Implementation 88**

<i>Introduction</i>	90
<i>Team Building and Deploying</i>	92
<i>Developing a Project Management Process</i>	93
<i>Data Scrubbing</i>	95
<i>Implementing Modification Change Management Process</i>	96
<i>Conducting a Modification Testing and Approval Methodology</i>	98
<i>Pretesting the System</i>	98
<i>Activating ERP Processes</i>	99
<i>Establishing the War Room</i>	99
<i>System Acceptance and Go-Live</i>	100
<i>Conclusion</i>	100
<i>Case Study: ERP Implementation</i>	102
<i>Case Challenges</i>	104

## **Chapter 6**

### **The ERP Components 105**

<i>Introduction</i>	107
<i>Sales Order Processing</i>	109
<i>Distribution Systems Planning</i>	114
<i>Warehouse Operations</i>	117
<i>General Ledger and Financials</i>	121
<i>Executive Information Systems</i>	121
<i>Conclusion</i>	121
<i>Case Study: What to Activate?</i>	124
<i>Case Challenges</i>	128

---

## **part 3**

## **Chapter 7**

### **Automating Sales and Marketing 130**

<i>Introduction</i>	133
<i>The Challenges</i>	134

<i>Supporting the Sales Force</i>	137
<i>Real-Time Order Processing</i>	144
<i>Data Collection and Integrity</i>	147
Lost Sales and Backorder Tracking	148
Sales Force Data Entry	148
Customer Data Entry	148
<i>Conclusion</i>	149
<i>Case Study: Automating the Sales Force</i>	151
<i>Case Challenges</i>	156
<b>Chapter 8</b>	
<b><i>Replenishment</i></b>	<b>157</b>
<i>Introduction</i>	159
<i>Forecasting</i>	161
Data Extracts	162
ERP Forecasting Tool	163
Forecast Error Metrics	165
<i>Lead-Time Tracking</i>	172
<i>Setting the Reorder Point</i>	173
Selecting the Fill Rate	174
<i>Buying Decisions</i>	176
<i>Inventory Classification</i>	178
<i>Automating Purchase Orders</i>	179
<i>Aggregate Planning</i>	179
<i>Conclusion</i>	180
<i>Case Study: Demand Management</i>	182
<i>Case Challenges</i>	186
<b>Chapter 9</b>	
<b><i>Operations Management</i></b>	<b>187</b>
<i>Introduction</i>	188
<i>Inventory Tracking</i>	190
<i>ABC Layouts</i>	193
<i>Automated Parts Identification</i>	195
<i>Pick Slips</i>	198
<i>Cycle Counts</i>	200



<i>MRP and Work Order Processing</i>	201
<i>Conclusion</i>	203
<i>Case Study: Work Order Processing</i>	205
<i>Case Challenges</i>	207

**Chapter 10**  
**Executive Information Systems** **208**

<i>Introduction</i>	209
<i>Setting Strategic Objectives Based on Supply Chain Goals</i>	211
<i>Connecting Strategic Objectives to Financial Measures</i>	216
<i>Connecting Financial Measures to Tactical Objectives</i>	220
<i>Connecting Tactical Objectives to Operational Metrics</i>	223
<i>Aggregating Measures for Executive Decision Making</i>	226
<i>Sharing Information in the Firm</i>	228
<i>Conclusion</i>	228
<i>Case Study: Targeting Success</i>	231
<i>Case Challenges</i>	235

**Chapter 11**  
**Managing the System** **236**

<i>Introduction</i>	237
<i>Enterprise Thinking</i>	241
<i>Organizing and Deploying Human IT Resources</i>	244
<i>Domain Experts</i>	246
<i>The Physical and the Information Networks</i>	247
<i>Matching Information Flows</i>	250
<i>Conclusion</i>	251

---

**part 4**

**Chapter 12**  
**Standardization and Putting the System to Work** **256**

<i>Introduction</i>	257
<i>Standardization Issues</i>	258
Information Systems and Standardization Challenges	258
Interconnecting the Functional Departments of the Firm	259
Creating Standards	260

Modifications and Other Special Issues	262
Standards Organizations	263
<i>Commoditization and Standardization</i>	264
<i>Data Standardization</i>	266
<i>Process Standardization</i>	267
<i>Standardization Rollout</i>	269
<i>Conclusion</i>	269
 <b>Chapter 13</b>	
<b>Customer Relationship Management Modules</b>	<b>272</b>
<i>Introduction</i>	274
<i>CRM Components</i>	275
The Roots of CRM: Order Processing	275
Sales/Marketing Tools	276
Sales Force Automation	276
Customer Service/Call Centers	278
Integrated Logistics	279
<i>SFA and Firm Productivity</i>	279
Contact Management	279
Quotes	280
Task Management	282
<i>Web Order Processing</i>	283
<i>Forecasting Modules</i>	283
<i>Data Mining and Customer Profiling</i>	290
<i>System Capabilities</i>	291
What to Do When the System Will Not Support Your Needs	291
Valuing Functionalities	292
Choosing Bolt-Ons	292
<i>Conclusion</i>	293
<i>Case Study: What to Do About CRM</i>	294
<i>Case Challenges</i>	297
 <b>Chapter 14</b>	
<b>Logistics and Procurement Systems</b>	<b>299</b>
<i>Introduction</i>	301
<i>Logistics Optimization</i>	302

---

<i>Is Your Firm Ready?</i>	304
Significance of Automation	305
Automation Challenges	306
Lack of Training	307
<i>Procurement</i>	307
ERP versus Best of Breed	307
Dynamic Reorder Points	308
E-Procurement	312
<i>Transportation</i>	312
<i>Getting to Real Time</i>	314
<i>Conclusion</i>	314
<i>Case Study: Operations Automation</i>	316
<i>Case Challenges</i>	317
 <b>Chapter 15</b>	
<b><i>Building a Best-in-Class ERP</i></b>	<b>319</b>
<i>Introduction</i>	321
<i>When the Bolt-Ons Make Sense</i>	321
<i>Are ASPs a Good Idea?</i>	325
<i>Designing Your Modular System</i>	326
Customer Relationship Management	326
Enterprise Resource Management	329
Business Intelligence	329
Manufacturing Relationships	332
<i>Conclusion: The Next Generation of ERP</i>	334
<i>Index</i>	336

# ***Preparing for ERP***

***p a r t***

***1***

**Chapter 1**

*The Roots of Distribution  
Information Management*

**Chapter 2**

*Strategic Use of Distribution ERP Systems*

**Chapter 3**

*Information System Tactical Planning*

