## Contents

## Parti

1 Introduction to the Handbook of Bioentrepreneurship.	1
Holger Patzelt and Thomas Brenner	
References.	6
	-
2 Biotechnology Dynamics at the Global Scale	7
Philip Cooke 2.1 Introduction:	. 7
2.2 The Global Health Care Market in Relation to Biotec	
2.3 Global Bioregions	
2.4 The World Leaders in Brief: Top Bioclusters in the U	
2.5 Comparison of UK and German Clusters:	
2.6 Bioregions and Their Key Characteristics. Elsewhere.	
2.6.1 Economic Geography of Clusters Spawned by	
Pharmaceuticals Firms	
2.6.2 The Research and DBF-led Clusters;in Israel a	
2.7 Conclusions.	
References.	_
3 Geographic Clustering in Biotechnology: Social Netwo	orks and Firm
Foundings1	35
Dirk Fornahl and Olav Sorenson	
3.1 Introduction	
3.2 Social Networks-and Geographic Proximity	
3.3 Social Networks and Entrepreneurship.	
3.3.1 Opportunity Perception	
3.3.2 Intellectual Capital	
3.3.3 Human Capital	
3.3.4 Financial Capital.	
3.4 Implications and Evidence	
3.5 Policy Implications	
3.6 Summary and Outlook	
References;	49

4 Innovation Networks in Biotechnology	53
Pier Paolo Saviotti and David Catherine	
4.1 Introduction	53
4.2 The Nature of Innovation Networks	55
4.2.1 The Entry of New Firms	55
4.2.2 Biotechnology	
4.2.3 The Changing Role of Universities	
4.2.4 Theories of Industrial Organization	
4.2.5 Innovation Networks	
4.3 Recent Developments in Network Dynamics	
4.4 Summary and Conclusions	
References	
Part II  5 Strategy and Strategic Thinking in Biotechnology Entrepreneurship Alan L. Carsrud, Malin Brannbackiand Maija Renko	83
5.1 Introduction	83
5.2 Sector Development Review.	
5.3 Innovation in Biotechnology	
5.4 Theoretical Bases for Entrepreneurial Biotechnology	
1 5.5 Strategic Management, Entrepreneurship, and Biotechnology	01
5.6 Strategy Components in Early Stage Biotechnology Firms	
5.6.1 Proactiveness.	
5.6.2 Fit	
5.6.3 Reactiveness	90
5.7 Discussion and Conclusions	
6 Research on Strategic Alliances in Biotechnology: An Assessment and Review	
Maxim Sytch and Philipp Bubenzer	105
6.1 Introduction	
6.2 Why and with Whom Do Biotechnology Firms Form Alliances?	
6.2.1 Access to Knowledge and Other Complementary Resources	
6.2.2 Pursuit of Legitimacy	
6.2.3 Choosing Partners.	
6.3 Governance of Alliances	
6.4 Consequences of Alliances	115
6.4.1 Consequences of Accessing Knowledge and Other	
Complementary Resources	
6.4.2 Consequences of Enhancing Legitimacy	120
6.4.3 Taking Off the Rose-Colored Glasses: Alliances as Relational	
Liability	
6.5 Future Research.	
References	126

7 Mergers and Acquisitions in the Biotechnology Industry	133
Lars Schweizer and Dodo zu Knyphausen-Aufsess	
7.1 Introduction	
7.2 Development of the Biotechnology Industry and the Need for M&A	134
7.2.1 The Development of the Biotechnology Industry from a Scientif	ïc
Perspective	. 134
7.2.2 The Development of the Biotechnology Industry from an	
Organizational Perspective;	135
7.2.3 The Development of the Biotechnology Industry from a Financi	
Perspective	
7.3 Layers of M&A Activities.	
7.3.1 M&A Activities Among Biotechnology Companies	
7.3.2 M&A Activities Between Pharmaceutical and Biotechnology •	130
Companies=	1/1
7.4 Summary and Future Research	
· · · · · · · · · · · · · · · · · · ·	
References	145
0 C C44	
8 Synergy, Strategy and Serendipity: Kirin Brewery's Entry into	1.40
Biopharmaceuticals	149
Michael J. Lynskey	
8.1 Introduction.	
8.2 The Locus of Entrepreneurship	
8.3 Background	
8.4 Synergy:	152
8.4.1 Opportunity Recognition	155
8.4.2 Early Efforts with Erythropoietin	155
8.4.3 Importance of Tacit Knowledge	156
8.4.4 Scientific Gatekeepers and Academic Collaboration	157
8.5 Serendipity	
8.5.1 Origins of the Alliance with, Amgen	
8.5.2 Structure of the Joint Venture	
8.5.3 Kirin's Contributions and Manufacturing Scale-Up	
8.5.4 Outcome of the Joint Venture	
8.5.5 Key Success Factors.	
8.6 Strategy	
8.6.1 Targeting Niche Therapeutic Fields	
8.6.2 Cell Therapy and Stem Cell Research	
8.6.3 Monoclonal Antibodies and the Transgenic Mouse	
8.7 Conclusions	
or conclusions.	
References	1/4
Part III	
9 A Survey Review of University Biotechnology and Entrepreneurship	
Commercialization.	179
David B. Audretsch, T. Taylor Aldridge and Marcus Perry	
9.1 Introduction	179

	9.2 Commercialization of Science and Entrepreneurial Choice	.180
	9.3 Scientist Biotech Entrepreneurship	
	9.4 Conclusions.	
	References	
•		402
10	University-Based Biotechnology Spin-Offs	193
	10.1 Introduction	193
	10.1.1 The Context of the Biotechnology Industry.	
	10.1.2 Entrepreneurial Universities	
	10.2 Scientific Entrepreneurship.	
	10.2.1 Changes in Academic Science	
	10.3 University Spin-Offs and University-Based Spin-Offs	
	10.3.1 University-Based Spin-Offs as a New Organizational Form	
	10.3.2 Levels of Analysis of USOs and USBOs^.	
	10.3.3 A Life Cycle Approach to USOs	
	10.4 Integration, Complexities arid New Research Directions	
	References.	
Pa	rt IV	
11	Patenting Biotechnology	.211
	Saradindu Bhaduri	
	11.1 Introduction	211
	11.2 Biotechnology Industry: Meaning and Scope	
	11.2.1 Genetic Engineering: Basic Features	
	11.2.2 Genetic Engineering: Continuity or Discontinuity?	215
	11.3 Patents: An Overview	
	11.3.1 Basic Issues	216
	11.3.2 Evolution of Patents in Biotechnology	220
	11.4 Patenting Biotechnology: Implications	
	11.4.1 Patenting Life Forms and 'Ordre Public': Basic Issues	
	and Inter-country Comparison	222
	11.4.2 Implications of Patent Length	224
	11.4.3 Implications of Patent Scope	
	11.4.4 Benefit Sharing: 'Bio-Diversity' vis-a-vis 'Indigenous Science'	238
	11.5 Conclusion	240
	References	241
12	Legal Frameworks and Public Support in the Biotechnology Industry	240
	Dirk Engel and Oliver Heneric	
	12.1 Introduction	249
	12.2 Legal Framework and Public Support: Rationales and Economic	
	Relevance	250
	12.2.1 Rationales for Public Support and a Legal Framework	
	12.2.2 The Impact of Public R&D Funding: Empirical Findings	
	12.2.3 Evidence Concerning the Impact of Legal Framework Changes.	

12.3 Legal Framework Changes in Germany	258
12.4 An Empirical Assessment of the Contribution of Legal	
Framework Change	266
12.5 Future Research and Concluding Remarks.	271
References.	
Index	275