

Contents

- I. Innovation: Key to Success in the Pharmaceutical Industry1**
 - The Productivity Paradox 1
 - The Blockbuster Imperative4
 - High Risks in Drug Development 10
 - Strategies for Growth 12
 - Differentiation via Clinical Profiles 15
 - Entering the Market Quickly 16
 - Conclusions 17

- II. The Industry Challenge: Do You Really Want to Be in This Business?19**
 - High Complexity of the Industry 19
 - How Attractive is the Pharmaceutical Industry? 22
 - Force 1: Bargaining Power of Suppliers..... 24
 - Force 2: Bargaining Power of Buyers 25
 - Force 3: Risk of Entry from Potential Competitors..... 26
 - Force 4: Threat of Substitute Products 27
 - Force 5: Rivalry among Established Companies 28
 - Force 6: The Regulators 28
 - Conclusions 30

- III. The Science and Technology Challenge: How to Find New Drugs.....33**
 - Rise of the Biotechnology Industry: Boosting Innovation 33
 - High-Throughput Screening: Fail Earlier, Succeed Sooner 38
 - Combinatorial Chemistry: Cut Experimental Cycle Times..... 39
 - Bioinformatics: More than 100 Gigabytes of Data per Day 40
 - Proteomics: Profiting from the Human Genome Project..... 42
 - Genomics: Towards Individualization and Mass Customization 43
 - Pharmacogenomics: Create Tailor-made Drugs..... 45
 - Molecular Design: From Experimenting to Analytic Design 47
 - Conclusions 48

IV. The Pipeline Management Challenge: How to Organize Innovation	51
The Relevance of Pipeline Management	51
Complexity and Phases of the R&D Process.....	56
The Importance of Project and Portfolio Management	65
The Disaggregation of the Pharmaceutical Value Chain.....	68
Impact of Outsourcing on Pharmaceutical R&D.....	71
Rising Importance of R&D Collaborations	75
Research Alliances: Accessing Early-stage Innovation	78
In-licensing: Enhancing the Innovation Pipeline.....	81
Co-development: Mutually Benefiting from Joint Resources	83
Out-licensing: Commercializing Internal Research Results.....	86
How to Commercialize a Breakthrough Technology	95
Conclusions	100
V. The Internationalization Challenge: Where to Get Access to Innovation	103
Trends and Drivers of R&D Internationalization	103
Primary Locations of Pharmaceutical R&D around the World.....	108
New Opportunities for Drug Development in China.....	111
Three Principal Problems of Dispersed R&D	117
Conclusions	121
VI. Management Answers to Pharmaceutical R&D Challenges ...	123
Managing R&D Organization at Roche	123
Managing R&D Strategy at Schering.....	125
Managing the Research-to-Development Handover at Roche	127
Managing Outsourcing Activities at Solvias	130
Managing Intellectual Property Rights at Bayer	133
Managing Out-licensing at Novartis.....	137
Managing Uncertainty at Roche.....	144
Managing Global R&D at Major Swiss Pharma Companies	145
Managing a Niche-Market Strategy at Intarcia	151
Managing Virtual Project Management Pools at Roche.....	153
Conclusions	156
VII. Future Directions and Trends	159

Bibliography	165
Index	173
Glossary	179
Authors	185