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OWNING GLOBAL KNOWLEDGE: THE RISE OF OPEN INNOVATION AND THE FUTURE OF PATENT LAW

INTRODUCTION

Most people are familiar with the story of the genius inventor, toiling away for years in a basement laboratory to one day emerge with the perfect solution to age old problems. Whether lighting our homes, cutting grass, or allowing instant telecommuting, innovation has propelled our societies forward and become one of the driving forces of economic success. The classic model of patent protection emerged to encourage the inventive process by rewarding the inventor with the exclusive right to profit from public dissemination of the invention.¹

However, the narrative of the lone inventor has faded over the years as technological advances, especially the internet, have resulted in dramatic changes to the innovative landscape.² The knowledge sharing potential in today's globalizing world has created an ever increasing demand for fast, accessible, and far reaching innovation.³ Further, innovation is now frequently an interdisciplinary, networked process from creation to distribution, a process that often proves impossible for the lone inventor.⁴ Even companies—the drivers of innovation activities today—have adapted traditional in-house research and development (“R&D”) models to access the knowledge necessary to make technologically complex products,⁵ to

1. EUROPEAN PATENT OFFICE, EUROPEAN PATENT ORGANISATION, SCENARIOS FOR THE FUTURE 9 (2007), available at <http://www.epo.org/topics/patent-system/scenarios-for-the-future.html>.

2. Katherine J. Strandburg, *Accommodating User Innovation in the International Intellectual Property Regime: A Global Administrative Law Approach*, 2009 ACTA JURIDICA 283, 283; Keith Sawyer, *The Collaborative Nature of Innovation*, 30 WASH. U. J.L. & POL'Y 293, 308 (2009).

3. José Cláudia Terra, *Collaboration in R&R: The Emerging Frontiers of Innovation*, TERRAFORUM CONSULTORES 2, <http://biblioteca.terraforum.com.br/Paginas/CollaborationinRDTheEmergingFrontiersofInnovation.aspx> (last visited May 18, 2010); see also ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT, OPEN INNOVATION IN GLOBAL NETWORKS 15 (2008) [hereinafter OECD]; Koen De Backer, Vladimir Lopez-Bassols & Catalina Martinez, *Open Innovation in a Global Perspective—What do Existing Data Tell Us?* 7 (Org. for Econ. Coop. & Dev., STI Working Paper 2008/4, 2008), available at <http://www.oecdilibrary.org/oecd/content/workingpaper/230073468188>.

4. OECD, *supra* note 3, at 15; John Dubiansky, *The Role of Patents in Fostering Open Innovation*, 11 VA. J.L. & TECH 7, 3 (2006) (“Ideas are created from the recombination of elements from various firms and in various industries.”); De Backer, Lopez-Bassols & Martinez, *supra* note 3, at 7.

5. See EUROPEAN PATENT OFFICE, *supra* note 1, at 17, 88; Mark A. Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 TEX. L. REV. 1991, 1992 (2007); Sawy-

share exorbitant development costs,⁶ to mitigate risk,⁷ and to compete on the forefront of global intellectual property markets.⁸

The future of innovation is an “open,” collaborative, global approach to R&D.⁹ To promote successful development of this trend, international patent reform must account for the changing modes of innovation and the new role of intellectual property in business strategies.¹⁰ Moreover, instead of focusing solely on patent harmonization, the conversation must shift to reevaluate the underlying goals of patent law. Rather than focusing on the ardent protection of ideas, the patent regime should work to facilitate the flow of knowledge and to police a growing international intellectual property market.

“Open innovation,” coined in 2003, is a new way of thinking about technology production and innovation that assumes that companies benefit most when they utilize ideas and paths to market that are both internal and external.¹¹ The key to the theory of open innovation is that firms open their doors to the free flow of ideas, allowing capitalization of technologies wherever most expedient, thus increasing the competitiveness of all market players.¹² Firms employ a growing division and specialization of innovation labor in a kind of reciprocal outsourcing model.¹³ These strategies hinge on the most efficient use of intellectual property—whether that entails finding needed technology to complete internal R&D, selling unused intellectual property, or collaborating on freely distributed knowledge.¹⁴ One well-known example of open innovation is “open source,” a popular means of producing software for which the source code is freely accessible as long as users comply with license terms which usually forbid restrictive redistribution or inclusion in a

er, *supra* note 2, at 303–04; Gene Slowinski & Matthew W. Sagal, *Allocating Patent Rights in Collaborative Research Agreements*, RES. TECH. MGMT, Jan.–Feb. 2006, at 51.

6. See EUROPEAN PATENT OFFICE, *supra* note 1, at 18.

7. OECD, *supra* note 3, at 41; De Backer, Lopez-Bassols & Martinez, *supra* note 3, at 7.

8. Cf. OECD, *supra* note 3, at 27 (“Changes in the marketplace—globalisation among them—require companies to be open to external ideas that supplement internal R&D in order to remain competitive.”).

⁹ Sawyer, *supra* note 2, at 312.

¹⁰ Cf. *id.* at 318.

11. HENRY CHESBROUGH, OPEN INNOVATION: THE NEW IMPERATIVE FOR CREATING AND PROFITING FROM TECHNOLOGY xxiv (2003).

12. See generally *id.*

13. See HENRY CHESBROUGH, OPEN BUSINESS MODELS: HOW TO THRIVE IN THE NEW INNOVATION LANDSCAPE 1–2, 56–57 (2006).

14. See generally CHESBROUGH, *supra* note 11.

commercially sold product which locks access to the original code.¹⁵ Thus, in practice, open innovation takes various forms that span a continuum of collective and proprietary intellectual property creation and use.

This Note explores the open innovation model with International Business Machines Corporation (“IBM”) as its example. IBM is one of the world’s largest information technology companies to begin employing open innovation strategies after a “near death experience” induced a strategic shift in its innovation trajectory.¹⁶ In 1992, IBM recorded the largest quarterly and annual losses in U.S. corporate history.¹⁷ This wake-up call resulted in a complete strategic overhaul with a particular emphasis on open innovation.¹⁸ While IBM is not the first, or only, company to expand R&D outside its four walls, the range and global reach of its innovation programs¹⁹ and its highly visible position in the marketplace make it a natural case study.²⁰

There is skepticism as to whether IBM can make this business model work as there are significant concerns regarding the issue of global intellectual property rights.²¹ Without doubt, IBM must employ significant efforts to coordinate and manage its extensive patent portfolio, especially with the magnitude of its open innovation programs and the accompanying variations on intellectual property ownership.²² Regardless of the agility of IBM’s attorneys to navigate complex intergovernmental patent systems, the question remains whether the world’s various patent systems can support IBM. Under the governance of international patent law, which is based on a fixed standard of mass market, seller-based innova-

15. Joel West & Scott Gallagher, *Challenges of Open Innovation: the Paradox of Firm Investment in Open-Source Software*, 36 R&D MANAGEMENT 319, 322 (2006); Sawyer, *supra* note 2, at 321.

16. CHESBROUGH, *supra* note 11, at 101; Video: Address of David Yuan, Vice President of Corporate Communications, IBM, at the Collaborative Innovation Summit, held by Business Innovation Factory-4 (Oct. 15–16, 2008), available at <http://www.businessinnovationfactory.com/iss/video/bif4-david-yaun>.

17. CHESBROUGH, *supra* note 11, at 101 (reporting a loss of \$4.96 billion after taxes).

18. *Id.* at 102.

19. Steve Hamm, *Big Blue’s Global Lab*, BUS. WK., Sept. 7, 2009, at 40, 42 (“The depth of [the] collaboration, the number of partners, the staff involved, and its global reach set IBM apart.”).

20. This Note makes no endorsement or criticism of IBM or its practices. Rather, the singular focus on IBM programs as illustrations of open innovation is purely for the purpose of consistency.

21. Hamm, *supra* note 19, at 42.

22. See generally, Athena Ma, *IBM Patent Leadership: Balances Proprietary and Collaborative Innovation*, CHINA IP, Jan.–Feb. 2008, at 24, available at <http://www.chinaipmagazine.com/en/journal-show.asp?id=250>.

tion,²³ open innovation may flounder in its more audacious goals of patent liberalization and collaborative development. Further, the disparate nature of global patent law and the increase of value placed on intellectual property assets have resulted in various obstacles to the functioning global patent regime.

As more multinational and transnational companies are beginning to employ open innovation models, issues arise on a global scale. The creation of the World Trade Organization (“WTO”) “deepened the deregulatory logic of economic globalization” and linked intellectual property rights to global trade, leading to territorial expansion.²⁴ The Agreement on Trade Related Aspects of Intellectual Property Rights, (“TRIPs”) incorporated into the WTO, helped to streamline global intellectual property rights. Patent law, however, is still largely territorial in nature—there is no single global patent registry, and the multiplicity of applications necessitates country-by-country monitoring and enforcement. This international state of patent law leads to significant costs and uncertainties for global ventures employing open innovation strategies.

While business models have evolved and adapted to a newly integrated world, patent law continues to reflect a defensive, sales-oriented, proprietary model²⁵ which may be incongruous with open innovation.²⁶ Despite this lag in patent law rationale, businesses have shifted their operations and are taking an offensive approach to patents, which are now the means by which knowledge is shared and built rather than controlled.²⁷ Additionally, the value of global businesses is increasingly measured with intangible assets protected and utilized by intellectual property, rather than physical assets.²⁸ “Patent registration is now no longer an expensive way to placate engineers—it is a primary means to generate value.”²⁹

This Note posits that for the continued development and growth of open innovation, international patent law harmonization must take on new dimensions. Due consideration must be given to the expanded role that intellectual property assets play in today’s global business strategies and the ways in which patent law can better facilitate the active man-

23. Strandburg, *supra* note 2, at 285.

24. EUROPEAN PATENT OFFICE, *supra* note 1, at 9, 22.

25. Strandburg, *supra* note 2, at 284.

26. *Cf.* Sawyer, *supra* note 2, at 297 (“[T]he current IP regime is based almost entirely on the linear model of innovation. If that model is inaccurate, then the IP regime currently is designed to work with an inaccurate conception of the innovation process.”).

27. EUROPEAN PATENT OFFICE, *supra* note 1, at 9; *see* OECD, *supra* note 3, at 103.

28. EUROPEAN PATENT OFFICE, *supra* note 1, at 17.

29. *Id.*

agement of these rights. However, this is not enough; the underlying goals of the patent regime must be reevaluated. Rather than a defensive exclusion of others, intellectual property rights should serve to further knowledge production, ease the sharing of ideas, and promote and police an ever growing international intellectual property market.

Part I of this Note explores the evolution of open innovation, its components, its globalization, and its interaction with intellectual property. Part II explains the international agreements and domestic laws that constitute international patent law in order to show that despite the move toward harmonization, patent law remains stuck in the past. Part III discusses the main themes of current patent reform and the implications for open innovation. Part IV argues that efforts toward harmonization are in fact misdirected because the only way to fully support the changing global landscape is a complete paradigm shift in the underlying logic of patent rights.

I. OPEN INNOVATION

In an age of globalization, competition comes from all corners of the world, knowledge is increasingly multidisciplinary and widespread, investment in R&D is on the rise, and product lifecycles are shortening.³⁰ With such fierce and dispersed competition, and equally diverse and demanding consumers, innovation is an important means to secure market share and build a sustainable business.³¹ Companies have thus been faced with a “sink or swim” situation;³² they have been forced to adapt to these challenges by innovating the *way* they innovate. One response has been the adoption of “open” models of innovation—companies search outside their firm for complementary assets, expertise, and research, in order to swiftly access new and different technologies and capitalize on their own unused intellectual property.³³ These R&D activities are also increasingly global, as firms explore new markets and local knowledge bases.³⁴ Open innovation is a targeted response to today’s interconnected world as it

30. OECD, *supra* note 3, at 15; Terra, *supra* note 3, at 2; De Backer, Lopez-Bassols & Martinez, *supra* note 3, at 7.

31. OECD, *supra* note 3, at 15.

32. Cf. OECD, *supra* note 3, at 27 (stating “[c]hanges in the marketplace—globalisation among them—require companies to be open to external ideas that supplement internal R&D in order to remain competitive”).

33. OECD, *supra* note 3, at 15; De Backer, Lopez-Bassols & Martinez, *supra* note 3, at 7.

34. OECD, *supra* note 3, at 15

results in faster, more efficient innovation by employing intellectual property assets as the catalysts of knowledge production.³⁵

A. *The Rise of Open Innovation*

Innovation methods are constantly changing and adapting to new circumstances.³⁶ The iconic “lone inventor” was indeed a prominent figure in nineteenth century American innovation and, consequently, the patent market of the time.³⁷ Fast forward to an industrialized world and the rise of the multinational enterprise (“MNE”) and witness R&D models that are completely internal, in-house, and closed to outsiders.³⁸ This “closed innovation” system relies on the assumption that “*successful innovation requires control*.”³⁹ This creates a “virtuous circle”—companies invest in internal R&D, make discoveries, use these discoveries to create new products and services, reap profits, and reinvest in further R&D, all of which leads to additional breakthroughs.⁴⁰ The intellectual property generated from internal R&D is usually guarded closely to prevent unwanted imitation.⁴¹ In order to compete in this system, firms must have significant resources and the ability to commit to lengthy research programs.⁴² Hence, giant corporate research laboratories such as Bell Labs and the Palo Alto Research Center (“PARC”) dominated the innovation scene of that time and contributed to the creation of global industry leaders such as AT&T, IBM, and Xerox.⁴³ Indeed, from 1945 to 1980, IBM was *the* central player in the computer industry, “built on internal innovation [and] proprietary control over the architecture and all its key elements . . .”⁴⁴

During the last years of the twentieth century, changes in the global landscape eroded the logic of closed innovation.⁴⁵ The growing availability and mobility of skilled workers led to a diffusion of knowledge and a

35. EUROPEAN PATENT OFFICE, *supra* note 1, at 9.

36. ERIC VON HIPPEL, *THE SOURCES OF INNOVATION* 3–5 (1988).

37. JAMES BESSEN & MICHAEL J. MEURER, *PATENT FAILURE: HOW JUDGES, BUREAUCRATS, AND LAWYERS PUT INNOVATION AT RISK* 169 (2008) (citing B. ZORINA KAHN, *THE DEMOCRATIZATION OF INVENTION: PATENTS AND COPYRIGHTS IN AMERICAN ECONOMIC DEVELOPMENT, 1790–1920* (2005)); see Sawyer, *supra* note 2, at 322.

38. CHESBROUGH, *supra* note 11, at xix; OECD, *supra* note 3, at 18, 25.

39. CHESBROUGH, *supra* note 11, at xx.

40. *Id.* at xx–xxi.

41. *Id.* at xxi.

42. *Id.* at xix.

43. See *id.* at xviii–xix.

44. *Id.* at 93, 96.

45. *Id.* at xxii.

fluid labor market which further dispersed technical know-how.⁴⁶ With large numbers of skilled graduates entering the job market, more companies could tap into their talent without the traditionally insurmountable costs of R&D.⁴⁷ Additionally, increased labor mobility resulted in further diffusion of knowledge as employees of R&D giants left their jobs to pursue careers with suppliers, customers, or start-ups who paid a premium for their training and experience. IBM felt the blow of this development, for example, when one of its engineers left the company and shared his knowledge of disk-drive technology with two competitors, contributing to the erosion of IBM's disk-drive dominance.⁴⁸

The leakage of intellectual property rights that once "sat on the shelf" also contributed to the erosion of closed innovation.⁴⁹ In a closed system, innovation that does not fit the company's needs or business strategy remains unused, "on the shelf," collecting dust.⁵⁰ However, with the increase of firms utilizing R&D, disillusioned employees sought out alternative means to utilize their unused discoveries.⁵¹ These ideas were brought to market without the original company that funded the creative R&D.⁵² Thus, despite the in-house control of closed innovation knowledge production, leakage of unused ideas led to an increase in external suppliers of specialized, technical components.⁵³ This proliferation of suppliers undermined the logic of closed innovation by providing previously inaccessible knowledge and technology to a broader market.⁵⁴ Closed innovators found themselves faced with increased competition and pressure from those that already utilize various sources of knowledge.⁵⁵

Open innovation signals a paradigm shift that encourages innovators to integrate external ideas and technology into their own internal R&D, as well as to control the flow of unused ideas and direct them to the most efficient users on the outside.⁵⁶ Companies cannot ignore the diffusion of knowledge production. Data shows that small firms—those with less

46. *Id.* at 34.

47. *Id.*

48. *Id.* at 35.

49. *Id.* at 40.

50. OECD, *supra* note 3, at 18.

51. CHESBROUGH, *supra* note 11, at 38.

52. *Id.*

53. *Id.* at 39.

54. *Id.*

55. *Id.* at 40.

56. CHESBROUGH, *supra* note 13, at xiii; ECONOMIST INTELLIGENCE UNIT, THE ECONOMIST, SHARING THE IDEA: THE EMERGENCE OF GLOBAL INNOVATION NETWORKS 10 (2007) [hereinafter EIU].

than a thousand employees—account for a growing proportion of R&D spending.⁵⁷ Further, universities conducting research around the world are more in tune today with industry needs⁵⁸ and produce more qualified graduates ready to work than ever before.⁵⁹ These facts suggest that the playing field for innovation is leveling and that there are fewer economies of scale in R&D than there once were.⁶⁰ Additionally, technological advances, such as the internet, make dispersed knowledge easier to access and less costly.⁶¹ The days of highly centralized corporate R&D laboratories and knowledge monopolies are gone and companies can no longer disregard the contribution of smaller, less traditional innovators.⁶²

Adaptive companies have developed the tools to leverage multiple paths to market for their technology by accepting a new logic of innovation that leverages and exploits existing internal and external knowledge.⁶³ “Companies’ solid boundaries are being transformed into a semi-permeable membrane that enables innovation to move more easily between the external environment and the companies’ internal innovation process.”⁶⁴ Cooperation is an essential means of knowledge-sourcing⁶⁵ and the partnerships that are created in these collaborations are “as important as the ownership of the actual knowledge.”⁶⁶ Of course, utilizing external knowledge is not an entirely new phenomenon; however, it takes place much more rapidly today and is distinguished by the systematic integration of the strategy into the overall business model.⁶⁷

57. CHESBROUGH, *supra* note 13, at 22–23 (detailing statistics from the National Science Foundation showing that small firms accounted for almost 25% of total industry spending).

58. CHESBROUGH, *supra* note 11, at 41.

59. EIU, *supra* note 57, at 7 (reporting that “India produces 1 million English-speaking graduates a year and, by 2008, it will have more technology graduates than the population of the UK”).

60. CHESBROUGH, *supra* note 13, at 23 & n.2.

61. CHESBROUGH, *supra* note 11, at 44.

62. *Id.* at 45–49. Chesbrough also notes that larger companies used to be skeptical of the quality of R&D from smaller firms. However, reports from the larger laboratories suggest that the competition for hiring researchers out of top Ph.D. programs comes not from other lab giants but from small start-ups and universities.

63. *Id.* at 51.

64. OECD, *supra* note 3, at 18.

65. De Backer, Lopez-Bassols & Martinez, *supra* note 3, at 7.

66. OECD, *supra* note 3, at 25.

67. *Id.* at 24; De Backer, Lopez-Bassols & Martinez, *supra* note 3, at 7.

B. Modes of Open Innovation

The open innovation business model is essentially a division of innovation labor.⁶⁸ Value is created by leveraging more ideas, some of which originate externally, and value is captured more effectively by using key assets both inside and outside the business.⁶⁹ In other words, companies look both “outside-in” and “inside-out” in this dynamic innovation model.⁷⁰ Ultimately, this setup makes it possible for ideas to reach the market more quickly and efficiently than when one company is responsible for the idea from start to finish.⁷¹

Companies employ open innovation strategies in a variety of ways. Modes of “outside-in” innovation include: the purchase or licensing of technology; joint ventures; joint development; collaboration within and across industries; equity in outside projects; and pooled R&D.⁷² IBM employs many of these techniques, forming strategic collaborative partnerships, called “collaboratories,” with universities, customers, and other firms to combine resources and skills.⁷³ For example, in 2008, an IBM laboratory in California teamed up with Yale University to research algorithms aimed at helping analyze medical images and videos for the purpose of cardiac disease analysis.⁷⁴ IBM also uses online brainstorming sessions, called “Innovation Jams” to assess the value of external projects.⁷⁵ In 2006, one Innovation Jam brought together over 150,000 people from 104 countries and 67 companies.⁷⁶ Some 46,000 ideas were posted by participants and, in the end, IBM pledged \$100 million to collaboratively pursue ten new businesses generated through the exercise.⁷⁷ The portfolio included initiatives such as real time translation services, 3D internet and a banking system capable of reaching remote locations in emerging market countries.⁷⁸

68. See CHESBROUGH, *supra* note 13, at 1–2, 56–57

69. *Id.* at 2.

70. OECD, *supra* note 3, at 18.

71. EIU, *supra* note 57, at 10.

72. OECD, *supra* note 3, at 37; WEST & GALLAGHER, *supra* note 15, at 323.

73. *Research and Development*, IBM, http://www.ibm.com/ie/emerging_business_centre/research.html (last visited Apr. 21, 2010).

74. *Collaborative Research Initiatives*, IBM, <http://www.ibm.com/developerworks/university/collaborativeresearch/projects.html> (last visited Apr. 21, 2010).

75. OECD, *supra* note 3, at 101.

76. Press Release, IBM, IBM Invests \$100 Million in Collaborative Innovation Ideas (Nov. 14, 2006), available at <http://www-03.ibm.com/press/us/en/pressrelease/20605.wss> [hereinafter IBM Press Release]

77. *Id.*

78. *Id.*

The outbound—or, “inside-out”—innovation strategy is a newer development that allows for the exploitation of in-house knowledge that has yet to be commercialized.⁷⁹ Modes of “inside-out” innovation also include licensing, joint ventures, and venture capital, as well as internal corporate venturing, and divesting—or, “spinning out”—unused technologies.⁸⁰ IBM licenses a considerable amount of technology and also sells internally-developed technology components to its competitors.⁸¹ These tactics work to make the technology more cost-effective, especially when fierce competition bars IBM from controlling or maintaining a competitive edge in any one branch of technology.⁸² Another radical innovation strategy is IBM’s internal corporate venturing through an internal website they call the “Thinkplace.”⁸³ Acting like an internal market, employees post ideas and proposals and their colleagues vote on them.⁸⁴ The highest rated ideas move on to the next stage where a manager sponsors and takes ownership of each idea’s development.⁸⁵ Three to four employees from around the world form a team and allocate one day a week to work on the project.⁸⁶ In this way, IBM invests and capitalizes on its employees and encourages cross-border collaboration.

C. Globalized Open Innovation

Globalization has collapsed the world of R&D, dramatically expanding the number of potential partners in the development of global innovation networks.⁸⁷ Firms forge these networks by building their own R&D facilities abroad and by collaborating with local partners and suppliers in foreign countries.⁸⁸ Locations for R&D investment are often based on a country’s technological infrastructure as well as the firm’s abilities to grasp trends in local markets, to benefit from local knowledge and skilled personnel, to access technology and spillover from other R&D activities, to support local manufacturing facilities, and to form strategic alliances with universities or government institutions.⁸⁹ In this regard, emerging

79. De Backer, Lopez-Bassols & Martinez, *supra* note 3, at 8.

80. OECD, *supra* note 3, at 38, 40.

81. CHESBROUGH, *supra* note 11, at 109.

82. *See id.* at 108.

83. OECD, *supra* note 3, at 97

84. *Id.*

85. *Id.*

86. *Id.*

87. De Backer, Lopez-Bassols & Martinez, *supra* note 3, at 8; *see* OECD, *supra* note 3, at 33.

88. De Backer, Lopez-Bassols & Martinez, *supra* note 3, at 8.

89. OECD, *supra* note 3, at 30–32; De Backer, Lopez-Bassols & Martinez, *supra* note 3, at 8.

countries are increasingly attractive because of low costs and, where the education system is strong, a large number of trained researchers.⁹⁰ Lower costs are attractive for any business, but the allure isn't only about the bottom line; there is also the potential for smaller companies—those that would not otherwise have the necessary resources or level of investment—to enter the globalized market.⁹¹

Despite this potential leveling of the playing field between MNEs and small firms, research shows that at least 98% of the 700 firms with the largest R&D expenditures are MNEs. These 700 firms account for close to half of the world's total R&D expenditure and more than two thirds of the world's business R&D.⁹² Recent evidence shows that these top spenders are increasing their investments outside their home countries.⁹³ IBM is one of the top twenty firms in R&D expenditures⁹⁴ and it has truly internationalized its R&D strategy. Since 1995, it has operated a wholly owned R&D facility in China⁹⁵ and currently has collaboratories underway in China, India, Ireland, Saudi Arabia, Switzerland, and Taiwan.⁹⁶ Furthermore, IBM is working with Taiwan's publicly funded Industrial Technology Research Institute, its Institute for Information Industry, and several universities to research and develop healthcare services and devices geared toward preventive medicine and wellness.⁹⁷

90. OECD, *supra* note 3, at 31. This phenomenon is interesting on a social level as well. In what is basically a reverse "brain drain," large companies invest resources and train local talent in their capacity as local employees. Thus, the brightest minds continue to boost their local economies and foster further growth in their countries. This is in stark contrast to the common concern that MNEs hire local talent to work for their companies outside of their home country (usually in a developed country) where they earn money for the company and, ultimately, the developed nation. Alternatively, concerns have been voiced that the emergence of India and China as seats of research and talent will lead to further outsourcing by companies and now in a field of relatively high skill jobs. The potential for this to erode national R&D infrastructures is unsettling to those on this side of the debate. Thus, the open innovation trend has interesting implications for global social policy.

91. *Id.* at 33.

92. U.N. Conference on Trade and Dev. [UNCTAD], *World Investment Report 2005: Transnational Corporations and the Internationalization of R&D*, 119, U.N. Doc. UNCTAD/WIR/2005 (Oct. 29, 2005).

93. Organisation for Economic Co-operation and Development [OECD], *The Internationalisation of Business R&D: Evidence, Impacts and Implications*, at 21 (2008).

94. UNCTAD, *supra* note 92, at 120.

95. *Id.* at 119.

96. Hamm, *supra* note 19, at 41.

97. See Dan Nystedt, *Taiwan to Host IBM's First Joint Healthcare IT Research Unit*, PCWORLD (Dec. 21, 2009), <http://www.pcworld.com/article/185193/taiwan>; Press Release, IBM, IBM Research Collaborates with Leading Taiwanese Institutions to Deliver Wellness-Centric Healthcare via Cloud Computing (Dec. 21, 2009), *available at*

Taiwan is experienced in technology-driven health care services, and this project explores the potential role of mobile devices, analytics, and cloud computing in preventative medicine and illness management.⁹⁸ Ultimately, the goal is to pioneer smarter solutions, test drive them in Taiwan, and then work together to export them to the rest of the world.⁹⁹

D. Open Innovation and Intellectual Property

The type and extent of open innovation strategy pursued in foreign countries often reflects the country's national intellectual property regime.¹⁰⁰ In fact, intellectual property is at the heart of open innovation as technologies or ideas being accessed, licensed, or sold are embodiments of intellectual property. "[T]he open innovation paradigm . . . is as much a change in the use, management, and employment of [intellectual property] as it is in technical and research driven generation of [intellectual property]."¹⁰¹ With open innovation strategies, companies take a proactive approach to intellectual property, usually in the form of patents, as an integral part of their technology strategy and capital creation.¹⁰² Patents are strategically utilized not only to leverage a firm's own product development, but also to profit off others' uses of its ideas.¹⁰³ Thus, firms shop for patents that compliment their own innovations and also offer unused technologies for more efficient allocation.

A clear example of intellectual property rights at the heart of an open innovation strategy is that of pooled R&D. "[F]irms donate [intellectual property] to the open-source project while exploiting the common benefits of all contributors to facilitate the sale of related products."¹⁰⁴ For instance, IBM has donated 300 of its software patents to the public domain for anyone working on open source projects.¹⁰⁵ Further, IBM employees are often tasked with contributing to open source software.¹⁰⁶ These activities may seem counterintuitive for value creation; however,

<http://www-03.ibm.com/press/us/en/pressrelease/29086.wss>; Yeshim Deniz, *IBM to Deliver Healthcare Through Cloud Computing*, AJAX WORLD MAG. (Dec. 21, 2009), <http://ca.sys-con.com/node/1227658>.

98. *Id.*

99. *Id.*

100. OECD, *supra* note 3, at 42.

101. WEST & GALLAGHER, *supra* note 15, at 320.

102. CHESBROUGH, *supra* note 11, at 56, 155.

103. *Id.*

104. WEST & GALLAGHER, *supra* note 15, at 323.

105. OECD, *supra* note 3, at 104. IBM will retain the patents, but has agreed not to seek royalties or place restrictions on their use, as long as they are used in open source projects.

106. CHESBROUGH, *supra* note 13, at 45.

the donated intellectual property creates demand for related products and services sold by IBM and fosters industry advancement and goodwill.¹⁰⁷

In open source situations, the intellectual property created is nonproprietary and, therefore, the arrangement of each party's rights is less complex than in situations such as partnerships and collaborations.¹⁰⁸ The obvious question that all partnerships encounter is how to properly allocate the benefits of the partnership.¹⁰⁹ IBM customizes each partnership agreement,¹¹⁰ producing a range of results from publicly shared and royalty free outputs to sponsored research where the output is intended to be owned by one or both of the partners.¹¹¹ However, one survey reports that of 300 senior executives, 60% of them indicated that intellectual property theft is the biggest risk in collaborating on innovation with international partners.¹¹²

Collaborative partnerships may require significant transfers of existing intellectual property and the "know-how" or the specialized practical skills necessary to utilize these shared technologies.¹¹³ Companies face an increased risk of leakage of proprietary knowledge, involuntary spillovers, and potential loss of control.¹¹⁴ Further, intellectual property has been described as "sticky" because exposure to the technology and know-how pollutes the firm, resulting in an "embedding problem."¹¹⁵ Once an employee learns about the intellectual property, the knowledge sticks with the employee and he or she unwittingly uses it in the future.¹¹⁶ The concern over this dissipation of know-how once prevented foreign partnerships.¹¹⁷ Now, studies indicate that companies act strategically in choosing where to operate abroad, taking account of national intellectual

107. See WEST & GALLAGHER, *supra* note 15, at 325.

108. See Sawyer, *supra* note 2, at 317 ("It can become difficult even to identify what the proper componential decomposition of a new innovation is. These realities provide many challenges for IP, including how to determine what proportion of ownership rights the creator of each individual idea should receive.").

109. See OECD, *supra* note 3, at 42. Successful partnerships will discuss these issues prior to starting the collaboration, otherwise serious breakdown often occurs. With today's IP regime, though, the winner might always be the partner with the best contract lawyer and the savviest understanding of the complex web of international patent laws.

110. IBM, *supra* note 74

111. *Id.*

112. EIU, *supra* note 57, at 2, 14.

113. OECD, *supra* note 3, at 34; see also Eric von Hippel, *Cooperation Between Rivals: Informal Know-How Trading*, 16 RES. POL'Y 291, 292 (1987).

114. OECD, *supra* note 3, at 41.

115. GENE SLOWINSKI & MATTHEW W. SAGAL, *THE STRONGEST LINK: FORGING A PROFITABLE AND ENDURING CORPORATE ALLIANCE* 154-55 (2003).

116. *Id.*

117. OECD, *supra* note 3, at 42.

property regimes to determine what types of R&D to carry out.¹¹⁸ For example, in emerging countries where intellectual property rights are weak,¹¹⁹ a company will focus R&D on technologies that require complementary assets unavailable in the host country.¹²⁰ Additionally, firms employ various tactics to foster the trust and confidence necessary to facilitate a free flow of knowledge within the partnership. Nondisclosure, confidentiality, and exclusivity agreements are often central in this endeavor.¹²¹

II. INTERNATIONAL INTELLECTUAL PROPERTY

Legal contracts between partners are a common business practice. However, in the context of open innovation these contracts take on a central role as a means of facilitating the active use of intellectual property assets.¹²² Businesses have adapted to meet the challenges of globalization and increased competition by utilizing patents in ways other than for the mere protection of ideas.¹²³ Meanwhile, patent law around the world remains static and rooted in a singular logic. It aims to curb a perceived market failure by rewarding inventors with a period of exclusivity in order to incentivize further innovation.¹²⁴ However, this system is unlikely to anticipate or be able to react to problems that arise from the offensive use of intellectual property assets.¹²⁵

Individual nations maintain their own national patent systems. There is no global patent law, *per se*; instead, international patent law is com-

118. *Id.*

119. Some may argue that these countries deserve access to the technologies used in the partnership for development purposes. Others will counter that the companies owning the proprietary knowledge are not required to allow “free-riders,” even if we are talking about a least developed country. Regardless of the “right answer” to this question, bringing advanced technology into a country for the first time can only have positive repercussions for those exposed to it due to the “leaky” and “sticky” nature of IP.

120. OECD, *supra* note 3, at 42.

121. *Id.* at 103.

122. *Id.*

123. CHESBROUGH, *supra* note 13, at 81.

124. R. VAN WENDEL DE JOODE, J.A. DE BRUIJN & M.J.G. VAN EETEN, PROTECTING THE VIRTUAL COMMONS: SELF-ORGANIZING OPEN SOURCE AND FREE SOFTWARE COMMUNITIES AND INNOVATIVE INTELLECTUAL PROPERTY REGIMES 52 (2003); Sawyer, *supra* note 2, at 321. Admittedly, this is traditionally thought of as the U.S. perspective with other countries focusing on labor or natural law theories. However, TRIPs harmonization of national laws has arguably established this utilitarian philosophy as the mainstay of international patent law. Doris Estelle Long, “Democratizing” Globalization: Practicing the Policies of Cultural Inclusion, 10 CARDOZO J. INT’L & COMP. L. 217, 243 (2002).

125. *Cf.* Sawyer, *supra* note 2, at 318 (“Many features of the current IP regime reward behavior that blocks the natural flow of innovation in collaborative webs . . .”).

posed of various agreements that link these territorial laws together. These agreements have successfully harmonized domestic laws more and more over the years; however, important areas are still in discord and the overall rationale behind patent law remains static. In order to understand how patent law must change, it is important to know the foundation upon which the existing laws are built.

The formal law of patents as we know it today began in the late fifteenth century in Venice as “an instrument designed to attract engineers to the Republic.”¹²⁶ Interestingly, this statute did not grant a monopoly to the patentee but instead ensured royalties for compulsory licenses, a more public policy oriented rationale.¹²⁷ The notion of intellectual property as private property was popularized in America and eventually enshrined in The International Convention for the Protection of Industrial Property (the “Paris Convention”) in 1883.¹²⁸ Though the Paris Convention grants individuals from any member state equal protection under the laws of any other member state,¹²⁹ a look at the distinct patent laws of individual states suggests that the underlying purpose of patent rights remains in dispute.¹³⁰

The Paris Convention is the “bedrock of the international patent system.”¹³¹ It commits its members to three key principles. First, members must treat foreign inventors from member states no worse than domestic

126. GRAEME B. DINWOODIE ET AL., *INTERNATIONAL INTELLECTUAL PROPERTY LAW AND POLICY* 415 (2d ed. 2008).

127. *Id.*

128. Convention of Paris for the Protection of Industrial Property, Mar. 20, 1883, *revised* Oct. 31, 1958, 13 U.S.T. 1, 828 U.N.T.S. 107 [hereinafter Paris Convention]. Please note that the Paris Convention underwent revision several times since its inception on Mar. 20, 1883: Brussels on Dec. 14, 1900; Washington on Nov. 6, 1925; London on Jun. 2, 1934; Lisbon on Oct. 31, 1985; and Stockholm on July 14, 1967. *Id.*; *see also* DINWOODIE ET AL., *supra* note 126, at 421–24.

129. DINWOODIE ET AL., *supra* note 126, at 424.

130. Note, for example, that U.S. law grants patents to the first-to-invent, with contest procedures to ensure the correct individual receives the patent and a tenancy-in-common grant for joint inventors. On the other hand, all other foreign systems award patents to the first-to-file, valuing the sharing of the invention over the protection of the “true” inventor. *Compare* 35 U.S.C. §§ 102, 262 (2006), *with* Tokkyohō [Patent Act], Act No. 121 of 1959, art. 29(2) (amended 2006).

131. DINWOODIE ET AL., *supra* note 126, at 426; *see also* John R Thomas, *Multinational Patent Acquisition and Enforcement: Public Policy Challenges and Opportunities for Innovative Firms*, in *PATENTS: ISSUES AND LEGAL DEVELOPMENTS* 143, 159 (John V. Martin ed., 2002) (referring to the Convention as “the foundation patent harmonization treaty”); Robert R. Willis, *International Patent Law: Should United States and Foreign Patent Laws Be Uniform? An Analysis of the Benefits, Problems, and Barriers*, 10 N.C.J.L. & TECH. 283, 288 (2009) (calling the Paris Convention the “foremost international intellectual property regime”).

inventors, and must provide them the same protections and the same access to legal remedies (this is the “national treatment” provision).¹³² Second, national patent rights are independent of one another,¹³³ thus, each country must enforce them individually within the distinct patent law regimes.¹³⁴ Third, a patent seeker who files in a member country must be given 12 months to file in another member country without prejudice regarding information that enters the public domain.¹³⁵ Known as the “international priority principle,” this provision is significant considering that many nations still have strict laws that any disclosure of an invention prior to the filing of a patent defeats the patentability of the invention.¹³⁶ Thus, the priority provision allows the patent seeker to preserve the first filing date while arranging for filing abroad.¹³⁷

Though the Paris Convention was a giant step toward alignment of national patent systems, the agreement fell short of any real substantive harmonization, and it failed to streamline the patent application procedures and provide effective enforcement mechanisms. The latter issue was addressed in the 1970 Patent Cooperation Treaty (“PCT”), which allows a single “international patent application” to be submitted to the national offices of designated member countries.¹³⁸ This simplifies the application process and reduces costs. It is important to note, however, that the international application does not result in a single, global patent but rather commences national applications in jurisdictions that are members of the PCT.¹³⁹ Ultimately, it is still the decision of the national patent authority whether to issue a patent and to protect the rights conferred.¹⁴⁰

132. Paris Convention, *supra* note 128, art. 2.

133. *Id.* art. 4bis.

134. Thomas, *supra* note 131, at 143, 159.

135. Paris Convention, *supra* note 128, art. 4.

136. *See, e.g.*, Convention on the Grant of European Patents (European Patent Convention), art. 54(2), *concluded* Oct. 5, 1973, 1065 U.N.T.S. 254 (as amended in 2000) [European Patent Convention] (“The state of the art shall be held to comprise everything made available to the public by means of a written or oral description, by use, or in any other way, before the date of filing of the European patent application.”); Tokkyohō [Patent Act], Act No. 121 of 1959, arts. 29(1), 30 (amended 2006) (disqualifying any invention that was made publicly known more than six months prior to filing the patent in Japan).

137. Thomas, *supra* note 131, at 143, 160.

138. Patent Co-operation Treaty, *done* Jun. 19, 1970, 28 U.S.T. 7645, 1160 U.N.T.S. 231; *see also* Thomas, *supra* note 131, at 143, 160–61 (citing ABBOTT, FREDRICK ET AL., THE INTERNATIONAL INTELLECTUAL PROPERTY SYSTEM: COMMENTARY AND MATERIALS 646 (1999)).

139. *See* Thomas, *supra* note 131, at 143, 161; Willis, *supra* note 131, at 291.

140. DANIEL C.K. CHOW & THOMAS J. SCHOENBAUM, INTERNATIONAL TRADE LAW 211 (2008).

The desire for substantive harmonization of patent laws was finally addressed in TRIPs under the WTO framework.¹⁴¹ This agreement, adopted by more than 153 members,¹⁴² is the primary authority on international patent law, as it directly incorporates the Paris Convention¹⁴³ and also provides minimum substantive standards, enforcement provisions, and a dispute settlement mechanism.¹⁴⁴ Though this agreement mandates that members bring their national laws into harmonized compliance, there is still considerable flexibility built into the agreement,¹⁴⁵ and a variety of issues remain the province of national law.

The TRIPs substantive standards provide that, at a minimum, members must give patent rights for inventions in all fields of technology as long as they are new, involve an inventive step, and are useful.¹⁴⁶ With a few exceptions to patentability,¹⁴⁷ this standard clearly indicates the outer parameters for which patents will be granted in exchange for disclosure.¹⁴⁸ TRIPs enshrines the traditional utilitarian, market failure logic by mandating—with a few exceptions¹⁴⁹—the right to exclude others from “making, using, offering for sale, selling[,] or importing” the patented subject for at least 20 years.¹⁵⁰ TRIPs also requires members to provide minimum enforcement mechanisms domestically¹⁵¹ and provides access

141. Agreement on Trade-Related Aspects of Intellectual Property Rights, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1C, 1869 U.N.T.S. 299, 33 I.L.M. 1197 (2004) [hereinafter TRIPs].

142. See generally World Trade Organization, Members and Observers, available at http://www.wto.org/english/thewto_e/whatis_e/tif_e/org6_e.htm (last visited Oct. 18, 2009) (listing members as of July 23, 2008).

143. TRIPs, *supra* note 141, art. 2.

144. Thomas, *supra* note 131, at 144, 163.

145. For example, Article 7 specifies that IP rights should be “conducive to social and economic welfare.” Article 8 allows for the protection of public health and the promotion of public interest in sectors of vital importance to their socio-economic and technological development.” Article 30 provides for “limited exceptions to the exclusive rights conferred by a patent.” And Article 66 allows grace periods for least-developed countries to comply with the standards. TRIPs, *supra* note 141.

146. TRIPs, *supra* note 141, art. 27.

147. *Id.* art. 27(2), (3) (providing exceptions to patentability for diagnostic, therapeutic, and surgical methods for treating humans or animals; for biological processes for growing plants or breeding animals; and for interests such as avoiding serious prejudice to the environment or protecting public order, morality, or human, animal, or plant life).

148. *Id.* art. 29 (“[A]n applicant for a patent shall disclose the invention in a manner sufficiently clear and complete for the invention to be carried out by a person skilled in the art.”).

149. *Id.* art. 30.

150. *Id.* arts. 28, 33; see Long, *supra* note 124, at 243.

151. TRIPs, *supra* note 141, art. 41, 44–46.

to the Dispute Settlement Body¹⁵² of the WTO, where the flex of other trade measures can pressure compliance with intellectual property laws.¹⁵³

All in all, the Paris Convention, the PCT, and TRIPs together provide the first steps towards a harmonized patent system. However, the international community continues to debate the future of patent law and the World Intellectual Property Organization (“WIPO”) is a forum in which members frequently grapple with such issues. Created in 1967, this specialized agency of the United Nations has as its mandate to “promote the protection of intellectual property throughout the world.”¹⁵⁴ In this role, the WIPO acts as the administrator of several intellectual property agreements including the Paris Convention and the PCT.¹⁵⁵ Additionally, TRIPs provides for an ongoing relationship with WIPO; for instance, WIPO members act as consultants regarding the implementation of TRIPs provisions.¹⁵⁶ WIPO also develops intellectual property policy and serves as a forum for discussion of potential improvements to international intellectual property rights. It is in this vein that WIPO’s Standing Committee on the Law of Patents has been addressing issues of harmonization.¹⁵⁷ Nevertheless, to acquire, manage, and enforce patent rights throughout the world is a complex and costly endeavor.¹⁵⁸ Even firms with the means to successfully achieve these ends may find the system inefficient in or incapable of supporting their global innovation.¹⁵⁹

152. *Id.* art 64.

153. *Cf.* CHOW & SCHOENBAUM, *supra* note 140, at 200 (explaining that a members protection of intellectual property rights plays a role in either encouraging or discouraging trade with other members); DINWOODIE ET AL., *supra* note 126, at 777 (describing the ability of members to retaliate against countries that refuse to comply with the agreement through the suspension of other trade concessions or obligations).

154. *What is WIPO*, WORLD INTELLECTUAL PROP. ORG., http://www.wipo.int/about-wipo/en/what_is_wipo.html (last visited Apr. 21, 2010).

155. *Id.*

156. TRIPs, *supra* note 141, art 68.

157. World Intellectual Prop. Org., Substantive Patent Law Harmonization, <http://www.wipo.int/patent-law/en/harmonization.htm> (last visited Apr. 21, 2010).

158. Thomas, *supra* note 131, at 143–144.

159. *Cf.* WENDY H. SCHACHT & JOHN R. THOMAS, CONGRESSIONAL RESEARCH SERVICE, PATENT REFORM IN THE 111TH CONGRESS: INNOVATION ISSUES 7 (2009) (“[P]atent protection in a single jurisdiction is an inefficient method to protect the interest of both domestic and international inventors.”); Sawyer, *supra* note 2, at 318 (“Current policy favors linear, centralized innovation, and blocks the natural rhythm of the collaborative web.”).

III. PATENT HARMONIZATION THROUGH THE LENS OF OPEN INNOVATION

It has been stated that “[t]he continued need for harmonization remains prevalent due to the globalization of commerce, the reduction of trade barriers, and the need for stability and predictability in international patent protection.”¹⁶⁰ However, despite the forces driving the international buzz over harmonization,¹⁶¹ the conversation largely fails to consider the implications of globalized commerce for patent reform. Open innovation, as one such trend in global business, should be considered both for the insight it can provide on patent reform, as well as for the impact that proposed harmonization can have on the stability and predictability of patent law in use. Harmonization debates generally focus on broader issues such as patent quality, costs, and scope of patentability with a specific focus on differences in patent priority, grace periods, and enforcement.¹⁶² These issues must be reexamined through the lens of open innovation.

A. Patent Priority

The United States is the only patent-issuing nation in the world to maintain a first-to-invent priority system.¹⁶³ In the event that more than one application is filed in the U.S. claiming the same invention, the patent is awarded to the applicant who can establish the earliest “date of conception, and reduction to practice of the invention,” as well as reasonable diligence to patent.¹⁶⁴ Outside the U.S., the first-to-file priority system grants the patent to the first applicant, regardless of whether he was actually the original inventor.¹⁶⁵ On the most basic level, the co-existence of these two systems could result in the award of patent rights

160. Ryan M. Corbett, Note, *Harmonization of US and Foreign Patent Law and H.R. 2795: The Patent Reform Act of 2005*, 18 FLA. J. INT’L L. 717, 722–23 (2006).

161. See generally Patent Reform Act of 2009, H.R. 1260, S. 515, S. 610, 111th Cong. (2009) (bills in both houses proposing significant changes to initiate some level of harmonization); EUROPEAN PATENT OFFICE, *supra* note 1, at 1 (explaining that “European patents are granted on the basis of harmonised law codified in the European Patent Convention” and exploring the potential for future international patent regimes); World Intellectual Prop. Org., *supra* note 157 (providing background on the international body’s work toward harmonization).

162. See Thomas, *supra* note 131, at 143, 151–58; see also SCHACHT & THOMAS, *supra* note 159; Willis, *supra* note 131.

163. Thomas, *supra* note 131, at 143, 152.

164. 35 U.S.C. § 102(g) (2006); see also SCHACHT & THOMAS, *supra* note 159, at 13.

165. Thomas, *supra* note 131, at 143, 153.

to different individuals for the same invention.¹⁶⁶ Proponents of the first-to-invent argue that it is a more equitable system, ensuring that the original inventor secures the patent.¹⁶⁷ Supporters of the first-to-file system believe that it provides greater legal certainty within innovative industries because the date of priority is stable and easily discernable.¹⁶⁸ Moreover, it reduces the complexity and limits the delays and the costs that arise when the true inventor is contested.¹⁶⁹

The priority system has several implications for open innovation. In a world where intellectual property assets are used offensively (rather than merely guarded jealously) the international community must consider the best way to manage licensing. Certainty of patent ownership facilitates efficient transfers of licensing and technology.¹⁷⁰ However, the first-to-invent system breeds uncertainty in a manner that is particularly harsh on small firms. When attempting to sell or license internally developed intellectual property, small firms may have reduced bargaining power since "true" ownership may be contested.¹⁷¹ Alternatively, lengthy and costly proceedings are often mandatory to prove priority of inventorship, and this leaves smaller (perhaps geographically removed) partners at a distinct disadvantage. In collaborative partnerships, the evidence necessary to win such a contest may be harder to manage or even inaccessible after the alliance ends. Further, U.S. law is ambiguous with respect to the level of contribution required by a team member to qualify as an inventor, and this fosters uncertainty and apprehension during collaboration.¹⁷² Hence,

166. *Id.* at 143, 172. Consider the following example that takes place among applicants from member nations of the previously mentioned treaties: applicant A files for a patent in country Y (a first-to-file country), as well as in country Z (a first-to-invent country). One month later, applicant B also files for a patent in both countries Y and Z claiming the exact same invention as applicant A. In country Y, applicant A clearly wins the patent as well as all subsequent patents filed in first-to-file countries using the priority principle under the Paris Convention. However, if applicant B can in fact prove that it is the first inventor, applicant B will win patent protection in country Z. Thus, different parties hold the rights to the same invention in different nations, and the international community lacks legal certainty.

167. Willis, *supra* note 131, at 295.

168. SCHACHT & THOMAS, *supra* note 159, at 14.

169. *Id.*

170. See BESSEN & MEURER, *supra* note 37, at 184 (stating that patents can facilitate licensing or sale of technology but only when boundaries are well defined).

171. *Cf. id.* at 167 ("Small inventors especially suffer because fuzzy boundaries mean that they realize less value from licensing or selling their patents.").

172. JOHN R. THOMAS, CONGRESSIONAL RESEARCH SERVICE, INTELLECTUAL PROPERTY AND COLLABORATIVE RESEARCH 15 (2005). Further, it should be noted that the U.S. system raises issues of apprehension and uncertainty even once the collaboration is complete. Where both parties to an invention are named as "joint inventors," they each, indi-

pre-research contracting is exceedingly important; meanwhile, this also carries serious implications for unsophisticated parties.¹⁷³

B. Grace Periods

Grace periods are another hotly contested issue within international negotiations. After a public disclosure of an invention (through publication or sale) by either the inventor or a third-party, the U.S. grants the inventor a grace period of one year to file a patent application.¹⁷⁴ Foreign jurisdictions are not as lenient. In Japan, an inventor has six months after personally disclosing the invention and no grace period at all for disclosures by third parties,¹⁷⁵ and the EU holds that “any sales or publication of an invention anywhere in the world prior to the filing date defeats the patentability of an invention.”¹⁷⁶ Proponents of the grace period argue that it allows leeway for inventors who are unfamiliar with foreign patent regimes and that it encourages public testing of inventions.¹⁷⁷ Critics argue that grace periods only serve to elongate the patent term and increase commercial uncertainties.¹⁷⁸

Of particular interest in the case of open innovation are the debates concerning academic and scientific communities. Though these communities have long been partners in innovation, the academic research community relies on norms that contravene many patent law principles.¹⁷⁹ Based on the notion that the best way to further science is to share research results, academic researchers widely believe that new knowledge should be shared as quickly as possible.¹⁸⁰ Though academics are fairly patent-savvy today,¹⁸¹ grace periods help support the continued practice of quick publication of academic research results.¹⁸² Critics of

vidually, have exclusive rights granted under the patent. As with the real property concept of a “tenancy in common,” each can do with the patent what he will, including licensing or selling the innovation to his or her partner’s competitors. Clearly, this system raises some concerns for open innovation.

173. *Id.*

174. 35 U.S.C. § 102(b) (2006).

175. Tokkyohō [Patent Act], Act No. 121 of 1959, arts. 29(1), 30 (amended 2006).

176. Thomas, *supra* note 132, at 153; *see also* European Patent Convention, *supra* note 136, art. 54(2).

177. JOSEPH STRAUS, EXPERT OPINION ON THE INTRODUCTION OF A GRACE PERIOD IN EUROPEAN LAW 50 (2000).

178. JAN E.M. GALAMA, EXPERT OPINION ON THE CASE FOR AND AGAINST THE INTRODUCTION OF A GRACE PERIOD IN EUROPEAN LAW 13 (2000).

179. Rebecca S. Eisenberg, *Proprietary rights and the Norms of Science in Biotechnology Research*, 97 YALE L.J. 177, 182 (1987).

180. *Id.*

181. SCHACHT & THOMAS, *supra* note 159, at 9.

182. STRAUS, *supra* note 177, at 54.

grace periods contend that academics and scientists choosing to participate in the commercial sphere must accept the legal rules that govern that sphere and adjust their behavior accordingly.¹⁸³ However, businesses are increasingly reaching out to fund university R&D,¹⁸⁴ though it has been argued that “[u]niversities are less well equipped to employ a ‘pro-active’ [intellectual property rights] strategy.”¹⁸⁵

Ultimately, the patent regime should help ensure that collaborative partnerships are mutually beneficial. Where one partner adheres to the norms of a specific community, the grant of patent rights should not be predicated upon the relinquishment of community norms.¹⁸⁶ Thus, as long as the norms of these communities do mandate prompt publication of findings, grace periods would facilitate open collaboration.¹⁸⁷

C. Enforcement

TRIPs provides for the first international dispute resolution mechanism for issues regarding intellectual property violations. However, disputes at the WTO are brought by and against nations, and, while they regard individual instances of violation, the WTO adjudicators are not able to coerce nations into providing remedies,¹⁸⁸ and they do not have any true law-making authority.¹⁸⁹ Therefore, patent litigation largely takes place

183. GALAMA, *supra* note 178, at 23.

184. De Backer, Lopez-Bassols & Martinez, *supra* note 3, at 11.

185. OECD *supra* note 3, at 116 (“[For universities,] management of IP in an open innovation context—as opposed to the technology transfer approach of licensing patents—remains a challenge, especially in their interactions with firms.”).

186. The choice to publish rather than patent does not always rest on community norms. Sometimes it is in a company’s economic interest to publish knowledge so that it is available to everyone without cost. This would be the case where the company knows it wouldn’t be able to maintain exclusivity for long. Thus, it is in the firm’s interest to make sure no one else tries to patent the idea while also promoting industry advancement through disclosure.

187. Some critics argue further that, for the reliability of knowledge production, it is essential that big businesses do not impede access to knowledge for the sole purpose of commercial exploitation. This is interesting considering that the “public good” of knowledge dissemination is the goal of patent law; however, these critics believe that the regime may actually serve as an impediment to that very goal. See Paul A. David, *Will Building “Good Fences” Really Make “Good Neighbors” in Science?* 2 (Stanford Inst. for Econ. Policy Research, Discussion Paper No.00-33, 2001) (citing Laxenburg Statement on the Global Science System, (Oct. 10, 1997)).

188. CHOW & SCHOENBAUM, *supra* note 140, at 52 (explaining that the WTO system works by peer pressure rather than any inherent enforcement authority).

189. See Marrakesh Agreement Establishing the World Trade Organization, Apr. 15, 1994, 1867 U.N.T.S. 154 art. IX(2) (granting exclusive authority to the Ministerial Conference and the General Council to interpret the agreements of the WTO); Panel Report, *Japan—Taxes on Alcoholic Beverages*, WT/DS8 (adopted Nov. 1, 1996) (interpreting art.

in the national court systems, subject to national patent laws. Further, patent holders bear the responsibility for monitoring their own patents in each individual country.¹⁹⁰ Both of these activities are costly and have implications for actual patent value. It has been stated, as an industry rule of thumb, that \$1.5 million in legal fees can be expected in the course of defending any given patent infringement lawsuit.¹⁹¹ Hence, some have found that litigation costs are in fact a *disincentive* to innovate.¹⁹² One study found that “worldwide patent profits were about 6 percent of R&D while litigation costs were also about 13 percent . . . that is, patents acted as a net *tax* on R&D.”¹⁹³

Thus, for any party using open innovation, the threat of litigation and the cost of monitoring worldwide patents may be prohibitive. Further, with open innovation, the need for protection extends beyond the issuance of the patent itself and must also contemplate an increase in contractual exchanges of intellectual property rights. Small firms may be at a particular disadvantage in terms of protecting their rights since they are not as well positioned to spread the cost of litigation over large numbers of patents.¹⁹⁴ This has implications for the relative bargaining power of different sized partners in a collaborative partnership. While a firm like IBM may have a handle on monitoring and protecting its intellectual property, a small firm from a remote location might not stand a chance. Additionally, though the Paris Convention assures equal access to protection and remedies for all members, the practicalities of that access are likely to prove prohibitive.

D. Patent Quality

Patent Quality is a concern that arises concurrently with many of the above-mentioned issues. For example, some commentators argue that shifting to a first-to-file system encourages a rush to the patent office at the expense of patent quality.¹⁹⁵ Grace periods allow for the receipt of feedback on inventions, which would facilitate perfection of patents prior

IX(2) of the Marrakesh Agreement as a deliberate grant of exclusive interpretive authority, thus, precluding the existence of the authority elsewhere); see Strandburg, *supra* note 2, at 308 (“TRIPs suffers from a law-making deficit because of the rarity and non-precedential character of WTO panel decisions.”).

190. THOMAS, *supra* note 172, at 7.

191. Mark H. Webbink, *A New Paradigm for Intellectual Property Rights in Software*, DUKE LAW AND TECH. REV., May 1, 2005, 15, 22.

192. BESSEN & MEURER, *supra* note 37, at 14.

193. *Id.* at 145 (emphasis in original).

194. *Id.* at 178.

195. Thomas, *supra* note 131, at 143, 153.

to filing and would thus enhance patent quality.¹⁹⁶ This could, in turn, reduce litigation because poor patent quality often leads to inadvertent infringement.¹⁹⁷ Poor patent quality cannot be tied to any one source, though the flood of patent applications in recent years does not bode well for quality control. Patent boundaries are often fuzzy and their scope can be hard to determine, which give rise to inadvertent infringement.¹⁹⁸ Further, unclear rights raise bargaining costs and heighten the chance that deals will break down.¹⁹⁹ Thus, it becomes “increasingly costly to find and negotiate the necessary patent license in advance of . . . technology development and adoption decisions.”²⁰⁰ To better support the increased movement of technology in light of open innovation, patent reform must focus on enhancing patent quality.

E. Open Innovation Raises Additional Concerns with International Patent Law

In addition to these common areas of focus for patent harmonization, open innovation raises unique questions about the appropriateness of the international patent regime. Some scholars argue that advances like open innovation do not readily fit under the sales-oriented, proprietary model of intellectual property, which underlies agreements such as TRIPs.²⁰¹ TRIPs applies a one-size-fits-all standard of strong protection for all technologies, reflecting its primary goal as an instrument of trade.²⁰² It is questionable whether an instrument of trade is even an appropriate means to regulate innovation since “innovative practices are simply not well-described as means by which goods invented and produced in one place are sold in another.”²⁰³ Further, as previously discussed, the WTO seems ill-equipped as an adjudicatory body for disputes arising among patent holders.

The particular grounds covered—or neglected—by TRIPs are also problematic in the context of open innovation. One basic concern is that an across-the-board mandate of a minimum of 20 years of exclusory protection could be excessive. With product life cycles drastically short-

196. *Cf. id.* (“[Grace periods] encourage[] the development of inventions that require a certain amount of public testing before the invention can be said to be complete.”).

197. *Cf. Schacht & THOMAS, supra* note 159, at 5–6.

198. BESSEN & MEURER, *supra* note 37, at 22.

199. *Id.* at 21.

200. *Id.* at 46.

201. Strandburg, *supra* note 2, at 284.

202. *Id.* at 298; Long, *supra* note 124, at 243 (“TRIPs . . . undeniably established that intellectual property protection is a trade matter.”).

203. *Id.* at 16.

ened—for example, most software is only used for two to three years²⁰⁴—patents could bar further innovation on a given technology even if that technology is no longer actively used. This raises another concern regarding the cumulative nature of inventions.²⁰⁵ The highly complex nature of products today is often the result of a cumulative process²⁰⁶ whereby knowledge from one innovation becomes input for subsequent research.²⁰⁷ This interdependence of knowledge creation raises questions of infringement protection. Notably, TRIPs does not set an upper bound for intellectual property protection which creates a potential holdout problem.²⁰⁸ Original patent holders are able to block future development and capture a disproportionate amount of the value of new innovations. Future inventors are also left with an often impossible task of obtaining licenses from disperse and numerous *ex ante* patent owners.²⁰⁹ Open innovation only further exacerbates this problem, though some companies have tried to remedy the situation by creating patent pools of the intellectual property required for any given product. Nevertheless, patent reform must contemplate better systems to support cumulative knowledge production.

One of the most important assumptions undergirding the international patent regime is that patents are a positive incentive to innovate and that the inventor would have no means to recoup his investment without a patent.²¹⁰ However, some research indicates that an open innovation regime may in fact be superior as it results in lower innovation costs, as well as lower imitation costs.²¹¹ This finding is premised on the assumption that innovators are able to gain advantages simply by being the first to discover such knowledge.²¹² R&D managers have themselves indicated that other means of appropriating value—for instance, lead-time

204. VAN WENDEL DE JOODE, DE BRUIJN & VAN EETEN, *supra* note 124, at 62.

205. EUROPEAN PATENT OFFICE, *supra* note 1, at 88.

206. *Id.*

207. David, *supra* note 187, at 3; *see* Sawyer, *supra* note 2, at 313 (“In a collaborative web, each innovation builds incrementally on a long history of prior innovations. The creative products that are successful in the market rarely spring to life full-grown.”).

208. *See* Strandburg, *supra* note 2, at 302.

209. Sawyer, *supra* note 2, at 319–20 (“[I]t can take a year or more to contact everyone with an ownership right, find out the price, and get all of the release forms signed.”); Michael A. Heller & Rebecca S. Eisenberg, *Can Patents Deter Innovation? The Anticommons in Biomedical Research*, 280 SCI. MAG. 698, 698 (1998) (describing the granting of patents as creating an anticommons in biomedical research).

210. Rufus Pollock, *Innovation, Imitation and Open Source* 2 n.3 (Econ. & Econometrics Research Inst., Research Paper No. 20/2008, 2008).

211. *Id.* at 16.

212. *Id.* at 17.

advantages, complementary products, or trade secrecy—are more effective than patents in earning returns on investment.²¹³ These mechanisms lend themselves well to open innovation strategies, which suggests that open innovation may be steering companies away from proprietary patent models. Further, in the absence of patent rights, there has not been a corresponding dip in innovation,²¹⁴ while stringent enforcement of intellectual property rights has actually blocked innovation.²¹⁵ Along with the factors listed above, market forces may step in to ensure an optimal level of invention.²¹⁶ Notably, thriving open-source communities provide a prime example of continued innovation in the absence of intellectual property rights.

IV. CHANGING THE WAY WE THINK ABOUT PATENT RIGHTS

The debate around patent harmonization should be framed with innovation in mind. However, for the benefit of the ever-evolving global business landscape, the discussion on patent reform must shift to reexamine the underlying rationale of patent law. Open innovation is the next chapter of global R&D, and, in this technological world, businesses must adapt or retreat. When businesses work together to license their unused intellectual property and to seek needed intellectual property from others, the world of technology and innovation multiplies exponentially.²¹⁷ Still, the interconnectedness of these businesses creates dependence; thus, these businesses need trust and clarity in order to thrive. Patent law continues to be based on static notions of incentives to innovate, inventor rewards, and public disclosure.²¹⁸ The time has come to reevaluate this one-size-fits-all system²¹⁹ and redefine the goals of patent law. To better support today's global businesses, the patent system should aim to clarify boundaries, simplify processes, and facilitate an ever growing intellectual property marketplace.

Patents are not always easily defined, and the lack of notice within the system makes infringement almost inevitable.²²⁰ As with real property, the notice system should serve as a warning to potential trespassers and

213. BESSEN & MEURER, *supra* note 37, at 89.

214. *Cf.* THOMAS, *supra* note 172, at 5 (“Some of our most dynamic industries arose at a time when patent rights were unavailable or uncertain.”).

215. Sawyer, *supra* note 2, at 317.

216. *Id.* at 5.

217. *Cf.* OECD, *supra* note 3, at 45 (discussing the emergence of intermediary markets and brokers for ideas in response to open innovation strategies).

218. VAN WENDEL DE JOODE, DE BRULIN & VAN EETEN, *supra* note 124, at 52–53.

219. SCHACHT & THOMAS, *supra* note 159, at 11.

220. BESSEN & MEURER, *supra* note 37, at 46, 147.

should aid in the movement of resources to the most efficient users. This would make technology markets more efficient²²¹ and reduce the transaction costs of open innovation. As explained by Ronald Coase, “transaction costs” include the costs of: searching, information provision, bargaining, decision-making, and contracting.²²² Through a better international notice system, search costs would be reduced as parties could easily access the patents they need or find buyers for those patents they are looking to sell. Making information accessible to all parties would equalize bargaining power and reduce litigation costs from inadvertent infringement. Open innovation also raises the need for more robust licensing mechanisms and patent registries to help facilitate connections and the efficient allocation of resources.

This signals the emergence of an intellectual property marketplace. Many prematurely assumed that the marketplace was already here and patent brokers and online innovation marketplaces emerged to cater to the new clientele.²²³ However, key problems bar the emergence of a functional intellectual property market.²²⁴ A general lack of information and a lack of standards for valuation make the coordination of market exchange difficult.²²⁵ Additionally, in a world of virtual interconnectedness, assets are now created and held in virtual spaces, and this gives rise to questions of origin and jurisdiction. An effective patent system will become not only a defense mechanism, but will also be expected to define and regulate an emergent innovation market.

One proposed solution is to set up an administrative type of approach that would allow for continuous adjustments to a global innovation policy.²²⁶ This system would rely on WIPO as a locus of innovation policy tasked with the interpretation of TRIPs’ flexibilities and exceptions in accordance with the needs of the innovation community.²²⁷ Ultimately, amendments to TRIPs could be made to extend exceptions for innovation, and WIPO’s administrative role would expand to vet these exceptions.²²⁸ This is an interesting suggestion and a potentially viable solution. However, while innovation is the focus, this focus is still situated

221. *Id.* at 21.

222. Ronald H. Coase, *The Nature of the Firm*, 4 *ECONOMICA* 386 (1937), reprinted in *ECONOMIC ANALYSIS OF CONTRACT LAW, ANTITRUST LAW, AND SAFETY REGULATIONS* 244 (Jenny B. Wahl ed, 1998).

223. See Terra, *supra* note 3, at 7 (detailing the advent of virtual auctions and online showroom websites).

224. CHESBROUGH, *supra* note 13, at 74.

225. *Id.* at 75.

226. Strandburg, *supra* note 2, at 286.

227. *Id.* at 24.

228. *Id.*

within the proprietary, trade-based paradigm of TRIPs. And, while enhancing the flexibilities of this international instrument on an *ad hoc* basis may provide innovators some protection, it is unlikely to encourage and support the continued development of innovation strategies.

It is important to consider a way forward that will avoid further entrenchment of outdated intellectual property rationales that are likely to stifle the evolution of innovation.²²⁹ Any successful solution will have to be flexible. Even the WIPO delegates have pointed out that “[i]n view of the rapid technological innovation and the social and economic challenges, the function, value[,] and impact of the patent system need to be constantly adjusted”²³⁰ Further, it has been suggested that the effectiveness of patents depends largely on the implementing institution.²³¹ Not only must a new institution other than the WTO be named as the arbiter of patents, but the definition of “effective” must be reexamined as well. As noted, owners of intellectual property are taking increasingly proactive roles in the management of their assets under open innovation. The ethos of patent law must shift accordingly to “[redefine] ‘ownership’ to focus on the right to distribute, rather than the right to exclude.”²³² Patent law is ripe for a paradigm shift akin to that of innovation with a focus on a more comprehensive notion of the law’s end goals.

CONCLUSION

The lone inventor no longer dominates the field of innovation. In fact, the companies who command these activities are beginning to embody the fundamental principle that two heads are better than one.²³³ Yet, the patent system, built to encourage innovation and reward inventors, remains faithful to the lone inventor. Thus, patents have become, at times, obstacles to successful innovation rather than incentives.²³⁴ Firms respond to the failure of the patent system by finding alternative means of protection and value creation.²³⁵ However, because intellectual property

229. David, *supra* note 187, at 5.

230. R&D, *Innovation and Patents*, WORLD INTELLECTUAL PROP. ORG., <http://www.wipo.int/patent-law/en/developments/research.html> (last visited Apr. 21, 2010).

231. BESSEN & MEURER, *supra* note 37, at 93.

232. Peter Evans, *The New Commons vs. The Second Enclosure Movement: Comments on an Emerging Agenda for Development Research*, STUD. COMP. INT’L DEV., June 2005, at 85, 87.

233. IBM Business Innovation Centre: *Collaborate Globally*, IBM, <http://www-07.ibm.com/innovation/in/exploit/cbp.html> (last visited Apr. 21, 2010).

234. Heller & Eisenberg, *supra* note 209, at 698–99; *see also* BESSEN & MEURER, *supra* note 37, at 14; Sawyer, *supra* note 2, at 317–18.

235. BESSEN & MEURER, *supra* note 37, at 89.

assets remain at the center of open innovation strategies, complete abandonment of the patent regime is not a viable solution.

Open innovation signals a shift in focus from isolated product development to faster, increasingly proactive management of intellectual property assets.²³⁶ Firms look “outside-in” for knowledge and technology to compliment their internal efforts, and they look “inside-out” to capitalize on others’ uses of their unused intellectual property.²³⁷ Though businesses have long employed these tactics, the rate at which they occur today—and the overall integration of the strategy into business models—signals a new era of R&D.²³⁸ Firms can no longer deny the importance of knowledge produced outside their four walls, and those that have learned to efficiently locate and integrate this knowledge have found a competitive edge. Today, complex technologies composed of multiple patents and ideas are created faster, produced faster, and, ultimately, replaced faster. The key to this cycle is the proactive, offensive use and management of intellectual property rights.²³⁹

Patent laws remain rooted in a traditional notion of reactive, defensive exclusion of others.²⁴⁰ In fact, the regime offers no affirmative rights to inventors—it merely offers the right to prevent others from exploiting one’s invention.²⁴¹ This and other substantive minimum mandates in the TRIPs agreement were heralded in the international arena as a great step forward. However, the harmonization debate has neglected changing global trends for too long. To continue to root patent law in a proprietary, sales-oriented model of intellectual property²⁴² is to ignore the full potential of innovation and intellectual property.

At the least, the debate over patent harmonization should be refocused through a new lens. The push to coordinate national regimes must keep in mind the ways in which these rights are utilized, the different players who use the system, and the clarity needed to meet users’ varying goals. However, if patent harmonization continues to rely on the nineteenth century rationale, open innovation may lead companies away from the

236. See OECD, *supra* note 3, at 103; De Backer, Lopez-Bassols & Martinez, *supra* note 3, at 7; WEST & GALLAGHER, *supra* note 15, at 320.

237. OECD, *supra* note 3, at 18.

238. *Id.* at 24; De Backer, Lopez-Bassols & Martinez, *supra* note 3, at 7; see WEST & GALLAGHER, *supra* note 15, at 320.

239. CHESBROUGH, *supra* note 11, at 155 (noting a shift from intellectual property rights as a means to control to a means of value creation).

240. VAN WENDEL DE JOODE, DE BRUIJN & VAN EETEN, *supra* note 124, at 52.

241. TRIPs, *supra* note 142, at art. 28 (mandating that members provide patent rights that “confer exclusive rights . . . to prevent third parties . . . from the acts of: making, using, offering for sale, selling, or importing”).

242. Strandburg, *supra* note 2, at 284.

use of patents. Patent reform should thus reevaluate the underlying goals of patent law and recognize that innovation does not always have to result in product creation to generate economic value. With this understanding, patent law can move in a new direction with an aim to further knowledge production, ease the sharing of ideas, and promote and police the growing international intellectual property market.

The lone inventor is not extinct. She continues to discover radical new ideas and technologies that change our lives. However, today, this inventor is not alone; she exists in a network of interconnected knowledge producers. The inventor thrives, despite the stunted growth of the patent law meant to support her. Patent reform must take up the torch and adapt to the globalizing world.

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