

4TH GENERATION R&D

Managing Knowledge,
Technology, and
Innovation

William L. Miller

AND

Langdon Morris



John Wiley & Sons, Inc.

New York • Chichester • Weinheim • Brisbane • Singapore • Toronto

Contents

INTRODUCTION: INNOVATION IN CRISIS	IX
The Challenge of Innovation	xi
Clarity and Opportunity	xiv
A Final Thought	xvi
1 4TH GENERATION R&D	I
Continuous and Discontinuous Innovation	4
From 3rd to 4th Generation R&D	11
The Approaches to Innovation	18
2 COMPETITIVE ARCHITECTURE:	
THE EXTERNAL FRAMEWORK	27
The Language of Innovation: Theory and Architecture	28
Architecture and Capability Development	31
Defining Customer Value in a Discontinuous Market	37
Dominant Design	43
Product, Service, and Process Innovation	47

Product, Service, and Distribution Platforms	50
The Innovation Cycle: Architecture, Capability, Platforms, and Products	55
Market Architecture as a Business Process	62
3 ORGANIZATIONAL CAPABILITY: THE INTERNAL FRAMEWORK	73
Information, Knowledge, and Capability	74
Learning and Knowledge	77
The Learning Curve	79
The Path to Wisdom	86
Tacit and Explicit Knowledge	92
Communities of Practice	99
The Story behind the Story of Apollo 13	114
4 THE KNOWLEDGE CHANNEL AND MARKET DEVELOPMENT	127
Market Research for Discontinuous Innovation	128
The Knowledge Channel	135
Market Development	141
Point of Use and the Internet	148
5 MANAGING KNOWLEDGE AND FINANCIAL ASSETS	161
Accounting	162
Finance and Decision Making	172
Investing in the Future at Intel	179
Signal and Noise	186
6 ORGANIZATIONAL ARCHITECTURE	191
Organization Design and Asset Management	192
Obstacles to Innovation	193
Sustaining and Disruptive Innovations	196

Learning and Unlearning	200
The Hierarchy	205
Specialization	207
The New Organization: Delayering and Relayering	208
The Chief Innovation Officer	213
The Story of HP's TMO Turnaround	216
New Processes and New Leadership	227
 7 ORGANIZATIONAL CAPABILITY DEVELOPMENT	 231
Improving Productivity on Many Levels	236
Strategies for Improving ₂	241
Measuring and Managing the Maturity of Capability	253
Executive Time	256
Future Enacting	262
Protocols: Learning How to Learn	266
 8 THE INNOVATION BUSINESS PROCESS	 271
From 3rd to 4th Generation Practice	272
The Innovation Business Process Map	280
The Innovation Business Process—Detailed Description	285
 NOTES	 315
 INDEX	 337