

INTELLECTUAL PROPERTY AND INNOVATION VOLUME I

Edited by **SHUBHA GHOSH**



Critical Concepts in Intellectual Property Law

14

Critical Concepts in Intellectual Property Law

Series Editor: **Robert P. Merges**, University of California at Berkeley, USA

The purpose of this series is to bring together the most compelling scholarly research in the sphere of intellectual property law. The series covers all areas of intellectual property law, at the practical and conceptual level, including patents, copyright trademark and related fields. Each title is edited by a distinguished specialist specifically selected for depth of understanding and knowledge of the extensive secondary literature, under the direction of the series editor. Each volume presents a careful selection of the most ground-breaking articles in the relevant subject area. The individual editors also provide an original introduction, which gives an authoritative overview of each topic.

INTELLECTUAL PROPERTY AND INNOVATION

Edited by **Shubha Ghosh**

'Innovation has become a vitally important field of study in the modern era. This edited two-volume compilation offers the single best collection of insights that scholars of innovation - including but not limited to intellectual property professors - have to offer about what innovation is, why it is essential to economic growth, and how to foster it. It is a major accomplishment to have brought these insightful works together.'

Pam Samuelson, University of California at Berkeley, USA

This illuminating two-volume collection presents leading articles on the theory and practice of intellectual property law as it applies to the promotion of innovation in economic, social, and legal dimensions. Topics include the role of law and incentives, cumulative and open forms of innovation, as well as discussion of its social dimensions, relationship with market institutions and how to chart a course for future innovation policy. Together with an original introduction by the editor, this collection offers a compelling overview of the ideas that ignite and enliven innovation scholarship, invaluable to academics and policymakers alike.

Shubha Ghosh is Crandall Melvin Professor of Law and Director of the Technology Commercialization Law Program at the Syracuse University College of Law, New York, USA.

Edward Elgar
PUBLISHING

The Lypiatts, 15 Lansdown Road, Cheltenham, Glos GL50 2JA, UK
Tel: + 44 (0) 1242 226934 Fax: + 44 (0) 1242 262111 Email: info@e-elgar.co.uk
William Pratt House, 9 Dewey Court, Northampton, MA 01060, USA
Tel: +1 413 584 5551 Fax: +1 413 584 9933 Email: elgarinfo@e-elgar.com
www.e-elgar.com www.elgaronline.com

ISBN 978-1-78536-625-3



9 781785 366253

INTELLECTUAL PROPERTY AND INNOVATION I

SHUBHA GHOSH


Elgar

Intellectual Property and Innovation Volume I

Edited by

Shubha Ghosh

*Crandall Melvin Professor of Law
and Director, Technology Commercialization Law Program
Syracuse University College of Law, New York, USA*

CRITICAL CONCEPTS IN INTELLECTUAL PROPERTY LAW

An Elgar Research Collection
Cheltenham, UK • Northampton, MA, USA

© Shubha Ghosh 2017. For copyright of individual articles, please refer to the Acknowledgements.

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, electronic, mechanical, photocopying, recording, or otherwise without the prior permission of the publisher.

Published by
Edward Elgar Publishing Limited
The Lypiatts
15 Lansdown Road
Cheltenham
Glos GL50 2JA
UK

Edward Elgar Publishing, Inc.
William Pratt House
9 Dewey Court
Northampton
Massachusetts 01060
USA

A catalogue record for this book
is available from the British Library

Library of Congress Control Number: 2017933398



ISBN 978 1 78536 625 3 (2 volume set)

Printed and bound by CPI Group (UK) Ltd, Croydon, CR0 4YY

Intellectual Property and Innovation
Volume I

Critical Concepts in Intellectual Property Law

Series Editor: Robert P. Merges

*Wilson Sonsini Goodrich & Rosati Professor of Law and Technology
and Co-Director, Berkeley Center for Law & Technology
University of California, USA*

- | | |
|--|---|
| 1. Patents
<i>Joseph Scott Miller</i> | 9. Trademark and Unfair Competition Law
<i>Graeme B. Dinwoodie and Mark D. Janis</i> |
| 2. Intellectual Property and Competition
<i>Michael A. Carrier</i> | 10. Trade Secrets and Undisclosed Information
<i>Sharon K. Sandeen and Elizabeth A. Rowe</i> |
| 3. Intellectual Property and Biotechnology
<i>Arti K. Rai</i> | 11. Geographical Indications
<i>Michael Blakeney</i> |
| 4. Copyright
<i>Christopher S. Yoo</i> | 12. Intellectual Property and Private International Law
<i>Paul Torremans</i> |
| 5. Intellectual Property and Property Rights
<i>Adam Mossoff</i> | 13. European Intellectual Property Law
<i>Jan Rosén</i> |
| 6. Intellectual Property and Digital Content
<i>Richard S. Gruner</i> | 14. Intellectual Property and Innovation
<i>Shubha Ghosh</i> |
| 7. Intellectual Property and Human Rights
<i>Laurence R. Helfer</i> | |
| 8. Intellectual Property, Innovation and the Environment
<i>Peter S. Menell and Sarah M. Tran</i> | |

Future titles will include:

Intellectual Property and the Public Domain
Robert P. Merges and Amy L. Landers

Employment Law and Intellectual Property
Ann L. Monotti

China and Intellectual Property Law
Peter K. Yu

International Intellectual Property Law
Susy Frankel

Intellectual Property and Agriculture
Brad Sherman and Susannah Chapman

History of Intellectual Property Law
Oren Bracha

Intellectual Property and Economic Development
Carlos Correa

Wherever possible, the articles in these volumes have been reproduced as originally published using facsimile reproduction, inclusive of footnotes and pagination to facilitate ease of reference.

For a list of all Edward Elgar published titles visit our website at
www.e-elgar.com

Acknowledgements

The editor and publishers wish to thank the authors and the following publishers who have kindly given permission for the use of copyright material.

American Bar Association for article: Jonathan B. Baker (2007), 'Beyond Schumpeter vs. Arrow: How Antitrust Fosters Innovation', *Antitrust Law Journal*, **74** (3), 575–602.

Clark D. Asay for his own work: (2015), 'Enabling Patentless Innovation', *Maryland Law Review*, **74** (3), 431–95.

Columbia Law Review Association via the Copyright Clearance Center's RightsLink service for article: Robert P. Merges and Richard R. Nelson (1990), 'On the Complex Economics of Patent Scope', *Columbia Law Review*, **90** (4), May, 839–916.

Florida State University Law Review for article: Robert Cooter (2005), 'Innovation, Information, and the Poverty of Nations', *Florida State University Law Review*, **33** (2), Winter, 373–93.

Ronald J. Gilson, Charles F. Sabel and Robert E. Scott for their own work: (2013), 'Contract and Innovation: The Limited Role of Generalist Courts in the Evolution of Novel Contractual Forms', *New York University Law Review*, **88** (3), April, 170–215.

Michigan Telecommunications and Technology Law Review for article: Giovanni Dosi, Luigi Marengo and Corrado Pasquali (2007), 'Knowledge, Competition and Innovation: Is Strong IPR Protection Really Needed for More and Better Innovations?', *Michigan Telecommunications and Technology Law Review*, **13** (2), Spring, 471–85.

Northwestern University School of Law for article: Thomas Cheng (2013), 'Putting Innovation Incentives Back in the Patent-Antitrust Interface', *Northwestern Journal of Technology and Intellectual Property*, **11** (5), April, 385–439.

Chidi Oguamanam for his own work: (2013), 'Open Innovation in Plant Genetic Resources for Food and Agriculture', *Chicago-Kent Journal of Intellectual Property*, **13** (1), 11–50.

Santa Clara University School of Law for article: Amy L. Landers (2006), 'Let the Games Begin: Incentives to Innovation in the New Economy of Intellectual Property Law', *Santa Clara Law Review*, **46** (2), 307–75.

Stanford University School of Law for articles: Ted Sichelman (2010), 'Commercializing Patents', *Stanford Law Review*, **62** (2), January, 341–413; Dotan Oliar (2012), 'The Copyright-

Innovation Tradeoff: Property Rules, Liability Rules, and Intentional Infliction of Harm', *Stanford Law Review*, **64** (4), April, 951–1020.

Katherine J. Strandburg for her own work: (2009), 'Evolving Innovation Paradigms and the Global Intellectual Property Regime', *Connecticut Law Review*, **41** (3), February, 861–920.

UC Irvine Law Review for article: Lisa Larrimore Ouellette (2015), 'Patentable Subject Matter and Nonpatent Innovation Incentives', *UC Irvine Law Review*, **5** (5), December, 1115–45.

University of Chicago Press for articles: Petra Moser (2012), 'Innovation without Patents: Evidence from World's Fairs', *Journal of Law and Economics*, **55** (1), February, 43–74; Murat C. Mungan (2014), 'Less Protection, More Innovation?', *Supreme Court Economic Review*, **22** (1), January, 123–46.

Vermont Law Review for article: Brett Frischmann (2000), 'Innovation and Institutions: Rethinking the Economics of U.S. Science and Technology Policy', *Vermont Law Review*, **24**, Fall, 347–416.

Washington University School of Law for articles: Clarisa Long (2000), 'Patents and Cumulative Innovation', *Washington University Journal of Law and Policy, Re-Engineering Patent Law: The Challenge of New Technologies*, **2**, January, 229–46; Joel West (2009), 'Policy Challenges of Open, Cumulative, and User Innovation', *Washington University Journal of Law and Policy: Open Source and Proprietary Models of Innovation*, **30**, 17–41; Keith Sawyer (2009), 'The Collaborative Nature of Innovation', *Washington University Journal of Law and Policy: Open Source and Proprietary Models of Innovation*, **30**, 293–324.

Every effort has been made to trace all the copyright holders but if any have been inadvertently overlooked the publishers will be pleased to make the necessary arrangement at the first opportunity.

In addition the publishers wish to thank the Library of Indiana University at Bloomington, USA for their assistance in obtaining these articles.

Introduction

Shubha Ghosh

“Build a better mousetrap and the world will beat a path to your door.” Attributed to Ralph Waldo Emerson, this aphorism extols the virtues of good work benefitting society, and implicitly of self-reliance and pragmatism. But the exhortation is almost magical, not that much different from “If you build it, they will come.” Innovation, however, does not arise in a field of dreams. One should ask, how is the path built and what do we mean by “the world”? With equal certainty and determination, those on the left might answer, the state; those on the right, the market. As the articles in these two volumes demonstrate, the answers are much more detailed and complex.

Returning to the origins of Emerson’s assurance illustrates part of the complexity. Not surprisingly, Emerson may not have actually written these exact words. But he expressed a similar, and more profound, sentiment in his *Journals*, written in 1855 and published in 1912 (see Rawson and Miner, 2006 p.240):

I trust a good deal to common fame, as we all must. If a man has good corn, or wood, or boards, or pigs, to sell, or can make better chairs or knives, crucibles or church organs, than anybody else, you will find a broad hard-beaten road to his house, though it be in the woods.

Rather than mousetraps, Emerson referred to everything from agriculture to manufactures, including knives, crucibles, and church organs. All of these can be the basis for “common fame,” Emerson’s appeal to the common man who obtains fame by meeting everyday needs. Furthermore, note that the path is described as “broad” and “hard-beaten” rather than one that is magically built by the “world.” This path is one an observer can actually see, even if remotely in the woods.

Read from a clinical, academic perspective, Emerson’s metaphors translate into some objective propositions. Success is open to everyone and arises from improving what has come before. Those in need will make their way to the improver, perhaps to engage in transactions for the transfer of the new works. The path to the improver’s door is evidence of such transactions, and note that the path is both broad and hard-beaten, adjectives that have implications for how transfer functions. Breadth suggests that there are many parties interacting to obtain the benefits of the mousetrap, or corn, or church organ, suggesting thick, competitive markets. But this path is also hard-beaten and not inherently smooth, a metaphor that maps onto what academics may call transaction cost management or engineering (see Gilson, 1984). Whichever Emerson quote one prefers, the mythic or actual, each hints at a complex web of details underlying “common fame” and what we today would call innovation.

What is the reality behind the magic of innovation? The thirty-nine articles collected in these two volumes take us far in answering this question. But, like any good work of scholarship, they each also raise fresh questions for inquiry. With this collection, the reader might find

insight into the legal, social, and economic underpinnings of innovation. The adventurous reader will follow the path blazed by the scholars represented here and produce the next generation of innovative scholarship.

The many dimensions of innovation are set forth in the following six thematic sections: (1) delineating the concept of innovation and the role of law; (2) understanding the role of incentives in the innovation process; (3) exploring cumulative and open innovation as alternatives to the myth of the lone innovator; (4) presenting social innovation as a complement, or in some cases an alternative, to economic growth as the primary metric for innovation success; (5) mapping the relationships between innovation and market institutions; and (6) charting the course for innovation policy. Each topical section contains several articles that represent leading scholarship, both theoretical and empirical, drawn from the discipline of law and the social sciences. All the articles were published since the year 1999, except for one. They are organized, for the most part, chronologically within each section to provide some sense of the development of the topic from foundational pieces to those at the forefront of the particular topic. As editor, I had to make difficult choices in selecting articles, but the reader will find a rich vein of material here, each substantive on its own terms and each serving as a source of references for continuing in depth inquiries. Articles considered but not included in this volume are often well-represented in the footnotes of the included articles.

What should the reader expect from going through this volume? Some common themes emerge. Competition is important for innovation, but scholars and policymakers may not have a complete sense of the full dimensions of competition. Standard economic models of perfect price competition are too idealized to apply readily even though they provide some sort of benchmark for structures desirable for a competitive dynamic: price taking behavior, low barriers to entry, complete information, markets for almost all tradeable commodities. However, innovation often occurs in situations when one or more of these desirable structures are missing. Firms may have some degree of market power over pricing decisions, barriers to entry may be high, consumers and firms may be lacking information about the attributes of an innovative product, and financial markets may not be functioning adequately to fund research and development or product promotion.

Even more challenging for designing innovation policy are the social dimensions of innovation. A consistent challenge, especially in the policy area of development, is ensuring that the benefits of innovation are spread broadly. Health care breakthroughs should not be enjoyed only by the rich. Information and educational technology should not entrench an elite but should open up access to often marginalized members of society. Market institutions are only one set of institutions within which innovation functions. Social institutions, such as schools, families, hospitals, clinical facilities, libraries, are even more critical for the promotion and implementation of innovation. These institutions are also critical for gauging the success of innovation, more so than a narrow focus on markets. These themes resonate in various timbres throughout the articles in this volume.

Perhaps the most compelling unifying theme is the policy turn, either implicit or explicit in each of these articles. Volume II, Part III is titled "Innovation Policy" but policy implications permeate the more purely analytical pieces. The prevalence of policy should not be surprising. While the term innovation might evoke images of new technologies and scientific breakthroughs, the most important innovations occur in creating legal reforms that support new institutions. Policy guides institutional innovations. As each author presents a case for what

promotes or inhibits innovations, there is an implicit normative claim, set forth in various levels of detail, about institutional design and innovation. What makes the volume cohere is the view towards the future of innovation and the ongoing, and perhaps never ending, debate about how change can be implemented and sustained.

Volume I, Part I: Introduction: The Concept Of Innovation And The Role Of Law

An editor is hard pressed to decide how to begin a particular collection. While the topic of defining innovation is an obvious starting point, there are several choices for the initial article. Merges and Nelson (1990, Chapter 1 Volume I) seemed to me to be the obvious choice for a number of reasons. Published before 2000, a decade before the new millennium, the article has the status of a classic. The authors also address many of the concerns that inform these two volumes, particularly the importance of competition for innovation. Worth noting is this article's origins as a response to Professor Kitch's famous work on prospect theory and patents. See Kitch (1977). As Merges and Nelson summarize, Professor Kitch developed the idea of patent's role in promoting the creation of new markets and industries. Patent law, and perhaps intellectual property law more broadly, serves as a tool for innovation. Where Merges and Nelson disagree with Kitch is the scope of exclusive rights needed for the socially desired level of innovation. While Kitch supported very broad exclusionary rights, Merges and Nelson are more skeptical, emphasizing the role of competition in promoting desirable innovation. But how narrow should the scope of exclusionary rights be? That is the question igniting the research program surrounding innovation. That is the question which provides the motivation for each of the articles in this volume, whether acknowledged or not. Hence, Merges and Nelson serves as the appropriate starting point for this collection.

While Kitch's seminal article is not included, it casts a broad shadow over the debates reflected in these pages. As I suggest at the end of this introduction, reference to a shadow may be too negative. Perhaps Kitch's prospect theory provides a nourishing light from which critical and progressive scholarship grew and continues to flourish. One argument for not including the piece is the date. Written before the explosion in biotechnology and information technologies, the article, for obvious reasons, does not address some of the problems with a strong version of prospect theory for these two important sources of innovation. Many of the articles in this volume specifically draw our attention to the unique problems for exclusion rights within these two sectors. Consequently, these articles lay a foundation for a richer and more accurate version of innovation theory.

Nonetheless, Kitch's article has had a deep influence on the research program on innovation, from its market focus to the definitional boundaries. The three articles following the Merges and Nelson piece reflect nuanced responses to Kitch. Frischmann (2000, Chapter 2 Volume I) reminds us of the government's role in creating institutions that promote research and development, the seeds for innovation. Patent law is only one brick in this set of institutions, which also encompass government grants, tax policy, and cooperative projects between governments and industry. These institutions show how much of innovation policy entails the shifting of private costs to the public sector, thereby supporting risk taking by innovators. What Kitch would describe as prospecting, Frischmann would characterize as risk shifting. The challenge is determining how much the government should bear in promoting risky ventures.

Cooter (2005, Chapter 3 Volume I) offers one path to addressing this challenge. As a prominent law and economics scholar, Cooter turns to predictable rules for property and contract as the key to innovation policy. Adopting the biological metaphor of innovation as a mutation, Cooter's article presents an organic model of innovation, one stemming from private decision making. His critical turn is from the institution of the market to the micro-details of an organization. While Kitch heralded the innovator creating a market for new products with strong property rights in hand, Cooter correctly points out that much decision making is not done by heroic individual entrepreneurs but in organizational settings where agents attempt to coordinate their activities. Law should aid in helping these organizations to function effectively, Cooter concludes, and warns about the dangers of state-created exclusionary rights being used as means for protection and a form of mercantilism.

Gilson et al. (2013, Chapter 4 Volume I) demonstrate the role of contract law for innovation. Their work is generalized in Gilson et al. (2015) which explores how contract law rules can address the uncertainty and the risk arising from innovation. Although their focus is not on intellectual property law, their analysis of contract supports a broader analysis of intellectual property licensing and the complementarities between exclusive rights and negotiated rights. More intriguingly, the authors argue in their 2013 article for the critical role for specialized courts, as opposed to generalized courts, in promoting innovation through contract. Although they are specifically thinking of specialized courts like the Delaware Court of Chancery, their ideas have likely implications for specialized courts like the Federal Circuit which often confronts intellectual property licensing issues.

Strandburg (2009, Chapter 5 Volume I) contributes by adding to Cooter's admonition against mercantilism through an analysis of international intellectual property institutions. She contrasts the trade-based notion of innovation promoted by the World Trade Organization and the TRIPS Agreement with an open and collaborative model, one that recognizes cooperation among organizations, both within and cross-borders. She agrees with Cooter about the need for private orderings, but also recommends oversight of private contracts and exclusionary rights, perhaps through a body like the World Intellectual Property Organization (WIPO), which has a more consciously development orientation towards intellectual property rights.

Starting with Merges and Nelson's classic response to Kitch's prospect theory, these four articles move out of prospect theory's narrow contours to broader theoretical and practical questions of institutional design. Although not completely escaping its shadow, these authors expand the understanding of how exclusionary rights shape innovation and illustrate the broad outline of the innovation research program carried forth by the several scholars represented in these pages.

Volume I, Part II: Incentives, Law And Innovation

Innovation often contrasts with the term invention. The latter refers to the creation of a new product; the former, to its diffusion. Innovation cannot occur without invention although it is possible that invention does not lead to innovation. Since social policy often is advanced by moving new technologies to meet the needs of people, invention and innovation are both critical for social well-being. Hence, the question of how to build the broad hard-beaten path described

by Emerson. The answer to this question lies in an understanding of incentives, both for creation and for diffusion of new products and technologies.

The scholars represented in this section aid in clarifying the role of incentives in promoting invention and innovation. Some articles focus on one rather than the other. A few articles do not distinguish between the two, recognizing that creation and diffusion are often part of an organic process. What the scholars as a whole teach is that incentives do not exist in a vacuum. Whether provided through government subsidies or legal entitlements, incentives operate within a set of institutions, such as market structures and corporate and other organizations directed towards research and commercialization.

For example, Landers (2006, Chapter 6 Volume I) provides a window into debates about the role of patent litigation in supporting or perverting incentives for innovation. She points out that litigation is gamed not for the purposes of disseminating new products but for capturing royalties. In other words, litigation is a tool for rent seeking. Her proposals for reforming patent remedies illustrate policy responses within the legal regime of intellectual property rights for correcting incentives. But her analysis is also precatory. Exclusive rights come with a cost: they may be pursued for their own sake rather than as a tool for prospecting.

Baker (2007, Chapter 7 Volume I) continues this theme by exploring how innovation works in a competitive environment and the role of antitrust law in some cases tempering the abuse of intellectual property rights. At the outset, he points out that economist Kenneth Arrow was more accurate in pointing to competition as a basis for innovation than Schumpeter who championed the need for monopolies in driving the development and diffusion of new products. Baker, however, offers a detailed analysis of the role of competition, pointing out that in some instances competition might hinder innovation. Firms might create new products and technologies as a means to attract new customers away from competitors. Such rivalry drives innovation. At the same time, product market competition might divert a firm's resources from valuable research and development activity. What is needed, he concludes, is an industry-specific application of antitrust law in order to promote innovation promoting competition.

Dosi et al. (2007, Chapter 8 Volume I) parallels Baker's focus on competition but turns to the role of firm specific factors in driving innovation. They cast their attention, much like Cooter (2005, Chapter 3 Volume I), to the internal coordination and decision making of a firm. Accumulation of knowledge within a firm, R&D investment decisions, and market promotion are the product of internal firm decision making that might often be hindered by strong IPR protection. Furthermore, the role of within-firm behavior introduces the question of how precisely to conceptualize competition. Is it about products, technologies, markets, or some combination? The authors offer some general thoughts about this question. One direction implied by the authors' work is the role of contract and corporate law in promoting innovation. For example, rules governing employee inventors, their ability to compete with the firm upon departure, and their ownership interests in inventions shape the direction and intensity of invention, largely through their effects on competitive dynamics within and between firms.

More specific answers to the question of what is the innovation-friendly mix of products, technologies, and markets may be found in Moser (2012, Chapter 9 Volume I), a study of innovation in the chemical industry drawing on empirical evidence from nineteenth century world fairs. Moser demonstrates the importance of trade secrecy for innovation within the industry. Protection through secrecy allowed for the diffusion of new chemical products in the marketplace as innovating firms managed to obtain a first mover advantage over competitors.

However, competitive dynamics were maintained through reverse engineering which further spurred firms on to develop new products. Intriguingly, the publication of the periodic table in the late nineteenth century made secrecy a less viable strategy, making firms in the chemical industry move towards patent protection. Moser tells a compelling story, one that contextualizes law and competition within a multi-institutional context.

Oliar (2012, Chapter 10 Volume I) presents a more decontextualized analysis of innovation under copyright law. Drawing on law and economic models of property and liability rule protection for legal entitlements, he examines how copyright can inhibit the use of new technologies that facilitate copying through doctrines of direct and indirect infringement. Should the creator of new technologies have a property right against copyright owners in their innovations, he asks. His analysis leads him to a qualified, if negative, answer. Although the creator of the new technology should not be immune from copyright liability (the implication of assigning property rule entitlement to the creator), sometimes the copyright owner's entitlement might be less strong, especially as new information about the technology's benefits emerges. Oliar's analysis supports a regime of shifting entitlements, attentive to market and technological context that would lead to a more contextualized application of the law to promote innovation.

Sichelman (2010, Chapter 11 Volume I) considers another context for the creation of legal entitlements: the actual commercialization of patented inventions. Sichelman focuses our attention on a central problem with prospect theory; the creation of rights does not guarantee transfer. There are several reasons for licensing failure, both psychological and economic. Sichelman's solution is to create a new type of time-limited exclusionary right granted to an entity that actually makes effective commercial use of an invention. The policy recommendation reminds us that the creation of a property right is not a sufficient condition (or even a necessary one) for the promotion of markets. What Sichelman proposes is a legal intervention needed to create incentives for the creation of markets. In Volume II, Hrdy (2015, Chapter 19 Volume II) offers a thoughtful critique of an alternative to Sichelman's proposal.

Products, markets, technologies, and legal rights constitute many pieces of the innovation puzzle. Can the pieces be fitted together? Cheng (2013, Chapter 12 Volume I) provides a possible integration of Oliar's formal discussion of entitlements and Baker's examination of antitrust law. Cheng argues that antitrust law and intellectual property law are not incompatible. The two bodies of law have differing normative domains with respect to static and dynamic efficiency. He proposes a rule for antitrust law of maximizing the net social benefits of innovation by adjusting the scope of patents rights to allow for recoupment of R&D costs. He uses this normative framework to re-examine several antitrust cases involving a firm's duty to deal with competitors. Cheng's discussion of patent scope obviously echoes Merges and Nelson. It also offers a potential approach to reconciling the tensions between competition and innovation, as discussed by Baker (2007, Chapter 7 Volume I).

Mungan (2014, Chapter 13 Volume I) introduces game theory analysis into the inquiry of incentives and innovation. Defining the structure of interactions among potentially innovative firms in a rational decision making environment where there is uncertainty and asymmetric information, Mungan shows that increasing the strength of intellectual property protection can deter research and development efforts. As incentives increase for R&D, more firms enter into the race. As more firms enter, the probability of any one firm succeeding in research decreases. Therefore, the incentive for R&D expenditure decreases. This analysis demonstrates some of the shortcomings of using exclusive rights as incentives for innovation. Admittedly, the model

is somewhat simplistic. For example, as the number of firms increase so might market possibilities, increasing the value of being a pioneer and having a first mover advantage. The attempt to become the first mover might be further encouraged by the pursuit of exclusionary rights (of some scope). The model also ignores the spillover benefits from R&D by existing firms to already developed product lines. Despite these criticisms, the author's work invites scholars and policymakers to devise other institutional means than exclusionary rights for supporting research and development efforts by firms.

Ouellette (2015, Chapter 14 Volume I) presents some of these other institutional means. Adopting a utilitarian framework for intellectual property rights, she identifies a potential limitation for utilitarian justifications for exclusionary rights, namely, there may be non-exclusivity based incentives for innovation. Her article turns to these non-patent incentives that are provided by the public sector, such as tax policy and subsidies. The larger point is that limiting patentable subject matter, such as for software or biotechnology, may not be harmful for promoting innovation because of the presence of these public non-patent incentives. Her recommendation is that the recent spate of United States Supreme Court cases limiting patentable subject matter are justified by the presence of non-patent incentives. While the argument supports giving the requirement of patentable subject matter independent significance from the other four requirements, it is not completely clear whether the current doctrinal formulation the Court offers to assess patentable subject matter is workable or adequate. Nonetheless, Professor Ouellette's ideas remind us of the limits of prospect theory, especially as applied to certain industries.

The nine articles illustrate a range of methodological approaches to the study of incentives. Read together, they demonstrate the need for some skepticism about the role of strong intellectual property rights in incentivizing innovation. Taken separately, however, the authors have different emphases on where limitations on intellectual property rights should originate, allowing for ongoing debate on how to shape incentives for the effective innovation policy.

Volume I, Part III: Cumulative And Open Innovation

The five articles selected provide an important gloss on the debate over incentives. They illustrate how innovation is not an individual process, but one that occurs among groups and within organizations. Standing independently, each article provides unique studies of group innovation. Taken together, they offer some guidance on how to define the scope of intellectual property rights to take account of organizational and group behavior.

Long (2000, Chapter 15 Volume I) sets the tone for the section by pointing out that innovation is not a linear process, but a complex one involving many actors. Exclusionary rights granted to an individual creator do not take account of these complex processes. Much intellectual property litigation stems from conflicts over the many actors who contribute to innovation, such as litigation between employers and employees, among past collaborators, between licensors and licensees, and among competitors, seeking to obtain an advantage in the marketplace. The complexity of innovation presumably invites both rethinking the scope of exclusionary rights and designing mechanisms other than legal entitlements to support innovation. Long does not offer solutions, but provides a map for identifying potential hazards for a single-minded focus on rights.

West (2009, Chapter 16 Volume I) elaborates on this fundamental point by introducing the notion of interorganizational innovation as an alternative to the hierarchical, value-chain approach to innovation associated with Alfred Chandler (1977), known for identifying the role of corporate managers in innovation through the expansion of markets. What Chandler labels the visible hand is the product of business decisions by directors and officers channeled through corporate hierarchies. West, by contrast, identifies the visible hand in terms of collaboration by many players (perhaps a visible set of handshakes?) operating within organizations. When innovation is understood as an interorganizational activity, several policy tools, in lieu of exclusionary rights, can become critical. With this point, West provides further support for the argument in Ouellette (2015, Chapter 14 Volume I), and the two authors overlap in identifying the critical non-IPR tools, such as tax, public funding and regulation of competition.

Two cases, one from the United States and the other from several African countries illustrate how collaborative and open innovation works. Sawyer (2009, Chapter 17 Volume I) provides a further gloss on these ideas by presenting a detailed case study of the collaborative venture that led to the development of the DOS/Windows interface. Oguamanam (2013, Chapter 18 Volume I) provides an equally compelling case study of seed sharing and the regulation of plant genetic resources for food and agriculture. He concludes that some measure of intellectual property protection is needed for seed sharing to function effectively.

Finally, Asay (2015, Chapter 19 Volume I) offers policy recommendations that support open innovation such as a two-track patent system and the introduction of an independent inventor defense to patent law. These recommendations follow from Asay's conclusion that exclusionary rights only affect open innovation that leads to commercialization. Noncommercial open innovation is not threatened by exclusionary rights. Therefore, his reforms are aimed towards improving the commercialization process, the bringing of inventions to markets. This article demonstrates how ideas of open and collaborative innovation have practical effects in guiding how to reform legal policy.

Volume II, Part I: Social Dimensions of Innovation

Building on the concepts of incentives and organizational innovation set forth as a foundation in Volume I, the twenty articles in Volume II offer a contextualized account of innovation within social and market settings. The Volume ends with a set of articles that explore the implications of scholarship for innovation policy. The Volume begins with the notion of social innovation.

Lee (2014, Chapter 3 Volume II) can be credited with introducing a full notion of social innovation within the legal scholarship literature. But the concept has deeper roots, as Long (2008, Chapter 1 Volume II) demonstrates. Long's article begins with a challenge to claims that intellectual property rights are irrelevant, if not harmful, for the progress of developing countries. The author admonishes advocates of this anti-IPR view for implicitly allowing appropriation of knowledge from developing countries without compensation, a problem especially for the management of traditional knowledge. Policymakers should design intellectual property law, Long argues, to create a system of compensation for creators and holders of knowledge that will encourage development. She introduces a concept of "generational innovation" in order to understand intellectual property as a means for