

LEAN

SIX

**Achieve major cost,
inventory, and lead
time reductions in
less than a year**

SIGMA

6 σ

**Combining Six Sigma
Quality with Lean Speed**

MICHAEL L. GEORGE

Contents

Preface	ix
Part One. The Lean Six Sigma Value Proposition	1
1. Lean Six Sigma: Creating Breakthrough	
Profit Performance	3
The Roadmap to Higher Shareholder Value	4
The Lean Six Sigma Secret	8
The Lean Six Sigma Value Proposition	9
Lean Six Sigma and MRP	13
The Power Is in the Total Process	13
To Learn More	14
2. Six Sigma: The Power of Culture	15
Critical Success Factors for Six Sigma	17
Predicting Team Success, Preventing Team Failure	23
The Six Sigma Process and Improvement Tools	24
The Role of Six Sigma as a Metric	31
The Key Is in the Culture	32
Key Messages of Six Sigma	32
To Learn More	32
3. Lean Means Speed	33
Is This Lean?	34
The Essentials of Lean	35
The Lean Metric: Cycle Efficiency	36
Velocity of Any Process	49
Knowing Where to Focus: The 80/20 Rule	51
Using a Value Stream Map to Find the 20% Waste	51
The Major Lean Improvement Tools	56
The Lean Enterprise	59
Epilogue on Ford	59
The Laws of Lean Six Sigma	60
To Learn More	60

4. Creating Competitive Advantage with Lean Six Sigma	61
The Need for Executive Engagement	62
Value Stream Selection à la Warren Buffett	71
Competing with Lean Six Sigma	76
Part Two. The Lean Six Sigma Implementation Process	79
5. Initiation: Getting Commitment from Top Management	85
Laying the Groundwork	87
Leadership Engagement	87
The Next Moves	92
6. Infrastructure and Deployment Planning	93
Plan Components and Typical Timelines	94
The Detailed Deployment Plan	96
A. Process Focus	96
B. Organizational Structures	98
C. Measures	110
D. Rewards and Recognition	113
E. Infrastructure Tools	115
Completing the Deployment Plan	116
7. Kickoff: Establishing the Vision Company-Wide	117
Structure of the Transforming Event	118
A. CEO Presentation	119
B. Design Team Presentation	120
C. "Testimonials" from Experienced Companies	120
D. Simulation	120
E. Launch Preparations	122
The Cascade of Transforming Events	122
Achieving a Company-Wide Vision	123
Only the Beginning ...	123
8. Selecting the Right People—and the Right Projects	125
Selecting Black Belt Resources	126
Selecting Projects	127
The Language of Project Selection	129
Who Does What	130
Diagnostic Processes for Project Identification	131
Top-Down Project Identification	132
Bottom-Up Project Identification	144

Grouping and Screening Ideas	146
Project Definition and Scoping	148
Final Project Selections	153
Projects Suitable for Lean Six Sigma	155
Selecting the Right Resources and Projects	156
9. Predicting and Improving Team Performance	157
Understanding Individual Performance	158
Preferred Team Roles as Predictors of Team Success or Failure	159
Applying Belbin's Research	162
The Importance of Team Leadership	163
Implications for Black Belt Training	165
10. Implementation: The DMAIC Improvement Process	167
The Context of Improvement	168
The DMAIC Process and Its Tools	170
A Walk Through DMAIC	173
Developing Focus: The DMAIC Filter	177
Big Gains with Simple Tools: Two Examples	178
Implications for Black Belt Training	181
11. Implementation: The DMAIC Tools	182
Define Tools	183
Measure Tools	185
Analyze Tools	199
Improve Tools	203
Control Tools	222
Using the Lean Six Sigma Tools	224
12. Institutionalizing Lean Six Sigma	226
Institutionalization	228
Planning for Each Business Unit Launch	232
The Executive's Role	232
Emphasizing the Ultimate Goals	234
Part Three. Leveraging Lean Six Sigma	235
13. Total Supply Chain Acceleration	237
Part A: Accelerating Your Internal Supply Chain	238
Part B: Extending the Enterprise to Suppliers	257
Part C: The Downstream Pull System	266
14. Lean Six Sigma Logistics	270
Inventory and Strategic Goals	271
Inventory and The Cost of Production	273

Fundamental Logistics Cost Drivers	278
Lean Manufacturing, Raw Materials, and Inventory Management	280
Implementing Lean Logistics	281
Challenges of Lean Logistics	288
15. Design for Lean Six Sigma	290
The Case for Applying Lean Six Sigma to the Design Process	292
Improving Design Velocity	296
Design for Lean Six Sigma	303
Final Thoughts on Lean Six Sigma and Product Development	307
Index	309