

## Investors' Perspective on Intellectual Property Financing

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*The intellectual property system is generally considered to be a legal system that promotes innovation. But the ways through which it achieves this goal are still not entirely clear. Conventional intellectual property theories tend to describe the system's role in promoting innovation as providing creators with incentives to create and commercialize intellectual products, as well as disseminating knowledge to potential users. What is lacking in the literature is theoretical research that explains the role of the intellectual property system in encouraging investors to finance innovations.*

*To fill this gap, this Article approaches the intellectual property system from the perspective of investors and examines its role in facilitating investors to finance innovative firms. This Article demonstrates that while investing in these firms, investors face the challenges of high risk of loss, information asymmetry, and inadequate channels. The intellectual property system helps investors handle these challenges by (1) securing their returns, (2) providing signals that assist in their decision-making, and (3) coordinating various parties to form relationships that facilitate investments. While the intellectual property system promotes innovation by facilitating financing, two inherent features of the system constrain its function: the uncertainty in intellectual property rights and the non-inclusiveness of disclosure.*

*To reduce the constraints on the financing function of the intellectual property system, this Article informs policymakers by presenting several reform options. Regarding the theoretical aspect, it proposes that scholars, policymakers, and lawyers examine the intellectual property system from the perspectives of investors or other parties who are not directly involved in the creation and use of intellectual products. These perspectives not only allow*

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*scholars, policymakers, and lawyers to reflect on, and even critique, conventional intellectual property theories but also assist them in developing a more comprehensive understanding of the intellectual property system.*

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## INTRODUCTION

The Intellectual Property Clause of the US Constitution states that Congress shall have the power “[t]o promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.”<sup>1</sup> This provision is the basis for the establishment of the copyright and patent systems, and determines their goals. The role of the copyright system is “[t]o promote the Progress of Science . . . by securing for limited Times to Authors . . . the exclusive Right to their respective Writings

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<sup>1</sup> U.S. CONST. art. I, § 8, cl. 8.

...<sup>2</sup> The patent system is intended to “promote the Progress of . . . useful Arts [] by securing for limited Times to . . . Inventors the exclusive Right to their respective . . . Discoveries.”<sup>3</sup> There is general agreement that the purpose of the intellectual property<sup>4</sup> system is to promote innovation.<sup>5</sup>

While the Intellectual Property Clause sets the normative goal for the intellectual property system with relative clarity, it does not elaborate on how the system should achieve this goal. Even now, the ways by which this system promotes innovation are not entirely clear, although scholars have developed theories to explain it. The most dominant is the incentive theory, which applies to both copyright and patent law.<sup>6</sup> According to this theory, copyright and patent laws offer creators incentives to engage in the creation of intellectual products by granting them rights that exclude others from using the intellectual products that they create.<sup>7</sup> By excluding competitors, creators can charge “substantially greater” prices for access to these products “than they could in a competitive market.”<sup>8</sup>

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<sup>2</sup> *Id.*

<sup>3</sup> *Id.*

<sup>4</sup> The concept of intellectual property usually encompasses the trademark system as well. But, the constitutional basis of the trademark system is different from that of patent and copyright. The intellectual property discussed in this Article refers to patents and copyrights. It is worth pointing out that in practice trademark rights are also used as a financing tool.

<sup>5</sup> See Mark A. Lemley, *Property, Intellectual Property, and Free Riding*, 83 TEX. L. REV. 1031, 1031 (2005) [hereinafter Lemley, *Property, IP, and Free Riding*], <https://doi.org/10.2139/ssrn.582602>; Jeanne C. Fromer, *A Psychology of Intellectual Property*, 104 NW. U. L. REV. 1441, 1441 (2010) [hereinafter Fromer, *Psychology of IP*].

<sup>6</sup> See Jeanne C. Fromer, *Expressive Incentives in Intellectual Property*, 98 VA. L. REV. 1745, 1746 (2012) [hereinafter Fromer, *Expressive Incentives in IP*] (“According to the dominant American theory of intellectual property, copyright and patent laws are premised on providing creators with just enough incentive to create artistic, scientific, and technological works of value to society by preventing certain would-be copiers’ free-riding behavior.”); William Fisher, *Theories of Intellectual Property*, in NEW ESSAYS IN THE LEGAL AND POLITICAL THEORY OF PROPERTY 168, 173 (Stephen R. Munzer ed., 2001) (“References to the role of intellectual-property rights in stimulating the production of socially valuable works riddle American law. Thus, for example, the constitutional provision upon which the copyright and patent statutes rest indicates that the purpose of those laws is to provide incentives for creative intellectual efforts that will benefit the society at large.”).

<sup>7</sup> Daniel J. Hemel & Lisa Larrimore Ouellette, *Innovation Policy Pluralism*, 128 YALE L.J. 544, 547 (2019) (“From the perspective of the inventor or creator, IP is an *innovation incentive* . . .”).

<sup>8</sup> Fisher, *supra* note 6, at 169.

Additional theories that seek to explain the ways by which the patent system promotes innovation include the “disclosure theory”<sup>9</sup> and the “commercialization theory.”<sup>10</sup> Based on the disclosure theory, the patent system promotes innovation by disseminating knowledge.<sup>11</sup> Specifically, patent law requires applicants to disclose their inventions to the public in patent documents.<sup>12</sup> Revealing the design of the invention leads to innovation because others can use it productively after the patent term has expired or be inspired by the invention even while the patent term is still in effect.<sup>13</sup> The commercialization theory is similar to the incentive theory in that it also builds on the incentive effect on property rights, but it focuses on the subsequent improvement and commercialization of the patented invention, particularly when these lead to socially beneficial results. Both improvement and commercialization require investment.<sup>14</sup> Without property rights to exclude others from using the invention, the creator or those entitled to use the invention might not have an incentive to invest resources in the subsequent development of the invention.<sup>15</sup> The exclusivity of a patent provides them with this incentive.<sup>16</sup>

Although these conventional theories provide valuable insights into the operation of the intellectual property system, this Article suggests they do not provide a complete picture of the role that it plays in promoting innovation. This role goes beyond providing incentives to innovate and disseminate knowledge; research has shown that firms use intellectual property rights to finance innovation.<sup>17</sup> Scholars have

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<sup>9</sup> Colleen V. Chien, *Contextualizing Patent Disclosure*, 69 VAND. L. REV. 1849, 1854–55 (2016).

<sup>10</sup> Hemel & Ouellette, *supra* note 7, at 570.

<sup>11</sup> See *Brenner v. Manson*, 383 U.S. 519, 533 (1966) (“[O]ne of the purposes of the patent system is to encourage dissemination of information concerning discoveries and inventions.”); *Bonito Boats, Inc. v. Thunder Craft Boats, Inc.*, 489 U.S. 141, 151 (1989) (“[T]he ultimate goal of the patent system is to bring new designs and technologies into the public domain through disclosure.”).

<sup>12</sup> See 35 U.S.C. § 112.

<sup>13</sup> See Jeanne C. Fromer, *Patent Disclosure*, 94 IOWA L. REV. 539, 541 (2009) [hereinafter Fromer, *Patent Disclosure*]; Lisa Larrimore Ouellette, *Do Patents Disclose Useful Information?*, 25 HARV. J.L. & TECH. 545, 554–57 (2012).

<sup>14</sup> See Ted Sichelman, *Commercializing Patents*, 62 STAN. L. REV. 341, 343 (2010).

<sup>15</sup> See *id.* at 344; Edmund W. Kitch, *The Nature and Function of the Patent System*, 20 J.L. & ECON. 265, 276–77 (1977), <https://doi.org/10.1086/466903>.

<sup>16</sup> Sichelman, *supra* note 14, at 346; Kitch, *supra* note 15, at 276–77.

<sup>17</sup> Stuart J. H. Graham et al., *High Technology Entrepreneurs and the Patent System: Results of the 2008 Berkeley Patent Survey*, 24 BERKELEY TECH. L.J. 1255, 1255 (2009).

pointed out that firms apply for and obtain patents in order to signal investors about the need to raise the funds necessary for innovation.<sup>18</sup> Firms that cannot continue to innovate because of internal financial shortfalls use their copyrights and patents as collateral, or as underlying assets for the issuance of securities.<sup>19</sup> Governments in important economies have included in their policy initiatives to enhance the use of intellectual property rights in financing, specifically in order to promote innovation.<sup>20</sup> In academia, there are longstanding calls for scholars to pay attention to the role of intellectual property in attracting investment for innovation.<sup>21</sup> All of this suggests that the intellectual property system might promote innovation by facilitating the financing of innovations.

But there has been little research on the theoretical aspect of the role that the intellectual property system plays in encouraging investors to finance innovations. This Article attempts to fill that gap. Importantly, in contrast to conventional theories, which tend to analyze the underpinnings of the intellectual property system from the

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<sup>18</sup> See Clarisa Long, *Patent Signals*, 69 U. CHI. L. REV. 625, 662–63 (2002), <https://doi.org/10.2307/1600501>; Graham et al., *supra* note 17, at 1255; see also Ann Bartow, *Separating Marketing Innovation from Actual Invention: A Proposal for a New, Improved, Lighter, and Better-Tasting Form of Patent Protection*, 4 J. SMALL & EMERGING BUS. L. 1, 3 (2000) (noting that the actual motivation for companies to obtain patents may be to use them as a marketing and corporate image enhancement tool).

<sup>19</sup> See Xuan-Thao Nguyen, *Collateralizing Intellectual Property*, 42 GA. L. REV. 1, 18 (2007) [hereinafter Nguyen, *Collateralizing IP*]; Xuan-Thao Nguyen, *Financing Innovation: Legal Development of Intellectual Property as Security in Financing, 1845–2014*, 48 IND. L. REV. 509, 510 (2015) [hereinafter Nguyen, *Financing Innovation*], <https://doi.org/10.18060/4806.0004>; Aleksandar Nikolic, *Securitization of Patents and Its Continued Viability in Light of the Current Economic Conditions*, 19 ALB. L.J. SCI. & TECH. 393, 395 (2009); Dov Solomon & Miriam Bitton, *Intellectual Property Securitization*, 33 CARDOZO ARTS & ENT. L.J. 125, 127–28 (2015).

<sup>20</sup> See, e.g., *IP and SMEs*, EUR. COMM'N, [https://single-market-economy.ec.europa.eu/industry/strategy/intellectual-property/ip-and-smes\\_en](https://single-market-economy.ec.europa.eu/industry/strategy/intellectual-property/ip-and-smes_en) (last visited Oct. 9, 2023); *Intellectual Property Financing—An Introduction*, WIPO MAG. (Sept. 2008), [https://www.wipo.int/wipo\\_magazine/en/2008/05/article\\_0001.html](https://www.wipo.int/wipo_magazine/en/2008/05/article_0001.html); *Patent and Trademark Pledge Financing in China Gains the Largest Increase in the 13th Five-Year Plan Period*, CHINA NAT'L INTELL. PROP. ADMIN. (Mar. 9, 2021), [https://english.cnipa.gov.cn/art/2021/3/9/art\\_1340\\_157495.html](https://english.cnipa.gov.cn/art/2021/3/9/art_1340_157495.html); *IP Finance in Japan: Challenges and Potentials—A WIPO Event Highlighting Preliminary Findings of the Japan Report on Unlocking IP-Backed Finance*, WIPO (July 7, 2022), [https://www.wipo.int/sme/en/news/2022/news\\_0011.html](https://www.wipo.int/sme/en/news/2022/news_0011.html).

<sup>21</sup> See, e.g., Mark A. Lemley, *Reconceiving Patents in the Age of Venture Capital*, 4 J. SMALL & EMERGING BUS. L. 137, 144 (2000) [hereinafter Lemley, *Reconceiving Patents in the Age of Venture Capital*], <https://doi.org/10.2139/ssrn.2635229> (“We ought to be asking how venture capitalists and the venture capital community see patents . . .”).

perspectives of the creators and users of intellectual products,<sup>22</sup> this Article approaches its financing function from the perspective of investors. This is critical because investors are the ones who make the final decisions about whether to allocate funds to innovative firms. The extent to which the financing function of the intellectual property system is realized depends more on the investor's view of the intellectual property than on the capital user's perception of it. Therefore, it is both sensible and necessary to examine the financing function of the intellectual property system from the perspective of investors.

Part I reviews the conventional theories that account for the function of the intellectual property system in promoting innovation: incentive theory, disclosure theory, and commercialization theory. It points out that these theories neglect the function of the intellectual property system in facilitating the flow of external funding to innovative firms. External funding, especially for small and medium-sized enterprises (SMEs), is a critical resource that allows them to sustain innovation.<sup>23</sup> In addition, external funding can also trigger the flow of nonmonetary assets, such as industry knowledge and collaboration opportunities, to innovative firms.<sup>24</sup> These resources make a considerable contribution to a firm's ability to continue to innovate.<sup>25</sup>

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<sup>22</sup> See, e.g., Hemel & Ouellette, *supra* note 7, at 547 ("From the perspective of the inventor or creator, IP is an innovation incentive—it establishes the payoff structure for producers of knowledge goods. From the perspective of consumers, including both end users and those who use knowledge goods as an input to subsequent creation, IP is an allocation mechanism—it establishes the terms under which individuals and firms can gain access to knowledge goods." (emphasis omitted)); Mark A. Lemley, *The Economics of Improvement in Intellectual Property Law*, 75 TEX. L. REV. 989, 1083 (1997) [hereinafter Lemley, *Economics of Improvement in IP Law*] ("Intellectual property law represents a 'delicate balance' between the rights of intellectual property owners and the rights of users, among them the next generation of owners."); Fisher, *supra* note 6, at 169 ("Pursuit of that end in the context of intellectual property, it is generally thought, requires lawmakers to strike an optimal balance between, on one hand, the power of exclusive rights to stimulate the creation of inventions and works of art and, on the other, the partially offsetting tendency of such rights to curtail widespread public enjoyment of those creations.").

<sup>23</sup> Nirosha Hewa Wellalage & Viviana Fernandez, *Innovation and SME Finance: Evidence from Developing Countries*, 66 INT'L REV. FIN. ANALYSIS 1, 1 (2019), <https://doi.org/10.1016/j.irfa.2019.06.009>.

<sup>24</sup> See generally David H. Hsu, *Venture Capitalists and Cooperative Start-up Commercialization Strategy*, 52 MGMT. SCI. 204, 204–06 (2006), <https://doi.org/10.1287/mnsc.1050.0480>.

<sup>25</sup> *Id.*

Part I also explains the rationale for analyzing the functions of the intellectual property system from the investor's perspective. Conventional theories tend to explain the function of the system in terms of the creators and users of intellectual products.<sup>26</sup> This Article argues that this approach oversimplifies the role of the intellectual property system and pays insufficient attention to the ways in which other members of society engage with the system, the impact that the system has on them, and their demands for its reform. Using the perspective of the investor—as a third party distinct from the creator and user—to examine the functions of the intellectual property system might make it necessary to revisit some of the assumptions implicit in the conventional theories and the conclusions that scholars have drawn from them. By presenting the theoretical aspect of the functions of the intellectual property system from an investor's perspective, this Article contributes to the literature by providing an opportunity to reflect on the functions of this system and the ways in which scholars have analyzed these functions.

Part II analyzes the financing function of the intellectual property system by summarizing the challenges that investors encounter when investing in innovative firms and the ways in which the intellectual property system helps them to handle these challenges. Specifically, investors encounter a high risk of loss, information asymmetries, and the inadequate channels when investing in innovative firms.<sup>27</sup> The intellectual property system helps them overcome these issues by (1) securing their returns, (2) providing signals that help them to make investment decisions, and (3) coordinating the various actors who form the complex relationships that facilitate investment. In this sense, the intellectual property system gives innovative firms more resources for innovation by reducing the challenges that might otherwise keep investors from investing in them.

Part III points out the two features that constrain the important role that the intellectual property system plays in financing. These are the lack of certainty regarding the rights of intellectual property and the lack of inclusiveness in the design of the system's disclosure function, both of which expose investors to high costs when utilizing the financing function of the current system. The invalidation of patents, unclear scope of patents and copyrights, and unpredictability of infringement remedies all contribute to the uncertainty of

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<sup>26</sup> See generally Hemel & Ouellette, *supra* note 7, at 547; Lemley, *Economics of Improvement in IP Law*, *supra* note 22, at 1083; Fisher, *supra* note 6, at 173.

<sup>27</sup> See discussion *infra* Part II.A.

intellectual property rights. In terms of disclosure, the assumption of a person having ordinary skill in the art (PHOSITA) as the recipient of the disclosed information, the absence of associated business operation information, and the static nature of disclosure pose substantial costs to investors, who must unpack the information that patent documents disclose.<sup>28</sup> Inadequate disclosure of ownership information and transaction history forces investors to do expensive due diligence on copyrights and patents. If the costs are too high, they might forgo engaging with the financing function of the intellectual property system. In other words, these two inherent constraints impede the flow of external resources to innovative firms and thus hinder innovation.

Part IV provides legal reform proposals for policymakers who seek to enhance the financing function of the intellectual property system. These proposals aim to counter the two inherent constraints that Part III identifies. This Part recommends that policymakers increase the validity rate of patents by improving the quality of the examinations by the United States Patent and Trademark Office (USPTO). By establishing more consistent and detailed rules for determining copyright infringement, implementing clearer rules for the construction of patent claims, and incorporating the need to utilize the financing function as well as existing financing structures into the consideration of remedies, policymakers can increase the certainty of intellectual property rights. With respect to disclosure, Part IV suggests that policymakers add to the existing framework for the disclosure of patent information for technical laymen, for updating disclosure information, and for disclosing information about business operations relevant to patented inventions. Part IV also recommends that policymakers upgrade the features for disclosing ownership information and transaction history information for both patents and copyrights.

To be clear, this Article neither asserts that the financing function of the intellectual property system is more important than other functions nor claims that understanding the underpinnings of the functions of the intellectual property system from an investor's perspective is helpful in every case. The purpose of this Article in presenting the perspective of a party other than the creator and the user of intellectual products is to illuminate an aspect of the intellectual property system that conventional theories have largely

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<sup>28</sup> See discussion *infra* Part III.B.



overlooked and to offer a previously unanticipated perspective that scholars might find helpful when analyzing its various functions. This Article's practical contribution is to help policymakers broaden their productive legal reform proposals. Analyzing the functions of the intellectual property system from the perspectives of different members of society can help scholars, policymakers, and lawyers gain a more comprehensive understanding of the intellectual property system. This Article concludes by encouraging scholars to analyze and explain the functions of the intellectual property system from other third-party perspectives.

## I. ANALYZING INTELLECTUAL PROPERTY FINANCING FROM THE INVESTOR'S PERSPECTIVE

### A. *The Financing Function of the Intellectual Property System and Innovation*

Article I, Section 8, Clause 8 of the US Constitution states that Congress shall have the power “[t]o promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.”<sup>29</sup> This provision is the basis for the establishment of the copyright and patent systems and sets their goals as to promote innovation in general.<sup>30</sup> Although this provision establishes the goals of the two systems with relative clarity, it does not elaborate on how they should achieve those goals. Legal scholars have advanced a variety of theories to explain this. Currently the predominant theory is the “incentive theory,”<sup>31</sup> which is exemplified in the Supreme Court's ruling in *Sony Corp. v. Universal Studios*. In the majority opinion, Justice Stevens stated that the goal of the intellectual property system is “to motivate the creative activity of authors and inventors by the provision of a special reward, and to allow the public access to the products of their genius after the limited period of exclusive control has expired.”<sup>32</sup> In other words, when authors and inventors have intellectual property rights, they can exclude competitors and charge higher prices for access to their

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<sup>29</sup> U.S. CONST. art. I, § 8, cl. 8.

<sup>30</sup> See Lemley, *Property, IP, and Free Riding*, *supra* note 5, at 1031; Fromer, *Psychology of IP*, *supra* note 5, at 1441.

<sup>31</sup> See, e.g., Hemel & Ouellette, *supra* note 7, at 547 (“From the perspective of the inventor or creator, IP is an innovation incentive . . .” (emphasis removed)).

<sup>32</sup> *Sony Corp. of Am. v. Universal City Studios, Inc.*, 464 U.S. 417, 429 (1984); see also *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 480 (1974).

intellectual products than they would be able to charge in a competitive market.<sup>33</sup> This constitutes an incentive for authors and inventors to create intellectual products.

In the field of patent law, disclosure theory describes another way through which the patent system promotes innovation: the dissemination of knowledge to potential users,<sup>34</sup> as recognized in the Supreme Court's decision in *J.E.M. Ag Supply, Inc. v. Pioneer Hi-Bred International, Inc.* This case holds "that patents are a bargain of sorts, between the inventor and the public, exchanging public disclosure of the claimed invention in return for the grant of a period of exclusive rights."<sup>35</sup> This perspective conceptualizes the patent system as a quid pro quo in that "[i]nventors give up information to the public domain . . . in exchange for exclusive rights . . . to a technology, and as if they only used those rights to capture an income stream from the technology, block competitors, or gain bargaining leverage with other market actors."<sup>36</sup> This theory provides a more precise articulation of the extent to which users may exploit intellectual products because they do not need to wait for the expiration of exclusive rights before gaining access to intellectual products. Once the creator discloses the invention through the patent document, the public (the users) can benefit from it, at least by not duplicating the efforts to develop the patented invention.<sup>37</sup>

The commercialization theory is similar to the incentive theory in that it also starts from the incentive effect that patents have, but it concerns the incentives for any subsequent improvement and commercialization of the patented invention.<sup>38</sup> According to this theory, after an invention has been created, it often requires

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<sup>33</sup> See Fisher, *supra* note 6, at 169.

<sup>34</sup> See Chien, *supra* note 9, at 1852; Alan Devlin, *The Misunderstood Function of Disclosure in Patent Law*, 23 HARV. J.L. & TECH. 401, 424 (2010); Jason Rantanen, *Peripheral Disclosure*, 74 U. PITT. L. REV. 1, 6 (2012), <https://doi.org/10.5195/lawreview.2012.190>.

<sup>35</sup> Dan L. Burk, *The Role of Patent Law in Knowledge Codification*, 23 BERKELEY TECH. L.J. 1009, 1010 (2008) [hereinafter Burk, *Role of Patent Law*].

<sup>36</sup> Long, *supra* note 18, at 629.

<sup>37</sup> WILLIAM M. LANDES & RICHARD A. POSNER, *THE ECONOMIC STRUCTURE OF INTELLECTUAL PROPERTY LAW* 295 (2003).

<sup>38</sup> Compare Sichelman, *supra* note 14, at 341, 345 (arguing under the prospect theory that patents provide incentives for subsequent improvements and commercialization of inventions), with Kitch, *supra* note 15, at 276 (contending under the commercialization theory that patent owners will be incentivized to maximize the patent's value).

subsequent “costly and risky development and testing” to transform it into a product that is salable to consumers.<sup>39</sup> Moreover, it is highly uncertain whether the commercialization of an invention will be successful.<sup>40</sup> Uncertainty and high development costs keep innovators from transforming inventions into socially valuable products.<sup>41</sup> Without rights to exclude others from making and selling the same or an equivalent product, innovators might not have an incentive to invest resources in the subsequent improvement and commercialization of the invention.<sup>42</sup> The exclusivity of a patent can provide them with that incentive.<sup>43</sup>

The use of intellectual property rights as a financing tool suggests a way that the intellectual property system can promote innovation other than giving creators an incentive to create and disseminate knowledge to users. In his 2000 article, Mark Lemley questioned the classic patent incentive model and pointed out that patents work as financing tools.<sup>44</sup> In 2002, Clarisa Long noted that patents can serve as signals to reduce information asymmetry between patentees and observers, including investors.<sup>45</sup> In this sense, patents help creators finance themselves by reducing the positive information costs that investors face in the investment process.<sup>46</sup> In 2008, several leading scholars in the field of patent law conducted a patent survey covering 1,332 early stage technology companies and found “that patents play an important role in the financing of many startup companies, both during the initial stages and subsequent development of the firm, and also at the liquidity or exit event.”<sup>47</sup> Xuan-Thao Nguyen’s works also offer pivotal insights. Specifically, in her 2007 article, Nguyen provides an overview of the ways by which companies use intellectual property rights as collateral to assist their financing endeavors.<sup>48</sup> Moreover, in a subsequent 2015 publication, she offers a comprehensive review of the history of the collateralization of intellectual property rights spanning from 1845 to 2014, underlying the evolving dynamics of intellectual

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<sup>39</sup> Sichelman, *supra* note 14, at 343.

<sup>40</sup> *Id.*

<sup>41</sup> *Id.*

<sup>42</sup> *See id.* at 346.

<sup>43</sup> *See id.* at 345–46.

<sup>44</sup> *See* Lemley, *Reconceiving Patents in the Age of Venture Capital*, *supra* note 21, at 143.

<sup>45</sup> Long, *supra* note 18, at 643–45.

<sup>46</sup> *See id.* at 644–45.

<sup>47</sup> Graham et al., *supra* note 17, at 1303.

<sup>48</sup> *See generally* Nguyen, *Collateralizing IP*, *supra* note 19, at 29–37.

property rights in the broader financing landscape.<sup>49</sup> Other studies indicate that innovative firms use intellectual property rights as the underlying asset to back the securities that they issue.<sup>50</sup>

External funding is a very important resource for allowing creators to innovate. Specifically, the creation, development, improvement, manufacture, sale, and expansion of the market share of intellectual products all require large amounts of capital. Innovative firms might not have enough internal funding to support the entire innovation process and therefore need to seek external funding from investors. In this sense, the intellectual property system promotes innovation by helping innovative firms obtain the external funding, which allows them to sustain their innovative activities.<sup>51</sup> Empirical studies have shown that holding patents facilitates innovative firms' access to investors' funds.<sup>52</sup> Intellectual property-based finance might even open new channels of funding, as it can foster better relationships between credit institutions and startups.<sup>53</sup> The speed and criteria for investor allocation of funds among firms influence the pace and

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<sup>49</sup> See generally Nguyen, *Financing Innovation*, *supra* note 19, at 510 ("The . . . history of lending with intellectual property collateral is uniquely American.").

<sup>50</sup> See, e.g., Solomon & Bitton, *supra* note 19, at 127–28; Jayant Kumar, *Intellectual Property Securitization: How Far Possible and Effective*, 11 J. INTELL. PROP. RTS. 98, 98 (2006); John M. Gabala, Jr., Comment, "Intellectual Alchemy": *Securitization of Intellectual Property as an Innovative Form of Alternative Financing*, 3 J. MARSHALL REV. INTELL. PROP. L. 307, 308–09 (2004); Jennifer Burke Sylva, *Bowie Bonds Sold for Far More than a Song: The Securitization of Intellectual Property as a Super-Charged Vehicle for High Technology Financing*, 15 SANTA CLARA COMPUT. & HIGH TECH. L.J. 195, 197 (1999).

<sup>51</sup> Nguyen, *Collateralizing IP*, *supra* note 19, at 11 ("Without key intellectual property assets, the companies may not be able to obtain capital necessary to their survival.").

<sup>52</sup> See, e.g., Dirk Czarnitzki et al., *Market Valuation of US and European Intellectual Property*, in THE MANAGEMENT OF INTELLECTUAL PROPERTY 111, 111–31 (Derek Bosworth & Elizabeth Webster eds., 2006), <https://doi.org/10.4337/9781847201553.00013> (demonstrating a positive correlation between patent counts and firm market values); Bill Francis et al., *Do Banks Value Innovation? Evidence from US Firms*, 41 FIN. MGMT. 159, 159 (2012), <https://doi.org/10.1111/j.1755-053X.2012.01181.x> (showing that firms with higher innovation capability obtain more favorable loans); Joel R. Reidenberg et al., *Patents and Small Participants in the Smartphone Industry*, 18 STAN. TECH. L. REV. 375, 417 (2015) ("With a few patents, small participants gain access to the market through financing that results from their increased attractiveness to investors as compared to the startup industry in general."); GERALD B. HALT, JR. ET AL., INTELLECTUAL PROPERTY IN CONSUMER ELECTRONICS, SOFTWARE AND TECHNOLOGY STARTUPS 148 (2014) ("[T]here are many VCs that prefer to invest only in companies that have an IP portfolio.").

<sup>53</sup> OECD, ENQUIRIES INTO INTELLECTUAL PROPERTY'S ECONOMIC IMPACT 472 (2015) [hereinafter OECD, ENQUIRIES].

direction of innovation.<sup>54</sup> This evidence suggests that external investments have an impact on innovation.

In addition to monetary resources, the financing function of the intellectual property system also promotes innovation by facilitating the allocation of noncapital resources from investors to innovative firms. Some investors provide portfolio companies with noncapital, value-added services such as shaping company strategy, building relationships (with management talents, professional service providers, and key clients), and acting as mentors.<sup>55</sup> Sometimes, noncapital, value-added services enhance the ability of innovative firms to innovate directly. For example, some investors help to establish strategic alliances among the companies in which they invest.<sup>56</sup> These alliances help innovative firms speed up the product-to-commodity transition, quickly open sales markets, and scale their business development.<sup>57</sup>

While prior studies have laid a solid foundation for our understanding of many aspects of the relationship between intellectual property and financing, no one has yet examined the theory underlying the financing function of the intellectual property system. Without research in this area, the literature has failed to provide scholars, policymakers, and practitioners with a complete understanding of the role that this system plays in promoting innovation.<sup>58</sup> In a practical sense, the inadequate understanding of the functions of the intellectual property system can keep scholars and policymakers from proposing effective legal reforms that promote innovation. Practitioners might underutilize intellectual property rights for financing due to their inadequate understanding of this

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<sup>54</sup> See Giovanni Dosi, *Finance, Innovation and Industrial Change*, 13 J. ECON. BEHAV. & ORG. 299, 299 (1990), [https://doi.org/10.1016/0167-2681\(90\)90003-V](https://doi.org/10.1016/0167-2681(90)90003-V) (demonstrating that financial structures can have an impact on the rates and modes of industrial innovation).

<sup>55</sup> Sophie Manigart & Mike Wright, *Venture Capital Investors and Portfolio Firms*, 9 FOUNDS. & TRENDS IN ENTREPRENEURSHIP 365, 411 (2013), <https://doi.org/10.1561/03000000040>.

<sup>56</sup> See, e.g., Hsu, *supra* note 24, at 205–06.

<sup>57</sup> *Id.* at 205–06.

<sup>58</sup> See Graham et al. *supra* note 17, at 1262 (“[P]atenting may play a previously underappreciated role in helping startups to secure investment from various sources of entrepreneurial capital, including not only angel and venture investors, but also ‘friends and family’ and commercial banks.”); Lemley, *Reconceiving Patents in the Age of Venture Capital*, *supra* note 21, at 143 (“[S]cholars have ignored the use of patents as financing tools.”).

function. As the Organization for Economic Co-operation Development (OECD) report points out, “IP-based finance appears to be under-exploited across OECD economies, especially with respect to those young SMEs who need to open new financing channels.”<sup>59</sup> In order to make the intellectual property system’s advantages more accessible to scholars, policymakers, and lawyers, this Article takes the initial step of explaining the theoretical aspect of the financing function of the intellectual property system.

B. *The Investor’s Perspective on the Intellectual Property System*

Scholars have generally examined the functions of the intellectual property system from the perspective of two groups of people: the creators of intellectual products and the users of these products. Typically, the theory that dominates copyright and patent law in the United States—incentive theory—conceptualizes the intellectual property system as a mechanism that provides incentives to “creators,”<sup>60</sup> “authors and inventors,”<sup>61</sup> “producers of knowledge goods,”<sup>62</sup> “input contributors,”<sup>63</sup> and “intellectual property owners”<sup>64</sup> on the one hand. On the other hand, it balances the interests of “users,”<sup>65</sup> “[the] widespread public [that enjoy] those creations,”<sup>66</sup> “others [who use] inventions, discoveries, and expression,”<sup>67</sup> “consumers, including both end users and those who use knowledge goods as an input to subsequent creation,”<sup>68</sup> “copiers[],”<sup>69</sup> and

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<sup>59</sup> OECD, ENQUIRIES, *supra* note 53, at 458.

<sup>60</sup> Fromer, *Expressive Incentives in IP*, *supra* note 6, at 1746.

<sup>61</sup> Sony Corp. of Am. v. Universal City Studios, Inc., 464 U.S. 417, 429 (1984); *see also* 1 MARK A. LEMLEY ET AL., INTELLECTUAL PROPERTY IN THE NEW TECHNOLOGICAL AGE 21 (2021) [hereinafter LEMLEY ET AL., IP IN NEW TECHNOLOGICAL AGE] (inventors and authors).

<sup>62</sup> Hemel & Ouellette, *supra* note 7, at 547.

<sup>63</sup> Henry E. Smith, *Intellectual Property as Property: Delineating Entitlements in Information*, 116 YALE L.J. 1742, 1751 (2007), <https://doi.org/10.2307/20455776>.

<sup>64</sup> Lemley, *Economics of Improvement in IP Law*, *supra* note 22, at 1083.

<sup>65</sup> *Id.* 22

<sup>66</sup> Fisher, *supra* note 6, at 169 (“Pursuit of that end in the context of intellectual property, it is generally thought, requires lawmakers to strike an optimal balance between, on one hand, the power of exclusive rights to stimulate the creation of inventions and works of art and, on the other, the partially offsetting tendency of such rights to curtail widespread public enjoyment of those creations.”).

<sup>67</sup> LEMLEY ET AL., IP IN NEW TECHNOLOGICAL AGE, *supra* note 61, at 21.

<sup>68</sup> Hemel & Ouellette, *supra* note 7, at 547.

<sup>69</sup> Fromer, *Expressive Incentives in IP*, *supra* note 6, at 1746.

“information users.”<sup>70</sup> Although other actors, such as investors and intermediaries in the transfer of intellectual property rights, are also participants in the innovation process and play an important role in the production, development, and circulation of intellectual products, scholars have rarely included their perspectives in their analyses of the functions of the intellectual property system.

Understanding the functions of the intellectual property system from the perspective of creators and users is necessary because these two groups of actors are the ones directly involved in the production, development, and exploitation of intellectual products. But the current theories' approach of focusing only on the two groups of actors has its limitations. For one thing, it can produce an oversimplified theory of the intellectual property system, as it tends to ignore the effects that this system has on the interests and behavior of those other than creators and users<sup>71</sup> and the fact that these actors can also have an impact on innovation. More research is necessary to allow scholars to determine the extent of the impact, be it positive or negative, and its ramifications.

Further, the conventional approach might render the theories less than fully representative. The instinct of scholars to place creators and users at the center of their theories can cause policymakers to design intellectual property systems that account only for the needs of these two groups.<sup>72</sup> Unrepresentative theories tend to give rise to

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<sup>70</sup> Smith, *supra* note 63, at 1751.

<sup>71</sup> In discussing the utilitarian analysis of intellectual property, Robert Merges points to the need to add up the positive effects and negative effects of the intellectual property system on *all* people. See Robert P. Merges, *Philosophical Foundations of IP Law: The Law and Economics Paradigm*, in 1 RESEARCH HANDBOOK ON THE ECONOMICS OF INTELLECTUAL PROPERTY LAW 72, 73 (Ben Depoorter & Peter S. Menell eds., 2019) (“We look at one course of action and add up all the positive effects it would have on all the people involved, then look at all the negative effects on all involved. Then we do the same with all other courses of action. The best course of action is the one that produces the highest ‘net positive.’”).

<sup>72</sup> There are studies in the literature that critique inequality in the design of the intellectual property system from the perspectives of gender and race. See, e.g., Miriam Marcowitz-Bitton et al., *Unregistered Patents & Gender Equality*, 43 HARV. J.L. & GENDER 47, 47 (2020); Shubha Ghosh, *Race-Specific Patents, Commercialization, and Intellectual Property Policy*, 56 BUFF. L. REV. 409, 410 (2008), <https://doi.org/10.2139/ssrn.1113505>; Kara W. Swanson, *Getting a Grip on the Corset: Gender, Sexuality, and Patent Law*, 23 YALE J.L. & FEMINISM 57, 57 (2011). Likewise, if the intellectual property system is analyzed from the perspectives of different social actors (e.g. investors, creators, users, intermediaries), then the system is not designed to fully cater to the needs of all types of actors, but to take special account of the needs of creators and users of intellectual products.

unrepresentative systems. Because theories of this sort might not identify other members of society who have demands on the design of the intellectual property system and might even regard them as irrelevant. The result is that the potential of the intellectual property system to promote innovation is not completely realized because it cannot fully mobilize the resources of other actors even when these might enhance its innovation functions.

When analyzing the financing function of the intellectual property system, including the perspective of a third party—someone other than the creator and the user (here, the investor)—avoids the oversimplification and underrepresentation of the conventional explanations. This approach is practical. The ways by which the intellectual property system help capital flow to innovative firms depend on the use that investors make of the system. After all, it is the investors who control the capital. In fact, European policymakers recently turned to the financial community, seeking ideas and proposals with which to improve the European Union's intellectual property system.<sup>73</sup> Part II of this Article presents the financing function of the intellectual property system from investors' perspectives. After surveying the literature of finance and law, it points out three challenges—the risk of loss, information asymmetry, and inadequate channels—that investors encounter when investing in innovative firms and demonstrates how the intellectual property system can serve as means to overcome these challenges.<sup>74</sup> By making it easier for investors' resources to flow to innovative firms, the intellectual property system promotes innovation in a way that increases the supply of resources for innovative activities.

More importantly, having the investors' perspectives on the financing function of the intellectual property system will give policymakers, lawyers, and scholars an opportunity to rethink some of the basic assumptions or positions that conventional theories of the intellectual property system hold. For example, the incentive theory generally assumes that the financial interests that motivate creators come from buyers in the product or service market, rather than from investors in the capital market.<sup>75</sup> In this vein, Christopher Buccafusco

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<sup>73</sup> *IP and SMEs*, *supra* note 20 (“To make it easier for SMEs to leverage their IP when trying to get access to finance, the Commission will discuss with the financial community what IP valuation and capacity building can help them to better take into account SMEs’ intellectual assets.”).

<sup>74</sup> See discussion *infra* Part II.A.

<sup>75</sup> See Long, *supra* note 18, at 627.



and Jonathan S. Masur contend that “owners of IP can only realize these profits if individuals are actually willing to purchase their products and services.”<sup>76</sup> From the investor’s perspective, it is easy to see that the investor’s resources are also a form of return for the innovative firm. In this sense, the ultimate source of incentives for creators is not necessarily money from the markets, but resources from investors. With these, creators need not wait until after the commercialization of products and services;<sup>77</sup> investors’ resources constitute an incentive for creators and can serve as an independent impetus for firms to acquire intellectual property rights.<sup>78</sup>

Moreover, scholars in this area generally do not take the interests of investors into account. Scholars tend to believe that the incentive effect of intellectual property rights is effective as long as the investors generate enough money for the innovative firms to cover their fixed costs or the average fixed costs of creation.<sup>79</sup> From an investor’s perspective, however, returns that just cover these costs have two negative implications regarding innovation. First, they make investment in the production of intellectual products less attractive.<sup>80</sup> When this happens, firms that are in the business of generating intellectual products and that rely on intellectual property rights for their revenues run into limits on the number of external resources

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<sup>76</sup> Christopher Buccafusco & Jonathan S. Masur, *Intellectual Property Law and the Promotion of Welfare*, in 1 RESEARCH HANDBOOK ON THE ECONOMICS OF INTELLECTUAL PROPERTY LAW, *supra* note 71, at 102.

<sup>77</sup> See Nikolic, *supra* note 19, at 405 (noting that securitization of patents benefits universities and nonprofit organizations by providing “a lump sum payment rather than waiting for future royalties”); Gabala, *supra* note 50, at 316 (“[B]y receiving the cash up-front, the artist avoids the risk of losing future royalties if the consumers at some point in the future stop buying his music.”); HALT ET AL., *supra* note 52, at 152 (“A creative financial solution is IP-based venture debt financing. IP-based venture debt financing is obtained by venture-backed entities that is used as working capital or spent on equipment purchases.”).

<sup>78</sup> See Burk, *Role of Patent Law*, *supra* note 35, at 1011 (“Commentators have suggested that these apparently unused patents are being procured for other business purposes, such as financing, marketing, or strategic advantage.”).

<sup>79</sup> LANDES & POSNER, *supra* note 37, at 296 (“With greater legal protection for patentees than for copyright holders comes a greater danger that the inventor will be enabled to charge a higher price than he needs to recover the fixed costs of his invention, thereby restricting access to the invention more than is necessary.”); Lemley, *Property, IP, and Free Riding*, *supra* note 5, at 1065.

<sup>80</sup> Cf. John F. Duffy, *Intellectual Property Isolationism and the Average Cost Thesis*, 83 TEX. L. REV. 1077, 1078 (2005) (“Investments in creating intellectual property would still achieve just average market returns, and the firms engaged in creativity would just be covering their costs.”).

available to them for innovation.<sup>81</sup> Second, if the innovative firm is itself an investor, it might allocate capital to generate higher returns rather than to produce intellectual products.<sup>82</sup> In other words, the ability to create returns that just cover the fixed or average fixed costs of creation might not be sufficient to make intellectual property rights an effective incentive for innovation.

In the field of patent law, current disclosure theory also fails to account for the interests of investors. Scholars tend to describe the disclosure function of the patent system as promoting innovation through the way that patentees communicate technical information to the users of the technology.<sup>83</sup> When scholars debate whether patents disclose useful information, they examine empirical evidence to determine whether *researchers* have used patents “as a source of technical information.”<sup>84</sup> Effective patent disclosures are supposed to reach a level, as Jeanne Fromer maintains, “so that *inventors* can use them to culminate scientific and technological progress more effectively.”<sup>85</sup> But if investors are added to the picture, the disclosure function of the patent system can also promote innovation by helping investors allocate resources more efficiently, giving innovative firms more resources to use for innovation. As Part III of this Article points out, the current disclosure function of the patent system is insufficiently inclusive because it largely neglects the investors’ demand for information.<sup>86</sup> This oversight has translated into high transaction costs for investors who use the financing function of the intellectual property system, impeding their ability to allocate resources to innovative firms. Taking investors’ need for information into account in the design of the disclosure function would improve the intellectual property system.

Scholars often justify the establishment of the intellectual property system and its reform proposals by analyzing the impact of

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<sup>81</sup> *Id.* at 1077–78 (noting that capital can flow out of the production of intellectual property).

<sup>82</sup> *See id.* at 1079 (“Capital markets are very good at equalizing such supra-market levels of returns. Indeed, it is generally assumed that capital will flow from sectors of the economy that are underperforming (compared to the market average) to ones that are performing better.”).

<sup>83</sup> *See, e.g.,* Ouellette, *supra* note 13, at 556–57.

<sup>84</sup> *Id.* at 547.

<sup>85</sup> Fromer, *Patent Disclosure*, *supra* note 13, at 542 (emphasis added).

<sup>86</sup> *See* discussion *infra* Part III.B.

the system on social welfare.<sup>87</sup> This tends to only come from the points of view of the creator and the user of intellectual products,<sup>88</sup> without taking others' perspectives into account. But the intellectual property system even affects the welfare of investors who are not engaged in the production and use of intellectual products. As Part II notes, the intellectual property system assists investors in capital allocation by decreasing their risk of loss, reducing information asymmetry, and expanding the channels for investment.<sup>89</sup> In this sense, the intellectual property system might have a first order positive effect on social welfare through its ability to enhance the ways by which investors allocate capital<sup>90</sup> and a second order positive effect on social welfare when firms use the invested capital for innovation.<sup>91</sup> Scholars might want to revisit their previous conclusions about the impact that the intellectual property system has on social welfare by accounting for the investor's perspective. Otherwise, their analysis of the intellectual property system might be oversimplified and lead to a conclusion that underestimates the impact that the system has on social welfare.

To be clear, this Article does not claim that the literature misunderstands the functions of the intellectual property system. It does not argue that approaching the intellectual property system from the investors'—or other noncreator-users'—perspectives is better than

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<sup>87</sup> See, e.g., Fisher, *supra* note 6, at 169 (“The first and most popular of the four employs the familiar utilitarian guideline that lawmakers’ beacon when shaping property rights should be the maximization of net social welfare.”); Buccafusco & Masur, *supra* note 76, at 102; Fromer, *Expressive Incentives in IP*, *supra* note 6, at 1750–51 (“The Supreme Court, Congress, and many legal scholars consider utilitarianism the dominant purpose of American copyright and patent law.” (footnote omitted)); LEMLEY ET AL., *IP IN NEW TECHNOLOGICAL AGE*, *supra* note 61, at 18 (“Utilitarian theory and the economic framework built upon it have long provided the dominant paradigm for analyzing and justifying the various forms of intellectual property protection.”).

<sup>88</sup> See, e.g., Buccafusco & Masur, *supra* note 76, at 107–15 (analyzing patent and copyright law from consumer-side welfare effects and producer-side welfare effects).

<sup>89</sup> See discussion *infra* Part II.

<sup>90</sup> OECD, *ENQUIRIES*, *supra* note 53, at 458 (“More generally, imperfections in the capital markets can lead to less-than-optimal investments in KBC [‘knowledge-based capital’], thus slowing the pace of economic growth. In this context, intellectual property (IP) assets have two attractive features that may help firms to unlock new investment or obtain more favourable financing conditions.”).

<sup>91</sup> See Valérie Revest & Alessandro Sapió, *Financing Technology-Based Small Firms in Europe: What Do We Know?*, 39 SMALL BUS. ECON. 179, 180 (2012), <https://doi.org/10.1007/s11187-010-9291-6> (“Entrepreneurs with promising business projects but short of outside capital may not be able to overcome such barriers. The beneficial effects of new firms on dynamic efficiency and technical change can be severely hampered.”).

the conventional creator-user approach. Nor does it suggest that no one in the existing literature has paid attention to the impact of the intellectual property system on investors. This Article merely attempts to open a new avenue to present the functions of the intellectual property system to scholars, policymakers, and lawyers. The development, improvement, and exploitation of intellectual products involves many more actors than just creators and users. Looking beyond these two parties will give everyone involved a more comprehensive and deeper understanding of the functions of the intellectual property system and allow them to identify more needs and options for legal reform than in the past.

## II. THE FINANCING FUNCTION OF THE INTELLECTUAL PROPERTY SYSTEM

This Part first examines three challenges that investors encounter when investing in innovative firms: (1) the risk of loss, (2) information asymmetry, and (3) the inadequacy of the current channels between investors and potential investees. It then discusses the ways that the intellectual property system helps investors overcome these challenges. This Article regards the aggregation of these solutions as the financing function of the intellectual property system.

### A. *Challenges Investors Face in Finance Innovation*

#### 1. Risk of Loss

Investors' returns depend heavily on the success of the innovative firms that they invest in. If the innovative company receiving the investment does not operate well, debtors might not be able to recover the principal and receive interest on time, and company owners' stocks might depreciate significantly. In the worst case, if the company goes bankrupt, the proceeds from the sale of the company's assets might be insufficient to repay the principal to the investors.<sup>92</sup> The equity of a bankrupt company is likely worthless.<sup>93</sup> Innovative firms fail frequently.<sup>94</sup> At least four factors contribute to the risk of loss to investors.

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<sup>92</sup> See Nikolic, *supra* note 19, at 400.

<sup>93</sup> *Id.* at 399.

<sup>94</sup> See John Bowers & Alireza Khorakian, *Integrating Risk Management in the Innovation Project*, 17 EUR. J. INNOVATION MGMT. 25, 25 (2014), <https://doi.org/10.1108/EJIM-01-2013-0010> (noting that innovation is characterized by a high failure rate); see also Gerben van der Panne et al., *Success and Failure of*

First, most of the activities of innovative firms are related to the creation of new products and services, which means that they explore unknown fields. Exploring unknown fields creates a higher risk of failure. R.G. Cooper and E.J. Kleinschmidt, two prominent figures in the field of product development and commercialization, point out:

Product innovation remains a very high-risk endeavor, fraught with difficulties and littered with failures. New product failure rates remain high (estimated to be about 33% at launch), while almost half the resources that U.S. industry devotes to product innovation is spent on innovation duds—products that fail commercially or never make it to the marketplace!<sup>95</sup>

An empirical study by F.M. Scherer and Dietmar Harhoff shows that a large percentage of innovation activities have little or no economic value and that only a very small percentage of innovation activities generate high value.<sup>96</sup> Innovation projects generally last for a long time, which means that the outcome of the innovation comes after a long period of uncertainty.<sup>97</sup> Long-term uncertainty makes the problem of high risk even more acute. The high risk and the long time between the research and development phase and commercialization constitute high barriers to investing in innovation.<sup>98</sup>

Second, in addition to the risk that the firm will fail for operational reasons, investors face the moral hazard that the management of the innovative company is not aligned with their

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*Innovation: A Literature Review*, 07 INT'L J. INNOVATION MGMT. 309, 309–10 (2003), <https://doi.org/10.1142/S1363919603000830> (summarizing the literature concerning the high failure rate of innovations).

<sup>95</sup> R.G. Cooper & E.J. Kleinschmidt, *Success Factors in Product Innovation*, 16 INDUS. MKTG. MGMT. 215, 215 (1987), [https://doi.org/10.1016/0019-8501\(87\)90029-0](https://doi.org/10.1016/0019-8501(87)90029-0) (citations omitted).

<sup>96</sup> F.M. Scherer & Dietmar Harhoff, *Technology Policy for a World of Skew-Distributed Outcomes*, 29 RSCH. POL'Y 559, 565 (2000), [https://doi.org/10.1016/S0048-7333\(99\)00089-X](https://doi.org/10.1016/S0048-7333(99)00089-X); see also OECD, ENQUIRIES, *supra* note 53, at 460 (“[I]nnovative projects tend to be very risky at their inception. Very few projects result in high returns; most turn out to have little or no value.”).

<sup>97</sup> See Michael Kahn et al., *The Financing of Innovation*, in FINANCING INNOVATION: BRICS NATIONAL SYSTEMS OF INNOVATION 1, 2 (Michael Kahn et al. eds., 2020), <https://doi.org/10.4324/9780367818555-1> (noting that innovation is characterized by long development lead times, inherent uncertainty, and high risk, and that these inherent characteristics of the innovation process cause banks and even markets to resist financing early stage innovation).

<sup>98</sup> *Id.*

interests.<sup>99</sup> The incomplete nature of the contract between investors and the invested company can give the company's management the opportunity to engage in opportunistic behavior by taking advantage of unforeseen circumstances.<sup>100</sup> The management of an innovative company might transfer the benefits of having outside investors to the company's insiders by reducing the intensity of the work, increasing the risk of its projects, or spending too much money.<sup>101</sup>

Third, even if a company successfully develops and commercializes its new products and services, competitors might copy its innovations.<sup>102</sup> The outcomes of innovation are usually embodied in certain intellectual products that have the characteristics of "public goods," which are nonexclusive and nonrivalrous.<sup>103</sup> Nonexclusivity means that once an intellectual product has been created, it is difficult for the innovating company to exclude others from exploiting it.<sup>104</sup> Nonrivalry implies that the innovating firm's use of intellectual products does not reduce the utility of the products to its

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<sup>99</sup> See Arnoud W. A. Boot et al., *Secured Lending and Default Risk: Equilibrium Analysis, Policy Implications and Empirical Results*, 101 ECON. J. 458, 458 (1991), <https://doi.org/10.2307/2233552> (pointing out the moral hazard that can arise when borrowers take unobservable actions after borrowing and that these actions can affect loan returns); Alan Schwartz, *Priority Contracts and Priority in Bankruptcy*, 82 CORNELL L. REV. 1396, 1417–18 (1997) (noting that borrowers may engage in a form of moral hazard known as debt dilution, which involves reducing "the value of prior debt by [pursuing] later debt-financed projects that increase the firm's risk").

<sup>100</sup> See Dan L. Burk, *Intellectual Property and the Firm*, 71 U. CHI. L. REV. 3, 6 (2004) [hereinafter Burk, *IP and the Firm*].

<sup>101</sup> See generally Michael Peneder, *The Problem of Private Under-Investment in Innovation: A Policy Mind Map*, 28 TECHNOVATION 518, 520 (2008), <https://doi.org/10.1016/j.technovation.2008.02.006> (noting that moral hazard arises when an entrepreneur, due to misaligned incentives, takes actions detrimental to the investor).

<sup>102</sup> Mark A. Lemley, *Intellectual Property Rights and Standard-Setting Organizations*, 90 CALIF. L. REV. 1889, 1892 (2002) [hereinafter Lemley, *IP Rights and Standard-Setting Organizations*], <https://doi.org/10.2307/3481437> ("Intellectual creations are public goods that are much easier and cheaper to copy than they are to produce in the first place. Absent some form of exclusive right over inventions, no one (or not enough people) will bother to innovate."); see also Michael Abramowicz & John F. Duffy, *Intellectual Property for Market Experimentation*, 83 N.Y.U. L. REV. 337, 340 (2008) (noting that competitors can also free-ride on the information generated by the market experimentation that innovators had conducted).

<sup>103</sup> Lemley, *IP Rights and Standard-Setting Organizations*, *supra* note 102, at 1892.

<sup>104</sup> See Peneder, *supra* note 101, at 519.

competitors.<sup>105</sup> Since the cost of imitating an innovation can be low, free-riding competitors can compete with innovative firms at a much lower cost.<sup>106</sup> The result is that innovative firms invest significant capital in creating intellectual products but can only enjoy a small, temporary first-mover advantage over their competitors.<sup>107</sup> The returns in this situation might not be sufficient to compensate investors for their investments, which therefore weakens their enthusiasm for investing in innovative firms.<sup>108</sup>

Fourth, losses to investors can also come from the difficulty of liquidating an innovative firm.<sup>109</sup> To elaborate, innovative firms often use investors' funds to manufacture or purchase assets dedicated to a specific innovation, such as facilities for a specific function or individuals who serve a specific project.<sup>110</sup> These assets are difficult to redeploy elsewhere.<sup>111</sup> If an innovative company goes bankrupt because its innovation project fails, the lender will need to dispose of those assets if it is to recover the return to which it is entitled. But these assets might have no liquidation value—or one that is far below the return due to the lender.<sup>112</sup> In addition, anticipating that investors might be desperate to avoid the insolvency of an innovative firm, said firm might extort additional concessions.<sup>113</sup> In other words, investors

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<sup>105</sup> See *id.*; DAVID J. TEECE, *MANAGING INTELLECTUAL CAPITAL: ORGANIZATIONAL, STRATEGIC, AND POLICY DIMENSIONS* 15 (2000).

<sup>106</sup> See LANDES & POSNER, *supra* note 37, at 23–24.

<sup>107</sup> Abramowicz & Duffy, *supra* note 102, at 340.

<sup>108</sup> See Peneder, *supra* note 101, at 518–19 (noting that external investors might be hesitant to provide funding because they are unsure whether entrepreneurs will be successful in fending off potential imitators and thus protecting the future returns of the innovation).

<sup>109</sup> See Min Lin, *Law and Economics of Security Interests in Intellectual Property* 68 (Mar. 30, 2017) (Ph.D. dissertation, Universities of Bologna, Hamburg, and Rotterdam), <http://amsdottorato.unibo.it/7833>.

<sup>110</sup> See *id.*

<sup>111</sup> See Revest & Sapio, *supra* note 91, at 181 (“[S]pecialized and intangible assets . . . cannot be collateralized and are difficult to redeploy.”); OECD, *ENQUIRIES*, *supra* note 53, at 460 (“[T]he output of innovation investment mostly takes the form of KBC that needs to be sustained with continuous efforts and that is difficult for the financier to appropriate in case of distress. A significant fraction of the expenditures for innovation—like research and development (R&D), design and marketing of new products and workers’ training—goes to the salaries of scientists, engineers, consultants and other highly skilled labour.”).

<sup>112</sup> See Lin, *supra* note 109, at 68.

<sup>113</sup> See Burk, *IP and the Firm*, *supra* note 100, at 6.

run the risk of being caught in a hold-up situation. This possibility reduces their willingness to invest in innovative firms.

## 2. Information Asymmetry

Before making an investment decision, investors might want to collect and analyze information that will help them understand the attributes of the firm and assess whether it can generate returns on their investment.<sup>114</sup> When a potential investment target is an innovative company, it can be a challenge to gather sufficient information.<sup>115</sup> This is because an important attribute of such companies is their innovative project, which involves many intellectual assets that are important to the success of the firm's business but are difficult to observe directly,<sup>116</sup> such as research and development (R&D) output.<sup>117</sup> It might be difficult to communicate this data in a meaningful and complete way to those outside the firm, including external investors.<sup>118</sup> Moreover, even if the firm is able to educate outsiders about its new knowledge, the risk that others might appreciate this information might tempt firms to limit how much they are willing to divulge to external investors.<sup>119</sup> Although information that reveals the state of an innovative firm's innovation project helps

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<sup>114</sup> See OECD, ENQUIRIES, *supra* note 53, at 466.

<sup>115</sup> See *id.* at 460 (noting information asymmetries in the context of investing in innovative firms).

<sup>116</sup> Peneder, *supra* note 101, at 518 ("Among industrial sectors, business services face the biggest finance-related barriers to innovation—probably due to their stronger dependence on intangible assets."); Robert E. Carpenter & Bruce C. Petersen, *Capital Market Imperfections, High-Tech Investment, and New Equity Financing*, 112 ECON. J. F54, F67 (2002), <https://doi.org/10.1111/1468-0297.00683> (noting that R&D investment is generally significantly higher than physical investment in high-tech enterprises, and a large portion of their investment, especially for small firms, is intangible).

<sup>117</sup> Long, *supra* note 18, at 646.

<sup>118</sup> See TEECE, *supra* note 105, at 13–14; Eric von Hippel, "Sticky Information" and the Locus of Problem Solving: Implications for Innovation, 40 MGMT. SCI. 429, 429–30 (1994), <https://doi.org/10.1287/mnsc.40.4.429>.

<sup>119</sup> Carpenter & Petersen, *supra* note 116, at F55; see also Kenneth J. Arrow, *Economic Welfare and the Allocation of Resources for Invention*, in THE RATE AND DIRECTION OF INVENTIVE ACTIVITY 609, 615 (Nat. Bureau of Econ. Rsch. ed., 1962) (noting that there is a paradox between disclosing information and determining demand and price for it when the property right covering it is absent).



investors to value the firm accurately,<sup>120</sup> investors might find the cost of collecting this information excessively high.<sup>121</sup>

In addition to the costs of gathering information, the costs associated with analyzing it can also be high.<sup>122</sup> Investors must be able to interpret the information that they gather.<sup>123</sup> The required knowledge is also, in essence, a type of information; it is the key necessary for decoding information related to innovative projects. Without it, investors will lack the ability to understand technically complex, innovative projects. Innovative firms participate in projects that can involve advanced science and breakthrough technologies, which can require a great deal of scientific, technical, and industry knowledge on the part of those who aim to verify its commercial viability.<sup>124</sup> Investors such as banks have excellent, experienced teams of financial professionals, but they often lack the talent to understand both technology and finance. As a result, the cost of validating a company's innovative projects might be too high for them.<sup>125</sup>

Of course, even without being able to understand a company's innovative projects, investors can use the company's track record, investment record, reputation, and financial position<sup>126</sup> to get a sense of the quality of the investment target and to decide whether to invest. But the innovative firms that need external financial support the most tend to face the most serious information problems.<sup>127</sup> Specifically, small- and medium-sized innovative firms and startups often do not

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<sup>120</sup> Graham et al., *supra* note 17, at 1303; *see also* Long, *supra* note 18, at 644 ("When information is imperfect . . . the value of a firm is ambiguous.").

<sup>121</sup> *See* Carl J. Dahlman, *The Problem of Externality*, 22 J.L. & ECON. 141, 148 (1979) (regarding information costs as one of the major transaction costs).

<sup>122</sup> Long, *supra* note 18, at 644.

<sup>123</sup> Peneder, *supra* note 101, at 520 ("[T]he accuracy of the allocation of resources depends on two critical factors: (i) the availability of *information*; and (ii) the ability to interpret information properly, i.e., *knowledge*.").

<sup>124</sup> Revest & Sapiro, *supra* note 91, at 181 (noting that information asymmetries between managers of technology-based small firms and outside investors can be severe due to investors' lack of understanding of technically complex projects); Carpenter & Petersen, *supra* note 116, at F54–55.

<sup>125</sup> Long, *supra* note 18, at 644.

<sup>126</sup> OECD, *ENQUIRIES*, *supra* note 53, at 460 ("[I]n the early stage of financing, an innovative project is generally expected to bring revenues only in the long term, while debt arrangements often require predictable cash flows to repay the loan.").

<sup>127</sup> Revest & Sapiro, *supra* note 91, at 198 (pointing out that small technology-based companies in Europe have difficulty accessing external funding due to information asymmetry).

have a long operating history,<sup>128</sup> have not received many investments,<sup>129</sup> and lack a reputational track record with creditors.<sup>130</sup> Innovative firms (especially small ones) do not even have a cash flow at the point when they seek investment.<sup>131</sup>

The difficulty of collecting information related to innovation, difficulty of interpreting this information once collected, and lack of credit and operational information together result in a wide information gap between external investors and innovative firm insiders. The existence of this information gap is also commonly referred to as information asymmetry between insiders and external investors.<sup>132</sup> Information asymmetry can lead to an adverse selection problem.<sup>133</sup> Specifically, when investors know that insiders might overstate the value of a company but lack the information that would allow them to distinguish between good and bad quality companies, they tend to give companies average appraisals in order to avoid overvaluing them. The result might be the undervaluing of a good quality company, which would therefore have to accept harsh financing terms or even get squeezed out of the capital market. Information asymmetry in the capital markets prevents efficient allocation of capital to innovative firms.<sup>134</sup>

### 3. Inadequate Channels

In addition to the risk of loss and information asymmetry, the inadequacy of investment channels also deters investors from putting money into innovative firms. The channels through which investors allocate capital to these firms can be obstructed. There are at least

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<sup>128</sup> Graham et al., *supra* note 17, at 1303; Revest & Sapio, *supra* note 91, at 181 (noting that because of the short track record of companies in the startup and early growth stages, information asymmetries between managers of technology-based small firms and outside investors can be severe).

<sup>129</sup> OECD, ENQUIRIES, *supra* note 53, at 460 (“[Y]oung firms . . . lack a track record of successful investments.”).

<sup>130</sup> Peneder, *supra* note 101, at 520–21.

<sup>131</sup> *Id.*

<sup>132</sup> See Long, *supra* note 18, at 644.

<sup>133</sup> See Peneder, *supra* note 101, at 520–22; OECD, ENQUIRIES, *supra* note 53, at 459; Ronald J. Mann, *Verification Institutions in Financing Transactions*, 87 GEO. L.J. 2225, 2226 (1999).

<sup>134</sup> Mann, *supra* note 133, at 2226 (“One of the most common problems in commercial transactions is the resolution of information asymmetries . . .”); OECD, ENQUIRIES, *supra* note 53, at 459; Long, *supra* note 18, at 644–45.

three types of obstacles: constraints imposed by government regulation, investors, and innovative firms themselves.

Government regulation might put barriers in the channel between investors and innovative firms. For example, the stock market is a place where innovative firms can raise capital directly from investors. Yet, barriers to entry and strict regulations make it difficult for many innovative firms to enter the market. For example, there are significant fees associated with going public,<sup>135</sup> which can be unmanageable for start-up and growth stage innovative firms. If the initial public offering is unsuccessful, the company can suffer a loss.<sup>136</sup> The Securities and Exchange Commission (SEC) requires public companies to disclose their annual statements including detailed information on the company's financial performance, its shareholders, and the material contracts affecting its operations.<sup>137</sup> The cost of meeting these regulatory requirements is too high for many small firms.<sup>138</sup>

The norms to which investors adhere might also limit the flow of capital into innovative firms. Typically, traditional commercial banks follow strict risk control standards to ensure the safety of the lending.<sup>139</sup> They use certain models to measure companies and determine their credit rating. These models generally demand a high level of cash flow and proof of the profitability of the enterprise.<sup>140</sup> This leads traditional commercial banks to prefer investing in low-risk companies with large assets, clear sources of repayment, and mature production and operations. In contrast, innovative firms generally have a small asset size, unclear management structures, immature technology and products, and an unestablished market position. Therefore,

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<sup>135</sup> HALT ET AL., *supra* note 52, at 150.

<sup>136</sup> *Id.*

<sup>137</sup> See *Exchange Act Reporting and Registration*, U.S. SEC. & EXCH. COMM'N (Apr. 6, 2023), <https://www.sec.gov/education/smallbusiness/goingpublic/exchangeactreporting>.

<sup>138</sup> See Brian J. Bushee & Christian Leuz, *Economic Consequences of SEC Disclosure Regulation: Evidence from the OTC Bulletin Board*, 39 J. ACCT. & ECON. 233, 233 (2005) (finding that the imposition of disclosure requirements by the SEC has resulted in significant costs for smaller companies); Nikolic, *supra* note 19, at 399 ("Another factor in raising money by issuing stock is the high cost to the company of compliance with the various Securities and Exchange Commission registration requirements.").

<sup>139</sup> See Nikolic, *supra* note 19, at 399.

<sup>140</sup> See Amir Sufi, *Bank Lines of Credit in Corporate Finance: An Empirical Analysis*, 22 REV. FIN. STUD. 1057, 1057 (2009); Gabriel Jiménez et al., *Empirical Analysis of Corporate Credit Lines*, 22 REV. FIN. STUD. 5069, 5069–70 (2009).

traditional bank credit measurements will not give them high scores. In order to comply with regulatory requirements when giving loans to enterprises with low credit ratings, banks have to include more provisions for possible bad and doubtful debts. This requires increasing capital, raising the cost of lending, and reducing the banks' incentive to lend. In addition, to decrease the risk of lending, traditional commercial banks prefer to accept as collateral physical assets (such as property) that are stable in value and easy to liquidate, but many innovative firms lack physical assets that they can offer as collateral.

The resistance to investors putting their capital into innovative firms can come from within the firm. Typically, when innovative firms seek funding from investors, especially venture capitalists, investors often ask the founders or the management to transfer a substantial portion of ownership as consideration as the investors hope to reap substantial benefits should the firm succeed.<sup>141</sup> But doing so might dilute the original shares of the firm's founders and other existing stockholders and thus reduce their prospective returns, making them less willing to accept the investment.<sup>142</sup> Sometimes the investor will seek board control and substantial protective rights, such as the right to veto changes in the certificate of incorporation.<sup>143</sup> The founders, management, and key employees might prefer not to take an investor's money when the investor's goal is different from theirs.<sup>144</sup>

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<sup>141</sup> Nikolic, *supra* note 19, at 399 ("Venture capitalists are entities willing to invest in riskier business enterprises, however, in exchange for this risk, they wanted a large equity interest in the company and a voice on the company board.").

<sup>142</sup> *See id.* ("A company is limited as to how often it can issue new stock. As residual owners of a company, stockholders would be hesitant to invest if a company regularly attempted to issue new shares because each new issue of shares would dilute the shares of existing stockholders."); HALT ET AL., *supra* note 52, at 148.

<sup>143</sup> Jesse M. Fried & Mira Ganor, *Agency Costs of Venture Capitalist Control in Startups*, 81 N.Y.U. L. REV. 967, 970–71 (2006); *see also* Nguyen, *Collateralizing IP*, *supra* note 19, at 14 ("VC-backed equity financing, however, often provides ownership in the form of preferred stock and extensive control rights to the VC firm." (footnote omitted)).

<sup>144</sup> Nguyen, *Collateralizing IP*, *supra* note 19, at 14; *see also* Nikolic, *supra* note 19, at 399 ("[Venture capital investment] may be unappealing to many companies because management would have to cede some control.").

### B. *Intellectual Property as a Solution*

When investors face the challenges of high risk of loss, information asymmetry, and obstacles in channels when investing in innovative firms, they can turn to the intellectual property system for help.

#### 1. Securing Function

When investors invest in innovative firms by purchasing equity, their returns are related to the firm's performance. Intellectual property rights can reduce an investor's risk of loss if these rights enhance the innovative company's performance. Innovative firms might perform well if the products and services that they offer remain competitive in the marketplace. Intellectual goods, such as inventions and works of authorship, can add to the uniqueness of products and services, enabling the companies to generate profits by differentiated competition<sup>145</sup> and/or by reducing production costs.<sup>146</sup> Intellectual property rights help products and services remain competitive because they preclude others from exploiting the underlying inventions and work.<sup>147</sup> In this sense, intellectual property rights secure investors' investments by maintaining the invested company's competitive advantage in product and service markets.<sup>148</sup> Before making an investment, angel investors often consider whether a company has obtained or sought to obtain intellectual property protection over its products.<sup>149</sup>

Intellectual property rights enhance the performance of innovative firms by facilitating their collaboration—both vertically and horizontally—with other entities. Vertically, intellectual property rights, especially patents, help innovative firms make efficient choices about their firm's scope because they lower the barriers to bargaining

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<sup>145</sup> See OECD, ENQUIRIES, *supra* note 53, at 458 (noting that companies have used intellectual assets to develop new products and services and to differentiate from competitors); OECD, INTELLECTUAL ASSETS AND INNOVATION: THE SME DIMENSION 17 (2011), <https://doi.org/10.1787/9789264118263-en> ("Firms may use IPRs to open up or segment markets through product and design differentiation . . . ." (emphasis omitted)).

<sup>146</sup> LEMLEY ET AL., IP IN NEW TECHNOLOGICAL AGE, *supra* note 61, at 19.

<sup>147</sup> *Id.* at 21.

<sup>148</sup> Steven L. Meltzer et al., *Intellectual Property as a Foundation for Funding*, 20 NATURE BIOTECHNOLOGY BE47, BE47 (2002) (noting that intellectual property rights can keep "potential competitors out of your niche market while you reap the rewards of your innovation").

<sup>149</sup> HALT ET AL., *supra* note 52, at 149.

over ideas, giving them more opportunities to transact with others.<sup>150</sup> These expanded transactional opportunities allow companies to trade with the least-cost suppliers, reducing the minimum size of technological and production inputs within the firm and letting them reap the benefits of specialization.<sup>151</sup> Horizontally, companies can use intellectual property rights to foster research alliances<sup>152</sup> and reduce rivalry from competitors.<sup>153</sup> As a result, innovative firms encounter fewer obstacles to R&D, production, and marketing.<sup>154</sup> When there are disputes with competitors, intellectual property rights can act as leverage to facilitate reconciliation<sup>155</sup>—that is, to eliminate hostility horizontally. For example, cross-licensing can be the result of cooperation between firms with an interest in cooperating or a compromise between firms with prior disputes. In this sense, intellectual property rights contribute to the performance of innovative firms because they make the R&D, production, and marketing of these firms more efficient.<sup>156</sup>

Investors are generally concerned about a company's depreciation in value due to the loss of its core assets. For innovative firms, these core assets are generally their intellectual property.<sup>157</sup> If

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<sup>150</sup> See Jonathan M. Barnett, *Intellectual Property as a Law of Organization*, 84 S. CAL. L. REV. 785, 791–92 (2011); F. Scott Kieff, *Coordination, Property, and Intellectual Property: An Unconventional Approach to Anticompetitive Effects and Downstream Access*, 56 EMORY L.J. 327, 328, 345–46 (2006) [hereinafter Kieff, *An Unconventional Approach*].

<sup>151</sup> See Barnett, *supra* note 150, at 791–92.

<sup>152</sup> HARALD WIESER ET AL., INNOVA, LEVERAGING INTELLECTUAL PROPERTIES FOR START-UP AND SME HYPERGROWTH: TOWARDS HOLISTIC SUPPORT SERVICES 14–15 (2022), [https://www.kmuforschung.ac.at/wp-content/uploads/2020/10/leveraging-ip-for-start-up-and-sme-hypergrowth\\_towards-holistic-support-services\\_09-02-2022-komprimiert.pdf](https://www.kmuforschung.ac.at/wp-content/uploads/2020/10/leveraging-ip-for-start-up-and-sme-hypergrowth_towards-holistic-support-services_09-02-2022-komprimiert.pdf).

<sup>153</sup> See Nikolic, *supra* note 19, at 411–12 (noting that patent portfolios strengthen a company's position in defending lawsuit).

<sup>154</sup> See Edward Levitas & M. Ann McFadyen, *Managing Liquidity in Research-Intensive Firms: Signaling and Cash Flow Effects of Patents and Alliance Activities*, 30 STRATEGIC MGMT. J. 659, 660 (2009).

<sup>155</sup> See Chien, *supra* note 9, at 1872 (pointing out the role of patents as a defensive tool against lawsuits); see, e.g., Bronwyn H. Hall & Rosemarie Ham Ziedonis, *The Patent Paradox Revisited: An Empirical Study of Patenting in the U.S. Semiconductor Industry, 1979–1995*, 32 RAND J. ECON. 101, 107–09 (2001) (showing that the purposes for defense and as bargaining chips are particularly prevalent in the industries driven by complex and cumulative technologies, such as semiconductors or telecommunications, but might be less relevant in others); HALT ET AL., *supra* note 52, at 149.

<sup>156</sup> See Levitas & McFadyen, *supra* note 154, at 660.

<sup>157</sup> See WIESER ET AL., *supra* note 152, at 11 (“Intellectual assets lie at the heart of many innovative businesses.”).

these assets are intrinsically tied to their creators, employees may take these assets when they leave.<sup>158</sup> Intellectual property rights set boundaries for intellectual assets, separating them from individual innovators (the human resources of the firm).<sup>159</sup> In addition, the work-for-hire doctrine in copyright and patent law vests the ownership of intellectual assets in the company.<sup>160</sup> Even in cases beyond the scope of the work-for-hire doctrine, a company can automatically get the assignment of the ownership from its employees by entering into an agreement about this with them.<sup>161</sup> By facilitating asset separation and ownership allocation, the intellectual property system reduces the risk of depreciation of the company's value due to intellectual assets leaving with their creators.<sup>162</sup>

Investors can be reluctant to lend to innovative firms for fear that the companies will not have the ability to repay their loans. Collateral can reduce this reluctance because in the event of a company's default, the law prioritizes the liquidation proceeds for repayment to investors.<sup>163</sup> Intellectual property law gives innovative firms property rights that let them exclude others from using their intellectual assets in particular ways without their consent. On the one hand, the establishment of exclusivity gives intellectual assets an exchange value independent of other assets.<sup>164</sup> On the other hand, the extent to which

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<sup>158</sup> See OECD, *ENQUIRIES*, *supra* note 53, at 460 ("The output [of innovation] is an intangible asset, which, unless codified, is only embedded in the human capital of the firm's employees."); see also LEMLEY ET AL., *IP IN NEW TECHNOLOGICAL AGE*, *supra* note 61, at 19 (noting that competitors may learn a creator's idea from a former employee).

<sup>159</sup> Burk, *Role of Patent Law*, *supra* note 35, at 1018 (noting that patents codify knowledge, transforming it into a tangible asset and enabling its separation from the individuals who possess it).

<sup>160</sup> William P. Hovell, *Patent Ownership: An Employer's Rights to His Employee's Invention*, 58 NOTRE DAME L. REV. 863, 864 (1983); Evelyn D. Pisegna-Cook, *Ownership Rights of Employee Inventions: The Role of Preinvention Assignment Agreements and State Statutes*, 2 U. BALT. INTELL. PROP. L.J. 163, 166 (1993).

<sup>161</sup> Hovell, *supra* note 160, at 875; Pisegna-Cook, *supra* note 160, at 163.

<sup>162</sup> Cf. Burk, *IP and the Firm*, *supra* note 100, at 9 ("[F]irms may be reluctant to develop project-specific intellectual property if control is incompletely allocated, as this sets the stage for potential hold-up by employees.").

<sup>163</sup> See Ashish Bharadwaj, *Intellectual Property and Markets for Finance*, INNOVATION POL'Y PLATFORM (Nov. 17, 2013), [https://www.slideshare.net/ashishbharadwaj/ip-and-markets-for-finance?from\\_action=save](https://www.slideshare.net/ashishbharadwaj/ip-and-markets-for-finance?from_action=save) (suggesting that the risks of investing in innovative firms and the barriers to accessing information pose challenges to innovation financing, but that IP can help to address these challenges by providing title).

<sup>164</sup> See Robert P. Merges & Richard R. Nelson, *On the Complex Economics of Patent Scope*, 90 COLUM. L. REV. 839, 845 (1990) ("The patent claims serve a different function:

the establishment of exclusivity reduces the risk that potential competitors will appropriate these intellectual assets allows innovative firms to disclose them at lower risk and thus transfer them to others more easily.<sup>165</sup> This makes the transaction costs of liquidating intellectual assets more manageable for potential sellers and buyers. In other words, intellectual property law helps intellectual assets to develop an independent exchange value and makes them easier to liquidate,<sup>166</sup> allowing innovative firms to use their intellectual assets as collateral to secure repayment to investors.<sup>167</sup>

Investors are concerned about the financial position of the innovative firms in which they invest. Even if investors do not obtain the company's intellectual property rights as collateral, those rights can protect the investment because they enhance the company's financial position by generating cash flow.<sup>168</sup> Firms can license the intellectual property rights over innovations that they cannot further develop themselves to other companies in exchange for money. This is particularly true for SMEs because they have fewer resources at their

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Analogous to the metes and bounds of a real property deed, they distinguish the inventor's intellectual property from the surrounding terrain."); *see also* OECD, ENQUIRIES, *supra* note 53, at 458 (noting that one of the attractive feature of IP assets that help firms to attract investments is that they "can be separated from the business and sold in case of financial distress").

<sup>165</sup> *See* Robert P. Merges, *A Transactional View of Property Rights*, 20 BERKELEY TECH. L.J. 1477, 1487 (2005); Jag Singh, *How Startups and SMEs Should Think About IP: An Investor's Perspective*, WIPO (June 2021), [https://www.wipo.int/wipo\\_magazine/en/2021/02/article\\_0006.html](https://www.wipo.int/wipo_magazine/en/2021/02/article_0006.html) ("IP rights enable inventors and creators to transform their intellectual outputs into tradeable commercial assets."); *see generally* Paul J. Heald, *A Transaction Costs Theory of Patent Law*, 66 OHIO ST. L.J. 473, 476 (2005) (examining the function of patent law to reduce transaction costs).

<sup>166</sup> *See* WIESER ET AL., *supra* note 152, at 15; OECD, ENQUIRIES, *supra* note 53, at 458 (noting that IP assets help firms to attract investments because they "can be separated from the business and sold in case of financial distress").

<sup>167</sup> *See* Nguyen, *Collateralizing IP*, *supra* note 19, at 19 ("The proliferation of intellectual property as collateral in secured financing has spread across many industries."); *Securing Financing with IP Assets*, WIPO, <https://www.wipo.int/sme/en/securing-financing.html> (last visited Oct. 9, 2023) ("[B]anks may take into account IP assets as collateral when determining whether to grant a loan . . .").

<sup>168</sup> *See* OECD, ENQUIRIES, *supra* note 53, at 461; Nikolic, *supra* note 19, at 411 ("A company that has a patent portfolio can exclude a larger proportion of competitors from practicing a larger proportion of inventions, potentially reaping greater royalties or infringement rewards.").



disposal.<sup>169</sup> Innovative firms find the option of licensing intellectual property to other companies to generate income appealing,<sup>170</sup> as it allows them to use the money to repay investors or to invest in intellectual assets that fit the firm's strengths. This cash flow can also prevent a company from failing when its products or services suffer a setback.<sup>171</sup>

## 2. Signaling Function

The intellectual property system can provide signals that help investors make investment decisions.<sup>172</sup> Investors need to collect and analyze information to screen and select potential investment targets. After investing, they also need to collect and analyze information in order to supervise the companies in which they have invested.<sup>173</sup> The sources of information are diverse. A typical source of information is the disclosure system of the SEC, through which publicly traded innovative firms offer substantial amounts of information.<sup>174</sup> The networks that investors form are another important source of information.<sup>175</sup> The intellectual property system can also provide information that investors need to make investment decisions.<sup>176</sup> In late 2006, the Ocean Tomo 300 Patent Growth Index became one of

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<sup>169</sup> Gaétan de Rassenfosse, *How SMEs Exploit Their Intellectual Property Assets: Evidence from Survey Data*, 39 SMALL BUS. ECON. 437, 449 (2012).

<sup>170</sup> WIESER ET AL., *supra* note 152, at 14.

<sup>171</sup> The case of Nokia is a typical example. After the significant contraction of its cell phone market share, the licensing fees that its patent portfolio generated came to play a critical role in its company's operations. See J. Gregory Sidak, *What Aggregate Royalty Do Manufacturers of Mobile Phones Pay to License Standard-Essential Patents?*, 1 CRITERION J. ON INNOVATION 701, 703–05 (2016).

<sup>172</sup> See, e.g., DAVID H. HSU & ROSEMARIE H. ZIEDONIS, ACAD. OF MGMT. PROC., PATENTS AS QUALITY SIGNALS FOR ENTREPRENEURIAL VENTURES 1 (2008), <https://doi.org/10.5465/ambpp.2008.33653924>; Annamaria Conti et al., *Patents as Signals for Startup Financing*, 61 J. INDUS. ECON. 592, 592 (2013).

<sup>173</sup> See, e.g., Paul A. Gompers, *Optimal Investment, Monitoring, and the Staging of Venture Capital*, 50 J. FIN. 1461, 1461 (1995).

<sup>174</sup> Russell B. Stevenson, Jr., *SEC and the New Disclosure*, 62 CORNELL L. REV. 50, 51 (1976).

<sup>175</sup> See HALT ET AL., *supra* note 52, at 149.

<sup>176</sup> See Peter S. Menell & Suzanne Scotchmer, *Economic Models of Innovation: Stand-Alone and Cumulative Creativity*, in 1 RESEARCH HANDBOOK ON THE ECONOMICS OF INTELLECTUAL PROPERTY LAW, *supra* note 71, at 120 (“[I]ntellectual property is an effective screening device . . . .”); OECD, ENQUIRIES, *supra* note 53, at 458 (“First, IPRs help to reveal to investors the quality of the firm's management and of its technological capabilities.”).

the indices of the US stock market, reflecting the fact that stock investors view intellectual property as an important indicator of a company's value.<sup>177</sup>

The exclusivity of intellectual property rights reduces the risk that competitors will appropriate intellectual assets once a company has published them in order to seek external financing.<sup>178</sup> The laws protecting intellectual property rights therefore encourage innovative firms to display their intellectual assets, making them accessible to investors.<sup>179</sup> They might present these intellectual assets directly to potential investors. Alternatively, innovative firms might document the characteristics of their intellectual assets in forms like patent documents, which are prepared for future investors to review.<sup>180</sup> Intellectual property rights also allow innovative firms to present peripheral information associated with intellectual assets to investors.<sup>181</sup> This peripheral information can help investors make decisions.

For investors, the value of the information that the intellectual property system generates is that it can reduce informational asymmetries between them and innovative firms (the owners of intellectual assets).<sup>182</sup> Understanding the attributes of an investment target is the basis for assessing the returns and risks of an investment. Investors usually perform due diligence on a company before deciding to buy an equity stake in it or lend to it. The purpose of due diligence is to help investors understand a company's attributes. If the potential investment target is an innovative company, it is important that the investors grasp the present and future profitability of the company's core assets—its intellectual property.<sup>183</sup> Beyond gauging a company's

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<sup>177</sup> See Nikolic, *supra* note 19, at 410–11; Raymond Millien & Ron Laurie, *A Survey of Established & Emerging IP Business Models*, 9 SEDONA CONF. J. 77, 85 (2008).

<sup>178</sup> See Levitas & McFadyen, *supra* note 154, at 662.

<sup>179</sup> See OECD, ENQUIRIES, *supra* note 53, at 460–61; Burk, *Role of Patent Law*, *supra* note 35, at 1012; Menell & Scotchmer, *supra* note 176, at 145.

<sup>180</sup> See Long, *supra* note 18, at 646 (noting that individual patents can convey information about inventions); OECD, ENQUIRIES, *supra* note 53, at 460–61; Burk, *Role of Patent Law*, *supra* note 35, at 1012.

<sup>181</sup> See Rantanen, *supra* note 34, at 6–9.

<sup>182</sup> OECD, ENQUIRIES, *supra* note 53, at 460 (“[T]o an external investor, IP can be a signal of a company's quality and potential, thus reducing information asymmetries.”); Long, *supra* note 18, at 625 (“Patents can reduce informational asymmetries between patentees and observers.”).

<sup>183</sup> See Long, *supra* note 18, at 647 (explaining in detail what information an investor can get from a patent document about the patentee's invention).

intellectual assets, investors can utilize the data provided by the intellectual property system to assess other less observable characteristics of the company.<sup>184</sup>

Intellectual property signals being not susceptible to manipulations explains why these signals can be used to reduce information asymmetries. If the cost of generating signals was low, firms that could not otherwise attract investors would do so by generating signals. Thus, investors tend to give more weight to signals that require relatively high costs to generate.<sup>185</sup> In this sense, investors tend to give little or no weight to some signals, such as information about the number of copyrights and the number of trademarks. This is because the cost of obtaining copyrights and trademarks is low,<sup>186</sup> so innovative firms might opportunistically increase their number in order to mislead investors. In contrast, the reliability of the information that the patent system generates is higher<sup>187</sup> because it is more expensive to create. To obtain a patent, innovative firms' applications must pass the examination for novelty, utility, non-obviousness, and the fulfillment of certain disclosure requirements by the USPTO.<sup>188</sup>

In practice, investors might use intellectual property signals to infer various attributes of innovative firms.<sup>189</sup> These attributes might

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<sup>184</sup> *Id.* at 664 (noting that the patent system might produce signals about attributes of a firm that are not easy to measure); Hanna Hottenrott et al., *Patents as Quality Signals? The Implications for Financing Constraints on R&D*, 25 ECON. INNOVATION & NEW TECH. 197, 199 (2016).

<sup>185</sup> OECD, ENQUIRIES, *supra* note 53, at 460 (“IPRs as signals. According to information theory, to be highly informative as indicators of a company’s high quality and potential, signals need to be observable by external stakeholders and overly expensive for low quality companies to obtain.”); *see also* Long, *supra* note 18, at 648 & n.62 (citing literature to explain why signals that require high costs to send can distinguish between high-quality and low-quality firms).

<sup>186</sup> OECD, ENQUIRIES, *supra* note 53, at 461 (“Other kinds of IPRs like copyrights and trademarks appear to be less informative since their registration is cheaper and easier to obtain.”).

<sup>187</sup> Long, *supra* note 18, at 649.

<sup>188</sup> Andrea Mina et al., *The Demand and Supply of External Finance for Innovative Firms*, 22 INDUS. & CORP. CHANGE 869, 874 (2013) (“From an investment viewpoint, the informational content of patents is superior to that of R&D, and the public character of patents as legal documents increases the transparency of firms.”).

<sup>189</sup> *See* Lemley, *Reconceiving Patents in the Age of Venture Capital*, *supra* note 21, at 143 (mentioning that venture capitalists take even patent application information into account when investing in startups); Long, *supra* note 18, at 651 (“Many observers—academics, industry analysts and investors, venture capitalists, and firms—correlate patents with desirable firm attributes and have been doing so for decades.”); Dietmar

be as general as the firm's technological capabilities, market niche, and management quality.<sup>190</sup> Or they might be more specific. With regard to technological aspects of the company, more granular attributes include the quality of its research personnel and current research undertakings, the speed of its research in a particular field, and the direction of its technological development.<sup>191</sup> As for market and management aspects, investors might check on whether the company's intellectual property portfolio is aligned with the company's business strategies.<sup>192</sup> Because intellectual property protection is territorial, if a firm's relevant portfolio does not cover the areas it mentions in its business strategy, investors will have reason to suspect that the firm will not be able to achieve the market position and profit prospects it claims.<sup>193</sup> A firm's absence of a robust intellectual property protection framework can indicate its management's operational shortcomings and an inability to effectively utilize available legal measures.<sup>194</sup>

Academic research shows that there is also a correlation between a company's intellectual property portfolio and some of the attributes that might be of interest to investors. Regarding internet and biotechnology industries, empirical studies show that patenting correlates positively with a company's survival.<sup>195</sup> The assets of high-

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Harhoff, *The Role of Patents and Licenses in Securing External Finance for Innovation*, in HANDBOOK OF RESEARCH ON INNOVATION AND ENTREPRENEURSHIP 55, 62 (David B. Audretsch et al. eds., 2011) ("Patents may also serve as signals that certify to some extent that the start-up has available a novel and inventive technology. In [this] case, the patent's function is mainly to act as a seal of quality, possibly reducing the information problem on the investor's side.").

<sup>190</sup> OECD, ENQUIRIES, *supra* note 53, at 458; Sichelman, *supra* note 14, at 377; Holger Ernst, *Patent Information for Strategic Technology Management*, 25 WORLD PAT. INFO. 233, 239-40 (2003); Mark A. Lemley, *Rational Ignorance at the Patent Office*, 95 NW. U. L. REV. 1495, 1505-06 (2001) [hereinafter Lemley, *Rational Ignorance at the Patent Office*].

<sup>191</sup> See Long, *supra* note 18, at 648.

<sup>192</sup> WIESER ET AL., *supra* note 152, at 20 ("IP strategies must be aligned with the overall business strategy."); Singh, *supra* note 165 (business plans).

<sup>193</sup> See WIESER ET AL., *supra* note 152, at 20.

<sup>194</sup> See Andrew White, *UK: How IP Can Help Your Business Secure Investment*, MONDAQ (April 5, 2021), <https://www.mondaq.com/uk/trademark/1054266/how-ip-can-help-your-business-secure-investment> ("You can have the greatest idea . . . but if you cannot protect it, an investor is not likely to take you seriously. Building a strong IP portfolio puts you in a better position to secure business investment when you need it.").

<sup>195</sup> S. Wagner & I. Cockburn, *Patents and the Survival of Internet-Related IPOs*, 39 RSCH. POL'Y 214, 214 (2010), <https://doi.org/10.1016/j.respol.2009.12.003> (finding that processing patents is positively associated with the survival rate of Internet-related firms listed on the NASDAQ, though "business method" patents do not appear to

tech startups that obtain patents appear to have higher annual growth rates.<sup>196</sup> Researchers also suggest that patent citation information can help investors determine the future earnings potential of a company's scientific discoveries,<sup>197</sup> and that new biotechnology companies with more patents reach the stage of initial public offering more quickly.<sup>198</sup>

Knowing that investors are likely to consider intellectual property signals gives companies, especially start-ups, an incentive to use intellectual property as a marketing tool.<sup>199</sup> These companies generally have a short operating history and small asset size,<sup>200</sup> so investors tend to rely more heavily on intellectual property signals to determine their attributes.<sup>201</sup> Because of their disadvantaged position in the capital markets, startups have a greater incentive to manipulate these signals to attract investments.<sup>202</sup> But as some have noted, few SMEs acquire intellectual property rights for the purpose of increasing their market value or access to financing.<sup>203</sup> Regardless of the firm's intent to manipulate intellectual property signals, research suggests

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confer a survival advantage"); Brian S. Silverman & Joel A. C. Baum, *Alliance-Based Competitive Dynamics*, 45 ACAD. MGMT. J. 791, 800 (2002), <https://doi.org/10.5465/3069312> (finding that the number of patents owned by biotech companies and the number of pending patent applications are both negatively correlated with the exit rate of the companies).

<sup>196</sup> Christian Helmers & Mark Rogers, *Does Patenting Help High-Tech Start-Ups?*, 40 RSCH. POL'Y 1016, 1016 (2011), <https://doi.org/10.1016/j.respol.2011.05.003>.

<sup>197</sup> Mark Hirschey & Vernon J. Richardson, *Are Scientific Indicators of Patent Quality Useful to Investors?*, 11 J. EMPIRICAL FIN. 91, 91 (2004), <https://doi.org/10.1016/j.jempfin.2003.01.001>.

<sup>198</sup> Toby E. Stuart et al., *Interorganizational Endorsements and the Performance of Entrepreneurial Ventures*, 44 ADMIN. SCI. Q. 315, 334 (1999), <https://doi.org/10.2307/2666998>.

<sup>199</sup> See Long, *supra* note 18, at 663; Bartow, *supra* note 18, at 2 (noting that the actual motivation for firms to obtain patents may be to use them as a marketing and corporate image enhancement tools); Jay M. Mattappally, Comment, *Goliath Beats David: Undoing the Leahy-Smith America Invents Act's Harmful Effects on Small Businesses*, 58 LOY. L. REV. 981, 985 (2012).

<sup>200</sup> Graham et al. *supra* note 17, at 1303.

<sup>201</sup> See David B. Audretsch et al., *Financial Signaling by Innovative Nascent Ventures: The Relevance of Patents and Prototypes*, 41 RSCH. POL'Y 1407, 1407–08 (2012), <https://doi.org/10.1016/j.respol.2012.02.003>; Graham et al., *supra* note 17, at 1303–04.

<sup>202</sup> See Long, *supra* note 18, at 655.

<sup>203</sup> WIESER ET AL., *supra* note 152, at 15; Graham et al., *supra* note 17, at 1255 (“[S]tartup executives report that patents generally provide relatively weak incentives to conduct innovative activities.”).

that investors tend to gradually reduce their reliance on these signals as their knowledge of the startup grows.<sup>204</sup>

### 3. Coordinating Function

When investment channels are blocked, stakeholders can take steps to remove the obstacles or to open new channels with fewer or weaker obstacles. The intellectual property system allows them to create these new channels, as it gives them the ability to coordinate various parties and form relationships to facilitate investment. Edmund Kitch first mentioned this coordinating function in 1977,<sup>205</sup> and other scholars continue to develop it.<sup>206</sup> But the current literature analyzing the coordinating function of the intellectual property system focuses on explaining how it helps different parties to coordinate in order to engage in the improvement and commercialization of intellectual products.<sup>207</sup> Typically, as F. Scott Kieff put it, intellectual property rights “should be expected to be fairly effective in facilitating the coordination among complementary users of the IP-protected subject matter that can help get it commercialized.”<sup>208</sup> When backed by strong legal protection—property rules—intellectual property rights can have a “beacon effect,” providing an incentive for complementary users to come together and a “bargain effect,” giving them an incentive to transact with each other.<sup>209</sup>

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<sup>204</sup> Sebastian Hoenen et al., *The Diminishing Signaling Value of Patents Between Early Rounds of Venture Capital Financing*, 43 RSCH. POL’Y 956, 982 (2014), <https://doi.org/10.1016/j.respol.2014.01.006> (finding that patent activity prior to the first round of financing increases the amount of capital invested in the company, but that “the signaling value of patent activity diminishes” as the company matures and information asymmetry between the company and investors decreases—i.e., patent activity does not affect the second round of financing).

<sup>205</sup> Kitch, *supra* note 15, at 276 (“[The prospect function of the patent system] puts the patent owner in a position to coordinate the search for technological and market enhancement of the patent’s value . . .”).

<sup>206</sup> See Burk, *IP and the Firm*, *supra* note 100, at 8 (“[I]ntellectual property rights are conceived of primarily as mechanisms for coordinating activities *between* firms.”); Kieff, *An Unconventional Approach*, *supra* note 150, at 416; see generally Stephen Yelderman, *Coordination-Focused Patent Policy*, 96 B.U. L. REV. 1565, 1614–16 (2016) (delineating the coordination function and theorizing its operation within the patent system and emphasizing the need for future investigations on the topic).

<sup>207</sup> Yelderman, *supra* note 206, at 1586 n.102.

<sup>208</sup> Kieff, *An Unconventional Approach*, *supra* note 150, at 333; see also *id.* at 414 (“[C]omplimentary users of the IP subject matter, includ[e] . . . investors . . .”).

<sup>209</sup> *Id.* at 333–34, 347. F. Scott Kieff explains that “[t]he key [of coordination] is to create an incentive for diverse complementary users of the asset to come together (the beacon effect) and transact with each other (the bargaining effect).” *Id.* at 346.

An investor's perspective on the intellectual property system expands this insightful presentation. The function of intellectual property rights goes beyond just drawing participants in innovation together and facilitating their negotiations. While it aids in developing and commercializing the underlying invention, it also plays a critical role in forging voluntary and complex transactional relationships vital for capital market financing.<sup>210</sup> These relationships have the ability to generate returns, simplify signals, expand access, and adjust risks—thus facilitating investors' efficient allocation of capital to innovative firms. This Part illustrates the coordinating function of the intellectual property system for financing by analyzing the securitization of intellectual property rights. It does not purport to cover all aspects of intellectual property securitization but only uses its features for illustrative purposes.

Intellectual property securitization is a specific form of asset securitization. It uses intellectual property rights that are capable of generating predictable streams of royalties as the underlying assets to back securities.<sup>211</sup> The prospective royalties from intellectual property rights become a security interest in exchange for current money, which an innovative company can then use to sustain its R&D, production, and operations.<sup>212</sup> Investors indirectly allocate their capital to innovative firms by purchasing the securities backed by the firm's intellectual property rights. The purchasers of the securities can be institutional investors, such as pension funds, insurance companies, and mutual funds, or they can be individuals.<sup>213</sup> At a designated point,

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<sup>210</sup> See *id.* at 352 (elucidating that intellectual property rights act as a beacon, magnetizing various stakeholders involved in the commercialization process and fostering complex, interconnected relationships crucial for both innovation and financial transactions in the capital market); F. Scott Kieff, *Property Rights and Property Rules for Commercializing Inventions*, 85 MINN. L. REV. 697, 707–12 (2001).

<sup>211</sup> Solomon & Bitton, *supra* note 19, at 129–30 (discussing how intellectual property rights holders can raise funds by securitizing future cash flows from royalties derived from licensing their exclusive rights).

<sup>212</sup> See Nikolic, *supra* note 19, at 409 (highlighting how companies can leverage anticipated royalties from patents through securitization to obtain immediate funds, aiding in bridging the development-to-market cost gap, and supporting ongoing R&D and production); see also Solomon & Bitton, *supra* note 19, at 129–30; HALT ET AL., *supra* note 52, at 152.

<sup>213</sup> Claire A. Hill, *Securitization: A Low-Cost Sweetener for Lemons*, 74 WASH. U. L.Q. 1061, 1067–68 (1996).

the purchasers get back their principal and receive interest at the rate fixed by the securities that they bought.<sup>214</sup>

Securitization depends on the ability of the underlying assets to generate predictable cash flows.<sup>215</sup> The exclusivity of intellectual property rights, which is backed by legal remedies, allows innovative firms to earn royalties by entering into licensing arrangements with the users of their intellectual products; under these arrangements they can receive royalties from the users.<sup>216</sup> Kieff's beacon effect and bargain effect help to explain why royalties can exist and remain relatively stable.<sup>217</sup> The legal remedies that protect intellectual property rights give users the incentive to approach and contract with innovative firms for their permission to use the intellectual products.<sup>218</sup> These remedies also discourage other potential users from implementing the intellectual products without paying a fee, preventing their infringing use from disrupting the licensing arrangements. From the perspective of investors and other parties involved in intellectual property securitizations, the existence of the licensing arrangement reduces their cost of predicting the returns that the intellectual products will generate and allows them to focus on the royalties specified in the contract.

The prospect of users paying royalties provides an incentive for both investors and other parties in the intellectual property securitization process, such as innovative firms seeking funding, to engage in transactional structures that bolster the securitization. At the outset, the innovative firm (known as the *originator*, in the process of securitization) establishes a separate legal entity, commonly known as a special purpose vehicle (SPV), and transfers the contractual right to collect royalties to it.<sup>219</sup> In consideration for the transfer, the SPV pays the innovative firm a sum of money that is derived from the

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<sup>214</sup> Nikolic, *supra* note 19, at 408 (“[P]ayments to investors are generally at a fixed interest rate for a fixed period of time.”); see also HALT ET AL., *supra* note 52, at 155.

<sup>215</sup> See Nikolic, *supra* note 19, at 409–10 (noting that a necessary step in securitizing patents is establishing a regular cash flow through licensing).

<sup>216</sup> See *id.* at 411 (“A company that has a patent portfolio can exclude a larger proportion of competitors from practicing a larger proportion of inventions, potentially reaping greater royalties or infringement awards.”).

<sup>217</sup> Kieff, *An Unconventional Approach*, *supra* note 150, at 346 (describing the coordination process, which is about signaling through a beacon effect and ensuring stable deal negotiations through a bargaining effect).

<sup>218</sup> See *id.* (noting that credible threat of an injunction ensures the coordination process).

<sup>219</sup> Solomon & Bitton, *supra* note 19, at 135–36.



issuance of asset-backed securities to investors in the capital market.<sup>220</sup> The SPV is responsible for paying investors who purchase the securities for the proceeds that the intellectual property rights generate.<sup>221</sup>

From the investors' perspective, the major function of the SPV arrangement is to adjust risk—the SPV arrangement separates the risk of the proceeds of the IP-backed securities from the overall risk (such as the risk of bankruptcy) of the innovative firm.<sup>222</sup> The risk of investment decreases if the contractual repayment risk is lower than the firm's overall risk.<sup>223</sup> In addition to the potential effect of risk reduction, the separation of risks has the effect of reducing the information cost of investment because when investors associate the return on their investment only with the royalties stemming from the intellectual property licensing contract, they do not need to make the effort to assess the overall risk of the company. In addition, an SPV can further reduce the risk from IP-backed securities to investors through diversification.<sup>224</sup> By selecting and consolidating intellectual property cash flows from multiple companies, SPVs can reduce the concentration of royalty receivable risk, licensee industry risk, and regional risk.<sup>225</sup> By adjusting risks and reducing information costs, the

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<sup>220</sup> See *id.* at 136.

<sup>221</sup> *Id.* at 137.

<sup>222</sup> See *id.* at 136–38; see also Douglas R. Elliott, *Asset-Backed IP Financing*, in FROM IDEAS TO ASSETS: INVESTING WISELY IN INTELLECTUAL PROPERTY 459, 467 (Bruce Berman ed., 2002); Edward M. Iacobucci & Ralph A. Winter, *Asset Securitization and Asymmetric Information*, 34 J. LEGAL STUD. 161, 165 (2005), <https://doi.org/10.1086/427765> (explaining why the SPV arrangement can isolate the bankruptcy risk of the originator based on the U.S. Bankruptcy Code).

<sup>223</sup> See Iacobucci & Winter, *supra* note 195, at 166 (“The greater the recourse against the originator for unpaid or untimely repayments of the receivables that the SPV (and its security holders) has, the less likely will the transaction meet the true-sale requirements.”).

<sup>224</sup> Solomon & Bitton, *supra* note 19, at 136 (“[S]ince the securitized IP rights are from different sources, the pool of assets backing the securities is more diversified, meaning that the investors in said securities enjoy a greater level of investment diversification.”).

<sup>225</sup> See Nikolic, *supra* note 19, at 407; Solomon & Bitton, *supra* note 19, at 138 (noting the situation in which multiple originators transfer IP-based revenue streams to a single SPV); see also Robert Dean Ellis, *Securitization Vehicles, Fiduciary Duties, and Bondholders' Rights*, 24 J. CORP. L. 295, 301–02 (1998) (noting that if the asset pool is large, the risk diversification will be wide, which makes investing in asset-backed securities relatively low risk). For a typical example, Yale University has tried one securitization of intellectual property without risk diversification and one securitization of intellectual property with risk diversification. See HALT ET AL., *supra* note 52, at 156–57. The former failed and the latter succeeded. See *id.*

SPV arrangement allows some investors who might otherwise be deterred by high information costs and high risks to allocate their capital to innovative firms.<sup>226</sup> Accordingly, these firms gain access to a broader range of financial sources.<sup>227</sup>

The relationship between the SPV and credit rating agencies can further reduce the information costs that investors face.<sup>228</sup> Although the contract establishes a fee for licensing the intellectual property rights, the risk of realization of the proceeds remains—after all, the licensee might default on the contract. In addition, if the licensing royalties are calculated based on fluctuating product or service sales, investors might need a technical background and industry knowledge to determine whether the royalties will be sufficient to cover the principal and interest. For many investors, assessing the risk of realization of proceeds can be difficult because they do not have the relevant knowledge and expertise.<sup>229</sup> After establishing a contractual relationship with the SPV, the rating agency can assess the risk of the proceeds of the security and present the results to the investor in the form of a rating: a high rating indicates a low risk, while a low rating indicates a high risk.<sup>230</sup> Investors can make investment decisions based on the ratings at a lower cost than if they were to do the evaluation on their own.<sup>231</sup>

The relationship between the SPV and the insurer can further reduce the risk of loss to the investor.<sup>232</sup> The SPV might contract with banks and insurance companies that guarantee the investor's claim on

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<sup>226</sup> See Solomon & Bitton, *supra* note 19, at 137–38.

<sup>227</sup> *Id.* at 136.

<sup>228</sup> See *id.* at 139 (“Credit ratings lower the cost of knowledge, which would otherwise be borne by investors in the asset-backed securities market, and supply them with vital information regarding the risks involved in the investment.”).

<sup>229</sup> *Id.*; see also Long, *supra* note 19, at 665–66 (“Verifying anything beyond quantity presents higher costs. Observers may employ experts such as attorneys, consultants, or scientists to examine individual patents more closely.”).

<sup>230</sup> Steven L. Schwarcz, *The Alchemy of Asset Securitization Features*, 1 STAN. J.L. BUS. & FIN. 133, 136–37 (1994). See MOODY'S INVESTORS' SERVICE, RATING SYMBOLS AND DEFINITIONS 6 (2011), <https://www.moodyanalytics.com/-/media/products/Moodys-Rating-Symbols-and-Definitions.pdf>, for an example of rating symbols and their indication of risk.

<sup>231</sup> See Solomon & Bitton, *supra* note 19, at 139 (discussing risk); HALT ET AL., *supra* note 52, at 154 (discussing cost).

<sup>232</sup> Solomon & Bitton, *supra* note 19, at 140.

the relevant principal and interest.<sup>233</sup> This arrangement is known as an “external credit enhancement.”<sup>234</sup> When the securities are insured, the rating agencies can then raise the credit rating.<sup>235</sup> The combination of insuring and increasing the credit rating allows many investors (e.g., insurance companies and money market mutual funds) that are constrained by internal norms from purchasing lower rated securities to allocate capital to innovative firms.<sup>236</sup> This broadens the innovative firm’s access to resources for innovation. Intellectual property rights are the basis of external credit enhancement arrangements. These arrangements rely on the premise that intellectual property rights will generate proceeds and that these proceeds are sufficient to cover the costs that these arrangements incur.<sup>237</sup>

On the transactional side, the relationship between the SPV and the underwriters can remove some of the obstacles—such as transaction costs and unsuitable investment targets—that might block this investment channel.<sup>238</sup> Here, one or more underwriters contract with the SPV to facilitate the sale of the securities by helping to determine the number and price of the securities, marketing them, and distributing them to investors.<sup>239</sup> By reasonably determining the number and price of the securities that the firm will issue, underwriters reduce the number of instances in which investors abstain from investing due to the unsuitability of the investment targets. Their support in marketing and distributing securities reduces the transaction costs that might otherwise keep investors from purchasing securities.<sup>240</sup> Intellectual property rights are the foundation of this relationship because it is built on the prospect that the proceeds of intellectual property rights will be sufficient to cover the fee paid to

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<sup>233</sup> *Id.*; see also Kumar, *supra* note 50, at 99 (“It may also be necessary to obtain residual value protection, such as, insurance, for deals in the case of underperformance of the royalties.”).

<sup>234</sup> Solomon & Bitton, *supra* note 19, at 140.

<sup>235</sup> See Sylva, *supra* note 50, at 227–28.

<sup>236</sup> Hill, *supra* note 213, at 1071.

<sup>237</sup> See Sylva, *supra* note 50, at 228 (“If an external credit enhancement source is used [such as default insurance], that cost must be calculated into the overall administrative costs which the future receivables must cover.”).

<sup>238</sup> See Solomon & Bitton, *supra* note 19, at 143.

<sup>239</sup> See *id.*

<sup>240</sup> See *id.*

the underwriters, which is usually a “percentage of the value of the offering.”<sup>241</sup>

### III. INHERENT CONSTRAINTS TO THE FINANCING FUNCTION OF THE INTELLECTUAL PROPERTY SYSTEM

The securing, signaling, and coordinating functions of the intellectual property system can help investors overcome the challenges of high risk, information asymmetry, and inadequacy of channels that they encounter when investing in innovative firms. But the intellectual property system has certain characteristics that constrain its financing function. These characteristics prevent investors from taking full advantage of this function, leading to its underuse.<sup>242</sup> This Article argues that uncertainty in intellectual property rights and non-inclusiveness in disclosure are two of these limiting characteristics.

#### A. *Uncertainty in Intellectual Property Rights*

In general, investors want to know with relative accuracy the value of intellectual property,<sup>243</sup> or more precisely, the prospects that a given piece of intellectual property will generate cash flow.<sup>244</sup> But accurately estimating the value of intellectual property is often difficult.<sup>245</sup> Some of this difficulty stems from factors external to the intellectual property system, such as market uncertainty, technology evolution, and changes in consumer preferences. There are also factors in the legal system that make it challenging for investors to ascertain the value of the intellectual property. One of these is the relatively high degree of uncertainty in the legal right to intellectual property, particularly regarding its validity, scope, and the remedies for infringement. Uncertainty in intellectual property rights increases the cost of valuation for investors on one hand, and on the other, decreases the

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<sup>241</sup> *Id.*

<sup>242</sup> OECD, ENQUIRIES, *supra* note 53, at 470; *see also Securing Financing with IP Assets*, *supra* note 167 (“[B]anks may take into account IP assets as collateral . . . [but] this is not a widespread practice.”).

<sup>243</sup> Mattias Karlsson Dinnetz & Michael S. Mireles, *The Promise of Patent-Backed Finance for SMEs and Universities, and Shifting Patent Eligible Subject Matter*, 26 LEWIS & CLARK L. REV. 57, 90 (2022).

<sup>244</sup> Gabala, *supra* note 50, at 312–13 (noting that investors’ attention has been focused on the cash flow prospects of IP assets).

<sup>245</sup> WIESER ET AL., *supra* note 152, at 26; Nikolic, *supra* note 19, at 412 (noting that determining the value of a patent portfolio is complicated).

likelihood that investors and innovative firms will agree on the value of the intellectual property.<sup>246</sup> This disparity often complicates the negotiation process.<sup>247</sup> Both the cost of increasing the accuracy of the valuation and the cost of eliminating disagreements about the valuation can deter investors from utilizing the financing function of the intellectual property system.

The issue of uncertainty about the validity of intellectual property rights arises primarily in the area of patent law. While the patent system gives innovative firms the right to exclusivity, it also gives others the opportunity to challenge the validity of that right.<sup>248</sup> The validity of a patent, as Mark Lemley and Carl Shapiro point out, is an “uncertain and contingent” matter.<sup>249</sup> Lemley and Shapiro observe that, when examined through final legal procedures like appeals, trials, or summary judgments, nearly 46 percent of the patents are deemed invalid.<sup>250</sup> That means the risk of a patent being invalidated once it is under review is relatively high.<sup>251</sup> This is of concern to investors, because once a patent is invalidated, the right of exclusivity underlying its securing and coordinating functions vanishes.<sup>252</sup>

Commentators have long criticized the patent system for allowing the proliferation of patents that should not have been granted.<sup>253</sup> They often cite the perfunctory nature of the examination by the USPTO as one of the main causes of this situation.<sup>254</sup> Examiners are often unable to devote sufficient time to review each application because of

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<sup>246</sup> See WIESER ET AL., *supra* note 152, at 26.

<sup>247</sup> *Id.* (“This discrepancy often complicates the negotiations process and consequently increases the cost of IP collateralisation [sic].”).

<sup>248</sup> *Merges & Nelson, supra* note 164, at 841.

<sup>249</sup> Mark A. Lemley & Carl Shapiro, *Probabilistic Patents*, 19 J. ECON. PERSPS. 75, 95 (2005) [hereinafter Lemley & Shapiro, *Probabilistic Patents*], <https://doi.org/10.1257/0895330054048650>. Strictly speaking, real estate is also a probabilistic asset. Title to a piece of land is not infallible. But, the likelihood that most real property rights will be invalidated in the face of a challenge is low. In contrast, patents are much more likely to be invalidated.

<sup>250</sup> *Id.* at 80.

<sup>251</sup> *Id.* at 76; *see also id.* at 83 (“There is widespread and growing concern that the Patent and Trademark Office issues far too many ‘questionable’ patents that are unlikely to be found valid based on a thorough review of the sort one sees in patent litigation.”).

<sup>252</sup> *Id.* at 75.

<sup>253</sup> Roger Allan Ford, *Patent Invalidity Versus Noninfringement*, 99 CORNELL L. REV. 71, 127 (2013) (“Most patent scholars and lawyers agree that there are too many bad patents in force . . .”).

<sup>254</sup> Long, *supra* note 18, at 668.

the backlog of work.<sup>255</sup> Lemley and Shapiro found that while applicants wait three years for a patent to be granted, patent examiners spend an average of only eighteen hours reading each application.<sup>256</sup> Worse, the high turnover of patent examiners has led to the loss of senior examiners who are less likely to commit mistakes in the examination.<sup>257</sup> The compensation scheme by the UPTO consists of a base salary and a bonus, and provides an incentive for examiners to grant patents rather than deny them.<sup>258</sup> The bonus increases with the number of patents that they handle, while the effort required to deal with disputes over denials from applicants does not increase the examiner's compensation.<sup>259</sup>

Uncertainty as to the scope of rights also adds to investors' cost of estimating the value of intellectual property. The scope of rights in both copyrights and patents is subject to a relatively high degree of uncertainty.<sup>260</sup> In the case of copyright, this uncertainty derives in part from the inconsistency of the rules for determining infringement. Typically, in deciding whether a defendant has infringed a plaintiff's right of reproduction, the court must determine whether the defendant's copying has reached the level of "improper appropriation."<sup>261</sup> Currently, courts rely on the doctrine of substantial similarity when making this determination. But, the parameters of the doctrine vary from circuit to circuit.<sup>262</sup> In addition, the subjective

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<sup>255</sup> See John R. Thomas, *Collusion and Collective Action in the Patent System: A Proposal for Patent Bounties*, U. ILL. L. REV. 305, 315–17 (2001), [https://doi.org/10.1016/S1048-4736\(01\)13006-7](https://doi.org/10.1016/S1048-4736(01)13006-7).

<sup>256</sup> Lemley & Shapiro, *Probabilistic Patents*, *supra* note 249, at 79 (“[A] patent examiner spends only [eighteen] hours per application on average during those three years reading the application . . . .”); Lemley, *Rational Ignorance at the Patent Office*, *supra* note 190, at 1496 n.3.

<sup>257</sup> Robert P. Merges, *As Many as Six Impossible Patent Before Breakfast: Property Rights for Business Concepts and Patent System Reform*, 14 BERKELEY TECH. L.J. 577, 606–07 (1999) [hereinafter Merges, *As Many as Six*] (noting that the high turnover at the USPTO leads to a shortage of experienced senior examiners and insufficiently trained juniors, which cause the unsatisfactory examination quality of the USPTO).

<sup>258</sup> *Id.* at 607.

<sup>259</sup> *Id.*

<sup>260</sup> See Shyamkrishna Balganesh, *The Questionable Origins of the Copyright Infringement Analysis*, 68 STAN. L. REV. 791, 857 (2016) [hereinafter Balganesh, *The Questionable Origins*].

<sup>261</sup> *Id.* at 859.

<sup>262</sup> Kevin J. Hickey, *Reframing Similarity Analysis in Copyright*, 93 WASH. U. L. REV. 681, 681 (2016) (“Substantial similarity is a fundamental limit on the scope of copyright, but it is plagued by confusion and governed by a series of arcane tests that differ in

nature of infringement determination also leads to uncertainty in the scope of copyright. Courts generally hold that the determination of substantial similarity is a question of fact for a jury to make.<sup>263</sup> Yet, a jury's infringement determination is often highly subjective and hard to predict.<sup>264</sup>

It is not easy for an investor to determine the scope of a patent.<sup>265</sup> In general, the language of a patent's claims delineates its scope. But the ambiguity and abstraction of language can lead to uncertainty; the very nature of language makes ambiguity difficult to avoid.<sup>266</sup> While courts can turn to tools such as dictionaries, encyclopedias, and expert testimony to reduce ambiguity, these do not necessarily make the scope of a patent definitive. As Tun-Jen Chiang points out, there are multiple levels of abstraction between the invention that the claims describe and the embodiments of the invention that the specification encompasses.<sup>267</sup> The scope of a patent's rights depends on the methodology by which judges construe the claim, i.e., claim construction.<sup>268</sup> Currently, however, judges do not agree on the methodology of claim construction.<sup>269</sup> They are divided over whether courts should determine patent's scope based on the linguistic

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each circuit.”). For instance, the Ninth Circuit applies a two-part test considering both extrinsic and intrinsic similarity, while the Second Circuit employs a more holistic approach, emphasizing the total concept and feel of the copyrighted work. *See* Sid & Marty Krofft Television Prods., Inc. v. McDonald's Corp., 562 F.2d 1157, 1165 (9th Cir. 1977); Nichols v. Universal Pictures Corp., 45 F.2d 119, 121 (2d Cir. 1930). These variations in application underscore the inherent uncertainty and inconsistency in the scope of copyright across jurisdictions.

<sup>263</sup> Balganes, *The Questionable Origins*, *supra* note 260, at 795.

<sup>264</sup> *Id.* (“This second step attempts to measure the subjective reaction of the jury to the copying.”); *see generally* Shyamkrishna Balganes et al., *Judging Similarity*, 100 IOWA L. REV. 267, 267 (2014) (conducting an experiment on the determination of similarity between two works by the fact finder and questioning the supposed objectivity of the substantial similarity requirement).

<sup>265</sup> Long, *supra* note 18, at 634 (“Even after inventors have obtained patents, it is difficult to determine where the boundaries of the patents lie.”); Nikolic, *supra* note 19, at 413; Lemley and Shapiro, *Probabilistic Patents*, *supra* note 249, at 95.

<sup>266</sup> Lemley & Shapiro, *Probabilistic Patents*, *supra* note 249, at 85–86.

<sup>267</sup> Tun-Jen Chiang, *The Levels of Abstraction Problem in Patent Law*, 105 NW. U. L. REV. 1097, 1098–99, 1152 (2011).

<sup>268</sup> Tun-Jen Chiang & Lawrence B. Solum, *The Interpretation-Construction Distinction in Patent Law*, 123 YALE L.J. 530, 534 (2013).

<sup>269</sup> *Id.*

meaning of the claim text or on the invention as it really is.<sup>270</sup> Uncertainty over claim scope will continue until judges reach an agreement regarding this methodology.<sup>271</sup>

The lack of clarity regarding the remedies available to infringed rightsholders also contributes to the uncertainty of intellectual property rights. Prior to 2006, courts typically granted injunctive relief to innovative firms once they determined that a company's patents or copyrights had been infringed.<sup>272</sup> Only in rare cases would a court deny a request for an injunction. But the Supreme Court's 2006 case *eBay Inc. v. MercExchange, L.L.C.* muddied these waters. In that case, the Supreme Court determined that in order to obtain an injunction, a plaintiff must prove:

(1) that it has suffered an irreparable injury; (2) that remedies available at law, such as monetary damages, are inadequate to compensate for that injury; (3) that, considering the balance of hardships between the plaintiff and defendant, a remedy in equity is warranted; and (4) that the public interest would not be disserved by a permanent injunction.<sup>273</sup>

Since then, courts have frequently denied injunctive relief to patent and copyright plaintiffs who prevailed, awarding them only damages, known as "ongoing royalty," for the future use of their intellectual property.<sup>274</sup> The *eBay* case turned the routine issuance of

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<sup>270</sup> *Id.* at 577; *see also* FED. TRADE COMM'N, THE EVOLVING IP MARKETPLACE: ALIGNING PATENT NOTICE & REMEDIES WITH COMPETITION 77–79, 79 n.29, 81 & n.46, 96, 102–103 (2011).

<sup>271</sup> Chiang & Solum, *supra* note 268, at 534 (“[U]ncertainty in claim application most typically arises because judges have core policy disagreements about the underlying goals of claim construction.”).

<sup>272</sup> *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1247 (Fed. Cir. 1989) (“It is the general rule that an injunction will issue when infringement has been adjudged, absent a sound reason for denying it.” (citing *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 842 F.2d 1275, 1281 (Fed. Cir. 1988)); Jiarui Liu, *Copyright Injunctions After eBay: An Empirical Study*, 16 LEWIS & CLARK L. REV. 215 (2012) (noting that the history of copyright law shows that injunctive relief is usually available to copyright holders who succeed on the merits).

<sup>273</sup> *eBay Inc. v. MercExchange, L.L.C.*, 547 U.S. 388, 391 (2006), *superseded by statute*, Trademark Modernization Act of 2020, Pub. L. 116-260, § 226, 134 Stat. 2208, *as recognized in* *Kia Am., Inc. v. Rally Auto Grp., Inc.*, No. 8:22-CV-00109, 2022 WL 2161998, at \*6 n.3 (C.D. Cal. May 18, 2022).

<sup>274</sup> *See* Colleen V. Chien & Mark A. Lemley, *Patent Holdup, the ITC, and the Public Interest*, 98 CORNELL L. REV. 1, 9–10 (2012), <https://doi.org/10.31235/osf.io/6bvua> (examining data from patent cases from July 26, 2006 to August 5, 2011, and reporting a drop in the success rate of injunction requests from an estimated 95 percent in the pre-*eBay* period to about 75 percent post-*eBay*); Christopher B. Seaman, *Permanent*



injunctions into a contingent matter depending on case-by-case evaluation based on these four factors, making the issuance of injunctions harder to predict.<sup>275</sup>

The uncertainty associated with the issuance of injunctive relief increases the cost of the assessment required when investors engage with the financing function of intellectual property. When utilizing the coordinating function of intellectual property, investors must assess whether the deterrence effect of infringement remedies is sufficient to provide stability and certainty in complex transactions. For example, in the case of intellectual property securitization, the stability of the cash flow in the licensing contract that covers the return and expenses of IP-backed securities depends on injunctive deterrence. Insufficient injunctive deterrence will shake the stability of this financial basis. Because it provides an incentive for parties other than intellectual property owners to go to court, agencies and legislatures can press for lower fees, rather than striking deals with intellectual property owners,<sup>276</sup> which disrupts transactions.

It is a challenge for investors to account for ongoing royalties in the return of intellectual property rights because judges have not yet agreed on how to calculate this amount.<sup>277</sup> In patent law, for example, many district courts follow a method of calculating past damages, called “hypothetical negotiation.”<sup>278</sup> *Georgia-Pacific Corp. v. U.S. Plywood*

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*Injunctions in Patent Litigation After eBay: An Empirical Study*, 101 IOWA L. REV. 1949, 1984 & fig.2 (2016), <https://doi.org/10.2139/ssrn.2632834> (finding that the overall rate of permanent injunctions granted dropped to about 67 percent between 2010 and 2013).

<sup>275</sup> Christopher B. Seaman, *Ongoing Royalties in Patent Cases After eBay: An Empirical Assessment and Proposed Framework*, 23 TEX. INTELL. PROP. L.J. 203, 205 & nn. 6–8 (2015) [hereinafter Seaman, *Ongoing Royalties in Patent Cases After eBay*].

<sup>276</sup> Kieff, *An Unconventional Approach*, *supra* note 150, at 335.

<sup>277</sup> Seaman, *Ongoing Royalties in Patent Cases After eBay*, *supra* note 275, at 227–28; J. Gregory Sidak, *Ongoing Royalties for Patent Infringement*, 24 TEX. INTELL. PROP. L.J. 161, 162 (2016) (finding that courts have not yet come up with a consistent way to calculate an ongoing royalty). Some district courts, invoking the *Read* factors used in “determining enhanced damages for willful patent infringement[,]” have considered a defendant’s continued use of patented technology after the denial of an injunction as indicative of willful infringement. Seaman, *Ongoing Royalties in Patent Cases After eBay*, *supra* note 275, at 228. And some other courts have held that ongoing royalties should be increased from the rate established for past infringement by arbitrary rules or without clear explanation. *Id.*

<sup>278</sup> John C. Jarosz & Michael J. Chapman, *The Hypothetical Negotiation and Reasonable Royalty Damages: The Tail Wagging the Dog*, 16 STAN. TECH. L. REV. 769, 772 (2012) (“Its long-standing and widespread use has led many courts to go so far as to define a reasonable royalty as the outcome of a hypothetical negotiation.” (emphasis omitted)).

*Corp.* established this method over fifty years ago.<sup>279</sup> Under this approach, the court envisions the plaintiff and defendant as willing licensing parties in the negotiation of the terms of a patent licensing contract.<sup>280</sup> After considering fifteen specified factors, the court determines as damages a reasonable royalty for the hypothetical licensing contract. But many have criticized this approach for being “overly flexible,” and not giving juries and judges a clear method of damage calculation.<sup>281</sup> Other courts have viewed a defendant’s continued use of patented technology after the denial of an injunction as willful infringement, and thus have held that ongoing royalties should be increased by a certain amount from the damages awarded for past infringement.<sup>282</sup> According to J. Gregory Sidak’s empirical study, ongoing royalty is, on average, 1.66 times the damages award for past infringement.<sup>283</sup> There is, however, a relatively large variation between cases, from the same amount to more than ten times the amount.<sup>284</sup>

The uncertainty associated with the damages for the infringement of intellectual property rights also constrains the securing and coordinating functions of the intellectual property system. Whether setting up collateral or securities based on intellectual property rights, investors need to assess the returns on the intellectual property rights. Damages are an important component of these returns. They also affect the exchange value of intellectual property in voluntary transactions, such as royalties in patent licensing. If damages for intellectual property are difficult to determine, investors might have to spend a lot of money on experts who will help them to estimate the relevant returns in any given situation<sup>285</sup> or extend the due diligence period. In addition, in order to reduce risk, investors might only

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<sup>279</sup> *Georgia-Pacific Corp. v. U.S. Plywood Corp.*, 318 F. Supp. 1116, 1123 (S.D.N.Y. 1970).

<sup>280</sup> *Id.* at 1121; *see also* *Rite-Hite Corp. v. Kelley Co.*, 56 F.3d 1538, 1576 (Fed. Cir. 1995) (en banc).

<sup>281</sup> Seaman, *Ongoing Royalties in Patent Cases After eBay*, *supra* note 275, at 228.

<sup>282</sup> *Id.*; *see, e.g.*, *Fractus v. Samsung Elecs. Co.*, No. 6:09-CV-203, 2013 WL 1136964, at \*2 (E.D. Tex. Mar. 15, 2013); *Affinity Labs of Tex. v. BMW N. Am.*, 783 F. Supp. 2d 891, 899 (E.D. Tex. 2011).

<sup>283</sup> Sidak, *supra* note 277, at 177.

<sup>284</sup> *Id.* at 176 tbl.2.

<sup>285</sup> *See* Kumar, *supra* note 50, at 99. *But see* WIESER ET AL., *supra* note 152, at 26 (noting that debtors prefer to have SMEs, start-ups, or external subsidies cover their assessment costs). But whether the investors or the innovative firms bears the costs of assessment, the funds available for innovation are squeezed.

accept a very conservative estimate of the intellectual property's value.<sup>286</sup> The practice of accepting conservative estimates limits an investor's ability to allocate more capital to innovative firms. The result is that innovative firms receive less financial support from investors, so innovative firms have less money to put into innovation.

B. *Non-Inclusiveness of Disclosures*

Before investing in innovative firms, investors can infer their characteristics based on the information or signals that the intellectual property system discloses. The signaling function of intellectual property, however, operates effectively only when investors can understand the signals, and doing so has costs.<sup>287</sup> If these are significant, the signals will play a limited role, if any, in the financing process.<sup>288</sup> Investors also rely on the information that the intellectual property system discloses when utilizing the securing and coordinating functions. For example, investors who set up collateral or securities based on patents use the information in the patent documents disclosed to estimate the future returns that the patents will generate.<sup>289</sup>

The current disclosures in the intellectual property system, however, do not appear to have been designed to take into account investors' need for information and signals. Some of the important information that investors need when they engage with the financing function of intellectual property is not disclosed, or when it is disclosed, it is not sufficiently tailored to the ability of investors to interpret the information. This Part refers to such deficiencies in disclosure as the "non-inclusiveness" of disclosure.

A typical example of this non-inclusiveness is the high cost to investors of interpreting the signals that patent disclosures offer. Currently, patent applicants do not draft their patent documents according to the standards of a nontechnical person. The potential readers of the patent document are presupposed to have certain technical training. Specifically, section 112 of the Patent Act requires

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<sup>286</sup> HALT ET AL., *supra* note 52, at 154; OECD, ENQUIRIES, *supra* note 53, at 463 (noting that investors applied strict credit standards collateralization of IP).

<sup>287</sup> Long, *supra* note 18, at 665.

<sup>288</sup> *Id.* at 645 ("It is useless for the firm to convey information if investors would have to spend too many resources deciphering it.").

<sup>289</sup> See, e.g., *Factsheet IP Due Diligence*, EUR. COMM'N (2020), <https://intellectual-property-helpdesk.ec.europa.eu/system/files/2021-01/FS%20IP%20Due%20Diligence.pdf>.

patent applicants to provide “a written description of the invention” to “enable any person skilled in the art . . . to make and use the same.”<sup>290</sup> The Supreme Court in *Kewanee Oil Co. v. Bicron Corp.* corroborated this reading by holding that “any person skilled in the art” refers to a “person having ordinary skill in the art.”<sup>291</sup> The terms “any person skilled in the art,” “make,” and “use” imply that the disclosure is intended for any person who can make and use the invention after the patent has expired. As the USPTO states in the *Manual of Patent Examining Procedure* that it provides to the public, a person as such is the “person skilled in the art to which [the invention] pertains, or with which it is most nearly connected.”<sup>292</sup>

From inventors’ or users’ perspectives, there is nothing wrong with the USPTO and the court using this standard to determine whether the disclosure is sufficient as to amount to a grant of a patent to the applicant. After all, they are reading the patent document for the purpose of using the disclosed technology or improving it. But from an investor’s perspective, disclosures made solely based on this standard might not be sufficient. Most investors’ knowledge of technology is not at the level of the skilled person to whom section 112 of the Patent Act and Supreme Court precedents refer.<sup>293</sup> Investors have noted that given the complexity of technology, “few financial institutions have the expertise to conduct thorough due diligence” on their own without relying on third parties.<sup>294</sup> The fact that patent disclosure documents contain jargon and technical terms makes the situation worse.<sup>295</sup> The relatively high costs associated with unpacking patent signals<sup>296</sup> discourage investors’ interest in engaging with the financing function of patents.<sup>297</sup>

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<sup>290</sup> 35 U.S.C. § 112(a).

<sup>291</sup> *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 477 n.8, 481 (1974) (first citing 35 U.S.C. § 103; and then citing 35 U.S.C. § 112); *see also* *Gould v. Quigg*, 822 F.2d 1074 (Fed. Cir. 1987) (holding appellee’s patent met the standard set by 35 U.S.C. § 112).

<sup>292</sup> § 112(a).

<sup>293</sup> WIESER ET AL., *supra* note 152, at 26 (“[T]here is a language gap between IP experts and financial institutions.” (emphasis omitted)).

<sup>294</sup> *Id.* at 20 (emphasis omitted).

<sup>295</sup> Burk, *Role of Patent Law*, *supra* note 35, at 1016.

<sup>296</sup> Long, *supra* note 18, at 666 (noting that verifying any information other than quantitative information entails relatively high costs, such as the cost of hiring experts, like lawyers, consultants, or scientists, to verify information in patents).

<sup>297</sup> WIESER ET AL., *supra* note 152, at 26 (“The lack of knowledge and confidence stems from the banks’ lack [of] experience in managing the risks associated with IP-

Another problem stemming from the non-inclusiveness of intellectual property disclosures is the inadequate provision of three types of information that investors might consider important when using the financing function of the intellectual property system. The first type is information about the status of intellectual property rights. This includes ownership and transaction history.<sup>298</sup> Whether establishing collateral or securities based on intellectual property, investors need to confirm that the intellectual property belongs to the innovative company.<sup>299</sup> Information on the transaction history of intellectual property rights is important because it reveals both the current owner of the intellectual property and whether that property is currently encumbered (i.e. whether it has already been licensed or used as collateral).

Finding information about the ownership of an intellectual property right is not simple. The copyright system sets the owner of the rights as the author. But it requires neither registration nor the revelation of the ownership information as prerequisites for establishing copyright protection.<sup>300</sup> Currently there are many unregistered works.<sup>301</sup> Investors cannot determine the authors of these works by consulting the registration system. In contrast, the patent system grants rights predicated on an application, and therefore investors can use the patent document to look up the original owner.<sup>302</sup> As it does not require the owner to update the ownership information, the patent document will not tell investor whether the others have become the owner.

There is no requirement to disclose transfers of copyright and patent rights (either licenses or assignments).<sup>303</sup> In other words, it is

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based lending.”); *id.* at 25 (noting that it is rare for IP-driven startups to receive commercial loans at an early stage because private banks are not familiar with the risks associated with their technology).

<sup>298</sup> *Startups and Intellectual Property (IP): What Tech Investors Look For*, MARS STARTUP TOOLKIT, <https://learn.marsdd.com/article/what-your-technology-investors-look-for-with-respect-to-intellectual-property-assets-ip> (last visited Oct. 10, 2023) (highlighting that investors perform due diligence on the ownership and transaction history of a company’s intellectual property).

<sup>299</sup> HALT ET AL., *supra* note 52, at 153 (“IP-backed lending is a fairly straight forward debt instrument. As a borrower, it is important to establish title to the collateral IP as a preliminary matter.”).

<sup>300</sup> Nguyen, *Collateralizing IP*, *supra* note 19, at 7–8.

<sup>301</sup> *Id.* at 8.

<sup>302</sup> 35 U.S.C. § 111.

<sup>303</sup> Chien, *supra* note 9, at 1880.

likely that investors cannot gather a complete knowledge of the history of the disposition of intellectual property from the publicly available database. Inadequate information on intellectual property right ownership and its transfer reduces the efficiency of intellectual property market operations, which in turn hinders intellectual property right liquidation and licensing.<sup>304</sup> The liquidation and licensing of intellectual property rights are important steps in the collateralization and securitization of intellectual property rights, respectively. While investors can gain access to private databases—which compile a large amount of information on the transaction history of intellectual property rights—the cost of purchasing or subscribing to these databases is usually high.<sup>305</sup>

The second type of information in which investors might be interested is information about the relationship between the intellectual property and the business operations of the innovative firm. The intellectual property system does not currently require innovative firms to disclose this type of information at all. But it is helpful to investors because intellectual property, especially patented technology, generally needs to be combined with other factors of production, such as production facilities, dedicated employees, and know-how, to generate economic value.<sup>306</sup> The current absence of information about the relevant company's business makes it difficult to relate intellectual property information to the operations of the firm.<sup>307</sup> This absence devalues the signaling function of the intellectual property system because investors use both functions to estimate the value of intellectual properties, and it is difficult to do this for intellectual properties in isolation from the specific context in which the company uses them. While investors can resort to on-site due diligence to collect information relating to business operations, such

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<sup>304</sup> *Id.* at 1882.

<sup>305</sup> WIESER ET AL., *supra* note 152, at 22.

<sup>306</sup> OECD, ENQUIRIES, *supra* note 53, at 465; *see also* Mark A. Lemley & Robin Feldman, *Patent Licensing, Technology Transfer, and Innovation*, 106 AM. ECON. REV. 188, 188 (2016) (noting that commercialization of patented technology needs “things like know-how, complementary assets, and other peripheral disclosures”); Taorui Guan, *Contractual Bundles for Innovation*, 37 BERKELEY TECH. L.J. 171, 189–206 (2022) (categorizing complementary assets that might be used for commercialization of patented technology, which include proprietary information, facilities, and labor).

<sup>307</sup> *See* Shigeki Kamiyama et al., *Valuation and Exploitation of Intellectual Property* 13 box.2 (OECD, Working Paper No. 2006/5, 2006), <https://dx.doi.org/10.1787/307034817055>.

due diligence is often costly and inefficient, which constrains them from engaging with intellectual property in investing.<sup>308</sup>

The third type of information that is particularly relevant for investors is information on the subsequent development of the patented technology. Currently, the patent system tends to reward the first person to disclose technology. So patent disclosure often “occurs early in the process of innovation, at the time a patent is filed.”<sup>309</sup> At this stage, “the invention is often still at the preliminary, pre-commercial stage . . . .”<sup>310</sup> Patent law does not require inventors to update their disclosures.<sup>311</sup> In fact, it impedes their doing so. Section 123 of the Patent Act states, “No amendment shall introduce new matter into the disclosure of the invention.”<sup>312</sup> As a result, patent documents often do not include valuable information about the subsequent development of the technology.<sup>313</sup> As Jeanne Fromer notes, patent disclosure tends to be “early and static.”<sup>314</sup> There is, therefore, often a significant gap between disclosures and the technology actually used to make commercial products.<sup>315</sup> As the timeliness of information is important to investors, without subsequent updates, patent disclosures are of limited help in their investment decisions.

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<sup>308</sup> *Id.* at 22 box.3.

<sup>309</sup> Jeanne C. Fromer, *Dynamic Patent Disclosure*, 69 VAND. L. REV. 1715, 1715 (2016) [hereinafter Fromer, *Dynamic Patent Disclosure*]; see also Chien, *supra* note 9, at 1851–52 (“[T]he patents that are filed are often relatively poor tools of teaching. The patent system incents early disclosure by awarding those who are first to file their applications . . . but as a result, disfavors mature, complete disclosure, as the invention is often still at the preliminary, pre-commercial stage at the time of filing.” (footnotes omitted)).

<sup>310</sup> Chien, *supra* note 9, at 1852.

<sup>311</sup> Sichelman, *supra* note 14, at 355 (“Additionally, an inventor need not—in fact, cannot—update the disclosure during the prosecution of the patent application in front of the Patent Office.”).

<sup>312</sup> 35 U.S.C. § 132(a).

<sup>313</sup> Fromer, *Dynamic Patent Disclosure*, *supra* note 309, at 1716 (“Yet the law does not require disclosure of so much of this valuable information related to a patented invention.”).

<sup>314</sup> *Id.* at 1715–16 (“So much of the innovation process, from refinement to prototyping to market research to mass production, has yet to occur at the moment of patent filing.”).

<sup>315</sup> See Robert P. Merges, *Commercial Success and Patent Standards: Economic Perspectives on Innovation*, 76 CALIF. L. REV. 803, 807 (1988), <https://doi.org/10.2307/3480538> (“[T]he innovation will in all likelihood be different in significant respects from the invention due to the changes necessary to turn the invention into a commercial product.”).

## IV. OVERCOMING THE INHERENT CONSTRAINTS

In order to exploit the financing function of the intellectual property system more fully, governments are making increasing efforts to understand the constraints that inhibit investors from using it and trying to develop policies and initiatives to address those constraints.<sup>316</sup> European governments are turning their attention to the investor community and seeking insights from it for institutional reform.<sup>317</sup> This Part proposes a number of ways to reform the intellectual property system from an investor's perspective. To be clear, there are no easy answers or simple solutions to improving the financing function of the intellectual property system. Reform comes with costs. The recommendations here are critical and diagnostic. Rather than suggesting to policymakers exactly how the system should be modified, this Part mainly offers ways to think about options for making the intellectual property system more inclusive of the perspective of investors.

A. *Ascertaining Intellectual Property Rights*

The uncertainty of intellectual property rights raises the cost for investors to engage with the financing function of the intellectual property system. Policymakers who seek to enhance this function might consider increasing the certainty of rights. Specifically, they could weigh increasing the certainty in the validity of patents, the scope of patents and copyrights, and the remedies for patent and copyright infringement.

Since one of the main reasons for the uncertainty of patent validity is the perfunctory patent examination, improving the quality of these examinations can help to improve the certainty of patent validity. To achieve this goal, policymakers could give the USPTO a larger budget.<sup>318</sup> An increased budget would allow the USPTO to hire more examiners to work on patent examinations, which would reduce the workload and allow examiners more time to review each application.<sup>319</sup> The USPTO could use the increased budget to increase examiner salaries, thereby reducing the turnover rate of senior examiners; to upgrade the prior art search system; to train junior

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<sup>316</sup> OECD, ENQUIRIES, *supra* note 53, at 458.

<sup>317</sup> See *IP and SMEs*, *supra* note 20.

<sup>318</sup> Cf. Thomas, *supra* note 255, at 317 ("The Patent Office has identified such programs as the expansion of prior art databases, quality assurance, and the hiring and training of examiners as deleteriously impacted by miserly financial policies.").

<sup>319</sup> Lemley & Shapiro, *Probabilistic Patents*, *supra* note 249, at 83.



examiners;<sup>320</sup> and to cover the costs of consulting with leading experts in the relevant scientific fields.<sup>321</sup> In addition, policymakers might consider providing incentives to examiners to lower the invalidity rate of the patents that they review. For example, as Robert Merges suggests, the USPTO could establish a tracking system by which to measure the percentage of patents that relevant tribunals later determine to be invalid and then pay bonuses to those examination panels and examiners whose percentages are below the average for the USPTO or meet a predetermined acceptable level.<sup>322</sup>

Although enhancing USPTO examinations would incur costs, the benefits of doing so might outweigh these costs,<sup>323</sup> especially for investors. Currently, there is no mechanism that allows investors to share the results of their review of patent validity. Individual investors bear their own costs of review, which can be high enough to make the verification process impractical.<sup>324</sup> In the cases where each of the investors is able to bear their own costs, the aggregated expenditures of their duplicated efforts might constitute a significant waste of resources.<sup>325</sup> In contrast, all of the investors can share the results of the examiner's examination, saving resources that repeated verification of a patent's validity would waste. Furthermore, patent examiners are technical persons and have a comparative advantage over investors in terms of their knowledge of technology and patent law. A patent examiner might well consume fewer resources than an investor in screening out weak patents. The cost of improving patent examination might be less than the aggregation of the additional costs that investors would incur without these improvements.

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<sup>320</sup> Merges, *As Many as Six*, *supra* note 257, at 606–07.

<sup>321</sup> Lemley, *IP Rights and Standard-Setting Organizations*, *supra* note 102, at 1940.

<sup>322</sup> Merges, *As Many as Six*, *supra* note 257, at 609.

<sup>323</sup> See Shubha Ghosh & Jay Kesan, *What Do Patents Purchase? In Search of Optimal Ignorance in the Patent Office*, 40 HOUS. L. REV. 1219, 1220–26 (2003), <https://doi.org/10.2139/ssrn.410545> (criticizing Mark Lemley's argument that "patent review does not provide adequate benefits").

<sup>324</sup> See Long, *supra* note 18, at 665; see also Lemley & Shapiro, *Probabilistic Patents*, *supra* note 249, at 83 ("These problems are likely to be most pronounced in areas where technology is changing rapidly. Thus, the system is skewed toward the grant of patents of dubious objective validity, based on a brief, inconclusive process, which are then potentially subject to later disputes . . .").

<sup>325</sup> Long, *supra* note 18, at 666 ("If each investor had to shoulder all the verification costs of the information contained in a patent, this would duplicate effort and waste resources.").

Policymakers might consider taking steps to clarify the scope of copyrights and patents. Regarding copyright, they could vest appellate jurisdiction over copyright in a single adjudicative body, as is the case with the Federal Circuit in the patent area.<sup>326</sup> Doing so could reduce the variability of standards for determining infringement that occurs when different appellate courts adjudicate copyright law. Further, more detailed rules should be put in place to specified conditions and criteria to determine whether two works are substantially similar. As Shyamkrishna Balganesesh notes, the decision about whether a defendant's copying rises to the level of illicit is not a mere factual determination but contains a normative aspect of analysis.<sup>327</sup> Judges can use this to develop a body of detailed common law rules on which a jury can rely when determining whether two works have substantial similarities. Elaborating the conditions and criteria for judging substantial similarity with greater detail would diminish the subjectivity and arbitrariness of a jury's determination and make it easier for investors to determine the scope, and thereby the value, of copyrights.

Uncertainty in the scope of patents might arise when judges disagree on the underlying policy goals of claim construction.<sup>328</sup> Policymakers might consider reform measures to resolve policy disagreements among judges.<sup>329</sup> Typically, the Federal Circuit or the Supreme Court can use precedent to determine whether the lower courts should construe the claims according to their linguistic meaning or the invention that the patentee actually made.<sup>330</sup> After all, it might be impractical for hundreds of district court judges to form a

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<sup>326</sup> See generally Matthew D. Henry & John L. Turner, *The Court of Appeals for the Federal Circuit's Impact on Patent Litigation*, 35 J. LEGAL STUD. 85, 85–86 (2006), <https://doi.org/10.1086/498834> (documenting the great heterogeneity in validity and infringement determinations across circuits and district courts).

<sup>327</sup> Shyamkrishna Balganesesh, *The Normativity of Copying in Copyright Law*, 62 DUKE L.J. 203, 214–15, 221 (2012).

<sup>328</sup> See Chiang & Solum, *supra* note 268, at 534.

<sup>329</sup> *Id.* at 537.

<sup>330</sup> *Id.* at 549–50, 574 (noting that the Federal Circuit emphasizes patent claim interpretation based on a skilled person's understanding, while the Supreme Court prioritizes aligning claims with the actual invention detailed in the patent's specifications); see also Greg Reilly, *Completing the Picture of Uncertain Patent Scope*, 91 WASH. U. L. REV. 1353, 1362 (2014); Kelly Casey Mullally, *Legal (Un)Certainty, Legal Process, and Patent Law*, 43 LOY. L.A. L. REV. 1109, 1146–47 (2010) (contending that one of the guiding principles in dealing with legal uncertainty is to identify as precisely as possible the primary institution or actor responsible for the uncertainty and noting the important role of the Supreme Court in shaping doctrines in patent law).

consensus about which claim construction method to adopt.<sup>331</sup> Moreover, the ambiguity in the claim language itself can give rise to uncertainty in the scope of patents.<sup>332</sup> Policymakers might consider taking steps to reduce linguistic ambiguity in patent claims. They could, for example, raise the requirement of the definiteness of claims.<sup>333</sup> The Court could shift the burden to the patentee to prove that the claims are definite, or to construe the claims against the patentee, who is the drafter of the disputed language.<sup>334</sup>

The Supreme Court's 2006 *eBay* decision has reduced the frequency of injunctions in copyright and patent infringement cases and increased the uncertainty of their issuance. From the perspective of investors, the grant or denial of an injunction affects not only the interests of both the rightsholder and the infringer but also their own interests. Courts may consider the rightsholders' use or intent to use intellectual property rights to finance their innovations as an independent factor that carries significant weight to support the grant of an injunction. This approach has the effect of making intellectual property rights more appealing to investors; it provides them with assurance that infringers are less likely to disrupt their IP-based financing relationships with innovative firms. This strengthened assurance enhances the deterrent effect of injunctive relief. As a result, investors might be more willing to take patent and copyrights as collateral or as the underlying assets of securities. Some investors might also dedicate nonmonetary resources to the innovative firm once their investment relationship is established.

The inclusion of the rightsholders' exploitation of the financing function of intellectual property rights as an important factor in considering the issuance of an injunction does not mean that this factor will make the issuance of an injunction automatic. One possible scenario is that courts will weigh this factor along with the four factors of the *eBay* test and decide not to grant an injunction. In this situation, courts might need to determine an ongoing royalty to compensate the rightsholder for future damages. In order to minimize the potential disruption that the determination of an ongoing royalty might cause to the already established investment relationship between the rightsholder and the investor, courts should take into account the

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<sup>331</sup> See Reilly, *supra* note 330, at 1355, 1359.

<sup>332</sup> See Chiang & Solum, *supra* note 268, at 534.

<sup>333</sup> See Mullally, *supra* note 330, at 1147.

<sup>334</sup> See *id.*

features of that relationship. For example, in cases where the rightsholder has securitized the intellectual property rights in question, courts should set up an ongoing royalty that is consistent with the royalty in the licensing contract, or at least one that is not less than that royalty.

Although increasing the certainty of intellectual property rights allows investors to allocate resources to innovative firms more easily, doing so comes with costs. These include not only financial costs, such as an increased budget for the USPTO, but also the constraints on courts' ability to respond to unforeseen situations and achieve fair adjudication by adapting legal rules to varied circumstances and policy considerations.<sup>335</sup> Theoretically, there should be a threshold beyond which further increases in the certainty of intellectual property rights would no longer be beneficial. But determining where the threshold lies in practice is difficult and beyond the scope of this Article, which limits itself to pointing out the importance of thinking about reform of the intellectual property system from the perspective of the investor.

#### B. *Optimizing Disclosures*

Investors need information in order to make decisions that will allow them to engage with the financing function of the intellectual property system. The current intellectual property system does not adequately cater to investors' needs with regard to disclosure because it does not require the inclusion of some important information, and unpacking some of the disclosed information demands considerable costs. Policymakers who seek to enhance the financing function of the intellectual property system might consider reforming it to require the disclosure of the information that investors need, as well as to reduce the cost for investors in disguising the information that the system discloses.

Information about the ownership and transaction history of intellectual property is important to investors. This is an important part of what they seek when performing due diligence on intellectual property. But, there are no mechanisms through which investors can share the information that they have collected. This means that investors bear the full cost of their own due diligence. The aggregation of their costs might be significant. Moreover, not every investor can afford the cost of collecting these two types of information. Therefore, having the government gather intellectual property ownership

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<sup>335</sup> *Id.* at 1157.

information and transaction history information, and make it publicly available, could be a way to reduce the substantial resources currently wasted when individual entities must collect it.

In order to collect and disclose this ownership and transaction history information to investors, the government could add new disclosure requirements to the patent law system. Although the government has acknowledged that requiring patent owners and applicants to provide information on the attributable owner of patents and applications on a regular basis would be beneficial,<sup>336</sup> it does not currently require this or provide incentives for owners to reveal their identities to the general public.<sup>337</sup> While the USPTO has created a patent assignment database, submission of ownership information remains voluntary.<sup>338</sup> Furthermore, the database does not have a place for the disclosure of collateral and licensing information. Policymakers might consider mandating that rightsholders provide owner information, collateral information, and licensing information to the database.

For the disclosure of copyright ownership information, it is customary for rightsholders to register their copyrights with the Copyright Office by submitting forms and a fee. Investors can determine who owns the copyright by checking the Copyright Office's public records. But registration is currently not required, and imposing a rule to mandate it is inconsistent with the Berne Convention.<sup>339</sup> Scholars have proposed several alternatives. For example, Lawrence Lessig has suggested putting in place servers to

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<sup>336</sup> See *FACT SHEET—Executive Actions: Answering the President's Call to Strengthen Our Patent System and Foster Innovation*, THE WHITE HOUSE (Feb. 20, 2014), <https://obamawhitehouse.archives.gov/the-press-office/2014/02/20/fact-sheet-executive-actions-answering-president-s-call-strengthen-our-p>.

<sup>337</sup> See *USPTO-Led Executive Actions on High Tech Patent Issues*, U.S. PAT. & TRADEMARK OFF., <https://www.uspto.gov/patents/initiatives/uspto-led-executive-actions-high-tech-patent-issues#heading-2> (last visited Oct. 10, 2023).

<sup>338</sup> *Id.*

<sup>339</sup> See Berne Convention for the Protection of Literary and Artistic Works art. 5, Sept. 9, 1886, 828 U.N.T.S. 221 (amended Sept. 28, 1979) [hereinafter Berne Convention]; Molly Shaffer Van Houweling, *Author Autonomy and Atomism in Copyright Law*, 96 VA. L. REV. 549, 631 (2010), <https://doi.org/10.2139/ssrn.1422016>. The Berne Convention for the Protection of Literary and Artistic Works, established in 1886, harmonizes copyright protection standards across its member states, emphasizing that copyright should arise automatically upon the creation of a work without the need for formal registration. See Berne Convention, *supra*, art. 5.

which copyright holders could upload their works for a signature.<sup>340</sup> Peter Menell recommended requiring the deposit of digital copies of works in a searchable public digital database.<sup>341</sup> The government could use either the signature and the database of digital copies to record ownership information, collateral information, and licensing information. But policymakers still need to develop rules that would give copyright owners an incentive to provide the information.

Information that reveals the relationship between intellectual property and business operations can help investors better understand the commercial value of intellectual property. Scholars have previously proposed requiring patentees to disclose information about the commercial importance of their intellectual property.<sup>342</sup> Policymakers might consider taking measures to provide investors with information that reveals its relevance to business operations.<sup>343</sup> Building on the current disclosure system, policymakers could consider adding modules that allow rightsholders to disclose business information relevant to their intellectual property. Alternatively, they might consider linking intellectual property disclosure documents to a database that discloses a business's operations.<sup>344</sup> For example, the SEC requires public companies to publish their corporate operations in their annual reports, specifically to help investors make decisions. Policymakers could provide links to the annual reports that companies file with the SEC in the interface of the patent search and copyright registration systems. This approach has the benefit of being less costly because it does not require the disclosure of new information to rightsholders. But it is only applicable to public companies under the jurisdiction of the SEC, and many companies that use intellectual property to raise capital are not public.

The timeliness of the information disclosed is important to investors. Scholars have criticized the static nature of patent disclosure

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<sup>340</sup> LAWRENCE LESSIG, REMIX: MAKING ART AND COMMERCE THRIVE IN THE HYBRID ECONOMY 265 (2008).

<sup>341</sup> Peter S. Menell, *Knowledge Accessibility and Preservation Policy for the Digital Age*, 44 HOUS. L. REV. 1013, 1066–67 (2007).

<sup>342</sup> See, e.g., Chien, *supra* note 9, at 1849 (suggesting that applicants disclose whether a patent is commercially important).

<sup>343</sup> See *id.* (proposing the concept of contextualizing patent disclosure, which means focusing not only on the content of the patent, but also keeping in mind its context).

<sup>344</sup> See *id.* at 1883 (emphasizing the use of information already publicly available, such as patent licensing data that exists “in court records, . . . SEC filings, and USPTO records”).

information and have recommended making it more dynamic.<sup>345</sup> At the time of the patent application, the applicant might not have made a product or designed a service based on the invention in question. But once the company is producing products and services, the information about them can help the investor to anticipate the prospects for the returns of intellectual property. Indeed, some scholars have suggested that the USPTO could require patent applicants to provide a “working example”<sup>346</sup> or a “prototype,”<sup>347</sup> on the ground that this information will enable others to understand the commercial value of the patent. Policymakers might consider adding a module to existing disclosure systems to allow rightsholders to update information about products and services related to their intellectual property in a timely manner.<sup>348</sup>

The cost to investors of interpreting patent disclosures is substantial. This is especially the case as many patent documents today use obscure language.<sup>349</sup> Policymakers might consider taking measures to make the information disclosed in patent documents clearer and more accessible to all, including investors. As David Teece points out, whether the individuals who receive the information will find it to be meaningful depends on their familiarity with the way in which it is codified.<sup>350</sup> Considering that many investors do not have the knowledge of the invention to the level of a PHOSITA, there should be an incentive for patent applicants to write their applications in

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<sup>345</sup> See Fromer, *Dynamic Patent Disclosure*, *supra* note 309, at 1716 (proposing broadening the scope of disclosure to cover important information generated after the filing of patent application).

<sup>346</sup> See Sean B. Seymore, *The Teaching Function of Patents*, 85 NOTRE DAME L. REV. 621, 627 (2010) (“[Seymore] proposes that raising the standard of disclosure, by allowing the U.S. Patent and Trademark Office (Patent Office) to request working examples, will improve the teaching function of patents.”).

<sup>347</sup> See Christopher A. Cotropia, *The Folly of Early Filing in Patent Law*, 61 HASTINGS L.J. 65, 92, 120 (2009); *see also* Fromer, *Dynamic Patent Disclosure*, *supra* note 309, at 1716 (suggesting requirement of patent disclosure of important information generated post-patent filing, which might include information about refinement and prototyping).

<sup>348</sup> See Fromer, *Dynamic Patent Disclosure*, *supra* note 309, at 1716 (“[P]atentees should be required to divulge all commercialized products they or their licensees make, linking the products to the patents they reasonably think cover those products.”); *see also* Chien, *supra* note 9, at 1849 (recommending the disclosure of contextual information about patents, representing not only the final product of a patent as granted, but also the process by which it is manufactured and used).

<sup>349</sup> See Seymore, *supra* note 346, at 638–39.

<sup>350</sup> TEECE, *supra* note 105, at 13.

language that will make the function and features of the invention accessible to a nontechnical audience. This does not mean that policymakers should abandon the PHOSITA standard in patent law when it comes to determining whether a patent application has met the enablement requirement. But the possibility that clearer language will enhance the financing function of the patent and potentially benefit the applicant financially might be a sufficient incentive. During the patent application proceeding, for example, policymakers could inform applicants of the benefits of providing additional explanation for laypeople and allow them to add this to their patent documents. The patent examiners should not use this explanatory section to limit the scope of the claims, as this would discourage patent applicants from including it.

#### CONCLUSION

This Article analyzes the financing function of the intellectual property system from the investor's perspective. It suggests that by helping investors to invest in innovative firms, the intellectual property system allows them to allocate more resources to those firms. Specifically, investors face the challenges of the high risk of loss, information asymmetry, and inadequate channels when investing in innovative firms. The intellectual property system helps them to overcome these challenges by securing their returns, providing them with signals for investment decisions, and coordinating various actors in the market to establish complex relationships. This makes it easier for innovative firms to gain access to the resources of investors, which allows them to sustain their innovations. In this sense, the intellectual property system promotes innovation by increasing the supply of resources for innovation.

This Article also points out, however, that the system's internal features constrain this function in some ways. The uncertainty in intellectual property rights and the noninclusive nature of disclosure expose investors to high costs when engaging with this function and discourage them from utilizing it. As some policymakers are working to enhance the financing function of the intellectual property system, this Article proposes some initiatives that could enhance the certainty of intellectual property rights and optimize disclosure. This Article intends these initiatives to counter the inherent constraints of the financing function of the intellectual property system.

The contribution of this Article is twofold. First, it takes an initial step toward a systematic explanation of the financing function of the intellectual property system. Second, it goes beyond the limits of



conventional theories that analyze the functions of the intellectual property system from the perspective of the creators and users of intellectual products and adopts a third-party perspective—that of investors—to provide a broader understanding of the functions of the intellectual property system. The increase in perspectives provides scholars, policymakers, and lawyers with a new dimension through which to analyze the system, giving them a more comprehensive understanding of it.

It is important to note that analyzing the function of the intellectual property system from the investor's perspective is only one aspect of the third-party perspective analysis. Subsequent studies can analyze the functions of the intellectual property system from other third-party perspectives and use these to re-examine, or even critique, the conclusions of conventional theories of intellectual property. As for the practical contribution, policymakers can use the reform proposals that this Article presents as a reference for future legal reforms. The investor's perspective will help them modify the intellectual property system, making it more accessible to laypeople, and increase the flow of money for innovation. When policymakers incorporate the perspectives of more parties involved in innovation, the intellectual property system will improve, becoming more inclusive and better able to encourage people to participate in innovation.

