Full text available at: http://dx.doi.org/10.1561/0300000041

Biotechnology Entrepreneurship

Full text available at: http://dx.doi.org/10.1561/0300000041

Biotechnology Entrepreneurship

Holger Patzelt

Technische Universität München
Germany
patzelt@tum.de

Lars Schweizer

Goethe University Frankfurt
Germany
l.schweizer@em.uni-frankfurt.de

Judith Behrens

Technische Universität München
Germany
judith.behrens@tum.de

now
the essence of knowledge

Boston – Delft

Full text available at: http://dx.doi.org/10.1561/0300000041

Foundations and Trends® in Entrepreneurship

Published, sold and distributed by:
now Publishers Inc.
PO Box 1024
Hanover, MA 02339
USA
Tel. +1-781-985-4510
www.nowpublishers.com
sales@nowpublishers.com

Outside North America:
now Publishers Inc.
PO Box 179
2600 AD Delft
The Netherlands
Tel. +31-6-51115274

The preferred citation for this publication is H. Patzelt, L. Schweizer and J. Behrens, Biotechnology Entrepreneurship, Foundations and Trends® in Entrepreneurship, vol 8, no 2, pp 63–140, 2012

ISBN: 978-1-60198-554-5
© 2012 H. Patzelt, L. Schweizer and J. Behrens

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, mechanical, photocopying, recording or otherwise, without prior written permission of the publishers.

Photocopying. In the USA: This journal is registered at the Copyright Clearance Center, Inc., 222 Rosewood Drive, Danvers, MA 01923. Authorization to photocopy items for internal or personal use, or the internal or personal use of specific clients, is granted by now Publishers Inc for users registered with the Copyright Clearance Center (CCC). The 'services' for users can be found on the internet at: www.copyright.com

For those organizations that have been granted a photocopy license, a separate system of payment has been arranged. Authorization does not extend to other kinds of copying, such as that for general distribution, for advertising or promotional purposes, for creating new collective works, or for resale. In the rest of the world: Permission to photocopy must be obtained from the copyright owner. Please apply to now Publishers Inc., PO Box 1024, Hanover, MA 02339, USA; Tel. +1-781-871-0245; www.nowpublishers.com; sales@nowpublishers.com

now Publishers Inc. has an exclusive license to publish this material worldwide. Permission to use this content must be obtained from the copyright license holder. Please apply to now Publishers, PO Box 179, 2600 AD Delft, The Netherlands, www.nowpublishers.com; e-mail: sales@nowpublishers.com

Full text available at: http://dx.doi.org/10.1561/0300000041

Foundations and Trends® in Entrepreneurship
Volume 8 Issue 2, 2012

Editorial Board

Editors-in-Chief:

Zoltan J. Acs
George Mason University
zacs@gmu.edu

David B. Audretsch
Indiana University
daudrets@indiana.edu

Editors

Howard Aldrich, University of North Carolina
Sharon Alvarez, Ohio State University
Mark Casson, University of Reading
Per Davidsson, Queensland University of Technology
William B. Gartner, Clemson University
Sharon Gifford, Rutgers University
Magnus Henrekson, The Research Institute of Industrial Economics
Michael A. Hitt, Texas A&M University
Joshua Lerner, Harvard University
Simon Parker, University of Durham
Paul Reynolds, Florida International University
Kelly G. Shaver, College of William and Mary
David Storey, University of Warwick
Patricia Thornton, Duke University
Roy Thurik, Erasmus University
Gregory Udell, Indiana University
Sankaran Venkataraman, Batten Institute
Paul Westhead, Nottingham University Business School
Shaker Zahra, University of Minnesota

Full text available at: http://dx.doi.org/10.1561/0300000041

Editorial Scope

Foundations and Trends® in Entrepreneurship will publish survey and tutorial articles in the following topics:

- Nascent and start-up entrepreneurs
- Opportunity recognition
- New venture creation process
- Business formation
- Firm ownership
- Market value and firm growth
- Franchising
- Managerial characteristics and behavior of entrepreneurs
- Strategic alliances and networks
- Government programs and public policy
- Gender and ethnicity
- New business financing
  - Business angels
  - Bank financing, debt, and trade credit
  - Venture capital and private equity capital
  - Public equity and IPO's
- Family-owned firms
- Management structure, governance and performance
- Corporate entrepreneurship
- High technology
  - Technology-based new firms
  - High-tech clusters
- Small business and economic growth

Information for Librarians
Foundations and Trends® in Entrepreneurship, 2012, Volume 8, 6 issues. ISSN paper version 1551-3114. ISSN online version 1551-3122. Also available as a combined paper and online subscription.

Full text available at: http://dx.doi.org/10.1561/0300000041

Foundations and Trends® in
Entrepreneurship
Vol. 8, No. 2 (2012) 63–140
© 2012 H. Patzelt, L. Schweizer and J. Behrens
DOI: 10.1561/0300000041

now
the essence of knowledge

Biotechnology Entrepreneurship

Holger Patzelt[1], Lars Schweizer[2] and Judith Behrens[3]

[1] *Technische Universität München, Karlstr. 45, 80333 Munich, Germany, patzelt@tum.de*
[2] *Goethe University Frankfurt, Grueneburgplatz 1, 60322 Frankfurt am Main, Germany, l.schweizer@em.uni-frankfurt.de*
[3] *Technische Universität München, Karlstr. 45, 80333 Munich, Germany, judith.behrens@tum.de*

Abstract

Biotechnology is one of the strongest growing industries of the twenty-first century. Yet, the sector is still young and many biotechnology firms are at an early stage of their life cycle. Thus, biotechnology and entrepreneurship are intrinsically linked together, and over the last years a substantial number of articles in the entrepreneurship literature have studied biotechnology at the regional, firm, and individual level of analysis. This monograph reviews the literature on biotechnology entrepreneurship. First, at the regional level, we focus on innovation networks and biotechnology clusters. Second, at the firm level, we illustrate strategies and business models of biotechnology firms and the determinants of their success. We also elaborate on strategic alliances of biotechnology ventures, and on mergers and acquisitions in the biotechnology industry. Third, at the individual level of analysis, we review the

Full text available at: http://dx.doi.org/10.1561/0300000041

literature on strategic decision making in the biotechnology industry and the role of the management team for biotechnology ventures' development. We conclude our review by offering future research opportunities within and across levels of analysis for scholars interested in the field of biotechnology entrepreneurship.

Full text available at: http://dx.doi.org/10.1561/0300000041

Contents

Full text available at: http://dx.doi.org/10.1561/0300000041

Full text available at: http://dx.doi.org/10.1561/0300000041

1

Introduction

Over the last 35 years, the biotechnology industry has been booming. Since the inception of Genentech — which is often referred to as the first modern biotechnology firm — in 1976, many thousands of new biotechnology ventures have been founded, and some of these ventures have been extraordinarily successful. For example, Genentech's market capitalization was $100 billion in 2012, and the firm employed more than 11,000 people. Similarly, firms like Amgen (founded in 1980; market capitalization $53 billion in 2012; 17,000 employees) and Biogen (founded in 1978; market capitalization $28 billion in 2012; 5000 employees) are not small firms anymore but global players. These and other firms have been so successful because they have developed and commercialized radically new technologies based on scientific advancements that improved our understanding of cellular processes at the molecular level. For example, based on the scientific breakthrough of recombinant DNA technology, Genentech was first to produce insulin from bacteria to treat human diabetes.

Today the biotechnology sector has a substantial economic impact. The global biotechnology market had total revenues of $200 billion in 2009, representing a compound annual growth rate of 10.2% for the

Full text available at: http://dx.doi.org/10.1561/0300000041

period spanning 2005–2009. Further, US biotechnology firms employed about 112,000 people and European biotechnology firms about 31,000 people in 2010 (Ernst and Young, 2011). Due to these impressive numbers, biotechnology has attracted considerable attention not only from policy makers, but also from academic researchers. For example, a number of studies have investigated how governments can create regional environments that trigger the formation of a biotechnology industry. This research has found that regional clustering of biotechnology ventures, universities, investors, and incumbent firms can stimulate biotechnology development (e.g., Audretsch and Stephan, 1996, 1999; Cooke, 2002; Stuart and Sorenson, 2003a,b; Zucker et al., 1998). Other studies at the regional level have investigated how trans-organizational networks in the biotechnology sector are organized (e.g., Liebeskind et al., 1996; Maurer and Ebers, 2006; Powell et al., 1996), and the role of policy and national innovation systems in the formation of networks and clusters (e.g., Chaturvedi, 2007; Dodgson et al., 2008; Dohse, 2000; Kaiser and Prange, 2004; Lehrer, 2007; Phene et al., 2006).

Further, as the examples of Genentech and others illustrate, the successful development and commercialization of biotechnological techniques can form the basis for new firms' overwhelming success. Indeed, biotechnological techniques have substantially triggered the research output and productivity in many industrial sectors. For example, recent industry statistics suggest that the biotechnology industry discovers roughly two times as many new drugs as the traditional pharmaceutical industry, but spends only one quarter as much on R&D (Ernst and Young, 2011). However, many biotechnology firms never bring a product to market and fail to successfully commercialize their technology. One reason for these frequent failures is that the biotechnology ventures' environment is highly dynamic and competitive (Fildes, 1990; Greis et al., 1995), and that bringing biotechnological products to market is therefore one of the most complex managerial challenges. Moreover, new product development costs and product failure rates are substantial (DiMasi et al., 2003; Evans and Varaiya, 2003), illustrating that biotechnology can be characterized as a high-risk industry. The development process requires on average more than $100 million and 10 years of R&D investment

Full text available at: http://dx.doi.org/10.1561/0300000041

(DiMasi et al., 2003). Moreover, only one out of 5000 initial drug candidates reaches market launch (Evans and Varaiya, 2003). Due to the environmental conditions and the complexity of newly developed biotechnological methods, managing a biotechnology firm is a highly complex endeavor. Understanding the factors that contribute to the success of biotechnology ventures has been an important research avenue for researchers from the field of strategy and entrepreneurship.

Finally, some studies have focused on the individuals starting and managing biotechnology ventures. Many of these individuals are different from entrepreneurs outside the biotechnology industry since in addition to managerial and entrepreneurial skills they need to possess substantial scientific knowledge to assess both the technological feasibility and the commercial potential on new biotechnological developments. Indeed, many biotechnology entrepreneurs are professors at research institutions (Audretsch and Stephan, 1996, 1999; Zucker et al., 1998) who when becoming entrepreneurs often face problems in the development of their shared occupational identities, the distribution of their limited time between research and entrepreneurship, and the acquisition of managerial skills required to run a startup firm.

The purpose of this monograph is to review past research on biotechnology at different levels of analysis. As for most reviews, we cannot be exhaustive on the studies included. Rather, our goal is to highlight important research streams that scholars have pursued over the last two decades and illustrate some key findings. In the following section we introduce important definitions and concepts which are necessary for readers new to the field of biotechnology entrepreneurship to understand (some of) the studies subsequently introduced. We then summarize work on biotechnology entrepreneurship at the regional level. Next, we extend our review to the firm and individual levels of analysis, respectively. Finally, we highlight future research opportunities in the field of biotechnology entrepreneurship within and across levels, and draw final conclusions.

Full text available at: http://dx.doi.org/10.1561/0300000041

References

Aharonson, B. S., J. A. C. Baum, and A. Plunket (2008), 'Inventive and uninventive clusters: The case of Canadian biotechnology'. *Research Policy* **37**, 1108–1131.

Ahuja, G. and R. Katila (2001), 'Technological acquisitions and the innovation performance of acquiring firms'. *Strategic Management Journal* **22**, 197–220.

Al-Laham, A., L. Schweizer, and T. L. Amburgey (2010), 'Dating before marriage? Analyzing the influence of pre-acquisition experience and target familiarity on acquisition success in the "M&A as R&D" type of acquisition'. *Scandinavian Journal of Management* **26**, 25–37.

Al-Laham, A. and V. Souitaris (2008), 'Network embeddedness and new-venture internationalization: Analyzing international linkages in the German biotech industry'. *Journal of Business Venturing* **23**, 567–586.

Almeida, P. and B. Kogut (1999), 'Localization of knowledge and the mobility of engineers in regional networks'. *Management Science* **45**, 905–917.

Alper, J. (2002), 'The rise of the European Bioentrepreneur'. *Nature Biotechnology* **20**, BE3–BE5.

Full text available at: http://dx.doi.org/10.1561/0300000041

Amit, R. and C. Zott (2001), 'Value creation in e-business'. *Strategic Management Journal* **22**, 493–520.

Andrews, A. O. and T. M. Welbourne (2000), 'The people/performance balance in IPO firms: The effect of the chief executive officer's financial orientation'. *Entrepreneurship Theory and Practice* **25**, 93–106.

Arnold, R., J. Grindley, and S. Smart (1999), 'Honorable disposals as planned exit routes?'. *Nature Biotechnology* **17**, BE6–BE7.

Arora, A. and A. Gambardella (1990), 'Complementarity and external linkages: The strategies of the large firms in biotechnology'. *The Journal of Industrial Economics* **38**, 361–379.

Audretsch, D. B. (2001), 'The role of small firms in US biotechnology clusters'. *Small Business Economics* **17**, 3–15.

Audretsch, D. B. and P. E. Stephan (1996), 'Company-scientist locational links: The case of biotechnology'. *American Economic Review* **86**, 641–652.

Audretsch, D. B. and P. E. Stephan (1999), 'Knowledge spillovers in biotechnology: Sources and incentives'. *Journal of Evolutionary Economics* **9**, 97–107.

Baba, Y. and J. P. Walsh (2010), 'Embeddedness, social epistemology and breakthrough innovation: The case of the development of Statins'. *Research Policy* **39**, 511–522.

Bae, J., F. C. Wezel, and J. Koo (2011), 'Cross-cutting ties, organizational density, and the firm formation in the US biotech industry, 1994–98'. *Academy of Management Journal* **54**, 295–311.

Bagchi-Sen, S. and H. L. Smith (2008), 'Science, institutions, and markets: Developments in the Indian biotechnology sector'. *Regional Studies* **42**, 961–975.

Barkema, H. G., J. H. J. Bell, and J. Pennings (1996), 'Foreign entry, cultural barriers and learning'. *Strategic Management Journal* **17**, 151–166.

Barley, S. R., J. Freeman, and R. C. Hybels (1992), 'Strategic alliances in commercial biotechnology'. In: N. N. A. R. Eccles (ed.): *Networks and Organizations: Structure, Form and Action*. Boston, MA: Harvard Business School Press, pp. 311–347.

Bartholomew, S. (1997), 'National systems of biotechnology innovation: Complex interdependencies in the global system'. *Journal of International Business Studies* **28**, 241–266.

Full text available at: http://dx.doi.org/10.1561/0300000041

Baum, J. A., T. Calabrese, and B. S. Silverman (2000), 'Don't go it alone: Alliance network composition and startup's performance in Canadian biotechnology'. *Strategic Management Journal* **21**, 267–294.

Baum, J. A. C. and S. J. Mezias (1992), 'Localized competition and organizational failure in the Manhattan hotel industry 1898–1990'. *Administrative Science Quarterly* **37**, 580–603.

Baum, J. A. C. and B. S. Silverman (2004), 'Picking winners or building them? Alliance, intellectual, and human capital as selection criteria in venture financing and performance of biotechnology startups'. *Journal of Business Venturing* **19**, 411–436.

Bernstein, K. (2003), 'Private M&A: Few and far between'. BioCentury, The Bernstein Report on BioBusiness, p. A20.

Bhaduri, N. and M. Mathew (2004), 'Implications of TRIPs on Pharmaceutical-Biotechnology Industry'. *IIMB Management Review (Indian Institute of Management Bangalore)* **16**, 75–81.

Bhaduri, S. (2008), 'Patenting biotechnology'. In: H. Patzelt and T. Brenner (eds.): *Handbook of Bioentrepreneurship*. New York: Springer, pp. 211–241.

Bigliardi, B., A. Nosella, and C. Verbano (2005), 'Business models in Italian biotechnology industry: A quantitative analysis'. *Technovation* **25**, 1299–1306.

Biocentury (2003), 'Back-to-School Issue. The M&A Game'. *BioCentury* **11**, A1–A18.

Bogner, W. C., H. Thomas, and J. McGee (1996), 'A longitudinal study of the competitive positions and entry paths of European firms in the US pharmaceutical market'. *Strategic Management Journal* **17**, 85–107.

Boone, C., B. D. Brabander, and A. V. Witteloostuijn (1996), 'CEO locus of control and small firm performance: An integrative framework and empirical test'. *Journal of Management Studies* **33**, 667–699.

Bower, J. L. (2001), 'Not all M&As are alike — and that matters'. *Harvard Business Review* **79**, 93–101.

Bradfield, R. and H. El-Sayed (2009), 'Four scenarios for the future of the pharmaceutical industry'. *Technology Analysis and Strategic Management* **21**, 195–212.

Full text available at: http://dx.doi.org/10.1561/0300000041

Breschi, S. and C. Catalini (2010), 'Tracing the links between science and technology: An exploratory analysis of scientists' and inventors' networks'. *Research Policy* **39**, 14–26.

Breugst, N., A. Domurath, H. Patzelt, and A. Klaukien (2012), 'Perceptions of entrepreneurial passion and employees' commitment to entrepreneurial ventures'. *Entrepreneurship Theory and Practice* **36**, 171–192.

Breznitz, S. M., R. P. O'Shea, and T. J. Allen (2008), 'University commercialization strategies in the development of regional bioclusters'. *Journal of Product Innovation Management* **25**, 129–142.

Carayannopoulos, S. and E. R. Auster (2010), 'External knowledge sourcing in biotechnology through acquisition versus alliance: A KBV approach'. *Research Policy* **39**, 254–267.

Carsrud, A. L., M. Brännback, and M. Renko (2008), 'Strategy and strategic thinking in biotechnology entrepreneurship'. In: H. Patzelt and T. Brenner (eds.): *Handbook of Bioentrepreneurship*. Berlin: Springer, pp. 81–101.

Cartwright, S. and C. L. Cooper (1992), *Mergers and Acquisitions. The Human Factor*. Oxford: Butterworth-Heinemann Ltd.

Cartwright, S. and C. L. Cooper (1993), 'The role of culture compatibility in successful organizational marriage'. *The Academy of Management Executive* **7**, 57–70.

Casper, S. (2000), 'Institutional adaptiveness, technology policy, and the diffusion of new business models: The case of German biotechnology'. *Organization Studies* **21**, 887–914.

Casper, S. (2007), 'How do technology clusters emerge and become sustainable? Social network formation and inter-firm mobility within the San Diego biotechnology cluster'. *Research Policy* **36**, 438–455.

Casper, S. and F. Murray (2005), 'Careers and clusters: Analyzing the career network dynamic of biotechnology clusters'. *Journal of Engineering and Technology Management* **22**, 51–74.

Casper, S. and R. Whitley (2004), 'Managing competences in entrepreneurial technology firms: A comparative institutional analysis of Germany, Sweden and the UK'. *Research Policy* **33**, 89–106.

Full text available at: http://dx.doi.org/10.1561/0300000041

Chaturvedi, S. (2007), 'Exploring interlinkages between national and sectoral innovation systems for rapid technological catch-up: Case of Indian biopharmaceutical industry'. *Technology Analysis and Strategic Management* **19**, 643–657.

Cho, D.-S., E. Hyun, and S. H. Lee (2007), 'Can newly industrializing economies catch up in the science-based industries? A study of the Korean biotechnology sector'. *Journal of Interdisciplinary Economics* **18**, 177–201.

Colyvas, J. A. (2007), 'From divergent meanings to common practices: The early institutionalization of technology transfer in the life sciences at Stanford University'. *Research Policy* **36**, 456–476.

Cooke, P. (2001a), 'New economy innovation systems: Biotechnology in Europe and the USA'. *Industry and Innovation* **8**, 267–289.

Cooke, P. (2001b), 'Regional innovation systems, clusters, and the knowledge economy'. *Industrial and Corporate Change* **10**, 945–974.

Cooke, P. (2002), 'Regional innovation systems: General findings and some new evidence from biotechnology clusters'. *Journal of Technology Transfer* **27**, 133–145.

Cooke, P. (2003), 'Biotechnology clusters, 'Big Pharma' and the knowledge-driven economy'. *International Journal of Technology Management* **25**, 65–66.

Coombs, J. E. and D. L. Deeds (2000), 'International alliances as sources of capital: Evidence from the biotechnology industry'. *Journal of High Technology Management Research* **11**, 235–253.

Coombs, J. E., R. Mudambi, and D. L. Deeds (2006), 'An examination of the investments in U.S. biotechnology firms by foreign and domestic corporate partners'. *Journal of Business Venturing* **21**, 405–428.

Danzon, P. M., A. Epstein, and S. Nicholson (2007), 'Mergers and acquisitions in the pharmaceutical and biotech industries'. *Managerial and Decision Economics* **28**, 307–328.

Datta, D. K., G. E. Pinches, and V. Narayanan (1992), 'Factors influencing wealth creation from mergers and acquisitions: A meta-analysis'. *Strategic Management Journal* **13**, 67–84.

Full text available at: http://dx.doi.org/10.1561/0300000041

Deeds, D. L., D. M. DeCarolis, and J. E. Coombs (1999), 'Dynamic capabilities and new product development in high technology ventures: An empirical analysis of new biotechnology firms'. *Journal of Business Venturing* **15**, 211–229.

Deeds, D. L. and C. W. L. Hill (1996), 'Strategic alliances and the rate of new product development: An empirical study of entrepreneurial biotechnology firms'. *Journal of Business Venturing* **11**, 41–55.

Deeds, D. L., P. Y. Mang, and M. L. Frandsen (2004), 'The influence of firms' and industries' legitimacy on the flow of capital into high-technology ventures'. *Strategic Organization* **2**, 9–34.

Deeds, D. L. and F. T. Rothaermel (2003), 'Honeymoons and liabilities: The relationship between age and performance in research and development alliances'. *The Journal of Product Innovation Management* **20**, 468–484.

DiMasi, J. A., R. W. Hansen, and H. G. Grabowski (2003), 'The price of innovation: New estimates of drug development costs'. *Journal of Health Economics* **22**, 151–185.

Dodgson, M., J. Mathews, T. Kastelle, and M.-C. Hu (2008), 'The evolving nature of Taiwan's national innovation system: The case of biotechnology innovation networks'. *Research Policy* **37**, 430–445.

Dohse, D. (2000), 'Technology policy and the regions — The case of the BioRegio contest'. *Research Policy* **29**, 1111–1133.

Durand, R., O. Bruyaka, and V. Mangematin (2008), 'Do science and money go together? The case of the French biotech industry'. *Strategic Management Journal* **29**, 1281–1299.

Eisenhardt, K. M. and L. J. Bourgeois (1988), 'Politics of strategic decision making in high-velocity environments: Toward a midrange theory'. *Academy of Management Journal* **31**, 737–770.

Eisenhardt, K. M. and C. B. Schoonhoven (1996), 'Resource-based view of strategic alliance formation: Strategic and social effects in entrepreneurial firms'. *Organization Science* **7**, 136–150.

Ernst and Young (1998), *Deutscher Biotechnologie Report 1998*. Mannheim, Germany: Ernst and Young.

Ernst and Young (2000), *Gründerzeit — Deutscher Biotechnologie-Report 2000*. Mannheim, Germany: Ernst and Young.

Full text available at: http://dx.doi.org/10.1561/0300000041

Ernst and Young (2002), *Beyond Borders — Global Biotechnology Report 2002*. Cambridge, UK: Ernst and Young.

Ernst and Young (2005), *Kräfte der Evolution - Deutscher Biotechnologie Report 2005*. Mannheim, Germany: Ernst and Young.

Ernst and Young (2011), *Beyond Borders — Global Biotechnology Report 2011*. Cambridge, UK: Ernst and Young.

Evans, A. G. and N. P. Varaiya (2003), 'Assessment of a biotech market opportunity'. *Entrepreneurship Theory and Practice* **28**, 87–105.

Fabrizio, K. R. (2009), 'Absorptive capacity and the search for innovation'. *Research Policy* **38**, 255–267.

Fildes, R. A. (1990), 'Strategic challenges in commercializing biotechnology'. *California Management Review* **32**, 63–72.

Finkle, T. A. (1998), 'The relationship between boards of directors an initial public offerings in the biotechnology industry'. *Entrepreneurship Theory and Practice* **22**, 5–29.

Fisher, L. M. (1996), *How Strategic Alliances Work in Biotech*. Strategy + Business.

Fleming, L., C. K. King III, and A. Juda (2007), 'Small worlds and regional innovation'. *Organization Science* **18**, 938–954.

Folta, T. B. and K. D. Miller (2002), 'Real options in equity partnerships'. *Strategic Management Journal* **23**, 77–88.

Fornahl, D. and O. Sorenson (2008), 'Geographic clustering in biotechnology: Social networks and firm foundings'. In: H. Patzelt and T. Brenner (eds.): *Handbook of Bioentrepreneurship*. New York: Springer, pp. 35–82.

Furman, J. and S. Stern (2011), 'Climbing atop the shoulders of giants: The impact of institutions on cumulative research'. *American Economic Review* **101**, 1933–1963.

Galli, R. and M. Teubal (1997), 'Paradigmatic shifts in national innovation systems'. In: C. Edquist (ed.): *Systems of Innovation Technologies, Institutions, and Organizations*. London: Pinter, pp. 342–370.

Gans, J. S. and S. Stern (2003), 'The product market and the market for'. *Research Policy* **32**, 333–350.

Geisler, E. (1995), 'Industry-university technology cooperation: A theory of inter-organizational relationships'. *Technology Analysis and Strategic Management* **7**, 217–229.

Full text available at: http://dx.doi.org/10.1561/0300000041

Geisler, E., A. Furino, and T. J. Kiresuk (1990), 'Factors in the success or failure of industry-university cooperative research centers'. *Interfaces* **20**, 99–110.

George, G., S. A. Zahra, K. K. Wheatley, and R. Khan (2001), 'The effects of alliance portfolio characteristics and absorptive capacity on performance: A study of biotechnology firms'. *Journal of High Technology Management Research* **12**, 205–226.

Giesecke, S. (2000), 'The contrasting roles of government in the development of biotechnology industry in the US and Germany'. *Research Policy* **29**, 205–223.

Gilding, M. (2008), 'The tyranny of distance': Biotechnology networks and clusters in the antipodes'. *Research Policy* **37**, 1132–1144.

Glenna, L. L., R. Welsh, D. Ervin, W. B. Lacy, and D. Biscotti (2011), 'Commercial science, scientists' values, and university biotechnology research agendas'. *Research Policy* **40**, 957–968.

Gopalakrishnan, S., J. L. Scillitoe, and M. D. Santoro (2008), 'Tapping deep pockets: the role of resources and social capital on financial capital acquisition by biotechnology firms in biotech–pharma alliances'. *Journal of Management Studies* **45**, 1354–1376.

Graebner, M. E. (2004), 'Momentum and serendipity: How acquired leaders create value in the integration of technology firms'. *Strategic Management Journal* **25**, 751–777.

Graebner, M. E., K. M. Eisenhardt, and P. T. Roundy (2010), 'Success and failure in technology acquisitions: Lessons for buyers and sellers'. *The Academy of Management Perspectives* **24**, 73–92.

Greis, N. P., M. D. Dibner, and A. S. Bean (1995), 'External partnering as a response to innovation barriers and global competition in biotechnology'. *Research Policy* **24**, 609–630.

Gulati, R. (1998), 'Alliances and networks'. *Strategic Management Journal* **19**, 293–317.

Gulati, R. (2007), *Managing Network Resources: Alliances, Affiliations and Other Relational Assets*. USA: Oxford University Press.

Gulati, R. and M. C. Higgins (2003), 'Which ties matter when? The contingent effects of interorganizational partnerships and IPO success'. *Strategic Management Journal* **24**, 127–144.

Full text available at: http://dx.doi.org/10.1561/0300000041

Gupta, A. K. and H. J. Sapienza (1992), 'Determinants of venture capital firms' preference regarding the industry diversity and geographic scope of their investments'. *Journal of Business Venturing* **7**, 347–362.

Haeussler, C. (2007), 'Proactive versus reactive M&A activities in the biotechnology industry'. *The Journal of High Technology Management Research* **17**, 109–123.

Haeussler, C. (2011a), 'The determinants of commercialization strategy: Idiosyncrasies in British and German biotechnology'. *Entrepreneurship Theory and Practice* **35**, 653–681.

Haeussler, C. (2011b), 'Information-sharing in academia and the industry: A comparative study'. *Research Policy* **40**, 105–122.

Haeussler, C. and J. Colyvas (2011), 'Breaking the Ivory Tower: Academic Entrepreneurship in the life sciences in UK and Germany'. *Research Policy* **40**, 41–54.

Hagedoorn, J. (1993), 'Understanding the rationale of strategic technology partnering: Interorganizational modes of cooperation and sectoral differences'. *Strategic Management Journal* **14**, 371–385.

Haleblian, J., J. Y. Kim, and N. Rajagopalan (2006), 'The influence of acquisition experience and performance on acquisition behavior: Evidence from the US commercial banking industry'. *The Academy of Management Journal* **49**, 357–370.

Hambrick, D. C. and A. A. Cannella (1993), 'Relative standing: a framework for understanding departures of acquired executives'. *Academy of Management Journal* **36**, 733–762.

Hamel, G. (1999), 'Bringing Silicon Valley inside'. *Harvard Business Review* **77**, 70–84.

Haspeslagh, P. and D. E. Jemison (1991), *Managing Acquisitions: Creating Value for Corporate Renewal*. New York: Free Press.

Hauser, J., G. Tellis, and A. Griffin (2006), 'Research on innovation: A review and Agenda for marketing science'. *Marketing Science* **25**, 687–717.

Henkel, J. and S. Maurer (2010), 'Network effects in biology R&D'. *American Economic Review* **100**, 159–164.

Full text available at: http://dx.doi.org/10.1561/0300000041

Hess, A. M. and F. T. Rothaermel (2011), 'When are assets complementary? Star scientists, strategic alliances, and innovation in the pharmaceutical industry'. *Strategic Management Journal* **32**, 895–909.

Higgins, M. C. and R. Gulati (2003), 'Getting off to a good start: The effects of upper echelon affiliations on underwriter prestige'. *Organization Science* **14**, 244–263.

Higgins, M. J., P. E. Stephan, and J. G. Thursby (2011), 'Conveying quality and value in emerging industries: Star scientists and the role of signals in biotechnology'. *Research Policy* **40**, 605–617.

Hitt, M. and V. Pisano (2004), 'Cross-border mergers and acquisitions: Challenges and opportunities'. In: A. P. A. M. J. (ed.): *Mergers and Acquisitions Creating Integrative Knowledge*. Oxford, UK: Blackwell, pp. 45–59.

Hitt, M. A., R. E. Hoskisson, R. A. Johnson, and D. D. Moesel (1996), 'The market for corporate control and firm innovation'. *Academy of Management Journal* **39**, 1084–1119.

Hoang, H. and F. T. Rothaermel (2005), 'The effect of general and partner-specific alliance experience on joint R&D project performance'. *Academy of Management Journal* **48**, 332–345.

Hoang, H. and F. T. Rothaermel (2010), 'Leveraging internal and external experience: Exploration, exploitation, and R&D project performance'. *Strategic Management Journal* **31**, 734–758.

Hofstede, G. (1980), *Culture's Consequences: International Differences in Work-related Values*. Beverly Hills, CA: Sage Publications.

Hsu, D. H. (2007), 'Experienced entrepreneurial founders, organizational capital, and venture capital funding'. *Research Policy* **36**, 722–741.

Hu, R., C. Pray, J. Huang, S. Rozelle, C. Fan, and C. Zhang (2009), 'Reforming intellectual property rights and the Bt cotton seed industry in China: Who benefits from policy reform?'. *Research Policy* **38**, 793–801.

Huckman, R. S. and D. E. Zinner (2008), 'Does focus improve operational performance? Lessons from the management of clinical trials'. *Strategic Management Journal* **29**, 173–193.

Full text available at: http://dx.doi.org/10.1561/0300000041

Ibata-Arens, K. (2008), 'Comparing national innovation systems in Japan and the United States: Push, pull, drag and jump factors in the development of new technology'. *Asia Pacific Business Review* **14**, 315–338.

Kachra, A. and R. E. White (2008), 'Know-how transfer: The role of social, economic/competitive, and firm boundary factors'. *Strategic Management Journal* **29**, 425–445.

Kaiser, R. and H. Prange (2004), 'The reconfiguration of National Innovation Systems — the example of German biotechnology'. *Research Policy* **33**, 395–408.

Kale, P., J. H. Dyer, and H. Singh (2002), 'Alliance capability, stock market response, and long-term alliance success: The role of the alliance function'. *Strategic Management Journal* **23**, 747–767.

Katila, R. and P. Y. Mang (2003), 'Exploiting technological opportunities: The timing of collaborations'. *Research Policy* **32**, 317–332.

Kim, J. W. and M. C. Higgins (2007), 'Where do alliances come from? The effects of upper echelons on alliance formation'. *Research Policy* **36**, 499–514.

King, D. R., R. J. Slotegraaf, and I. Kesner (2008), 'Performance implications of firm resource interactions in the acquisition of R&D-intensive firms'. *Organization Science* **19**, 327–340.

Kogut, B. (1988), 'Joint ventures: Theoretical and empirical perspectives'. *Strategic Management Journal* **9**, 319–332.

Konde, V. (2009), 'Biotechnology business models: An Indian perspective'. *Journal of Commercial Biotechnology* **15**, 215–226.

Larsson, R. and S. Finkelstein (1999), 'Integrating strategic, organizational, and human resource perspectives on mergers and acquisitions: A case survey of synergy realization'. *Organization Science* **10**, 1–26.

Lechner, C., M. Dowling, and I. Welpe (2006), 'Firm networks and firm development: The role of the relational mix'. *Journal of Business Venturing* **21**, 514–540.

Lee, J. (2010), 'Heterogeneity, brokerage, and innovative performance: Endogenous formation of collaborative inventor networks'. *Organization Science* **21**, 804–822.

Full text available at: http://dx.doi.org/10.1561/0300000041

Lehrer, M. (2007), 'Organizing knowledge spillovers when basic and applied research are interdependent: German biotechnology policy in historical perspective'. *Journal of Technology Transfer* **32**, 277–296.

Lerner, J. and U. Malmendier (2010), 'Contractibility and the design of research agreements'. *American Economic Review* **100**, 214–246.

Lerner, J. and R. P. Merges (1998), 'The control of technology alliances: An empirical analysis of the biotechnology industry'. *The Journal of Industrial Economics* **46**, 125–156.

Lerner, J., H. Shane, and A. Tsai (2003), 'Do equity financing cycles matter? Evidence from biotechnology alliances'. *Journal of Financial Economics* **67**, 411–446.

Levitt, T. (1983), 'The globalisation of markets'. *Harvard Business Review* **61**, 92–102.

Lewis, G. (1990), *Partnerships for Profit: Structuring and Managing Strategic Alliances*. New York, NY: The Free Press.

Liebeskind, J. P., A. L. Oliver, L. Zucker, and M. Brewer (1996), 'Social networks, learning, and flexibility: Sourcing scientific knowledge in new biotechnology firms'. *Organization Science* **7**, 428–443.

Luo, X. and L. Deng (2009), 'Do birds of a feather flock higher? The effects of partner similarity on innovation in strategic alliances in knowledge-intensive industries'. *Journal of Management Studies* **46**, 1005–1030.

Luo, X. R., K. W. Koput, and W. W. Powell (2009), 'Intellectual capital or signal? The effects of scientists on alliance formation in knowledge-intensive industries'. *Research Policy* **38**, 1313–1325.

Lynskey, M. J. (2008), 'Synergy, strategy, and serendipity: kirin brewery's entry into biopharmaceuticals'. In: H. Patzelt and T. Brenner (eds.): *Handbook of Bioentrepreneurship*. Berlin: Springer, pp. 145–178.

Marks, M. L. and P. H. Mirvis (2001), 'Making mergers and acquisitions work: Strategic and psychological preparation'. *Academy of Management Executive* **15**, 80–92.

Marshall, A. (1890), *Principles of Economics*. London: MacMillan.

Maurer, I. and M. Ebers (2006), 'Dynamics of social capital and their performance implications: Lessons from biotechnology start-ups'. *Administrative Science Quarterly* **51**, 262–292.

Full text available at: http://dx.doi.org/10.1561/0300000041

McCann, B. T. and T. B. Folta (2011), 'Performance differentials within geographic clusters'. *Journal of Business Venturing* **26**, 104–123.

McGill, J. P. and M. D. Santoro (2009), 'Alliances and governance in biotechnology: Firm level effects on performance'. *Academy of Management Annual Meeting Proceedings* pp. 1–6.

McNamara, P. and C. Baden-Fuller (2007), 'Shareholder returns and the exploration-exploitation dilemma: R&D announcements by biotechnology firms'. *Research Policy* **36**, 548–565.

Merz, R., P. B. Weber, and V. B. Laetz (1994), 'Linking small business management with entrepreneurial growth'. *Journal of Small Business Management* **32**, 48–60.

Monsen, E., H. Patzelt, and T. Saxton (2010), 'Beyond simple utility: Incentive design and trade-offs for corporate employee-entrepreneurs'. *Entrepreneurship: Theory and Practice* **34**, 105–130.

Nicholls-Nixon, C. L. and C. Y. Woo (2003), 'Technology sourcing and output of established firms in a regime of encompassing technological change'. *Strategic Management Journal* **24**, 651–666.

Oliver, A. L. (2001), 'Strategic alliances and the learning life-cycle of biotechnology firms'. *Organization Studies* **22**, 467–489.

Oliver, A. L. and J. P. Liebeskind (1998), 'Three levels of networking for sourcing intellectual capital in biotechnology: Implications for studying interorganizational networks'. *International Studies of Management and Organization* **27**, 76–103.

Orsenigo, L. (2001), 'The (failed) development of a biotechnology cluster: The case of Lombardy'. *Small Business Economics* **17**, 77–92.

Orsenigo, L., F. Pammolli, and M. Riccaboni (2001), 'Technological change and network dynamics: Lessons from the pharmaceutical industry'. *Research Policy* **30**, 485–508.

Oviatt, B. and P. McDougall (1994), 'Toward a Theory of International New Ventures'. *Journal of International Business Studies* pp. 45–64.

Oviatt, B. M. and P. P. McDougall (1997), 'Challenges for internationalization process theory: The case of international new ventures'. *Management International Review* **37**, 85–99.

Owen-Smith, J. and W. W. Powell (2004), 'Knowledge networks as channels and conduits: The effects of spillovers in the Boston biotechnology community'. *Organization Science* **15**, 5–21.

Full text available at: http://dx.doi.org/10.1561/0300000041

Pangarkar, N. (2009), 'Do firms learn from alliance terminations? An empirical examination'. *Journal of Management Studies* **46**, 982–1004.

Paruchuri, S., A. Nerkar, and D. C. Hambrick (2006), 'Acquisition integration and productivity losses in the technical core: Disruption of inventors in acquired companies'. *Organization Science* **17**, 545–562.

Patzelt, H. (2010), 'CEO human capital, top management teams, and the acquisition of venture capital in new technology ventures: An empirical analysis'. *Journal of Engineering and Technology Management* **27**, 131–147.

Patzelt, H., L. Schweizer, and D. zu Knyphausen-Aufseß (2007), 'Mergers and acquisitions of German biotechnology startups'. *International Journal of Biotechnology* **9**, 1–19.

Patzelt, H., D. A. Shepherd, D. Deeds, and S. W. Bradley (2008a), 'Financial slack and venture managers' decisions to seek a new alliance'. *Journal of Business Venturing* **23**, 465–481.

Patzelt, H., D. zu Knyphausen-Aufseß, and P. Nikol (2008b), 'Top management teams, business models, and the performance of biotechnology ventures: An upper echelon perspective'. *British Journal of Management* **19**, 205–221.

Phene, A., K. Fladmoe-Lindquist, and L. Marsh (2006), 'Breakthrough innovations in the U.S. biotechnology industry: The effects of technological space and geographic origin'. *Strategic Management Journal* **27**, 369–388.

Pisano, G. P. (2006), *Science Business — the Promise, Reality, and Future of Biotech*. Cambridge, MA: Harvard Business School Press.

Powell (1996), 'Inter-organizational collaboration in the biotechnology industry'. *Journal of Institutional and Theoretical Economics* **152**, 197–215.

Powell, W. W. (1998), 'Learning from collaboration: Knowledge and networks in the biotechnology and pharmaceutical industries'. *California Management Review* **40**, 228–240.

Powell, W. W. and P. Brantley (1992), 'Competitive cooperation in biotechnology: Learning through networks'. *Networks and organizations* pp. 366–394.

Full text available at: http://dx.doi.org/10.1561/0300000041

Powell, W. W., K. W. Koput, and L. Smith-Doerr (1996), 'Interorganizational collaboration and the locus of innovation: Networks of learning in biotechnology'. *Administrative Science Quaterly* **41**, 116–145.

Powell, W. W., D. R. White, K. W. Koput, and J. Owen-Smith (2005), 'Network Dynamics and Field Evolution: The Growth of Interorganizational Collaboration in the Life Sciences'. *American Journal of Sociology* **110**, 1132–1205.

Prahalad, C. K. and R. A. Bettis (1986), 'The dominant logic: A new linkage between diversity and performance'. *Strategic Management Journal* **7**, 485–501.

Prevezer, M. (2008), 'Technology policies in generating biotechnology clusters: A comparison of China and the US'. *European Planning Studies* **16**, 359–374.

Puranam, P., H. Singh, and M. Zollo (2006), 'Organizing for innovation: Managing the coordination-autonomy dilemma in technology acquisitions'. *The Academy of Management Journal* **49**, 263–280.

Quintana-García, C. and C. A. Benavides-Velasco (2008), 'Innovative competence, exploration and exploitation: The influence of technological diversification'. *Research Policy* **37**, 492–507.

Ranft, A. L. and M. D. Lord (2000), 'Acquiring new knowledge: The role of retaining human capital in acquisitions of high-tech firms'. *Journal of High Technology Management Research* **11**, 295–319.

Ranft, A. L. and M. D. Lord (2002), 'Acquiring new technologies and capabilities: A grounded model of acquisition implementation'. *Organization Science* **13**, 420–441.

Rauch, A. and M. Frese (2007), 'Let's put the person back into entrepreneurship research: A meta-analysis on the relationship between business owners' personality traits, business creation, and success'. *European Journal of Work and Organizational Psychology* **16**, 353–385.

Reuer, J. J., M. Zollo, and H. Singh (2002), 'Post-formation dynamics in strategic alliances'. *Strategic Management Journal* **23**, 135–151.

Richey, P. J. and B. M. Malsberger (1996), *Covenants Not to Compete: A State-by-State Survey*. Portland, OR: Book News.

Full text available at: http://dx.doi.org/10.1561/0300000041

Rienhoff, H. Y. (1998), 'Becoming a bioentrepreneur'. *Nature Biotechnology* **16**, 37–38.

Romanelli, E. and M. Feldman (2006), 'Anatomy of cluster development: Emergence and convergence in the US human biotherapeutics'. In: P. Braunerhjelm and M. P. Feldman (eds.): *Cluster Genesis: Technology-based Industrial Development*. USA: Oxford University Press, pp. 87–113.

Rothaermel, F. T. (2001a), 'Complementary assets, strategic alliances, and the incumbent's advantage: An empirical study of industry and firm effects in the biopharmaceutical industry'. *Research Policy* **30**, 1235–1251.

Rothaermel, F. T. (2001b), 'Incumbent's advantage through exploiting complementary assets via inter-firm cooperation'. *Strategic Management Journal* **22**, 687–699.

Rothaermel, F. T. (2002), 'Technological discontinuities and interfirm cooperation: What determines a startup's attractiveness as alliance partner?'. *IEEE Transactions on Engineering Management* **49**, 388–397.

Rothaermel, F. T. and W. Boeker (2008), 'Old technology meets new technology: complementarities, similarities, and alliance formation'. *Strategic Management Journal* **29**, 47–77.

Rothaermel, F. T. and D. L. Deeds (2004), 'Exploration and exploitation alliances in biotechnology: A system of new product development'. *Strategic Management Journal* **25**, 201–221.

Rothaermel, F. T. and D. L. Deeds (2006), 'Alliance type, alliance experience and alliance management capability in high-technology ventures'. *Journal of Business Venturing* **21**, 429–460.

Rothaermel, F. T. and A. M. Hess (2007), 'Building dynamic capabilities: Innovation driven by individual-, firm- and network-level effects'. *Organization Science* **18**, 898–921.

Sabatier, V., V. Mangematin, and T. Rousselle (2010a), 'From recipe to dinner: business model portfolios in the European biopharmaceutical industry'. *Long Range Planning* **43**, 431–447.

Sabatier, V., V. Mangematin, and T. Rousselle (2010b), 'Orchestrating networks in the biopharmaceutical industry: small hub firms can do it'. *Production Planning and Control* **21**, 218–228.

Full text available at: http://dx.doi.org/10.1561/0300000041

Santoro, M. D. and J. P. McGill (2005), 'The effect of uncertainty and asset co-specialization on governance in biotechnology alliances'. *Strategic Management Journal* **26**, 1261–1269.

Saviotti, P. P. and D. Catherine (2008), 'Innovation networks in biotechnology'. In: H. Patzelt and T. Brenner (eds.): *Handbook of Bioentrepreneurship*. New York: Springer, pp. 53–82.

Saxenian, A. L. (1996), *Regional Advantage: Culture and Competition in Silicon Valley and Route 128*. Harvard University Press.

Schwartz, S. H. (1999), 'A theory of cultural values and some implications for work'. *Applied Psychology: An International Review* **48**, 23–47.

Schweizer, L. (2005a), 'Concept and evolution of business models'. *Journal of General Management* **31**, 37–56.

Schweizer, L. (2005b), 'Organizational integration of acquired biotechnology companies in pharmaceutical companies: The need for a hybrid approach'. *Academy of Management Journal* **48**, p1051–1074.

Schweizer, L. (2006), 'Evolution and dynamics of business models in the German biotechnology industry'. *International Journal of Biotechnology* **8**, 265–284.

Schweizer, L. (2009), 'Post-merger integration of international biotechnology start-ups — The relationship between entrepreneurial strategy, culture and human resources'. *Zeitschrift für Betriebswirtschaft, ZfB-Special Issue International Entrepreneurship* **61**, 133–153.

Schweizer, L. (2012), 'Characteristics of biotechnology M&A'. In: D. Faulkner, S. Teerikangas, and R. Joseph (eds.): *Handbook of Mergers and Acquisitions*. Oxford University Press.

Shepherd, D. A. (2011), 'Multilevel entrepreneurship research: Opportunities for studying entrepreneurial decision making'. *Journal of Management* **36**, 412–420.

Sorenson, O. and P. G. Audia (2000), 'The social structure of entrepreneurial activity: Geographic concentration of footwear production in the United States, 1940–1989'. *American journal of sociology* **106**, 424–462.

Full text available at: http://dx.doi.org/10.1561/0300000041

Sorenson, O. and T. Stuart (2001), 'Syndication networks and the spatial distribution of venture capital investments'. *American Journal of Sociology* **106**, 1546–1588.

Sorenson, O. and D. M. Waguespack (2006), 'Social structure and exchange: Self-confirming dynamics in Hollywood'. *Administrative Science Quarterly* **51**, 560–589.

Sowlay, M. and S. Lloyd (2010), 'The current M&A environment and its strategic implications for emerging biotherapeutics companies'. *Journal of Commercial Biotechnology* **16**, 109–119.

Stremersch, S. and W. Van Dyck (2009), 'Marketing of the life sciences: A new framework and research agenda for a nascent field'. *Journal of Marketing* **73**, 4–30.

Stuart, T. and O. Sorenson (2003a), 'The geography of opportunity: Spatial heterogeneity in founding rates and the performance of biotechnology firms'. *Research Policy* **32**, 229–253.

Stuart, T. E., H. Hoang, and R. C. Hybels (1999), 'Interorganizational endorsements and the performance of entrepreneurial ventures'. *Administrative Science Quarterly* **44**, 315–349.

Stuart, T. E., S. Z. Ozdemir, and W. W. Ding (2007), 'Vertical alliance networks: The case of university-biotechnology-pharmaceutical alliance chains'. *Research Policy* **36**, 477–498.

Stuart, T. E. and O. Sorenson (2003b), 'Liquidity events and the geographic distribution of entrepreneurial activity'. *Administrative Science Quarterly* **48**, 175–201.

Suuma, M. (2011), 'The developments in the business models of biotechnology in the Central and Eastern European countries: The example of Estonia'. *Journal of Commercial Biotechnology* **17**, 84–108.

Sytch, M. and P. Bubenzer (2008), 'Research on strategic alliances in biotechnology: An assessment and review'. In: H. Patzelt and T. Brenner (eds.): *Handbook of Bioentrepreneurship*. Berlin: Springer, pp. 105–131.

Tallman, S. and A. Phene (2007), 'Leveraging knowledge across geographic boundaries'. *Organization Science* **18**, 252–260.

Full text available at: http://dx.doi.org/10.1561/0300000041

Teece, D. J. (1986), 'Profiting from technological innovation: Implications for integration, collaboration, licensing and public policy'. *Research Policy* **15**, 285–305.

Trippl, M. and F. Tödtling (2007), 'Developing biotechnology clusters in non-high technology regions — The case of Austria'. *Industry and Innovation* **14**, 47–67.

Tzabbar, D. (2009), 'When does scientists recruitment affect technological repositioning?'. *Academy of Management Journal* **52**, 873–896.

Ucbasaran, D., A. Lockett, M. Wright, and P. Westhead (2003), 'Entrepreneurial founder teams: Factors associated with member entry and exit'. *Entrepreneurship Theory and Practice* **28**, 107–127.

Urbig, D., R. Buerger, H. Patzelt, and L. Schweitzer (forthcoming), 'Investor reactions to new product development failures: The moderating role of product development stage'. *Journal of Management*. DOI: 10.1177/0149206311416120.

Van Brunt, J. (2000), 'Borderless biotech'. *Signals Magazine*.

Van Brunt, J. (2005), 'Biotech's old soldiers'. *Signals Magazine*.

Vanloqueren, G. and P. Baret (2009), 'How agricultural research systems shape a technological regime that develops genetic engineering but locks out agroecological innovations'. *Research Policy* **38**, 971–983.

Walsh, J. P., W. M. Cohen, and C. Cho (2007), 'Where excludability matters: Material versus intellectual property in academic biomedical research'. *Research Policy* **36**, 1184–1203.

Waxell, A. (2009), 'Guilty by association: A crossindustrial approach to sourcing complementary knowledge in the Uppsala biotechnology cluster'. *European Planning Studies* **17**, 1605–1624.

Webber, D. (1999), 'Economic Darwinism versus financial tooth fairies'. *Nature Biotechnology* **17**, BE14–BE15.

Whittington, K. B., J. Owen-Smith, and W. W. Powell (2009), 'Networks, propinquity, and innovation in knowledge-intensive industries'. *Administrative Science Quarterly* **54**, 90–122.

Full text available at: http://dx.doi.org/10.1561/0300000041

Willemstein, L., T. van der Valk, and M. T. H. Meeus (2007), 'Dynamics in business models: An empirical analysis of medical biotechnology firms in the Netherlands'. *Technovation* **27**, 221–232.

Wong, J. (2011), *Betting on Biotech: Innovation and the Limits of Asia's Developmental State*. Cornell University Press.

Yu, J., B. A. Gilbert, and B. M. Oviatt (2011), 'Effects of alliances, time, and network cohesion on the initiation of foreign sales by new ventures'. *Strategic Management Journal* **32**, 424–446.

Zhang, F., P. Cooke, and F. Wu (2011), 'State-sponsored research and development: A case study of China's biotechnology'. *Regional Studies* **45**, 575–595.

Zhang, J. (2011), 'The advantage of experienced start-up founders in venture capital acquisition: Evidence from serial entrepreneurs'. *Small Business Economics* **36**, 187–208.

Zollo, M., J. J. Reuer, and H. Singh (2002), 'Interorganizational routines and performance in strategic alliances'. *Organization Science* **13**, 701–713.

zu Knyphausen-Aufseß, D., A. Zaby, and S. Kind (2006), 'M&A and diversification strategies of VC-backed firms in the biotechnology industry — towards understanding the perspectives of venture capitalists and their portfolio companies'. In: J. Butler (ed.): *Venture Capital and Entrepreneurship*. Greenwich, CT: Information Age Publishing.

Zucker, L. G. and M. R. Darby (2001), 'Capturing technological opportunity via Japan's star scientists: Evidence from Japanese firms' biotech patents and products'. *Journal of Technology Transfer* **26**, 37–58.

Zucker, L. G., M. R. Darby, and J. S. Armstrong (2002), 'Commercializing knowledge: University science, knowledge capture, and firm performance in biotechnology'. *Management Science* **48**, 138–153.

Zucker, L. G., M. R. Darby, and M. B. Brewer (1998), 'Intellectual human capital and the birth of U.S. biotechnology enterprises'. *American Economic Review* **88**, 290–306.