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By David Orozco*

I. INTRODUCTION

¶1 The *Northwestern Journal of Technology & Intellectual Property* sponsored a recent symposium entitled, "Of BRICs and Mortar: Technological Drivers in Booming Economies." The BRICs acronym in the symposium's title originated from Goldman Sachs research and refers to Brazil, Russia, India and China (BRICS).[1] According to this research, within the next 50 years, the BRICs will become a formidable force in the world economy.[2] The growth model that underpins this forecast assumes appropriate economic and institutional policies, such as inflation controls, deficit reductions, a stable rule of law, adequate healthcare, investments in education, and trade liberalization.[3] Under these assumptions, the Chinese economy could overtake the Japanese economy by 2015 and the United States' by 2039. By 2025, the BRICs could account for more than half the size of the G6, which is comprised of the United States, Japan, Germany, France, Italy, and the United Kingdom.[4] Yet, there is an important and unspoken assumption in these aggressive forecasts. The assumption is that these rising economies will sustain their growth by profiting from technological innovation. As written a few decades ago by the noted management scholar David Teece, firms have to engage the rules of strategic management to capture the value of innovations or minimize the risk of innovating competitors.[5]

¶2 While a good deal of discussion has been given to the role of intellectual property rights in the BRICs, more attention is needed to discuss the strategic positioning of the

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[1] *See* Dominic Wilson & Roopa Purushothaman, *Dreaming with BRICs: The Path to 2050*, GOLDMAN SACHS GLOBAL ECONOMICS WEBSITE, http://www2.goldmansachs.com/insight/research/reports/99.pdf

[2] *Id*. at 3.

[3] *Id*. at 13. Another study that measures the competitiveness of nations focuses on similar factors, for example, the World Economic Forum's Annual Global Competitiveness Index (GCI), at: http://www.weforum.org/pdf/Global_Competitiveness_Reports/Reports/gcr_2006/gcr2006_rankings.pdf The GCI listed these factors as "critical to driving productivity and competitiveness": institutions, infrastructure, macroeconomy, health and primary education, higher education and training, market efficiency, technological readiness, business sophistication, and innovation. According to the 2006 GCI, the BRIC Economies are ranked as follows: India: 43; China: 54; Russia: 62; Brazil: 66.

[4] The press has taken a keen interest in the future of American competitiveness. *See, e.g.*, Pete Engardio, *Emerging Giants*, BUSINESSWEEK, July 31, 2006, at 41; Fareed Zakaria, *Can America Compete?*, NEWSWEEK, June 26, 2006, at 40.

[5] David J. Teece, *Profiting from Technological Innovation*, 15 RES. POL'Y 285 (1986).

critical industries within those economies that drive growth in those regions, namely technology firms. A broader discussion is proposed concerning strategic intellectual property dimensions within Teece's Profiting from Technological Innovation framework (PFI framework). The subject of this paper is the PFI framework as it relates to the dynamic economies of India and China. India and China astutely anticipated the global shift in outsourcing. In this context, their success will be measured by how Indian and Chinese firms competitively position themselves to take advantage of continuously evolving and deconstructing value chains in key industries. These value chains are characterized by international collaborations, knowledge capital as the source of differentiation and value, low trade barriers, and capital mobility that flows to areas of competitively priced skilled labor, and efficient government regulation.[6] Additionally, another goal of this paper is to introduce the strategic framework of PFI within the area of intellectual property legal scholarship. It is noted that recent research in management is increasingly receptive to treating intellectual property as an endogenous variable within the strategic management literature.[7] As such, the legal research in intellectual property can compliment this important area of management research.

II. THE PFI FRAMEWORK

¶3 The PFI framework takes an innovation as the unit of analysis.[8] The factors affecting whether an innovator profits from their innovation downstream are the appropriability regimes and the access to complimentary assets necessary for commercialization.

A. Appropriability Regimes

¶4 An appropriability regime is a function of the legal intellectual property rights regime in effect and whether the system allows markets for technology to coalesce and function efficiently. This involves markets where intellectual property rights and contracts are well defined, litigation is predictable, damages can be assessed, and licensing is an important component to technology transfers.[9] A claim made in this paper is that India and China have dynamic and rapidly growing technology sectors, yet their markets for technology have yet to flourish. This is partly because of a history of inadequate appropriability regimes and investments in generic technologies that do not lend themselves to be secured as intellectual properties traded in markets for technology. This assertion is tested by examining the set of globally valuable patents applied for and issued to Indian and Chinese companies. Globally valuable patents, as defined by the Organisation for Economic Cooperation and Development (OECD), are used to assess

[6] Foreign affiliates of multinational enterprises account for a growing number of research and development expenditures, demonstrating that even traditionally local activities like innovation-driven research are migrating across borders. *See* Organisation for Economic Cooperation and Development (OECD), *Science, Technology and Industry Outlook* 10 (2006), http://213.253.134.43/oecd/pdfs/browseit/9206081E.PDF [hereinafter OECD, *Science*].

[7] Gary Pisano, *Profiting from Innovation and the Intellectual Property Revolution*, 35 RES. POL'Y 1122 (2006).

[8] David J.Teece, *supra* note 5, at 288.

[9] *See* ASHISH ARORA, ANDREA FOSFURI, & ALFONSO GAMBARDELLA, MARKETS FOR TECHNOLOGY: THE ECONOMICS OF INNOVATION AND CORPORATE STRATEGY (2001).

this claim. These are the sets of patents (patent families) taken at the European, Japanese and United States Patent Offices that share one or more first date of application filing (priority date).[10] To summarize, these are patents developed by firms and inventors from India and China and filed at the major international patent offices in the United States, Japan, and the European Union. In these lucrative markets, intellectual property management capabilities and a mature legal infrastructure provide a market for customer-driven innovations. Due to these characteristics, these patent offices attract applicants from around the world. For example, half or more of all patent applications to the United States and European patent offices are of foreign origin.[11] In terms of the share of globally valuable patents, the United States accounts for 36.4%, Japan 25.7%, Germany 13.5%, and France 4.5%.

¶5 Appropriability regimes are also a function of the degree to which the technology behind the innovation is tacit, that is, the degree to which it is imitable[12]. Teece, in another work, demonstrates that tacit or poorly codified knowledge is harder to transmit and harder to appropriate.[13] Again, the laws of intellectual property may come into play, such as trade secrets. However, it is the unique and oftentimes complex characteristics of the technology that contribute to its level of tacitness. In today's day and age of rapid reverse engineering, the overall levels of tacitness have decreased substantially in relation to previous years.

B. Complimentary Assets

¶6 Teece's seminal article discusses several complementary assets, which, if owned by third parties or competitors, may deter innovators from capturing the downstream value of their innovations. These complimentary assets include: distribution networks, service capabilities, complimentary technologies, brands, and competitive manufacturing.[14] The value of these assets hinges to a large extent on whether they are generic, specialized, or cospecialized.[15] Generic assets are those that are undifferentiated, have little strategic value, and are easily replaced. Take for example, a very famous rock artist. She may view the downstream marketing and distribution capabilities of the music studios as interchangeable. Specialized assets make either the innovation dependent on the complimentary asset or the complimentary asset dependent on the innovation. An example of the former, offered by Teece, is Thorn EMI Laboratories' innovation of the computerized axial tomography scanner and its failure due to rival General Electric's distribution and marketing expertise. An example of the latter is the cottage industry of accessories made for the iPod media device. Cospecialized assets are those where the innovation and the downstream complimentary assets need each other to succeed. For

[10] OECD, *Compendium of Patent Statistics*, 10 (2006), http://www.oecd.org/dataoecd/5/19/37569377.pdf [hereinafter OECD, *Compendium*].

[11] OECD, *Science*, *supra* note 6.

[12] Teece, *supra* note 5, at 287.

[13] David J. Teece, *Capturing Value From Knowledge Assets: the New Economy, Markets for Know-How, and Intangible Assets*, in *Special Issue on Knowledge and the Firm*, 40 CAL. MGMT. REV., 55, 63-64 (1998).

[14] Teece, *supra* note 5, at 288-90.

[15] *Id.*

example, take the case of strong biotechnology patents and the marketing and distribution resources of the large pharmaceuticals.[16]

¶7 From the innovator's perspective, it is best when the appropriability regime is strong and the downstream assets are generic or highly substitutable. The next best regime is when the complimentary assets are specialized yet dependent on the innovation. When both resources are cospecialized is next. The worst regime, and often a case when the innovator loses the value of the innovation to the complimentary asset owners, occurs when the appropriability regime is weak and the innovation is dependent on the complimentary asset. In the case of India and China, the challenge will be to invest in innovations that turn their complimentary assets into cospecialized assets.

III. INDIA AND PFI

A. Economic Context

¶8 India's service exports have grown more than 20% on average since the mid 1990's[17]. As of 2007, nearly half of the foreign direct investment is concentrated in the computer software, electronics, telecommunications, and services sectors.[18] Almost one-third of India's exports are related to services and most of these are in the business process and software industries.[19] This dynamic sector has been growing at a rate of 20% per year since the 1990s.[20] India's focus on higher education, described in its 10th Five-Year Plan (2002–2007), is a source of competitive advantage and a priority for attracting export-oriented foreign direct investment (FDI).[21] Attention is focused on engineering to reinforce an already strong technical base. To do this, India relies on institutions for higher education, which include 16 national universities and more than 12,000 colleges.[22] With 7,000,000 total students and 100,000 engineers graduating every year, India is poised to capitalize on its human capital development, particularly within the information and communications technology (ICT) and business process outsourcing (BPO) sectors.[23] Both sectors are labor intensive and require a skilled labor force. The ICT sector involves an entrepreneurial group of firms that focus on exporting software solutions. The BPO industry leverages India's tech-savvy, English-speaking workforce to provide back-office operations mainly to American multinationals. Both sectors leverage India's comparative cost advantage and the ICT sector benefits from its resilience against infrastructural bottlenecks.[24] The growth and promising prospects of both industries demonstrate India's comparative advantage in service- and technology-focused sectors.

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[16] Pisano, *supra* note 7.

[17] Rajmal, *Developments and Measurement Issues in Services Exports: The Indian Experience* 8 (2006), http://www.oecd.org/dataoecd/52/54/37386703.pdf.

[18] India's Department of Industrial Policy and Promotion, Fact Sheet on Foreign Direct Investment, at: http://dipp.nic.in/fdi_statistics/india_fdi_june_2007.pdf

[19] Rajmal, *supra* note 17, at 3.

[20] *Id*. at 8.

[21] India's 10th Five-Year Plan, at: http://planningcommission.nic.in/plans/planrel/fiveyr/10th/volume2/v2_ch2_5.pdf

[22] RICHARD H.K. VIETOR, HOW COUNTRIES COMPETE: STRATEGY, STRUCTURE, AND GOVERNMENT IN THE GLOBAL ECONOMY 94 (2007).

[23] *Id*.

[24] *Id*.

After the 1991 currency crisis, India opened its markets to foreign investment and reduced state involvement in the economy. Additionally, import and export controls were lowered to stimulate trade and investment. The ICT sector in particular has benefited from the government's lower restrictions on technology imports and the absence of taxes on software exports.[25] Foreign direct investment also benefited from reduced barriers to foreign ownership.[26]

B. Complimentary Assets

¶9 Clearly the ICT and BPO sectors are growing and can be leveraged under a PFI framework. Doing so would sustain India's competitive advantage in these sectors and attract even more investment. What will be the critical drivers, however, as India nurtures these nascent and rapidly growing industries? Under the lens of PFI, the ICT and BPO assets under Indian management have largely been the focus of foreign firms interested in outsourcing generic service-oriented functions. The complimentary assets of service have largely existed at the level of generic complimentary assets under the PFI framework. How then can Indian firms move within this strategic framework to capture value? It seems that the upstream innovations have been captured by foreign firms and repatriated once again downstream.

¶10 The first step is to recognize that the generic complimentary service assets need to move from being generic low cost solutions to cospecialized assets. A premeditated transition can move the complimentary service capabilities from generic to cospecialized. A way to make this transition involves understanding the partner's needs and investing in research and development to create commercially significant innovations that address these needs. For example, Genesys Telecommunications[27] develops intelligent routing technologies that match incoming callers who are existing customers to the most appropriate sales force. One of Genesys' patented software technologies enables a securities brokerage firms call center to identify an incoming call based on the caller's net worth and match that caller to the appropriate broker.[28] Then, the next step is to appropriate those innovations using the World Intellectual Property Organization's (WIPO's) international patent application system, namely the Patent Cooperation Treaty (PCT) system, to obtain valuable patents in the home and foreign jurisdictions where the partners are located, and where the patents might be licensed to the competitors of the partnering firms.

C. Appropriability Regimes

¶11 As Teece made it evident, the appropriability regime hinges on intellectual property protection. In India, patents historically were used as a government policy tool instead of an individual property right alienable within technology markets. Government policy with regard to patents historically has been to regulate access to innovations that are important to the Indian economy. For example, under the Indian Patent Act, compulsory

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[25] *Id.*
[26] Robert Kennedy & Teresita Ramos, *India in 1996*, Case 9-798-064, 9 (1998).
[27] Owned by Alcatel-Lucent.
[28] *See* U.S. Patent No. 6,134,315.

licensing of food, drug, medicinal, or chemical innovations had been allowed, whereby any party can license the technology three years after the patent issuance. Indian intellectual property law also rests on a moral philosophy foundation that extends to the domains of the environment and health care. For example, the Indian Patent Act of 1970 prohibits the patenting of methods of agriculture or horticulture. Also, beyond patentability are any processes for the medicinal, surgical, curative, prophylactic, or other treatment of human beings to render them free of disease.[29] Additionally, much to the detriment of foreign pharmaceutical companies, until 2005 the Indian Patent Act forbade product patent protection in the pharmaceutical industry. According to a pharmaceutical lobbying group, "based on the refusal of the government to provide pharmaceutical patent protection, India has become a haven for bulk pharmaceutical manufacturers who pirate the intellectual property of the world's research-based pharmaceutical industry."[30]

¶12 In recent years, India's intellectual property policy shifted due to pragmatic concerns. The shift has been at the center of the discussion to conform with the Trade-related Aspects of Intellectual Property Rights (TRIPs) as part of India's membership within the World Trade Organization. This is an extension of policy change already underway. After the 1991 liberalization, a patent policy shift occurred along three stages. First, the economy opened to foreign investment. The number of joint ventures and foreign partnerships increased and multinational companies began patenting locally. These initial changes, however, did not add much value to Indian technological leadership. During the second stage, the emphasis was placed on the development of home-grown technologies. Strategic focal changes to develop market-driven indigenous technologies originated in science and technology organizations, such as the Council for Scientific and Industrial Research and the Indian Institute of Science. As measured by patents filed at major international patent offices, India has the highest percentage of state-owned patents, with 34.2% in 2003.[31] The final stage required an efficient legal infrastructure to protect these technologies. Evidence shows the policies have slowly begun to work. Annually, domestic patent applications filed in the Indian patent office have increased 17% to 2,247 from 1970-1999. Foreign applications have increased even more, with more than 6,500 patent applications filed during the same period.

¶13 Indian patenting is also characterized by international collaborations. The majority of foreign co-inventors are from the United States. India's ICT-related patent applications at the European Patent Office, in line with growth in the sector, grew 54.4% from 1995-2003.[32] Despite the rapid growth in ICT-related patents, India has yet to make a significant mark on the set of globally valuable patents. India's share of ICT-related patents filed under the Patent Cooperation Treaty (PCT), the international patent application system, amounted to 0.3% in 2003.[33] The relative measure for how well the appropriability regime in India functions will be the extent to which innovative Indian firms can secure cospecialized complimentary assets with the help of the patent regime.

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[29] Patent Act of 1970, 27 India A.I.R. Manual 450, § 3 (2d ed. 1979).

[30] Pharmaceutical Research and Manufacturers of America (PhRMA), *Submission of PhRMA for the National Trade Estimate Report on Foreign Trade Barriers: India*, CONSUMER PROJECT ON TECHNOLOGY, Dec 4, 1998, http://www.cptech.org/ip/health/phrma/nte-98/india.html.

[31] OECD, *Compendium*, *supra* note 10.

[32] *Id*. at 19.

[33] *Id*.

The areas of innovation likely to be critical will involve business methods, logistics, and software.

IV. CHINA AND PFI

A. Economic Context

¶14 Annual FDI flows to China grew from $1 billion in 1985 to $72 billion in 2005. These capital flows were primarily investments in manufacturing capabilities exploiting China's comparative advantage in flexible regulations, low-cost labor, low trade barriers, highly skilled labor, and good transportation and logistics.[34] By 2005 China was the world's leading exporter of garments, footwear, consumer electronics, home appliances, toys, motorcycles, and many other products.[35] China continued to modernize its economy as part of its strategic 10th Five-Year Plan (2001-2005). A significant macroeconomic structural change has been the relative decrease in the agricultural sector, which dropped from 27.1% of gross domestic product (GDP) in 1990 to 14.5% in 2002.[36]

¶15 In 1978, China's entire economic infrastructure was state controlled.[37] In the 1980s, the state began to allow state-owned enterprises to sell surplus production at market prices. By 1994, the government's industrial policy had morphed into *zhuada fangxiao*, or "grasping the big ones and letting go of the small ones."[38] The *big ones* included state-owned enterprises, such as the major oil, power, steel, aluminum, auto, airline, telecommunications, coal, and military equipment companies.[39] These strategic sectors are targeted for development in partnership with private firms. For example, in February, 2007, China announced that it would launch a program to develop and manufacture full-sized commercial aircraft. If successful, this state-controlled enterprise would partner with foreign and domestic component suppliers to compete with Airbus and Boeing.[40]

¶16 Building on its knowledge base, infrastructure, and pro-investment policies, China has extended its light-manufacturing capabilities to move from low-technology to high-technology industries.[41] Since 1992, China has steadily increased its share of high-technology manufactures. In 2001, these manufactures equaled the output of low-technology and medium-technology manufactures.

¶17 Many factors contributed to China's rapid development. The creation of Special Economic Zones (SEZs), however, played a critical role in the development of its manufacturing export capabilities.[42] The SEZs were created in the early 1980s and allowed the Chinese government to experiment with unconventional market-oriented

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[34] MICHAEL J. ENRIGHT & ARNAUD VAGNER, CHINA AND ITS NEIGHBORS IN 2005 2-4 (2005).

[35] *Id.*

[36] Martin Schaaper, *An Emerging Knowledge-Based Economy in China? Indicators From OECD Databases*, STI Working Paper 2004/4, 8, OECD, March 22, 2004.

[37] VIETOR, *supra* note 22, at 65.

[38] *Id.* at 67.

[39] *Id.* at 68-69.

[40] KNOWLEDGE AT WHARTON, *China's Large Aircraft Program Gains Momentum* (2007), http://www.knowledgeatwharton.com.cn/index.cfm?fa=viewfeature&articleid=1604&languageid=1.

[41] Martin Schaaper, *supra* note 36, at 14; The high-technology to low-technology categories are developed at the OECD according to research and development expenditures and value-added criteria.

[42] MARK FINN, KELLOGG ON CHINA: STRATEGIES FOR SUCCESS 27 (2004).

techniques to promote economic development in limited geographical areas.[43] The growth of the SEZ program has been remarkable, with four initially developed along the southeastern coast of China at Shenzen, Zhuahai, Xiamen, and Shantou.[44] Today there are 14 similar Economic and Technical Development zones spread along China's eastern coast, including important new centers such as Guangzhou.[45] These coastal centers leverage the logistics and infrastructure investments China has undertaken for land, sea, and air cargo.

¶18 The success of the SEZs was due to policies that provided each zone with special tax holidays to foreign firms, high-quality land, sea and air infrastructure, an adequate supply of low-cost and highly-skilled labor, streamlined government bureaucracy,[46] and an adequate rule of law.[47] The SEZs continue to play a critical role as China transitions itself from a low-cost exporter to a value-added manufacturer and research and development center. Supporting this transition is evidence that multinationals rely less on low-cost labor as the motivating factor behind their Chinese investments. Instead, multinationals place greater emphasis on streamlined government regulations, access to skilled labor, and adequate physical infrastructure as the three most important criteria for investing in China.[48]

¶19 Another policy goal is to increase research and development capabilities and investments.[49] China has, by all accounts, succeeded since between 1995 and 2004 the number of Chinese researchers increased 77%.[50] In 2006, China ranked second worldwide with 926,000 researchers, second only to the United States, which had 1.3 million researchers.[51] China's research and development intensity ratio, which normalizes its research and development expenditures to its GDP size, was 1.1% in 2001, more than double the amount in 1995.[52] This compares with the European Union's 2001 ratio of 1.9%. When normalized, China still lags behind Japan's ratio of 3.1% and the United States' ratio of 2.7%. Sustaining the effort to increase research and development expenditures are government entity-sponsored projects. In 2001, these projects amounted to 29% of total national research and development expenditures.

B. Complimentary Assets

¶20 China has become manufacturer to the world, and can leverage its significant capital and absorptive capacity in this sector to appropriate value from innovations. As

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[43] *Id*.

[44] *Id*. at 28.

[45] *Id*; Pudong is widely regarded as an SEZ although it is technically not one and has attracted value-added technologies, such as advanced manufacturing, financial-service institutions and pharmaceutical companies. Touted as the Chinese Silicon Valley, Pudong is the first city in China to create an intellectual property division in its court system. *Id*. at 36.

[46] For a vivid counter-example, see HERNANDO DE SOTO, THE MYSTERY OF CAPITAL 190-191 (2000). The book mentions how a small entrepreneur had to go through 728 bureaucratic steps and spend over 300 days to establish a two-sewing-machine garment factory in Lima Peru.

[47] FINN, *supra* note 42, at 34-37.

[48] *Id.* at 39-40.

[49] Schaaper, *supra* note 36, at 39.

[50] OECD, *Science*, *supra* note 6, at 44.

[51] *Id*.

[52] *Id*. at 11.

with the case of India, China will do best to continue to move from an owner of generic manufacturing facilities to an owner of manufacturing assets that involve cospecialized assets. The high tech manufacturing that is currently expanding in China will increasingly rely on differentiation that leverages and expands the value of foreign and increasingly domestic partners. Moving from generic manufacturing to cospecialized manufacturing is necessary to ensure that the sector remains competitive in light of emerging East Asian competitors.

¶21 Again, a critical step will be to appropriate technological innovations using a system like the WIPO's Patent Cooperation Treaty to obtain valuable patents in domestic and foreign jurisdictions where partners are located and where the patents might be licensed. Research and development efforts aimed at moving towards cospecialization should be a major focus for Chinese firms interested in innovation. Also, learning from partners is the easiest route to understanding what areas of innovation need to be prioritized. It is likely that patents in the fields of automation, rapid prototyping, telecommunications, and electrical engineering will be of high relevance.

C. Appropriability Regimes

¶22 The level of patenting activity at China's State Intellectual Property Office increased rapidly between 1990 and 1999, with domestic applications rising 11.9% a year and foreign applications increasing 26.9% a year. China, as indicated by the growth statistics, has begun to make its entry onto the world intellectual property stage. China showed the largest growth in ICT-related patent applications at the European Patent Office from 1995 to 2003, registering an average 73.7% annual growth. China did the same with respect to biotechnology patent applications, registering 49.3% growth.[53]

¶23 Despite the growth, China accounts for less than 0.3% of the patents filed during 2003 in the world's major patent offices (the United States, Japan, and the European Union).[54] Clearly, patenting activity in China has increased dramatically. And the patenting is increasingly collaborative. By 1999, 65% of the total patent applications made in China, amounting to 45,380, were made by foreign inventors.[55] The patents filed in China, however, have yet to become part of the group of patents that are registered at the major international patent offices. From these data, it can still be said that Chinese firms will have to continue to innovate at a rapid pace to become the major economic force anticipated by the BRICs study.

V. SUMMARY

¶24 The nations of India and China have a foundation on which to build innovation-related competitive advantage. The decisive transition in the years to come will be to move away from a strategy of generic complimentary assets towards developing cospecialized assets that leverage the knowledge of experienced partners. This is increasingly likely and beneficial to all parties since the distributed models of innovation

[53] OECD, *Compendium*, *supra* note 10, at 19-20.
[54] *Id.* at 55.
[55] Martin Schaaper, *supra* note 36, at 53.

known as open innovation are increasingly moving towards international collaboration.[56] The patent-related data discussed in this article is a testament to the growing importance of cross-border research and development and provides a fertile area for further research.

¶25 The PFI theory is an accepted model to understand global competitiveness. The theory is highly influential in the areas of innovation and strategic management. The PFI framework has a great deal to offer the study of law since one of its major inquiries is intellectual property law's impact on the appropriability regime of innovation. The appropriability regime is a major determinant of a firm's ability to profit from innovation.

¶26 Until very recently, however, management scholars have treated the subject of intellectual property as an exogenous variable. Increasingly, these scholars are calling into question the validity of this assessment in managerial literature dealing with this important area of legal research.[57] They have well noted that legal scholars have treated the subject of intellectual property in depth.[58] One of the goals of this article is to persuade the reader that the field of management can benefit from the legal perspective on intellectual property and vice versa. The field of intellectual property as it impacts strategic management is thus ripe for further exploration.

[56] *See* HENRY W. CHESBROUGH, OPEN INNOVATION: THE NEW IMPERATIVE FOR CREATING AND PROFITING FROM TECHNOLOGY (2003).

[57] Pisano, *supra* note 7, discussing the intellectual property strategies of firms involved in open-source software and genomics.

[58] Legal scholars have mainly engaged, however, in property and contract research from the perspective of efficiency and policy, rather than the firm and its managers. *See* Nicholas Argyres & Kyle J. Mayer, *Contract Design as a Firm Capability: An Integration of Learning and Transaction Cost Perspectives*, 32 ACAD. MGMT. REV. 1060, 1060-61 (2007).