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# 目錄

1. ORGANIZING THE UNORGANIZED: THE ROLE OF NONPROFIT ORGANIZATIONS IN THE COMMONS COMMUNITIES.....	1
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## ORGANIZING THE UNORGANIZED: THE ROLE OF NONPROFIT ORGANIZATIONS IN THE COMMONS COMMUNITIES

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**摘要:** In recent years, commons communities, such as Wikipedia and free or open source software communities, have received extensive attention from academia. Conventional wisdom holds that these communities have produced information across boundaries, rendering formal organizations obsolete. Nonetheless, this article demonstrates that nonprofit organizations (NPOs) are actually playing a vital role in the digital commons production process. This conclusion is based on current commons and NPO scholarship and a series of in-depth, semistructured interviews with officers of NPOs and for-profit organizations associated with commons communities. NPOs' function for those communities in managing property rights, transacting with other entities, protecting individuals from potential liabilities, and institutionalizing various decision-making and standard-setting processes. The unique organizational structures of NPOs, associated with a "nondistribution constraint," have provided indispensable trust for community members. This article proposes that the commons environment has provided an "environmental niche" in which NPOs thrive. That is, the nature of NPOs is more consistent with commons-environment culture than is the nature of for-profit enterprises or governmental units. [PUBLICATION ABSTRACT]

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### 全文: Headnote

ABSTRACT: In recent years, commons communities, such as Wikipedia and free or open source software communities, have received extensive attention from academia. Conventional wisdom holds that these communities have produced information across boundaries, rendering formal organizations obsolete. Nonetheless, this article demonstrates that nonprofit organizations (NPOs) are actually playing a vital role in the digital commons production process.

This conclusion is based on current commons and NPO scholarship and a series of in-depth, semistructured interviews with officers of NPOs and for-profit organizations associated with commons communities. NPOs' function for those communities in managing property rights, transacting with other entities, protecting individuals from potential liabilities, and institutionalizing various decision-making and standard-setting processes. The unique organizational structures of NPOs, associated with a "nondistribution constraint," have provided indispensable trust for community members. This article proposes that the commons environment has provided an "environmental niche" in which NPOs thrive. That is, the nature of NPOs is more consistent with commons-environment culture than is the nature of for-profit enterprises or governmental units.

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In recent years, commons communities, such as Wikipedia and numerous free or open source software (F/OSS) projects,<sup>1</sup> have attracted extensive attention from academia. Some literature focuses on underlying structural issues, such as social norms and licensing terms, whereas other literature deals with institutions, such as governments and businesses, and their adaptation to the new production models. Among these discussions, there is a popular impression that commons communities are primarily informal and exist without centralized organizations. In fact, however, most prominent commons projects are hosted by formal nonprofit organizations

(NPOs), such as the Apache Software Foundation (ASF), the Mozilla Foundation, and the Wikimedia Foundation.<sup>2</sup> These organizations have played critical roles in coordinating distributed creativity and have had important legal and policy implications in the digital economy.

This article analyzes the role of NPOs in the commons communities. It proposes that the commons environment has provided an "environmental niche" in which NPOs thrive. Compared to the nature of for-profit enterprises or governmental units, the unique legal characteristics of NPOs are more attuned to commons-environment culture. A series of in-depth interviews with thirteen officers from ten NPOs and two for-profit organizations were performed. These provided the basis for this article, which argues that NPOs and their unique legal structures have provided the social infrastructure that is necessary to support the commons and yet differ from the infrastructure supporting the production of proprietary information.

This article proceeds in four parts. The concept of traditional commons and intellectual commons is introduced in Part I. Part II presents the characteristics of NPOs and provides an overview of three primary sectors - governments, businesses, and NPOs - in both the proprietary environment and the commons environment. In Part III, NPOs behind the commons communities are described and their legal and social functions are analyzed. These functions include managing property rights, transacting with other entities, protecting contributors from potential liabilities, and institutionalizing decision-making and standard-setting processes for various commons communities. Part IV provides the theoretical link of NPOs and the commons environment. It first investigates what features of the commons environment make it an ideal place for NPOs to flourish. Then, it deals with the introduction, application, and implication of contract failure theory in the commons realm. Through the lens of contract failure theory, this article argues that NPOs provide indispensable trust for the commons communities and that NPOs illustrate the importance of formal organizations in the Internet economy.

To select the organizations from which individuals would be interviewed, the possible NPOs involved in the commons movement were determined via a personal understanding of the environment. Officers in all of these NPOs were identified as potential interviewees. Next, a "snowball" method of sampling was used, in which each of the persons interviewed was asked to identify other relevant NPOs and persons who had significant information regarding the project. Interestingly, the NPOs identified by means of each of these two methods were often the same.

## I. FROM TRADITIONAL COMMONS TO INTELLECTUAL COMMONS

### A. Commons Traditionally Defined

The idea of commons has been articulated by a number of scholars in different fields. Traditionally, commons refers to common-pool resources (CPRs), which are "natural or man-made resources [for which] exclusion is difficult, and yield is subtractable."<sup>3</sup> In other words, commons is a shared, impure public good because it is nonexcludable, but competitive for consumption. Examples of CPRs range from "inshore fisheries, irrigation systems, and pastures to the vast domains of the oceans and the biosphere."<sup>4</sup> One's use of a part of a CPR subtracts that part from other people's use and enjoyment of the CPR. Therefore, a CPR may be overused by multiple entities that are allowed to use it jointly. This is known as the tragedy of the commons: Classic examples of this tragedy include overfished oceans and overgrazed fields.<sup>6</sup> CPRs may be subject to different property regimes that regulate access to resources. The open-access regime and the common-property regime (or communal-property regime) are the most prevalent regimes regulating CPRs.<sup>7</sup> The open-access regime entails characterizing commons as a resource that no one person or entity has the legal right to exclude others from using,<sup>8</sup> whereas the common-property regime means that only members of a clearly defined group have a bundle of related legal rights, including the right to exclude nonmembers from using a common resource.<sup>9</sup>

Many theorists perceive the concept of the commons via only one of these two regimes. For some scholars, the commons denotes resources indiscriminately available to the public.<sup>10</sup> Many other scholars, however, tend to use commons to denote resources controlled only by a clearly defined group or by limited members." Some of

these scholars use the terms commons and common property interchangeably in their research.<sup>12</sup> To avoid confusion, this article uses the term CPR, rather than the term common property, to represent the traditional definition of the term commons.<sup>13</sup>

## B. Intellectual Commons

Internet and digital technologies, which allow for inexpensive, wide distribution of information, have dramatically changed the way intellectual resources - such as arts, literature, research, pictures, film, music, and software code - can be shared.<sup>14</sup> Such shared intellectual resources are similar to, but also different from, traditional CPRs. As a result, within the intellectual arena, commons has taken on a new meaning. To many legal scholars who study intellectual property (IP) and information technology (IT), commons has a slightly different meaning from that typically used by other social scientists. They ignore the competitive attribute of CPRs and emphasize the nonexcludability of a resource.

To these scholars, a commons is a shared resource that is not under private control and that anyone can use without permission.<sup>15</sup> Expressed differently, the essential nature of commons is the opposite of the essential nature of property in terms of exclusiveness.<sup>16</sup> IP scholarship indicates that commons is not subject to exclusive private control,<sup>17</sup> whereas exclusivity is one of the most important characteristics of property.<sup>18</sup> Although some of these scholars mention that commons is a resource to members within a relevant community,<sup>19</sup> their definition and their application of commons are closer to the open-access regime mentioned previously, which is only one of the property regimes that regulate CPRs.<sup>20</sup>

This article treats the term commons, or intellectual commons, according to some IP scholars' previously mentioned definitions of the term commons. Therefore, commons, in contrast to the proprietary aspect of IP, refers to intellectual resources, including culture, knowledge, and information, which are openly accessible and not under private control.<sup>21</sup> By contrast, one can prevent the transformation of one's intellectual resource into a commons by keeping it secret or by exercising IP rights over it. In other words, proprietary IP is in "the realm of individual control," whereas intellectual commons is in "the realm of distributed creation, management, and enterprise."<sup>22</sup>

In IP scholarship, the terms commons and public domain are sometimes used interchangeably<sup>23</sup> because both terms somehow represent "property's outside" or "property's antonym."<sup>24</sup> Professor Jessica Litman defines public domain as "a commons that includes those aspects of copyrighted works which copyright does not protect . . . ."<sup>25</sup> Commons, however, is not necessarily in the "traditional" public domain, although intellectual resources in the public domain all seem to be commons.<sup>26</sup> There are some commons still under IP protection.<sup>27</sup> They, however, become commons because their owners indiscriminately allow certain forms of public use.<sup>28</sup> For this reason, Professor James Boyle distinguishes between the commons and the public domain, noting that the former includes rules, norms, and other restraints that are absent in the latter.<sup>29</sup> Nonetheless, because the commons protected by IP, just like the public domain, functions as a free space for creative activities, Professor Lessig refers to it as an "effective public domain."<sup>30</sup>

F/OSS is a typical example of commons described in this article.<sup>31</sup> F/OSS is software whose source and object code are distributed and made available to the public, a step that allows for use and modification by anyone.<sup>32</sup> F/OSS, which is licensed as commons by its developers, is not in the public domain - it is still subject to copyright protection.<sup>33</sup> F/OSS is distributed under a license that requires source code authors, distributors, and users to comply with certain conditions.<sup>34</sup> Similarly, the content of Wikipedia is commons because it is licensed under the GNU Free Documentation License,<sup>35</sup> which allows various uses by any user.<sup>36</sup>

## II. NPOs, INSTITUTIONAL FORMS, AND INTELLECTUAL RESOURCES

This section will introduce the concept of the NPO and the roles of different institutional forms in the proprietary and commons environments. By providing an overview of three primary institutional forms in two intellectual arenas, this section situates the study within current scholarship. Thereafter, this section will focus on NPOs' legal and social function in the commons communities.

## A. What Is an NPO?

Nonprofit organizations (NPOs), sometimes collectively referred to as "the voluntary sector,"<sup>37</sup> are private organizations that are restricted from distributing any profit to anyone associated with the organizations.<sup>38</sup> Scholars have regarded such a nondistribution constraint as NPOs' most important institutional characteristic and developed NPO theories based on that characteristic.<sup>39</sup> As a result, NPOs do not seek to maximize financial profit for distribution. Nonetheless, an NPO can earn surpluses and use them for its own purposes or for other charitable purposes.<sup>40</sup> United States law promotes NPOs by exempting them from certain taxes<sup>41</sup> and by subsidizing them on the basis of the belief that NPOs provide outputs that are not obtainable from proprietary firms.<sup>42</sup>

Internal Revenue Code (I. R. C.) §501(c) exempts a number of NPO categories from income tax.<sup>43</sup> Of the different types of NPOs listed in §501(c), a large percentage are registered under §501(c)(3),<sup>44</sup> which includes entities "organized and operated exclusively for religious, charitable, scientific, testing for public safety, literary, or educational purposes . . . ." <sup>45</sup> NPO scholars indicated that §501(c)(3) organizations are "public benefit" organizations, whereas other NPOs listed in §501(c)(4)-(25) are "mutual benefit" entities.<sup>46</sup>

One distinction between these two types of NPOs is that §501(c)(3) organizations primarily provide public benefits, whereas §501(c)(4)-(25) organizations provide mutual benefits to specific groups.<sup>47</sup> NPOs studied in this article are registered either as §501(c)(3) organizations or §501(c)(6) organizations. Section 501(c)(3) organizations must be primarily devoted to charitable, religious, educational, scientific, literary, or public safety endeavors,<sup>48</sup> whereas §501(c)(6) organizations are business leagues and groups, such as chambers of commerce.<sup>49</sup> From the legal perspective, although all NPOs are exempt from corporate income tax, contributions to §501(c)(3) organizations can be subject to tax deductions, whereas this deduction is not applied to §501(c)(6) organizations.<sup>50</sup>

## B. Institutional Forms and Intellectual Resources

There are three major types of formal organizations in every society: proprietary, public, and voluntary.<sup>51</sup> Each type has its own strengths and weaknesses in meeting various societal demands. Proprietary firms are usually more flexible and efficient in meeting consumer demands<sup>52</sup> because these firms have to maximize the profit they distribute to owners and managers.<sup>53</sup> Proprietary firms, however, are unlikely to respond to public-interest issues, such as pollution control and safety protection, as actively and efficiently as the other sectors<sup>54</sup> because profit-motivated firms usually consider only activities that affect their revenues or costs.<sup>5</sup>

Governments, in contrast, obtain centralized power from the political process and have the potential to correct market failure.<sup>56</sup> With the power to tax, governments can encourage public goods provision through subsidies or can discourage unwanted private activities through tax levies. <sup>7</sup> Governments can use coercive power to overcome the free-rider problem.<sup>58</sup> Nevertheless, government decisions are easily influenced by industries and pressure groups.<sup>59</sup> Therefore, the policy-making process usually ignores the interests of weakly organized groups.<sup>60</sup>

NPOs, as the third sector in the society, mirror the organizational advantages and disadvantages of the proprietary firms and the government. NPOs are usually much more responsive than proprietary firms to public-interest issues.<sup>61</sup> Moreover, in contrast to the government, they are less subject to transaction costs stemming from the political process.<sup>62</sup> NPOs, however, have their own limits. They cannot levy taxes,<sup>63</sup> and they are much more restricted than proprietary firms in the types of activities they pursue.<sup>64</sup> Charges against NPOs also include the notion that without an effective incentive mechanism, NPO managers are usually less efficient than those in proprietary firms;<sup>65</sup> as a result, NPOs themselves are less efficient than proprietary firms.<sup>66</sup>

Nonetheless, this deficiency may be overcome if NPO managers obtain personal fulfillment from their work.<sup>67</sup> Accordingly, as Table 1 reveals, different institutional forms exist in both proprietary and commons production systems. In the proprietary system, the government plays a critical role in designing IP laws<sup>68</sup> as well as in maintaining public IP administration, such as the United States Patent and Trademark Office (USPTO) and the

United States Copyright Office. Government's monopoly over coercive power also supports the IP system through the public enforcement of law. Arguably, an IP system provides incentives to proprietary firms to create and to innovate, and proprietary firms appropriate IP rights to gain business advantages. Some NPOs also are critically important in the commercial IP system. For example, the American Society of Composers, Authors, and Publishers (ASCAP) and Broadcast Music, Inc. (BMI) are NPOs that assist their members in collecting royalties from licensees.<sup>70</sup> Likewise, the Motion Picture Association of America (MPAA) is a trade association of movie studios advocating strong copyright protection.<sup>71</sup>

These three primary sectors play specific roles in the commons environment as well. For example, governments may subsidize basic research and the development of F/OSS.<sup>72</sup> An increasing number of for-profit firms, such as Dell, Hewlett-Packard, Hitachi, IBM, Intel, Motorola, Nokia, Oracle, Philips, Sony, and Sun Microsystems, have also begun to invest in the production of intellectual commons,<sup>73</sup> although these firms cannot directly appropriate the value of such commons. Other commercial F/OSS companies, such as Red Hat and SourceForge, make their money by selling updates, support, and services to companies that use F/OSS, rather than from the upfront license fees that traditional software companies charge.<sup>75</sup>

Among these three sectors, the NPO sector is probably the most active in the commons environment.<sup>76</sup> A number of NPOs, including ASF, the Mozilla Foundation, and the Wikimedia Foundation, have played important roles in cultivating the commons environment. The roles of these organizations are the focus of this article.

### III. NPOs BEHIND THE COMMONS COMMUNITIES

#### A. What Are These NPOs?

Some commentators have the impression that commons communities are primarily informal.<sup>77</sup> Indeed, over 100,000 F/OSS projects do not constitute legal entities. They use the free project hosting service provided by SourceForge, which provides free coordination mechanisms, such as a Concurrent Versions System (CVS)<sup>78</sup> repository, mailing lists, message forums, bugging tracking tools, and others.<sup>79</sup> The majority of the prominent F/OSS projects, however, have their own hosting NPOs. For example, the Free Software Foundation (FSF) is the institutional host for the GNU project.<sup>80</sup> The Apache Software Foundation has been successfully supporting Apache-server software development and other F/OSS.<sup>81</sup> The Mozilla Foundation exists to support and provide leadership to Mozilla projects, which are derived from the Netscape browser software.<sup>82</sup> Table 2 provides a list of NPOs that support certain F/OSS projects.

Although these NPOs similarly serve as institutional umbrellas for F/OSS projects, they can have different origins or development models. Some NPOs, such as the Apache Software Foundation, originated from grassroots communities of user developers.<sup>94</sup> More recently, however, a second model has emerged, in which for-profit organizations spin out internally developed code and incorporate NPOs to attract and build F/OSS communities. Examples of this model are the Eclipse Foundation, spun off from IBM, and the Mozilla Foundation, formed by AOL.<sup>95</sup> Businesses making such spin-off decisions may have numerous strategic reasons for doing so. Some businesses view the spin-off as a more active investment in F/OSS projects,<sup>96</sup> whereas others may use the spin-off strategy to withdraw from a specific type of technological development.<sup>97</sup> Outside the F/OSS world, there are other NPOs hosting platforms that facilitate online collaborative creation of the commons. For example, the Wikimedia Foundation supports the Wikipedia project,<sup>98</sup> an extensive online encyclopedia written and amended by any user who wants to participate.<sup>99</sup> Although volunteers are involved in much of the administrative work, the Wikimedia Foundation still needs to administer Web pages and to resolve conflicts in the community.<sup>100</sup> In contrast, the ccMixer run by Creative Commons is an online platform where individuals can upload music tracks that other participants can use for remixes.<sup>101</sup> Furthermore, the Project Gutenberg Literary Archive Foundation (Project Gutenberg Foundation) provides individuals with a platform on which volunteers can collaboratively scan and proofread public domain books.<sup>102</sup> The Internet Archive, also an NPO, provides the public with a depository of and free access to text, audio, images, software, and archived Web pages.<sup>103</sup>

## B. NPOs' Legal and Social Function in Commons Communities

The institutional support provided by these NPOs may vary according to the nature and history of the underlying commons projects.<sup>104</sup> Nonetheless, many of these organizations function similarly for their communities. They act on behalf of communities to manage property rights, to transact or communicate with other entities, to provide collective decision-making mechanisms, and to protect individual contributors from potential liability. This section explains NPOs' primary legal and social functions in various commons communities.

### 1. Property Rights Management

Property rights management is one of the NPOs' most important tasks in the commons setting. NPOs not only receive donations on behalf of communities, but also hold and manage assets, such as hardware and other business infrastructure that are essential to commons development.<sup>105</sup> By owning these resources, NPOs can better meet a community's needs and can thus prevent community decline.<sup>107</sup> For example, John Sullivan, the Manager of Operation of the FSF, described how the organization provides infrastructure resources for the GNU community:

[The FSF] provides things like a reliable infrastructure. ... So people . . . are around to maintain servers and machines that can run the mailing lists and provide people with shell access and the sorts of things that they need to develop free software for the GNU project.

IP ownership of code is an important asset for commons communities, as well. According to Cliff Schmidt, the former Vice President of Legal Affairs of the ASF:

The primary reason [for incorporating the ASF] was to have one entity that would be licensing software. . . . [W]e wanted ... to be able to release the collective work under one entity name and license that way.

....

... A second reason for the incorporation is to provide some liability protection for officers and directors of the corporation as they were making decisions for the interest of the group.<sup>109</sup>

David Ascher, Executive Vice President of the Python Software Foundation, also suggested that the Python Software Foundation was incorporated because Guido van Rossum, the pioneer Python developer, wanted to have an entity that independently could hold the IP rights of Python code.<sup>110</sup>

Additionally, NPOs function to handle various other IP issues for the community, such as IP management tasks pertaining to code contribution.<sup>111</sup> As Professor Robert P. Merges describes, the tragedy of the anticommons<sup>112</sup> exists in communities such as F/OSS and Wikipedia, where transaction costs are extremely hard to identify and to bargain over with scattered IP owners.<sup>113</sup> Merges' s proposal to solve such problems is to identify "good enough" representatives to administer multiple IP rights on behalf of the communities.<sup>114</sup> In fact, several NPOs have functioned, as Merges proposes, as IP representatives for commons communities. Some of them, such as the ASF<sup>115</sup> and FSF, serve as the single copyright holder of the underlying F/OSS projects. In an interview, Sullivan, of the FSF, explained such a role in an organization:

[We have done] things like collecting copyright assignments and serving as a single copyright holder that could help enforce the [General Public License] GPL and help make sure that free software isn't used in proprietary ways.

....

. . . [O]ur copyright assignment agreement gives [the contributors] a full grant-back of their rights, so they are basically enabling us to enforce the copyright on their behalf, but are not losing their own rights over the code that they wrote. So the reason we do that is to make enforcement easier for everybody ... if you have ten different contributors to a project and they all are copyright holders, then it might be hard to get agreement among, or not just agreement but action from all ten of those people<sup>116</sup>

Moreover, NPOs can register and protect trademarks to reinforce communities' organizational identification,<sup>7</sup> which is crucial to an individual's participation in organizational goals.<sup>118</sup> Brian Behlendorf, cofounder and former President of the ASF, stated how a formal organization can protect Apache's name effectively:



[W]e didn't want to see companies come up with something like Apache Plus, or Pro Apache, or use our name in other commercial products. . . . [S]o by creating a legal entity, it would at least dissuade companies from doing that, even if we didn't have the resources to chase everything down. At the very least, I could credibly say, "Here's an organization that will pursue [it] if there is an issue."

## 2. Legal Entity for Transactions

Moreover, NPOs provide a formal legal entity that helps commons communities transact with other parties.

From IBM's perspective, the former Vice President and Assistant General Counsel, Kappos, who is now the director of the Patent and Trademark Office, explains the importance of ASF's incorporation:

What is an advantage, though from our perspective and I think that of any company, about having the Apache Foundation be incorporated is that you [can deal] with it more effectively. . . . And, of course, somebody[']s got to sign on behalf of the legal entity. So we have people who are authorized to sign those agreements on behalf of IBM, people like myself. . . . On the other hand, if you look at some entities that haven't incorporated, it continues to be difficult to enter into any kind of relationship with them because there's nobody to sign on their behalf. They don't really exist in any legal sense.

Therefore, from a transactional perspective, the organizational formality provided by an NPO can give other entities the assurance they require to establish long-term legal relations with the communities. The formal organizations then, in return, help the communities better manage their legal relations with the outside world.

## 3. Protection from Individual Liability

One important function of NPOs in the F/OSS arena is to protect contributors from individual liabilities.<sup>121</sup>

According to the heads of several NPOs, protecting individual contributors from potential liabilities is one of the primary reasons for the ASF's incorporation. Behlendorf said in an interview:

[I]f we had implemented the feature that somebody else had a patent on, that even if we didn't know about it, [and] if the person with the patent chose to make a claim . . . something like \$10 per copy distributed . . . , that would be a big problem. And it would be a problem for us as individuals because we would all be personally liable, and just to respond to any claims would cost us all hundreds of thousands of dollars, if not more. So one of the rationales for creating a legal entity of some sort was to act something as a shield, so that the legal entities assumed the risk and could amass resources to fight if that challenge might arise.<sup>122</sup>

Allison Randal, member of the Board of Directors and former President of the Perl Foundation (TPF), also stated how an F/OSS NPO helps to protect contributors from potential liability:

[Protecting contributors from potential liabilities is] one of the goals of the contributors licensing agreement. The biggest way is by acting as an obvious target for litigation. If you put forward the Perl Foundation as the legal entity behind Perl, then anyone who would try to attack contributors would first go to the Perl Foundation, instead of speaking out [against] individual contributors.<sup>123</sup>

Sullivan of the FSF similarly explained the benefit of having an organization protect contributors from potential liabilities: "[B]y having that institutional process set up, we're able to make it easy for people to contribute without worrying about legal risks. As a formal organization with legal services and money in the bank, we're able to help be a steward of that software for those individuals."<sup>124</sup>

The emergence of the Software Freedom Conservancy illustrates such benefits provided by a formal legal structure. The Software Freedom Conservancy is an NPO that provides F/OSS projects with an alternative to independent corporate formation.<sup>125</sup> By joining the Software Freedom Conservancy, F/OSS projects can receive the benefits of a hosting NPO, such as protection from personal liability,<sup>126</sup> receiving tax-deductible donations,<sup>127</sup> and having the Conservancy hold and manage assets for the communities.<sup>128</sup>

## 4. Collective Decision Making

Allocating community resources is also an issue for commons communities. An NPO can assist in formalizing the resource allocation process for the community. For example, TPF has a Grants Committee to ensure that grant funding is allocated and used efficiently.<sup>129</sup> Furthermore, many nonprofit foundations maintain some

formal mechanism to guarantee a sustainable community development process.<sup>130</sup>

In addition to hosting mailing lists and newsgroups, or formalizing the code development process,<sup>131</sup> some organizations, such as the ASF, form committees who solve coordination problems by voting or by a consensus process.<sup>132</sup> Each Apache project has a Project Management Committee (PMC), appointed by the Board, to manage the development process.<sup>133</sup> The main role of the PMC is to ensure that the legal requirements of the code releasing process are met and that there is wide participation from the whole community.<sup>134</sup> As ASF's cofounder, Behlendorf, explained:

We felt that we could standardize the development processes, or even at least try to define them in a way that could make it be templated and applied to other projects. And so, I don't know how exactly successful we were at that, but we set every initiative up as a project within the Foundation.

Similarly, TPF has several committees (the Steering Committee, the Grants Committee, and the Conference Committee) to coordinate its development process and deal with its day-to-day business.<sup>136</sup> Thus NPOs' formal structures occasionally help communities to institutionalize a collective decision-making process.

#### 5. Standard Setting

Some NPOs provide organizational support for F/OSS through standardsetting efforts. For example, the Linux Foundation "offers application developers standardization services and support that makes Linux an attractive target for their development efforts."<sup>137</sup> Such standards are crucial to any operating system because they can make applications interoperable with the subject system and, thus, help to accelerate their adoption.<sup>138</sup> Standard setting, however, is a complicated task involving the definition of code specifications.<sup>139</sup> Therefore, NPOs, such as the Linux Foundation, facilitate F/OSS development and distribution through NPOs' coordinated standard-setting processes.

### IV. ASSOCIATING NONPROFITS WITH THE COMMONS ENVIRONMENT

The previous section explains why commons communities need formal organizations. Nonetheless, that analysis does not provide an adequate explanation about why these organizations need to be nonprofits, rather than forprofits. Although scholars in the F/OSS arena have argued that "a passion for the ideology behind [F/OSS] seems to be what prevents many of these organizations from becoming profit-earning entities,"<sup>140</sup> most current literature has not provided a detailed explanation of the close links between the nature of the commons and NPOs. Therefore, this section analyzes the commons environment and the distinctive traits that cause NPOs to proliferate in this environment.

Roger A. Lohmann is probably the first scholar to identify the link between NPOs and the commons. Lohmann uses the term commons to refer to the entire nonprofit sector because he believes that NPOs are involved in a vast array of relationships among benefactors, intermediaries, and beneficiaries, in which associative communities can operate freely. Lohmann uses commons (linked to the Greek term *koinonia*) to emphasize free participation, common purpose, shared goods, a sense of mutuality, and a commitment to fairness.<sup>142</sup> Drawing on Lohmann's theory, Dart refers to the commons as "an organizational space containing activity focused on prosocial behaviors, mutuality, voluntary labor, and the production of collective goods."<sup>143</sup>

Although Lohmann and Dart provide important insights into the connection between NPOs and the commons, they do not capture the NPOs' inimitable relationship with the intellectual commons. In observing the NPO phenomenon described herein, this article argues that we need to identify and to understand the characteristics that make the commons environment an ideal milieu in which NPOs can flourish. Such a belief is based on the claim that environmental characteristics shape organizations and their forms and that organizations in the same environment will become structurally similar as they respond to common environmental constraints.<sup>144</sup> The section below argues that the nonproprietary, gift, and community characteristics of the commons environment make it a place for NPOs to thrive.<sup>145</sup> The second part of this section uses one of the most important NPO theories - the contract failure theory - to explain NPOs' role in the commons environment.

#### A. The Common Nature of NPOs and the Commons Environment

## 1. Nonproprietary Ownership

Because of the commons' public goods attributes and scattered contributors, some researchers indicate that commons, such as the F/OSS and Wikipedia content, have "no legal owner."<sup>146</sup> Indeed, because of the collaborative nature of the commons, it is extremely difficult to accurately identify the ownership status of a large part of the commons.<sup>147</sup> Although individual contributors own their contributions in the commons discourse, each piece of the contribution is valuable only when it is combined with other contributions.<sup>148</sup> Therefore, individual contributors cannot appropriate the entire creative work for themselves.<sup>149</sup> Moreover, the incentive structure underlying the commons communities is usually hostile to exclusive claims over ownership.<sup>150</sup> All these features suggest that the commons exemplifies very strong characteristics of nonproprietary ownership. Similarly, because of the nondistribution constraint, some researchers suggest that NPOs either exist without a clear line of ownership<sup>151</sup> or even have no "owners"<sup>152</sup> at all. This characteristic of unclear ownership has caused scholars to refer to NPOs as nonproprietary organizations. NPOs' nonproprietary nature also can be understood through their multiple stakeholders, including customers, board members, donors, and managers.<sup>154</sup> Legally, none of these stakeholders has an ultimate claim over an NPO and its resources.<sup>155</sup> In fact, it is legally incorrect to state that neither NPOs nor the licensed commons have owners.<sup>156</sup> Nonetheless, the similar "no owner" or "nonexclusive ownership" impression associated with NPOs and the commons environment indicates that the NPOs' loose ownership structure probably fits well with the environment's norm of nonexclusive control over information.<sup>157</sup> As the founders of the Mozilla Foundation believe, the nonprofit structure is more suitable for Mozilla's efforts to keep the Internet an open platform.<sup>158</sup> Similarly, when describing the history of ASF's incorporation, Behlendorf linked the nonproprietary nature of both commons and NPOs:

[W]hen we were thinking about how it should be structured, we didn't want something that was a for-profit because then you have to start thinking about who has ownership, how much ownership they have, and what's the fair way to try to judge percentage of ownership .... [A]ll of us had started somewhere volunteering. And we all wanted this to be a place where we didn't have to worry as much about that. We wanted to be very liberal with the credit we gave, but we feel that when people fight over percentage points, it can really suck a lot of energy and a lot of enthusiasm out of what you're doing. So being a nonprofit seemed to make the most sense. We were really creating what we felt was a natural resource. It seemed to be the kind of thing that a nonprofit could be geared to defend.<sup>150</sup>

In contrast, because of their for-profit nature, commercial entities tend to exert centralized control over intellectual resources.<sup>160</sup> In the software industry, for example, the hacker culture conflicts with the traditional commercial practice, where source code is protected by IP law and where access to source code is highly restricted.<sup>161</sup> Such conflict explains why when Richard Stallman left MIT's Artificial Intelligence Lab, he chose not to join a private firm.<sup>162</sup> Stallman was opposed to the closed nature of the code produced under the conventional exclusion-based software production model.<sup>163</sup> He views FSF work as a first step away from that model.<sup>164</sup> Eric S. Raymond, who distinguished himself through FSF's ethical condemnation of commercial software, also believes that "pragmatic" hackers discriminate to some degree among proprietary firms.<sup>165</sup> In summary, compared to the nature of for-profits, the nature of NPOs seems much more consonant to the commons environment in terms of ownership of resources.

## 2. Gift Culture

### a. The Gift Culture in the Commons Discourse

Many F/OSS contributors identify themselves as members of the hacker community.<sup>166</sup> It is an important characteristic of hacker culture that programmers freely give and exchange the code they write individually or collaboratively.<sup>167</sup> Hackers developed a unique ideology, called the "hacker ethic," which announces hackers' "commitment to total and free access to computers and information" and their "mistrust of centralized authority."<sup>168</sup>

Eric S. Raymond views F/OSS communities as being "most effectively understood not in conventional exchange-economy terms but as what anthropologists call a gift culture in which members compete for status by giving things away."<sup>169</sup> The incentives for such gift-giving efforts can be broadly interpreted to include a variety of reasons other than altruism.<sup>170</sup> The gift economy is distinguished from the commodity economy in capitalist society, in which labor is supplied as a function of wages.<sup>171</sup> F/OSS contributors may expect that their gift will be "reciprocated by suggestions, bug reports, debugging, hard work, praise, and more source code."<sup>172</sup> Beyond the F/OSS scenario, the gift culture, or the share culture, is increasingly pervasive in other online commons communities.<sup>173</sup> For example, Wikipedia community members have created an enormous amount of content not for pecuniary gains.<sup>174</sup> Therefore, the gift nature represents a unique type of culture in the commons realm.

#### b. The Incompatibility Between the Gift Culture and Exclusive Control

NPOs' unique fit with the gift economy concerns the obvious conflicts between traditional profit-seeking activities and the gift culture.<sup>175</sup> Although numerous for-profit companies have directly supported commons projects,<sup>176</sup> many of these projects have either associated with another NPO or not yet undergone commercialization. For example, Sendmail, Inc., a for-profit F/OSS company that sells Sendmail-related F/OSS software enhancements and services, established the nonprofit Sendmail Consortium to promote continuing F/OSS development.<sup>177</sup> Moreover, the Mozilla Corporation, a for-profit company established to coordinate the development and marketing of Mozilla technologies and products, remains "a wholly-owned subsidiary of the nonprofit Mozilla Foundation."<sup>178</sup> According to Hecker, the Executive Director of the Mozilla Foundation, the deliberate structuring of the Mozilla Corporation created a nonprofit foundation acting as the sole shareholder so "there would have been really no straightforward way for the [the shareholder] to actually sell part of the corporation to a private company."<sup>179</sup> He further explained this point in an interview:

[If Mozilla Corporation has for-profit shareholders,] it would affect the motivation of volunteers who are working on Firefox and other things because, if anything, they would say to themselves, "Why am I continuing with hard work and basically my work is going to end up going to the private gain of some private shareholder."<sup>180</sup> The difficulties in completely commercializing commons projects occur in areas other than F/OSS as well. For example, the Open Directory Project, currently owned by Netscape Inc.,<sup>181</sup> is "the largest, most comprehensive human-edited directory of the Web. . . . [Constructed and maintained by a vast, global community of volunteer editors."<sup>182</sup> Early in its history, the project gave rise to controversy when volunteers asserted that the project had deceived them into unknowingly working for a for-profit firm.<sup>183</sup> Although the project's host remains a for-profit, commercialization has not yet subsumed the project. All the content therein is licensed under the terms of the Open Directory License, which requires that the content be commons.<sup>184</sup> A similar situation arose concerning the voluntary discussion moderators on the AOL board. When the volunteers learned that their contributions were used to increase the firm's value, they decided to leave the forum.<sup>185</sup> Even for commons projects hosted by NPOs, commercializing efforts are occasionally scrutinized by the communities. In many circumstances, the gift culture comprises a resistance to the privatization of voluntary contributions. One example concerns the commercial use of Project Gutenberg's trademark in a proprietary business, which charges users for access to digital books.<sup>186</sup> Numerous community members objected to such a practice because they believed that it would harm the Project's original gift culture and their incentives for contribution.<sup>187</sup> One volunteer wrote, "I didn't slave all these hours just . . . for a commercial purpose. . . . It's sad to see my work used for a commercial site . . . ."<sup>188</sup> Project Gutenberg Foundation's CEO, Greg Newby, who was then involved in the commercial project, recalls that "a lot of the volunteers became upset . . . . [T]hey believed the fact that we had an affiliate that was going to follow different procedures meant that they were somehow not consistent with the values the volunteers had."<sup>189</sup> Although the dispute was eventually resolved, the Foundation has used a trademark license to prevent potential commercialization of the Gutenberg brand name. As Newby explained:

Commercialization is possible. However, it's under a pretty limited license. You're not able to change the content other than to do some reformatting and things like that. So what that means really is that there's not a very easy way for a commercial enterprise to detract value from what the volunteers have done.<sup>190</sup> Moreover, the Wikimedia Foundation has hesitated to adopt commercial advertising in the Wikipedia Project<sup>191</sup> because of opposition from the community of voluntary editors and contributors.<sup>192</sup> As the Foundation's General Counsel, Michael Godwin, elucidated in an interview:

[O]ne of the frequent issues that are [sic] raised within the Wikipedia group community is whether it would ever be even remotely acceptable to carry advertising of any sort, even sort of the low overhead, relatively unobtrusive advertising of something like Google ad sense. I think that it is possible that the community of users might accept that. ... I think that in theory, a sufficiently sensitive advertising program could possibly generate important revenue for Wikipedia, but our community of editors and contributors tends to be very resistant to that model.<sup>193</sup>

Communities' resistance to commercialization also reflects on NPOs' cooperation with for-profit business. Godwin expressed the Wikimedia Foundation's concern regarding the development of partnerships with for-profit companies when he stated, "Obviously, we're not going to partner with a commercial enterprise whose business we find antithetical to our philosophy, so we try to be very careful about that. . . . Because we know that if we make an uncomfortable partnership with some business, our community will be unhappy with us."<sup>194</sup> From these stories,<sup>195</sup> it is apparent that despite for-profits' increasing exploitation of commons as a business strategy, numerous commons communities still place a negative value on the exclusive commercial control of the voluntarily produced information.

### c. The Gift Culture in the NPO Discourse

The close link between the nonprofit sector and gift culture in human society can be traced to the Roman laws governing trust and foundations that facilitated gift giving from donors to beneficiaries.<sup>196</sup> Current literature on NPOs highlights the gift-giving activities in the philanthropic context as well.<sup>197</sup> Because the gift culture parallels much profit-seeking impulse and IP practice in the proprietary industry,<sup>198</sup> it is not surprising that the NPO is probably the only ideal organizational form compatible with this culture.<sup>199</sup>

As many researchers have found, NPOs are usually better than for-profits in connection with seeking voluntary efforts because most altruistic volunteers do not want their input to flow to for-profit organizations.<sup>200</sup> Sullivan explained NPOs' advantage in attracting volunteers in the F/OSS realm: "Generally when you're talking about comparing a nonprofit and a company, one of the advantages is that people are willing to volunteer their time on behalf of a nonprofit, and put their spare time and their skills to work for the different work projects that need to be done."<sup>201</sup> Similarly, by comparing the Gutenberg Project and Google Book Project, Newby, of Project Gutenberg, vividly described volunteers' motives in nonprofit and for-profit settings:

The value to the volunteers is that what they do is not generating revenue for a company, and it's not something in any way being withheld for various purposes. ... If somehow we came up with a project where the volunteers were doing things that were going to a for-profit organization, we'd have to be very careful with that because the volunteers would not be happy with that, unless they saw how it was really going to be beneficial to the things we give away.<sup>202</sup>

This narrowness of the compatibility between gift culture and NPOs' nature may explain why the main commons projects are hosted by NPOs, rather than by proprietary firms. Although some proprietary firms seek to leverage resources created by F/OSS communities, these firms choose to conduct such investment through NPOs<sup>203</sup> in compliance with the hacker ethic that pervades hacker communities.<sup>204</sup> The gift culture underlying the commons environment is consistent with NPOs' noncoercive nature, which distinguishes NPOs from the government sector.<sup>205</sup> Godwin, of the Wikimedia Foundation, explained how the Foundation's nonprofit status relates to the gift culture underlying the Wikipedia Project:

[B]y setting [Wikipedia] up as a free resource that is organized around a nonprofit, it came across as very

inviting for anyone to step in and say I can contribute to this, too.

....

... [O]ne thing that we can do is to build our philosophy around giving something to people for free without trying to sell them anything. That is something I think a for-profit version of Wikipedia could not do.<sup>206</sup>

In addition to coping with the collective action problems described previously,<sup>207</sup> NPOs make F/OSS sustainable by compensating key developers. In reality, some F/OSS projects might need their key developers to spend substantial time concentrating on important coding problems. Such demand certainly will affect the unstable balance between an individual developer's allocation of job-related time and of F/OSS contribution time. As a consequence, some NPOs provide key F/OSS developers with financial support that helps them focus on complicated programming issues. For example, TPF has provided financial grants for leading Perl developers so that these developers can "have the time and the freedom-from-distraction to study difficult problems carefully, and develop practical, efficient, and easy-to-use solutions to them."<sup>208</sup> The Linux Foundation also has hired some key developers, such as Linus Torvalds, to work full time on improving the Linux operating system.<sup>209</sup>

In view of the fact that developers are expected to contribute for free, the financial support itself may be in conflict with the gift nature of the F/OSS spirit. To alleviate such conflicts, NPOs' nondistribution constraint plays an important role in convincing the F/OSS community that such financial support is not actually in conflict with the hacker culture or the gift economy. Because an NPO is not aiming to maximize its profit, individual developers supported by such an organization can maintain more independence than those who work for proprietary firms.<sup>210</sup> Therefore, given that key developers' full-time concentration is necessary for some F/OSS projects, NPOs' funding model "can best support non-commercial [F/OSS] development."<sup>211</sup>

The fact that the NPOs' nature is more compatible with the hacker ethic or the gift economy does not necessarily lead to the conclusion that all commons communities are against commercial or profitable use of the aggregated contribution. For example, the F/OSS communities' attitude toward commercial or profitable use of code may depend on the nature of the underlying project or the historic background of the community.

Additionally, the Apache developers have endeavored to make their code commercially valuable since the beginning of the project.<sup>212</sup> This is because many Apache developers were building Web sites for various companies.<sup>213</sup> The Eclipse Foundation, an IBM spinoff, has "focused on enabling a commercially profitable ecosystem around the free platform."<sup>214</sup>

Based on these cases of the ASF and the Eclipse Foundation, it appears likely that the baseline for these two F/OSS communities is not whether the code will be used to make profit,<sup>215</sup> but whether the code is maintained as a commons.<sup>216</sup> Similarly, in other commons projects, communities are not always against commercialization. Nonetheless, in all these communities, there is an invariable norm against the proprietary exclusion of peer-produced resources.<sup>217</sup> This perception reflects the phenomenon wherein once a gift is owned exclusively, its gift nature diminishes.<sup>218</sup> The nonprofit form of these organizations, occasionally at least, can assure the contributors that the communities will not be influenced by commercial, exclusive biases.<sup>219</sup>

## 2. Virtual Communities

### a. The Community Attribute of Commons

The gift economy is usually associated with some feature of "interpersonal dependence," which means that the gift functions to "develop or maintain social relationship between parties." Bollier points out that "[w]hat matters most [for a gift economy] is the ability to create and sustain caring, robust relationships within a group of people who share common commitments."<sup>221</sup> James Leach also describes the commons creative process as a network - a unique relationship occurring among people.<sup>222</sup> This process is considerably different from the proprietary information production structure, which is isolated in an individual's mental work.<sup>223</sup> Therefore, it is this informal person-to-person relationship that maintains the commons projects.<sup>224</sup>

When the interpersonal relationship takes hold among multiple parties, a community emerges to represent the aggregated interests of these parties. Community members continuously interact with one another around their mutual interests.<sup>225</sup> For individual contributors, affiliation with a community may significantly affect their motives for contributing intellectual power.<sup>22</sup> Therefore, some researchers suggest that the commons always has a root in communities.<sup>227</sup> Successful commons projects have demonstrated the importance of communities in large-scale, collaborative, information-producing activities.<sup>228</sup>

Members of commons communities collaborate with one another based on the "axiom of kinship amity."<sup>229</sup> Just like family, ethnic, and religious affiliation, association with a commons community is usually not "traded, divided, or bundled."<sup>230</sup> Personal connection to certain commons resources cannot be transacted in the marketplace.<sup>231</sup> Such connections are fairly different from acquiring the shareholder status of a for-profit enterprise by purchasing its stock.<sup>232</sup> Moreover, the close relationship within a community also helps to solve the anticommmons problem<sup>233</sup> and thus makes the commons project more sustainable.

#### b. NPOs' Unique Fit with the Community Relationship

The relationships among community members may be relevant to the prevalence of NPOs in the commons context. Several researchers have argued that compared to for-profit organizations and the government, NPOs usually better serve demands that come from informal or interpersonal networks, such as family, friends, and neighbors.<sup>234</sup> This is because NPOs are better at producing relational goods, which represent "networks or relationships, or . . . interpersonal interactions within them."<sup>235</sup> According to Ben-Ner and Gui, "a dense network of relations based on mutual acquaintance, trust, and ongoing cooperation that facilitates joint action is an important facilitator, perhaps a necessary condition for the formation of NPOs."<sup>236</sup>

On the other hand, Frumkin wrote that NPOs "are ideal vehicles for forging networks of weak ties that link people together."<sup>237</sup> With a formal organization structure, NPOs strengthen individuals' sense of belonging to a community.<sup>238</sup> The trust provided by NPOs enables individuals to easily find their connections to and enthusiasm for communities.<sup>239</sup> Some researchers even believe that the "close-knit ties developed in communities" have provided indispensable foundations for NPOs that promote social movements.<sup>240</sup> In summary, like those serving other close-knit communities, NPOs in the commons context often provide important inputs for a network of relations that facilitate collective action. As the Mozilla Foundation's board member, Behlendorf, stated, one of the reasons for the initial structuring of Mozilla as a nonprofit was that its founders lacked "the goal of monetizing every relationship."<sup>241</sup> Therefore, both the community nature underlying the commons realm and NPOs' unique compatibility with this nature help explain why the NPO is the most ideal type of organization in which members of the commons communities can work collaboratively.<sup>242</sup>

#### B. Contract Failure in the Commons Discourse

This section introduces one of the principal NPO theories - contract failure theory - to illustrate NPOs' role in commons scenario. It then uses the commons environment to exemplify new implications of that theory.

##### 1. Contract Failure Theory

The contract failure theory, first proposed by Professor Henry Hansmann, is built around the central concept that the monitoring that occurs naturally in a normal market, in which buyers pay when suppliers perform acceptably, cannot discipline the supplier of certain goods or services.<sup>243</sup> As a result, when consumers are underinformed in relation to the suppliers, the proprietary sector tends to perform badly.<sup>244</sup> Professor Hansmann uses charity as an example to articulate the essence of contract failure theory.<sup>245</sup> He believes that NPOs function as a trusted channel when donors of specific services or goods and the corresponding recipients have no connections with each other.<sup>246</sup> The nondistribution constraint of NPOs can assure donors that their contribution, in fact, meets the costs of the organizations' production.<sup>247</sup> Conversely, a for-profit firm has both the opportunity and the incentive to exploit the customer by charging excessive prices for inferior products or services in such a circumstance.<sup>248</sup>

Therefore, NPOs seem necessary when there is this kind of contract failure - where the donor cannot directly

contact the intended beneficiary of the gift.<sup>249</sup> Hansmann uses listener-support, advertising-free stations as an example to explain the limitation of for-profits.<sup>250</sup> He argues that "[a] for-profit station would have every incentive to solicit payments far in excess of the total needed to pay for its broadcast, and simply to distribute the difference to the owners as profits."<sup>251</sup> Therefore, in circumstances where contributors know the quality of the tendered service, contract failures still occur when contributors have little assurance about whether their payment will be used appropriately on the service they receive.<sup>252</sup> An NPO form may, therefore, inspire greater trust.<sup>253</sup>

In summary, according to Hansmann, "contract failure is the essential factor in the role of nonprofit enterprise."<sup>254</sup> NPOs' nondistribution constraint solves the problems of market failure stemming from the information asymmetry among the parties involved in the transaction. Therefore, NPOs offer their customers a degree of assurance that the goods or services being purchased meet adequate standards of quality and quantity.

## 2. Applications

One typical application of contract failure in the commons environment concerns donations to commons communities. In recent years, as part of their business strategy, large IT companies have begun to donate either money or code to F/OSS communities.<sup>255</sup> Nevertheless, communities are not legal entities that can receive donations for their widely dispersed participants.<sup>256</sup> As a result, many NPOs function as legal actors that represent the commons communities by receiving - on the community's behalf - donations from either individuals or businesses.<sup>257</sup> Although there are alternatives to establishing a formal organization,<sup>258</sup> the NPOs' nondistribution constraint provides donors with certain assurances that the NPOs' use of the donated resources will not conflict with the public interest.<sup>259</sup>

In addition to its traditional application described above, contract failure has new applications in the commons scenario. The new applications appear because commons production requires successful collective action either among individuals or among organizations. The organizational structure of NPOs has become an effective tool to enable such collective action. In fact, the relationship between collective action and NPOs is not new to academia. Nobel laureate Kenneth Arrow has long pointed out the collective-action problems for organizations besides the government and for-profit firms.<sup>260</sup> NPOs have historically functioned to overcome collective-action problems as "a tool of social coordination."<sup>261</sup> In the commons realm, NPOs also facilitate collaboration either among individuals or among organizations. Therefore, this article argues that NPOs are capable of correcting collaborative failure, which is a mutation of the original contract-failure scenario.

### a. Collaborative Failure Among Individuals

Participants in the commons projects are all voluntary contributors who donate their time and intellectual resources. The creative process inherent in these projects involves large, globally distributed communities of creators collaborating primarily through the Internet. These decentralized methods of voluntary information gathering and information exchange are referred to as "peer production."<sup>262</sup> As mentioned previously, a number of NPOs provide organizational support for these peer-production projects.<sup>263</sup>

As peer production has become the central means for commons production, collaboration has been one of the key features of the commons.<sup>264</sup>

Because peer production is deemed to be a viable production mechanism outside of the market-based approach, Benkler suggests that nonmarket organizations, such as NPOs and the government, can play a significant role in the information-production system.<sup>265</sup> Whereas Benkler does not further elaborate on the theoretical role of NPOs, this section argues that the existence of NPOs is crucial to correcting certain contract failures in the peer-production process.

Although peer production itself can address certain market failures<sup>266</sup> and generate production activities whose costs are relatively low,<sup>267</sup> it may fail owing to disincentive problems or to collective-action problems arising from coordination among participants, property-rights management, resources provision, and potential



liabilities.<sup>268</sup> Such failure constitutes the collaborative failure among dispersed participants in the commons-production system. By internalizing or reducing the costs of distributed participants' collective action in the peer-production process, many NPOs play an important role in rectifying the collaborative failure by managing property rights, providing resources, dealing with other entities, protecting individuals from liability, and formalizing the decision-making process.<sup>269</sup>

Large peer-production projects are always complicated.<sup>270</sup> As a result, communities often have to deal with scenarios in which the rising complexity of the project translates into rising costs. Traditionally, the firm represents the authority in coordinating the production activities of proprietary information.<sup>271</sup> In contrast, without a centralized controlling authority, peer-production projects usually have to take into account the costs of coordinating heterogeneous intellectual contributions.<sup>272</sup> Lacking coordination, it is difficult for community members to effectively achieve their mutual goals via individual contributions.<sup>273</sup> Although peer-production communities may use licensing arrangements, social norms, computer code, or other mechanisms to mitigate the coordination problems,<sup>274</sup> such problems still exist as the project's complexities and scale increase.<sup>275</sup> Ronald H. Coase has argued that firms function to internalize the transaction costs stemming from imperfect markets and, as a result, firms increase the markets' overall efficiency.<sup>276</sup> Therefore, organizations are a solution to the fundamental problem of transaction costs in the sphere of economic activity. Similarly, as formal organizations, NPOs can persist over time<sup>277</sup> while promoting the collective actions and internalizing the transaction costs<sup>278</sup> that result from various commons production activities. Charlotte Hess and Elinor Ostrom point out that "[s]elf-organized commons require strong collective action and self-governing mechanisms . . . ." <sup>279</sup> This is the backdrop against which many NPOs emerge as a formal organizational alternative that can solve, or at least mitigate, collective-action problems and provide a self-governing mechanism to large-scale commons communities.<sup>280</sup>

A casual observation of the NPOs' presence in the commons environment suggests that these organizations exist only around large-scale projects.<sup>281</sup> There are at least two possible explanations for the relationship between NPO incorporation and the size of these commons projects. The first explanation is that only when a peer-production project achieves a critical mass of volunteers will the project have enough resources to form an NPO.<sup>282</sup> According to the second explanation, a formal organization is needed only when the underlying peer-production project's complexity and scale increase substantially.<sup>283</sup> According to Schmidt, the history of the ASF reflects the relationship between the scale of the projects and their formalization:

"Formalize" means that it's [stipulated] in our bylaws, we appoint vice presidents, we get official reports to the board, but what the project management committee does is pretty much the same. . . . Apache has grown a lot since it was incorporated. There might only be 2 or 3 different projects at the time we incorporated, now we have 40. So in some sense, this form of formalization has happened more due to the growth of the number of projects ....<sup>284</sup>

Moreover, the nature of the NPO is especially suitable for large-scale, peerproduction projects because the NPO is less likely than for-profits to impair the diverse motivations of distributed contributors. Ostrom and Hess have argued that "[w]hen a resource is large and complex, users . . . frequently have substantially diverse interests; thus, the costs of sustaining large and diverse resources are much higher than when governing small and relatively homogeneous resources."<sup>285</sup> To harmonize these diverse interests and motivations, NPOs' structures provide organizational arrangements for various stakeholders in large commons communities. In the case of F/OSS development, Milinkovich stated:

There is some number of developers out there for whom contributing to a forprofit company is not something they'll be interested in doing. . . . Contributing to a community, which is hosted at a nonprofit [organization] is a lot more likely to interest those kind of people.<sup>286</sup>

By contrast, it is usually not difficult to coordinate F/OSS development when the community is moderate in size, and a for-profit company can easily internalize the costs of collective action by hiring all contributors. This

phenomenon is quite common for for-profit companies that adopt dual-licensing strategies,<sup>287</sup> making the same software available as two different products—F/OSS and proprietary software.<sup>288</sup> MySQL is one such company.<sup>289</sup> Another case is Sleepycat, a company that used a dual-licensing strategy on its Berkeley Database (Berkeley DB) F/OSS that Oracle acquired in 2006.<sup>290</sup> According to an interview with one of Sleepycat's founders, Keith Bostic, because Berkeley DB's developer community was a tiny community with relatively few diverse motivations, its founders fairly easily built a consensus regarding the community's proposal to incorporate as a for-profit company.<sup>291</sup>

#### b. Collaborative Failure Among Organizations

Collaborative failure occurs not only on the individual level, but also on the organizational level, where several NPOs have played a crucial role. The existence of §501(c)(6)<sup>292</sup> organizations exemplifies how NPOs overcome collaborative failures among organizations. As described previously, a number of NPOs in the F/OSS world, such as the Dojo Foundation, the Eclipse Foundation, the Linux Foundation, and the XMPP Standards Foundation, are organized as §501(c)(6) organizations.<sup>293</sup> These organizations have been established by and are composed of proprietary firms. They collect annual dues from their members as their revenue.<sup>294</sup> For-profits' collaborative efforts in NPO activities may be explained by the fact that these companies sometimes work with one another to build infrastructure resources for mutual business benefits.<sup>295</sup> Such collaboration is especially understandable when several commercial players have joint incentives in setting standards or developing an open platform product, such as the Linux operating system and the Eclipse platform, to ensure its interoperability with middleware and applications.<sup>296</sup> According to an interview with Jim Zimlin, the Executive Director of the Linux Foundation:

[The Linux Foundation] promote[s] a platform. . . . [It] acts as the spokesperson for the Linux platform, rather than any individual companies, such as Novell, Red Hat, or IBM. . . . [W]e [also] standardize the operating system, so we provide the Linux standard base, which is an interoperability specification for Linux.

....

. . . [For] people who choose to comply with the standard, they participate in an interoperable marketplace. . . . So what we do is balance the upstream innovation that open source provides with downstream consistency through the standard organization we do with the Linux standard base.<sup>297</sup>

For many proprietary players, standards and platform products, just like public streets, are important infrastructure resources for their business development.<sup>298</sup> If the standard or platform product is produced proprietarily, other businesses that build their products using it may be locked in by the standard or the platform.<sup>299</sup> Therefore, it is not surprising that proprietary firms have a mutual interest in having an NPO collectively develop open standards or platforms. Zimlin pointed out that "it is a more common structure for standardsetting bodies as [§ 501(c)(6)] trade organizations."<sup>300</sup>

Professor Ronald J. Mann has elaborated on the collective action among proprietary IT companies by examining the case of the Open Source Development Labs (OSDL) (currently the Linux Foundation).<sup>301</sup> On the basis of his intensive interviews with executives in the software industry, Mann argues that OSDL members "benefit by sharing the costs of production of the Linux operating system" because a high-quality Linux operating system can help those members focus on their core competencies.<sup>302</sup> Businesses' collective action also demonstrates the "demand-revelation" aspect of NPO activities, which provides a mechanism for market participants to reveal their true preferences.<sup>303</sup> David J. Kappos, the former Vice President and Assistant General Counsel of IBM, vividly described IBM's active involvement in the Linux Foundation:

[W]e know that the cost, the amount of money that has to be invested to develop and maintain a world-class operating system platform is at least about a billion dollars a year. We found that we can get the same industrial strength, world-class operating system platform with Linux, as a particular example of an open source solution with less than that investment. So by investing about \$200 million a year in Linux and sharing that investment with other companies and individuals, including now Linux Foundation, to vastly leverage our investment and

access to a highly scalable, highly reliable, world-class operating system, this avoided what cost us to do all that work on our own.<sup>304</sup>

Therefore, by being members of §501(c)(6) organizations, proprietary firms can not only enjoy superior collective control or consumption of the organization's public goods, but also express their preference for mutual coordination.<sup>305</sup>

### 3. Theoretical Implications

#### a. NPO as a Trusted Intermediary

Hansmann's contract failure theory is sometimes referred to as trust theory<sup>306</sup> or the trust hypothesis<sup>307</sup> because of the proposition that NPOs are trusted by parties who voluntarily contribute their resources to them.<sup>308</sup> The theory focuses on circumstances in which customers are more likely to trust NPOs than their for-profit counterparts because the former are not motivated by profit and thus may be less likely to act opportunistically toward consumers.<sup>309</sup>

Hansmann argues that donors usually aim to donate their resources to a specific group of recipients.<sup>310</sup> In the case of commons production, however, there are usually no specific recipients. Because all of the resources are donated as commons, the intended beneficiary of the donations is actually the whole society or community. Nonetheless, the two types of donors, donors in Hansmann's theory and donors in the commons scenario, are concerned about whether or not their donations will eventually fall into the hands of the intended beneficiaries.<sup>311</sup> In the commons arenas, stealing a commons and converting it into proprietary information is a serious infraction of accepted norms.<sup>312</sup> Consequently, NPOs may serve as trusted intermediaries that will not privatize intellectual resources donated by volunteers.<sup>313</sup>

In both CPRs and intellectual-commons scenarios, stakeholders face the tragedy of the commons or the tragedy of the anticommons owing to insufficient trust.<sup>314</sup> These disadvantageous situations usually can be corrected if related parties find ways to increase trust, which plays an important role in commons communities.<sup>315</sup> Trustworthy information regarding internal and external environments is perceived as being one of the necessities for building an effective commons governance mechanism.<sup>316</sup> Therefore, researchers have suggested that we need trustworthy institutions to protect and to enhance the commons and that these institutions ideally should be free from corporate control.<sup>317</sup>

It is not surprising that for-profit companies can rarely play the role of trustworthy institutions. These companies may not be able to credibly internalize the philanthropic objectives of commons communities.<sup>318</sup> Moreover, they may adjust or withdraw their commitment to commons communities because of their profit-making concerns.<sup>319</sup> Hecker, of the Mozilla Foundation, described the situation in an interview:

[I]f you have a company, it is ultimately responsible to its shareholders .... In many cases of course, companies will basically act the way they think the market or their private investors want them to go .... So although a company might run an open source project, they might have people participate in the community, there is always this lingering concern that if the company's priorities change, or the market is forced to do something else, then basically anything they might have done for the project will just simply be discontinued or changed or whatever. There is a real lack in basic trust there [or] [t]here is leak in trust ....<sup>320</sup>

Behlendorf similarly expresses communities' concerns regarding for-profits' role in the F/OSS realm: "[E]ven if you were for-profit, even if you gave away a lot of the money that you made, or did some other giant handout, it still wouldn't be the same. People would still naturally be a bit more suspicious."<sup>321</sup>

By contrast, NPOs' nondistribution constraint constitutes an assurance that voluntary contributions from the communities will reach the intended recipients.<sup>322</sup> Therefore, NPOs' nondistribution constraint provides a certain degree of trust that enables stakeholders in the commons environment to act collectively in their mutual interests. IBM's decision to incorporate the Eclipse Foundation can be used to explain such differences.

According to Kappos, the former Vice President and Assistant General Counsel of IBM:

[I]n the case of Eclipse, we knew we had some great software development tools that could benefit from being

opened up and being converted to open source and having a development community around them to offer a competitive open set of development tools. We knew that the community would never emerge to make Eclipse successful as long as those tools remained controlled by IBM. We knew that we had to somehow put them into public domain and do it as a way to show a good stewardship, good citizenship, and a community. We felt that the way to do that was to separately incorporate Eclipse and set it off on its own with the independent governance. IBM would participate along with everyone else in the community.<sup>323</sup>

In other words, an NPO provides the community with trust and independence from any single commercial power. Mike Milinkovich, the Executive Director of the Eclipse Foundation, described how trust is important for the Foundation:

We are a trusted agent in several different directions. One is commercially we are a neutral player. We try to enable opportunities for the commercial player in the ecosystem as opposed to taking opportunities for [our] self. The other area is that among the developers' community. We help manage the development process, help make sure the projects are doing [these] very things, and provide mentoring to projects. That's more inward looking, but that's very important. Try more the developers or committers on the projects trust the Eclipse Foundation and view what it does is providing value to them, I think the better off we are.<sup>324</sup>

Occasionally, NPOs' neutrality can help to convince common contributors that their contribution will not be managed for the interest of a specific proprietary business. As Milinkovich pointed out:

[W]henver an organization is in the center of the community or the ecosystem . . . [it] is important that [the] organization be viewed as a neutral player. For-profit entities are responsible for their shareholder to make as much money as they can. It's difficult for them to be a neutral player. And even more importantly, it's difficult for them to be perceived as a neutral player. Even if they are absolutely in the right place, they [are] gonna run the cases where their motives will be suspected in the eyes of others. So people will question why they are making decisions. Is this really for the benefit of the entire community or it's for their benefit?

....

. . . [W]hat we spend our time talking about in the Eclipse Foundation is what can we do to help the community, which is quite different from what you do in a company setting, which is what can we do to maximize profit.<sup>325</sup> Trolltech, a Norwegian software company, and the KDE Free Qt Foundation provide interesting examples regarding trust concerns in different organizational forms. Trolltech is a primary supporter of the Qt toolkit KDT F/OSS project.<sup>326</sup> To establish trust from the community and ensure the continuing development of the Qt toolkit KDT project, Trolltech established the KDE Free Qt Foundation as an NPO to oversee the F/OSS project in 1998.<sup>327</sup> An agreement between these two organizations "gives the Foundation the right to release Qt under a [Berkeley Software Distribution] BSD-style license in case Troll tech doesn't continue the development of the Qt Free Edition for any reason including, but not limited to, a buy-out of Trolltech, a merger or bankruptcy."<sup>328</sup> Another example of an NPO established as a result of the distrust of forprofit companies is the Python Software Foundation. Before the incorporation of the Foundation, the Python code had been hosted by BeOpen.com, a forprofit company that hired key Python developers.<sup>329</sup> Nevertheless, when the Python community realized that BeOpen.com had its own business priorities regarding Python, the community decided to establish an NPO that could consistently represent itself.<sup>330</sup> From the examples of the KDE Free Qt Foundation and the Python Software Foundation, it is evident that the trust provided by NPOs is crucial for commons communities. This pattern also may explain why a number of F/OSS NPOs, such as the FSF and the ASF, have required contributors to convey or to license their IP to organizations.<sup>331</sup> Sullivan, from the FSF, explains how such practice relates to trust from the community:

[O]ne of the things that our copyright assignment agreement promises is that the software will always be distributed under a free software license. So even though we are the copyright holder on all the software, we're not able to, for example, decide that we're going to make it all proprietary tomorrow because that would be against the agreement we've made with all the contributors.<sup>332</sup>

The Patent Commons Project, initiated by the Linux Foundation, also encourages patent holders to contribute patents to the Foundation, which is dedicated to accelerating the development and use of the Linux system.<sup>333</sup> With NPOs' nondistribution constraint, their management of F/OSS code or patent pledges is less likely to extract huge profits from a contribution;<sup>334</sup> thus, these NPOs can play the role of "trustees of the 'exclosed' commons"<sup>335</sup> better than proprietary firms. Kappos, of IBM, described vividly NPOs' role in providing F/OSS communities with trust, independence, and neutrality, which cannot be brought by for-profits:

[A]s a general proposition, given the nature of the open source development model, if you want to have a successful project, you really do have to make it independent, [place] the interest of the project ahead of any individual corporate commercial interest ... ; [it's] easier to accomplish all of that by making the entity separate and independent.<sup>336</sup>

Josh Lerner and Jean Tirole use Netscape as an example to illustrate the incompatibility between a firm's for-profit nature and the trust required by the F/OSS community development process.<sup>337</sup> Based on its profit motive, Netscape intended to make proprietary use of its F/OSS project and hesitated to release all the browser code as F/OSS.<sup>338</sup> Such behavior made Netscape's commitment to F/OSS development questionable.<sup>339</sup> As a for-profit company, Netscape - and especially its management - encountered difficulties when attempting to relinquish control over its code and to allow its F/OSS project to be guided by something other than revenue plans.<sup>340</sup> As a result, some suggested that the Mozilla Project led by Netscape was not a real F/OSS project but "Netscape stooges."<sup>341</sup> Indeed, the members of successful F/OSS communities trust the communities to respect - not to exploit - the members' contributions.<sup>342</sup>

In commons operating beyond the F/OSS world, NPOs similarly provide trust, which is indispensable for the sustainability of communities. As an NPO, the Wikimedia Foundation has decided not to run the Wikipedia project using revenue from commercial advertisements because its founder, Jimmy Wales, believes that commercial ads may be harmful to the project's credibility and community trust.<sup>343</sup> In the realm of digital archiving and digital libraries, scholars have shown distrust of Google's for-profit nature, which may induce Google to manipulate or even enclose the company's online library project.<sup>344</sup> By contrast, Brewster Kahle, the director and cofounder of the Internet Archive, analyzes how the organization's nonprofit status makes contributors decide to deposit their content with the Archive:

It seems when people look to see that their website is on the Internet Archive ... it's whether they are being taken advantage of, are they better off or are they worse off with being in the Internet Archive? And we always want to make it so that they feel they are better off and that they are not being taken advantage of. And a key part of that strategy is being not-for-profit.

....

... It's because we are not making a profit nor can we be bought. Many organizations are bought or they go out of business fairly fast, and nonprofits cannot be bought. This we see as another one of the reasons why we became a nonprofit so that we could last a long time.<sup>345</sup>

In summary, by enabling trust that is difficult for for-profit enterprises to gain, NPOs provide a proper "organizational incentive structure" for commons production.<sup>346</sup>

#### b. Organization Still Matters in Cyberspace

Many commons communities operate according to principles that differ greatly from the principles driving proprietary firms. Conventional wisdom attributes the success of F/OSS and other peer-production projects to the Internet and characterizes the Internet as the most important medium connecting contributors and users to one another.<sup>347</sup> Many commentators similarly suggest that the Internet is a perfect medium for eliminating the middleman and transaction costs stemming from organizational structure.<sup>348</sup>

Indeed, by removing the temporal and geographical obstacles of interpersonal communication, the Internet gives individuals the ability to distribute their contributions quickly and broadly, and to collaborate with other participants all over the world. Nonetheless, although the Internet has radically transformed the boundaries of

traditional organizations, the Internet-based arguments overlook the fact that new forms of organizational structures have arisen to reconfigure information-production processes.<sup>349</sup> The analysis of contract failure in the commons discourse demonstrates how humans come together, create communities and organizations, and make decisions and rules to sustain a common resource or to achieve a desired outcome. This analysis suggests that in addition to the Internet, many NPOs help connect people to each other and to pool resources in the digital world.

Conventional wisdom has viewed F/OSS development as a decentralized method of information production, in contrast to the centralized model of single firms' closed development.<sup>350</sup> On the basis of such understanding, Professor Richard A. Epstein has suggested that F/OSS communities have no formal governance mechanism; thus, he doubts that the F/OSS movement can be sustained.<sup>351</sup> Epstein correctly has argued that collaborative failure or a collective-action problem might exist for community members who try to coordinate their actions in the F/OSS development process,<sup>352</sup> but he may not be aware that many commons communities already have developed their own governance mechanisms with NPOs at their center to resolve such a problem. By considering NPOs that minimize collaborative failure, it is apparent that, although dispersed contributors participate in commons projects in a decentralized way, a formal central organization can help reduce coordination costs in the peer-production model. The observation that NPOs host large commons projects is consistent with classic organization theory, which posits that the intricacy in the division of labor will bring about a formal organizational structure.<sup>353</sup> In this sense, organizational structure still matters in cyberspace.

This understanding may have some policy implications for F/OSS and the Internet architecture generally. Professor Lessig has argued that it is more difficult to regulate scattered F/OSS developers than to regulate a few large firms.<sup>354</sup> Therefore, the decentralized production implies that government will be less able to control F/OSS architecture than architecture produced by proprietary firms.<sup>355</sup> It is always difficult to take actions against participants "scattered around the world,"<sup>356</sup> and control over F/OSS is more diffuse than control over proprietary software.<sup>357</sup> So, Lessig correctly makes the incisive point that, as a production model decentralizes, governments experience a corresponding decline in available regulatory approaches to information-production processes.<sup>358</sup> Previous analyses of collaborative failures, however, have shown that, when the scale of F/OSS projects is within a certain range, communities desire a formal organization so that they can internalize transaction costs. Accordingly, once an F/OSS project has a central organization in which the community can coordinate distributed creative activities, the community will subject itself to more regulatory control.<sup>359</sup> NPOs have played a critical role in various commons activities. The formal organizational structure provided by NPOs enables commons communities to effectively manage property, transact with other parties, and provide protection for contributors. NPOs also can help to institutionalize the collective decision-making and standard-setting processes. Furthermore, NPOs' nondistribution constraint strengthens their compatibility with the nonproprietary nature, gift culture, and community attributes of the commons environment. This phenomenon, however, does not mean that the nature of for-profits is incompatible with the commons economy. The baseline is not whether intellectual resources are used to make profits, but whether they are controlled exclusively. In this article, collaborative failure was identified as a new type of contract failure in the commons discourse. By clarifying the role of NPOs in correcting contract failures in the digitally networked world, this article illustrates how trust provided by NPOs is indispensable for commons governance. Diverging from the conventional wisdom associated with the Internet's disintermediation effect, this article uses NPOs in the commons arena to argue that formal organizations are still necessary for decentralized production activities in cyberspace.

#### **Footnote**

1 . F/OSS is software whose source code and object code are distributed and made available to the public, a step that allows for use and modification by anyone, subject to certain restrictions. Although the Free Software Foundation (FSF) and the Open Source Initiative, two important organizations in the F/OSS world, have different views about the definition of free software or open source software, they both agree that the key

concepts are free access, free distribution, and free modification in relation to the source code. See Lawrence Rosen, *Open Source Licensing: Software Freedom and Intellectual Property Law* 1-8 (2005). I am well aware of the distinctions between "free" and "open source" software, but will treat them as the same for the purpose of this article. In contrast, most commercial software is proprietary software and is distributed only with the object code so that competitors are prevented from reusing the source code to develop the software. See Christian H. Nadan, *Open Source Licensing: Virus or Virtue?*, 10 *Tex. Intell. Prop. LJ.* 349, 351 (2002).

2. See *infra* notes 81-82, 98-99 and accompanying text; see also *infra* Part III. A. Table 2. F/OSS Foundations.

#### **Footnote**

3. Elinor Ostrom & Roy Gardner, *Coping with Asymmetries in the Commons: Self-Governing Irrigation Systems Can Work*, 7 *J. ECON. PERSP.* 93, 93 (1993). See also ELINOR OSTROM ET AL., *RULES, GAMES, & COMMON-POOL RESOURCES* 4 (1994) (defining CPRs as resources "where excluding potential appropriators or limiting appropriation rights of existing users is nontrivial . . . and the yield of the resource system is subtractable"); Mark Cooper, *From WiFi to Wikis and Open Source: The Political Economy of Collaborative Production in the Digital Information Age*, 5 *J. ON TELECOMM. & HIGH TECH. L.* 125, 131 (2006) (noting that CPRs are nonexcludable but rivalrous). Some scholars use "common-property resources" to express the same concept. See, e.g., David Feeny et al., *Questioning the Assumptions of the "Tragedy of the Commons" Model of Fisheries*, 72 *Land Econ.* 187, 187 (1996); see also H. Scott Gordon, *The Economic Theory of a Common-Property Resource: The Fishery*, 62 *J. POL. ECON.* 124, 124 (noting that natural resources have a common-property nature). In this article, however, such expressions are avoided to prevent confusion over the "common-property regime." See *infra* notes 7-9 and accompanying text.

4. Ostrom & Gardner, *supra* note 3, at 93.

#### **Footnote**

5. See Garrett Hardin, *The Tragedy of the Commons*, 162 *Science* 1243, 1244 (1968) (arguing that individuals who jointly use a commons fall helplessly into an immutable tragedy); see also Todd Sandler, *Collective Action: Theory and Applications* 117-23 (1992) (using static economic analysis to illustrate the commons overexploitation problem).

6. Hardin, *supra* note 5, at 1244<sup>^</sup>-5; Michael A. Heller, *The Tragedy of the Anticommons: Property in the Transition from Marx to Markets*, 11 *HARV. L. Rev.* 621, 624 (1998).

7. See, e.g., Arun Agrawal, *Common Property Institutions and Sustainable Governance of Resources*, 29 *World Dev.* 1649, 1652-53 (2001); Daniel W. Bromley, *The Commons, Property, and Common-Property Regimes*, in *MAKING THE COMMONS WORK: THEORY, PRACTICE, AND Policy* 3, 3-4 (Daniel W. Bromley ed., 1992); Feeny et al., *supra* note 3, at 188.

8. David Bollier, *Silent Theft: The Private Plunder of Our Common Wealth* 20 (2002); Michael Heller, *Gridlock Economy: How Too Much Ownership Wrecks Markets, Stops Innovation, and Costs Lives* 34 (2008).

9. Feeny et al., *supra* note 3, at 188.

10. For example, the influential article *The Tragedy of the Commons*, written by Garrett Hardin, focuses on commons under an open-access regime. Hardin, *supra* note 5, at 1244-45 (using the example of "a pasture open to all"). See also Yochai Benkler, *Coase's Penguin, or, Linux and The Nature of the Firm*, 112 *Yale LJ.* 369, 436 (2002) (arguing that the term "commons" denotes a resource that is available for everyone's use).

11. See, e.g., Hanoch Dagan & Michael A. Heller, *The Liberal Commons*, 110 *Yale LJ.* 549, 557 (2001) (suggesting that commons denotes resources "owned or controlled by a finite number of people who manage the resource together and exclude outsiders" (emphasis added)); Sandler, *supra* note 5, at 117 (defining commons as "a scarce resource [that] is owned collectively by a set of agents").

12. See, e.g., Paul Seabright, *Managing Local Commons: Theoretical Issues in Incentive Design*, 7 *J. Econ. Persp.* 113, 113 (1993) (treating commons as "common property resources" in which "property rights that are exercised (at least partly) collectively by members of a group").

13. See supra notes 3-4 and accompanying text.

**Footnote**

14. See, e.g., BOLLIER, supra note 8, at 100-01 (noting that the Internet has enabled wide exchange of information); Elinor Ostrom & Charlotte Hess, A Framework for Analyzing the Knowledge Commons, in UNDERSTANDING KNOWLEDGE AS A COMMONS: FROM THEORY TO Practice 41, 46<sup>^</sup>-7 (Charlotte Hess & Elinor Ostrom eds., 2007) (arguing that most intellectual commons have "developed from the effects of new technologies" and that "[m]any digital facilities today make it possible for . . . information to be nonrivalrous . . .").

15. For example, Professor Yochai Benkler notes that "[t]he salient characteristic of commons, as opposed to property, is that no single person has exclusive control over the use and disposition of any particular resource in the commons." Yochai Benkler, The Wealth of Networks: How Social Production Transforms Markets and Freedom 61 (2006) [hereinafter Benkler, Wealth of Networks]. He defines commons as resources that are "unowned and free for all to use in pursuit of their productive enterprises." Yochai Benkler, Freedom in the Commons: Towards a Political Economy of information, 52 DUKE LJ. 1245, 1273 (2003) [hereinafter Benkler, Freedom in the Commons]. John Cahir defines commons as "a situation where no individual or entity is recognized under law as having the right to exclude others from access to or use of a resource." John Cahir, The Withering Away of Property: The Rise of the Internet Information Commons, 24 Oxford J. Legal Stud. 619, 634 (2004). Professor Brett M. Frischmann equates commons with open access, which means resources that are "openly accessible to all within a community regardless of the entity's identity or intended use." Brett M. Frischmann, An Economic Theory of Infrastructure and Commons Management, 89 MINN. L. REV. 917, 921 (2005). Professor Lawrence Lessig indicates that a commons is "a resource that is free," by which he means "[n]ot necessarily zero cost, but if there is a cost, it is a neutrally imposed or equally imposed cost." Lawrence Lessig, The Architecture of Innovation, 51 Duke LJ. 1783, 1788 (2002) [hereinafter Lessig, The Architecture of Innovation]. Lessig further states that the commons is a resource not subject to any entity's granting of permission. Lawrence Lessig, Code Version 2.0 198 (2006), available at <http://pdf.codev2.cc/Lessig-Codev2.pdf> [hereinafter Lessig, Code Version 2.0].

16. see, e.g., WILLIAM M. LANDES & RICHARD A. POSNER, THE ECONOMIC STRUCTURE OF INTELLECTUAL PROPERTY LAW 12 (2003) ("[a] property right is a legally enforceable power to exclude others from using a resource"); Frank H. Easterbrook, Intellectual Property Is Still Property, 13 Harv. J.L. & Pub. Pol'y 108, 112 (1990) (noting that both physical property and intellectual property give rights to exclude); Robert A. Heverly, The Information Semicommons, 18 Berkeley Tech. LJ. 1 127, 1 156 (2003) (noting the exclusive nature of property); Niva Elkin-Koren, What Contracts Cannot Do: The Limits of Private Ordering in Facilitating a Creative Commons, 74 FORDHAM L. Rev. 375, 407 (2005) (asserting that "[p]roperty rules reflect an exclusion strategy for regulating the use of resources").

**Footnote**

17. BENKLER, WEALTH OF NETWORKS, supra note 15, at 60-61 .

18. Carol Rose, The Comedy of the Commons: Custom, Commerce, and Inherently Public Property, 53 U. Cm. L. Rev. 711, 711 (1986); see also F. Scott Kieff & Troy A. Paredes, An Approach to Intellectual Property, Bankruptcy, and Corporate Control, 82 WASH. U. L. Q. 1313, 1321 (2004) (stating that "IP rights . . . core . . . value is tied to the certainty of the IP holder's right to exclude"); F. Scott Kieff & Troy A. Paredes, Engineering a Deal: Toward a Private Ordering Solution to the Anticommons Problem, 48 B.C. L. Rev. III, 114, 121 (2007) (noting that exclusivity is the nature of TP).

19. See LAWRENCE LESSIG, THE FUTURE OF IDEAS: THE FATE OF THE COMMONS IN A CONNECTED WORLD 19-20 (2001); Lessig, Code Version 2.0, supra note 15, at 198; Frischmann, supra note 15, at 921.

20. Professor Lawrence Lessig is fully aware his use of the commons terminology "is not technically accurate"; nonetheless, he believes "the spirit of the metaphor is correct." Lawrence Lessig, The Law of the Horse: What



Cyberlaw Might Teach, 113 HARV. L. Rev. 501, 536 n.108 (1999). Professor Boyle also is aware of the fact that the traditional commons is within certain groups, but he believes that in the IP context, "it is a commons only if the whole society has access." James Boyle, *The Public Domain: Enclosing the Commons of the Mind* 39 (2008). See also Heller, *supra* note 8, at 34 ("[m]istakenly, the legal and economics literatures have long conflated the commons with open access").

21. See James Boyle, *The Second Enclosure Movement and the Construction of the Public Domain*, 66 *Law &Contemp. Probs.* 33, 62 (2003) (noting that intellectual commons denotes "wellsprings of creation that are outside of, or different from, the world of intellectual property"). The terms information commons or digital commons are not used to represent such resources in this article because these terms sometimes include nonintellectual resources. See, e.g., Dan Hunter, *Cyberspace as Place and the Tragedy of the Digital Anticommons*, 91 *CAL. L. Rev.* 439, 502-04 (2003) (using the term digital commons to signify both intellectual resources and nonintellectual resources); Stephen J. Lukasik, *Protecting the Global Information Commons*, 24 *TELECOMM. Pol'y* 519, 519 (2000) (using information commons to stand for the Internet itself). Other similar expressions of this concept include electronic commons, virtual commons, communication commons, Internet commons, and technological commons. See Charlotte Hess & Elinor Ostrom, *Introduction: An Overview of the Knowledge Commons*, in *UNDERSTANDING KNOWLEDGE AS A COMMONS: FROM THEORY TO PRACTICE* 3, 4 (Charlotte Hess & Elinor Ostrom eds., 2007).

22. See Boyle, *supra* note 21, at 66.

#### Footnote

23. See, e.g., BOLLIER, *supra* note 8, at 119; Hess & Ostrom, *supra* note 21, at 15 (illustrating the danger of private control of information, which should originally be commons or in the public domain).

24. See Boyle, *supra* note 21, at 66.

25. Jessica Litman, *The Public Domain*, 39 *Emory LJ.* 965, 968 (1990); see also Boyle, *supra* note 20, at 38 ("The public domain is material that is not covered by intellectual property rights.").

26. See David Lange, *Reimagining the Public Domain*, 66 *LAW & CONTEMP. PROBS.* 463, 463-64 (2003); Litman, *supra* note 25, at 968, 975 (1990).

27. Cahir, *supra* note 15, at 639; Lawrence Lessig, *Re-crafting a Public Domain*, 18 *Yale J.L. & Human.* 56, 74-75 (2006).

28. This is why Lessig points out that the control of commons differs from the control of property. Lessig, *Architecture of Innovation*, *supra* note 15, at 1788. Professor Greg Lastowka refers to this type of commons as "open copyright." Greg Lastowka, *Digital Attribution: Copyright and the Right to Credit*, 87 *BU. L. Rev.* 41, 43, 47-49 (2007).

29. James Boyle, *Mertonianism Unbound? Imagining Free, Decentralized Access to Most Cultural and Scientific Material*, in *UNDERSTANDING KNOWLEDGE AS A COMMONS: FROM Theory to Practice* 123, 138 (Charlotte Hess & Elinor Ostrom eds., 2007); see also James Boyle, *Cultural Environment and Beyond*, 70 *LAW & CONTEMP. PROBS.* 5, 9 n.12 (2007) (describing commons as a "zone of freedom" created through IP rights and licenses).

30. Lessig, *supra* note 27, at 56, 64.

31. See, e.g., RON GOLDMAN & RICHARD P. GABRIEL, *INNOVATION HAPPENS ELSEWHERE: OPEN SOURCE AS BUSINESS STRATEGY* 15-16 (2005); David Bollier, *Is the Commons a Movement?*, *Speech at the Berlin Wizards of OS3: The Future of the Digital Commons* 1 (June 12, 2004), [www.bollier.org/pdf/BerlinWizardsOfOS3speechJune2004.pdf](http://www.bollier.org/pdf/BerlinWizardsOfOS3speechJune2004.pdf); Boyle, *supra* note 20, at 39; Cahir, *supra* note 15, at 639; Anupam Chander & Madhavi Sunder, *The Romance of the Public Domain*, 92 *CAL. L. Re V.* 1331, 1336 (2004); Lessig, *Architecture of Innovation*, *supra* note 15, at 1788; Eben Moglen, *Anarchism Triumphant: Free Software and the Death of Copyright*, *First Monday*, Aug. 2, 1999, <http://firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/article/view/684/594>; Pamela Samuelson, *Enriching*

Discourse on Public Domains, 55 Duke LJ. 783, 800 (2006); Charles M. Schweik, Free/Open-Source Software as a Framework for Establishing Commons in Science, in UNDERSTANDING KNOWLEDGE AS A COMMONS: FROM Theory to Practice 277, 279 (Charlotte Hess & Elinor Ostrom eds., 2007). But see David McGowan, Legal Implications of Open-Source Software, U. Ill. L. Rev. 241, 244 (2001) (arguing that F/OSS is not true commons because property rights still exist over such software).

#### Footnote

32. See *supra* text accompanying note 1 .

33. See Boyle, *supra* note 20, at 39, 167; Boyle, *supra* note 21, at 65; Brian W. Carver, Share and Share Alike: Understanding and Enforcing Open Source and Tree Software Licenses, 20 Berkeley Tech. LJ. 443, 455-56 (2005); Lawrence Lessig, Open Source Baselines: Compared to What?, in *Government Policy Toward Open Source Software* 50, 54-55 (Robert W. Hahn ed., 2002); Stephen M. McJohn, The Paradoxes of Free Software, 9 Geo. MASON L. Rev. 25, 28-30 (2000). But see Yochai Benkler, Free as the Air to Common Use: First Amendment Constraints on Enclosure of the Public Domain, 74 N. Y. U. L. Rev. 354, 361-62 (1999) (suggesting a broader scope of the public domain, as opposed to enclosed domain, that covers all uncontrolled information); Chander & Sunder, *supra* note 31, at 1338 (arguing that it is unnecessary to make a distinction between public domain and commons if the former is defined broadly).

34. McGowan, *supra* note 31, at 253-54.

35. The GNU Free Documentation License, which allows readers to copy, redistribute, and modify a work, was developed by the Free Software Foundation. "It is similar to the GNU General Public License . . . [that] requires all copies and derivative!" works to be released under the same licensing terms. Wikipedia, GNU Free Documentation License, [http://en.wikipedia.org/wiki/GNU\\_Free\\_Documentation\\_License](http://en.wikipedia.org/wiki/GNU_Free_Documentation_License) (last visited June 3, 2010).

36. Wikipedia, Text of the GNU Free Documentation License, [http://en.wikipedia.org/wiki/Text\\_of\\_the\\_GNU\\_Free\\_Documentation\\_License](http://en.wikipedia.org/wiki/Text_of_the_GNU_Free_Documentation_License) (last visited Apr. 24, 2010).

37. See, e.g., Peter Frumkin, On Being Nonprofit: A Conceptual and Policy Primer 14 (2002); Paul J. DiMaggio & Helmut K. Anheier, The Sociology of Nonprofit Organizations and Sectors, 16 ANN. Rev. Soc. 137, 144 (1990); Al Slivinski, The Public Goods Theory Revisited: Comments on Kingma's Revisitation of Weisbrod, in THE STUDY OF THE NONPROFIT ENTERPRISE: Theories and Approaches 67, 69 (Helmut Anheier & Avner Ben-Ner eds., 2003).

38. See Burton A. Weisbrod, The Nonprofit Economy 1 (1988); Henry B. Hansmann, The Role of Nonprofit Enterprise, 89 Yale LJ. 835, 838 (1980); Richard Steinberg, Economic Theories of Nonprofit Organizations, in THE NONPROFIT SECTOR: A RESEARCH HANDBOOK 117, 118 (Walter W. Powell & Richard Steinberg eds., 2d ed. 2006); see also Joseph Galaskiewicz & Wolfgang Bielefeld, The Behavior of Organizations, in THE STUDY OF THE NONPROFIT Enterprise: Theories and Approaches 205, 206 (Helmut Anheier & Avner Ben-Ner eds., 2003) (stating that "[i]nstitutional economists have argued that the nondistribution constraint removes an important incentive from organizational decision-making - claims to residual earnings or profits").

#### Footnote

39. See, e.g., Frumkin, *supra* note 37, at 4; Weisbrod, *supra* note 38, at 1; Avner Ben-Ner & Benedetto Gui, The Theory of Nonprofit Organizations Revisited, in THE STUDY OF THE Nonprofit Enterprise: Theories and Approaches 3, 5 (Helmut Anheier & Avner Ben-Ner eds., 2003); Galaskiewicz & Bielefeld, *supra* note 38, 205-09; Hansmann, *supra* note 38, at 838; Henry B. Hansmann, Reforming Nonprofit Corporation Law, 129 U. Pa. L. Rev. 497, 505-07, 511, 553 (1981); Steinberg, *supra* note 38, at 118. But see Alberto Bacchiega & Carlo Borzaga, The Economics of the Third Sector: Toward a More Comprehensive Approach, in THE STUDY OF the Nonprofit Enterprise: Theories and Approaches 27, 30 (Helmut Anheier & Avner Ben-Ner eds., 2003) (noting that a pure focus on the nondistribution constraint will overlook many other parts of the third sector); Burton A. Weisbrod, Institutional Form and Organizational Behavior, in Private Action and the Public Good 69, 72 (Walter

W. Powell & Elisabeth S. Clemens eds., 1998) (arguing that NPO studies have exaggerated the importance of nondistribution).

40. See Hansmann, *supra* note 38, at 838; see also John Markoff, When Tech Innovation Has a Social Mission, *N.Y. Times*, Apr. 13, 2008, at B4 (reporting several NPOs with significant revenues in Silicon Valley).

41. This is why the nonprofit sector was once called "the tax-exempt sector." See Frumkin, *supra* note 37, at 10-11.

42. Joseph J. Cordes & Burton A. Weisbrod, Differential Taxation of Nonprofits and the Commercialization of Nonprofit Revenues, in *TO PROFIT OR NOT TO PROFIT: THE COMMERCIAL TRANSFORMATION OF THE NONPROFIT SECTOR* 83, 84-85 (Burton A. Weisbrod ed., 1998); John Simon et al., The Federal Tax Treatment of Charitable Organizations, in *THE NONPROFIT SECTOR: A RESEARCH HANDBOOK* 267, 269, 271-72 (Walter W. Powell & Richard Steinberg eds., 2d ed. 2006); Weisbrod, *supra* note 38, at 1, 28-30.

43. I.R.C. §501 (2006).

44. Frumkin, *supra* note 37, at 8, 11; Daniel Halperin, Income Taxation of Mutual Nonprofits, 59 *Tax L. Rev.* 133, 133 (2006).

45. §501(c)(3).

46. Siobhán O'Mahony, Nonprofit Foundations and Their Role in Community-Firm Software Collaboration, in *PERSPECTIVES ON FREE AND OPEN SOURCE SOFTWARE* 393, 413 n.19 (Joseph Feller et al. eds., 2005); John Simon et al., *supra* note 42, at 268-69.

#### Footnote

47. See Frumkin, *supra* note 37, at 8.

48. §501(c)(3).

49. §501(c)(6).

50. Frumkin, *supra* note 37, at 55, 92-93; Weisbrod, *supra* note 38, at 9-10; Boris I. Bittker & George K. Rahdert, The Exemption of Nonprofit Organizations from Federal Income Taxation, 85 *Yale L.J.* 299, 347 (1976); see also Burton A. Weisbrod, *The Voluntary Nonprofit Sector: An Economic Analysis* 66 (1977) [hereinafter Weisbrod, *Nonprofit Sector*].

51. Weisbrod, *supra* note 38, at 5-6, 24.

52. See, e.g., Frumkin, *supra* note 37, at 81; Weisbrod, *supra* note 38, at 18; Eleanor Brown & Al Slivinski, Nonprofit Organizations and the Market, in *THE NONPROFIT SECTOR: A RESEARCH HANDBOOK* 140, 140 (Walter W. Powell & Richard Steinberg eds., 2d ed. 2006); see also Steinberg, *supra* note 38, at 127 (noting that "attention to consumer demands are the hallmark of the [proprietary] sector"). But see DiMaggio & Anheier, *supra* note 37, at 147 (introducing studies finding that NPOs are more efficient than their for-profit counterparts in the hospital industry).

53. See, e.g., Frumkin, *supra* note 37, at 125; Steinberg, *supra* note 38, at 117, 129. But see Julie A. Nelson, *Economics for Humans* 93-108 (2006) (disagreeing that profit-maximization is for-profits' single organizational goal).

54. Weisbrod, *supra* note 38, at 5, 7.

55. See *id.* at 19-20.

56. *W.* at 20-21.

57. *Id.* at 20.

#### Footnote

58. Free riders are those who consume more than their fair share of a public resource. Without government's coercive power, the free-rider problem may deter individuals from contributing to the production of public resources. James Douglas, *Political Theories of Nonprofit Organization*, in *The Nonprofit Sector: A Research Handbook* 43, 45 (Walter W. Powell ed., 1987).

59. See Weisbrod, *supra* note 38, at 5.

60. Id.

61. Id. at 5, 7, 19-20.

62. For a discussion of the political process in the governmental provision of public goods, see Weisbrod, *Nonprofit Sector*, supra note 50, at 53.

63. Frumkin, supra note 37, at 3.

64. For example, an NPO does not have access to capital markets for equity capital. See, e.g., Frumkin, supra note 37, at 83-84; Ben-Ner & Gui, supra note 39, at 18; Hansmann, supra note 39, at 507, 549.

65. See, e.g., Weisbrod, supra note 38, at 23; Weisbrod, supra note 39, at 71-72.

66. Weisbrod, supra note 38, at 23; Weisbrod, supra note 39, at 71-72.

67. Weisbrod, supra note 38, at 23.

68. See F. Scott Kieff, *Coordination, Property, and Intellectual Property: An Unconventional Approach to Anticompetitive Effects and Downstream Access*, 56 *Emory LJ.* 327, 363 (2006) (describing how the operation of the three branches of the government affects private entitlement and property rules); see also Weisbrod, supra note 38, at 21 (noting that "[g]overnment could . . . alter the incentives facing proprietary firms so that they would change their behavior").

#### Footnote

69. See, e.g., Benkler, *Wealth of Networks*, supra note 15, at 43<sup>14</sup> (categorizing businesses making profits based on the exclusiveness of IP); Cass R. Sunstein, *Infotopia: How Many Minds Produce Knowledge* 164-65 (2006) (stating that private property protects companies' valuable information); Elkin-Koren, supra note 16, at 385 n.34 (noting that "Microsoft's financial investment" is secured by IP rights); Amy Kapczynski, *The Access to Knowledge Mobilization and the New Politics of Intellectual Property*, 117 *YALE LJ.* 804, 820, 845 (2008) (noting that "IP rights . . . create opportunities for potentially lucrative rents"); Lastowka, supra note 28, at 53 (discussing Bill Gates's perspective that intellectual "progress is dependent upon proprietary rights").

70. See, e.g., Heller, supra note 8, at 72. For the historic background of ASCAP and BMI, see Paul Goldstein, *Copyright's Highway: From Gutenberg to the Celestial Jukebox* 53-61 (Stanford Law and Politics 2003) (1994).

71. Motion Picture Ass'n of Am., *About Us*, <http://www.mpa.org/AboutUs.asp> (last visited Apr. 23, 2010).

72. See, e.g., Fadi P. Deek & James A.M. McHugh, *Open Source: Technology and Policy* 309-15 (2008); Paul Dravis, *Open Source Software: Perspectives for Development* 7-11 (2003), available at <http://www.infodev.org/en/Document.21.html>.

73. See, e.g., Benkler, *Wealth of Networks*, supra note 15, at 46; Boyle, supra note 20, at 190; Deek & McHugh, supra note 72, at 272-79; Goldman & Gabriel, supra note 31, 54-59; Joseph Feller & Brian Fitzgerald, *Understanding Open Source Software Development* 115-21 (2002); Lawrence Lessig, *Free Culture: How Big Media Uses Technology and the Law to Lock Down Culture and Control Creativity* 264 (2004); Don Tapscott & Anthony D. Williams, *Wikinomics: How Mass Collaboration Changes EVERYTHING*, 63, 77-83 (2006); P.G. Capek et al., *A History of IBM's Open-Source Involvement and Strategy*, 44 *IBM Sys. J.* 249, 252-56 (2005); Kapczynski, supra note 69, at 830; Josh Lerner & Jean Tirole, *Some Simple Economics of Open Source*, 50 *J. INDUS. ECON.* 197, 198, 210 (2002); Daryl Lim, *Beyond Microsoft: Intellectual Property, Peer Production and the Law's Concern with Market Dominance*, 18 *FORDHAM INTELL. PROP. MEDIA & ENT. LJ.* 291, 325-27 (2008); McGowan, supra note 31, at 284; Pamela Samuelson, *IBM's Pragmatic Embrace of Open Source*, 49 *Comms. ACM* 21, 24 (2006); John Quiggin & Dan Hunter, *Money Ruins Everything*, 30 *Hastings Comm. & Ent. LJ.* 203, 219 (2008); Richard Waters, *Open Source Writers Wary of Oracle's Real Intentions: Is Ellison Planning Strategy or Subversion?*, *FIN. TIMES* (London), Feb. 16, 2006, at 27.

#### Footnote

74. See Lerner & Tirole, supra note 73, at 224-25 (2002) (arguing that although proprietary firms cannot directly capture the value of an F/OSS program's improvement, they can profit indirectly through the sale of more proprietary complementary goods); Ronald J. Mann, *Commercializing Open Source Software: Do Property*

- Rights Still Matter?, 20 HARV. J. L. &Tech. 1, 26 (2006) (arguing that IBM cannot profit from selling Linux or Apache programs, but that it can earn revenue from the value chain that use these programs); Robert P. Merges, A New Dynamism in the Public Domain, 71 U. Chi. L. Rev. 183, 192-93 (2004) (asserting that rather than make a profit directly, IBM's F/OSS strategy can decrease Microsoft's monopoly in the market).
75. Feller & Fitzgerald, *supra* note 73, at 47-48; Lerner & Tiróle, *supra* note 73, at 225; Lawrence Lessig, *Remix: Making Art and Commerce Thrive in the Hybrid Economy* 181-83 (2008); Jonathan Zittrain, *The Future of the Internet and How to Stop It* 64 (2008).
76. But see Bollier, *supra* note 31, at 2 (perceiving the commons itself as the third sector); Tómales Bay Institute, *The Commons Rising* 2-3, 24 (2006), available at [http://onthecommons.org/media/pdf/original/Commons\\_Rising\\_06.pdf](http://onthecommons.org/media/pdf/original/Commons_Rising_06.pdf) (identifying commons as an economic sector as opposed to for-profits); Roger A. Lohmann, *The Commons: New Perspectives on Nonprofit Organizations, Voluntary Action and Philanthropy* 59-60 (1992) (identifying commons, states, and markets as three primary categories of social space), available at <http://dlc.dlib.indiana.edu/dlc/bitstream/handle/10535/5310/TheCommons%28Lohmann%2c1992%29.pdf?sequence=1>.
77. See, e.g., Rishab Aiyer Ghosh, *Why Collaboration Is Important (Again)*, in *CODE: Collaborative Ownership and the Digital Economy* 1, 1 (Rishab Aiyer Ghosh ed., 2005); McGowan, *supra* note 31, at 253; see also Edward Lee, *Warming Up to User-Generated Content*, 2008 U. Ill. L. Rev. 1459, 1460 (2008) (stating that user-generated content is produced from "unorganized, informal practices of various, unrelated users"). But see Feller & Fitzgerald, *supra* note 73, at 160 (indicating that the F/OSS development process is sometimes more like the cathedral mode than the bazaar mode).
78. CVS allows developers around the globe to work on a local copy of codebase and is the dominant version control platform in the F/OSS world. See, e.g., Deek & McHugh, *supra* note 72, at 120-24; R. van Wendel de Joode et al., *Protecting the Virtual Commons: Self-Organizing Open Source and Free software Communities and Innovative Intellectual Property Regimes* 16-17 (2003); Zittrain, *supra* note 75, at 94.
79. Feller & Fitzgerald, *supra* note 73, at 128-29; SourceForge, *About*, <http://sourceforge.net/about> (last visited Apr. 23, 2010).
80. The GNU project is a F/OSS project launched to build the GNU operating system, "a complete Unix-like operating system." See GNU Operating System, <http://www.gnu.org/> (last visited Apr. 19, 2010).
81. Apache Software Found. (ASF) Homepage, <http://www.apache.org/> (last visited Apr. 21, 2010).
82. See Mozilla, *The Mozilla Found.*, <http://www.mozilla.org/foundation/> (last visited Apr. 23, 2010).
83. ASF Homepage, *supra* note 81.
84. Eclipse Found., *About the Eclipse Foundation*, <http://www.eclipse.org/org/> (last visited Apr. 20, 2010).
85. The FreeBSD Found. Homepage, <http://www.freebsdoundation.org/> (last visited Apr. 23, 2010).
86. GNU Operating Sys., *supra* note 80.
87. The GNOME Found. Homepage, <http://foundation.gnome.org/> (last visited Apr. 23, 2010).
88. Mozilla Homepage, <http://www.mozilla.org/> (last visited Apr. 23, 2010).

#### Footnote

89. Chandler Project: Open Source Application Found. Homepage, <http://www.osafoundation.org> (last visited Apr. 24, 2010).
90. The Linux Found., *About Us*, <http://www.linuxfoundation.org/about> (last visited Apr. 22, 2010).
91. The Perl Found. Homepage, <http://www.perlfoundation.org/> (last visited Apr. 24, 2010).
92. See Python Software Found. Homepage, <http://www.python.org/psf/> (last visited Apr. 24, 2010).
93. XMPP Standards Found. Homepage, <http://www.xmpp.org/xsf/> (last visited Apr. 24, 2010).
94. See, e.g., Lerner & Tiróle, *supra* note 73, at 207-08 (describing how the Apache group was incorporated into the ASF); Steven Weber, *The Success of Open Source* 109-11 (2004) (providing a brief history of the Apache

project).

95. Deek &McHugh, *supra* note 72, at 43; Mitchell Baker, *The Mozilla Project: Past and Future*, in *Open Sources 2.0: The Continuing Revolution* 3, 13 (Chris DiBona et al. eds., 2006); Telephone Interview with Frank Hecker, Executive Dir., Mozilla Found. 1 (May 14, 2008) (transcript on file with author).

96. West identifies two reasons firms release their code to form an F/OSS project: to win adoption and to gain development assistance in noncritical areas. See Joel West, *How Open Is Open Enough? Melding Proprietary and Open Source Platform Strategies*, 32 *RES. Pol'y* 1259, 1264-65 (2003).

97. For example, AOL created the Mozilla technology and formed the Mozilla Foundation after firing Netscape developers and structuring a deal with Microsoft. According to the deal, AOL promised that for the subsequent seven years, AOL would use Microsoft's Internet Explorer as the default browser for its subscribers. See Evan Hansen, *AOL Lays Off Netscape Developers*, *CNET News*, Jul. 15, 2003, [http://news.com.com/2100-1032\\_3-1026078.html](http://news.com.com/2100-1032_3-1026078.html); Joel West &Scott Gallegher, *Patterns of Open Innovation in Open Source Software*, in *OPEN INNOVATION: Researching a New Paradigm* 82,101 (Henry Chesbrough et al. eds., 2006).

#### **Footnote**

98. See Wikimedia Found. Homepage, <http://wikimediafoundation.org/wiki/Home> (last visited Apr. 24, 2010).

99. Wikipedia Homepage, <http://www.wikipedia.org/> (last visited Apr. 24, 2010).

100. Tapscott &Williams, *supra* note 73, at 72-73; Zittrain, *supra* note 75, at 135-36.

101. See ccMixter Homepage, <http://ccmixter.org> (last visited Apr. 20, 2010); Boyle, *supra* note 20, at 180-81.

102. See Project Gutenberg, *About Project Gutenberg*, <http://promo.net/pg/> (last visited Apr. 20, 2010). For a more detailed description of the Project, see Benkler, *supra* note 10, at 398-99 and Lessig, *supra* note 75, at 166-67.

103. Internet Archive, *About the Internet Archive*, <http://www.archive.org/about/about.php> (last visited Apr. 22, 2010).

104. For example, for the Linux Foundation, which is supporting the development of the Linux operating system, it is uniquely and critically important to standardize the Linux system so that various applications can be built on it. *The Linux Found.*, *supra* note 90.

105. See, e.g., Apache Software Found., Bd. of Dirs., <http://www.apache.org/foundation/board/> (last visited Apr. 20, 2010) (noting that the responsibilities of ASF's board include managing fund, IP, and other corporate assets); Eclipse Found., *About the Eclipse Foundation: Services of the Foundation*, <http://www.eclipse.org/org/#IT> (last visited Apr. 20, 2010) (pointing out that the Eclipse Foundation's function includes holding and managing infrastructure resources, which are essential for F/OSS development).

#### **Footnote**

106. For example, the ASF identifies the primary infrastructure resources it provides as the Web-serving environment, the code repositories, the mail management environment, the issue/bug tracking, and the distribution mirroring system. Apache Software Found., *How the ASF Works: The Foundation Structure*, <http://www.apache.org/foundation/how-it-works.html#infrastructure> (last visited Apr. 22, 2010).

107. See, e.g., Goldman &Gabriel, *supra* note 31, at 55 (stating that "[e]ach [F/OSS] community will flourish or wither depending on how well its interests are met by community resources").

108. Telephone Interview with John Sullivan, Manager of Operations, Free Software Found. 1 (Apr. 4, 2008) (transcript on file with author).

109. Telephone Interview with Cliff Schmidt, Vice President of Legal Affairs, Apache Software Foundation 1 (Jul. 13, 2007) (transcript on file with author). See also Weber, *supra* note 94, at 111 (stating that ASF's incorporation is partly because of IP management and liability concerns).

110. Telephone Interview with David Ascher, Former Executive Vice President, Python Software Found. 1 (Aug. 8, 2007) (transcript on file with author). See also van Wendel de JooDE ET AL., *supra* note 78, at 84-85 (describing the same reason for the incorporation of the Python Software Foundation).

111. For example, the Eclipse Foundation has developed its own "committer agreement" and "IP approval process" to ensure that the contributed code is legally effective under its Eclipse Public License. See Eclipse Found., About the Eclipse Foundation: Intellectual Property (IP) Management, <http://www.eclipse.org/Org/#IPManagement> (last visited Apr. 20, 2010); Eclipse Found., Intellectual Property Policy, [http://www.eclipse.org/org/documents/Eclipse\\_IP\\_Policy.pdf](http://www.eclipse.org/org/documents/Eclipse_IP_Policy.pdf) (last visited Apr. 20, 2010). The Mozilla Foundation also enacted its licensing policies through a number of licensing agreements. See Mozilla, Mozilla Licensing Policies, <http://www.mozilla.org/foundation/licensing.html> (last visited Apr. 23, 2010). The history of the Python Software Foundation is closely related to the IP status of Python code. Currently, the Foundation is responsible for holding and managing code contributions. See David Ascher, The Python Software Foundation: A Primer, 0 Perl Rev. 5, 5-6, 8 (2002), available at <http://www.theperlreview.com/Articles/v0i2/psf.pdf>.

#### Footnote

112. The term was originally coined by Michael Heller, who analyzed the real property problem in the postsocialist economies of Eastern Europe. The tragedy takes place when multiple parties have an effective right to prevent others from using a given resource; therefore, no one has an effective right of use. See generally Heller, *supra* note 8, at 143-64; Heller, *supra* note 6, at 624-26. In the digital environment, the tragedy of the anticommons occurs when overlapping rights - of different rights holders - make it more expensive to secure a license to use online intellectual resources. See Mark A. Lemley, Dealing with Overlapping Copyrights on the Internet, 22 U. Dayton L. Rev. 547, 549, 567-72 (1997).

113. See Robert P. Merges, Locke for the Masses: Property Rights and the Products of Collective Creativity, 36 HoFSTRA L. Rev. 1179, 1187-88 (2008).

114. *Id.* at 1189-90. Cf. Tim Wu, On Copyright's Authorship Policy, 2008 U. Chi. Legal F. 335, 340-41 (2008) (arguing that having a centralized entity to manage copyrights for authors can limit transaction costs and anticommons problems).

115. See VAN Wendel DE Joode ET AL., *supra* note 78, at 83 (stating that the purpose of creating ASF is to own the copyright of the software).

116. Telephone Interview with John Sullivan, *supra* note 108, at 1, 2. See also VAN Wendel de Joode et al., *supra* note 78, at 80-81 (similarly describing FSF's role as copyright collector and enforcer).

117. See, e.g., Deek & McHugh, *supra* note 72, at 237; Richard Fontana et al., A Legal Issues Primer for Open Source and Free Software Projects 31 (2008), available at <http://www.softwarefreedom.org/resources/2008/foss-primer.pdf>; Telephone Interview with Jim Zimlin, Executive Dir., Linux Found. 1 (Aug. 17, 2007) (transcript on file with author); Ascher, *supra* note 111, at 8; Apache Software Found., ASF Trademark Policy, <http://apache.org/foundation/marks/> (last visited Apr. 20, 2010); The Linux Found., Legal Programs, <http://www.linuxfoundation.org/programs/legal> (last visited Apr. 22, 2010); Mozilla, *supra* note 111; Telephone Interview with Allison Randal, Member of the Bd. of Dirs., Perl Found. 1 (July 30, 2007) (transcript on file with author). See also Telephone Interview with Mike Milinkovich, Executive Dir., Eclipse Found. 2 (June 26, 2007) (transcript on file with author) (stating that with the formal organization, the Eclipse Foundation has gained brand recognition or name awareness); The Perl Found., Perl Trademark, [http://www.perlfoundation.org/perl\\_trademark](http://www.perlfoundation.org/perl_trademark) (stating that "[b]y helping us protect the Perl trademark, you help us protect the openness and integrity of the Perl language") (last visited Apr. 24, 2010). Lawrence Rosen recognizes that trademark has crucial value in F/OSS projects and can be owned by individuals or by for-profit firms. See Rosen, *supra* note 1, at 37-38, 92-93.

#### Footnote

118. Herbert A. Simon, Organizations and Markets, 5 J. Econ. Persp. 25, 36 (1991).

119. Telephone Interview with Brian Behlendorf, Cofounder and former President, Apache Software Foundation, Bd. Member, Mozilla Found. 2 (June 19, 2008) (transcript on file with author).

120. Telephone Interview with David J. Kappos, Vice President & Assistant Gen. Counsel, IBM 6-7 (Mar. 25,

2008) (transcript on file with author).

**Footnote**

121. See, e.g., Apache Software Found., Frequently Asked Questions - How Does the ASF Help Its Projects, <http://www.apache.org/foundation/faq.html#projects> (last visited Apr. 20, 2010); Fontana et al., supra note 1 17, at 13; see also Lohmann, supra note 76, at 68 ("In the American context, on-going associations of all types tend to be incorporated, because of . . . limits on participants' liability offered by incorporation."); Weber, supra note 94, at 1 1 1 (stating that the incorporation of ASF is "in part to enhance itself with a legal infrastructure that could manage patent and liability concerns"). Indeed, formal organizations can reduce legal risk for individual contributors. Nonetheless, these organizations cannot totally eliminate such risk. If a developer practices patented technology in the contribution, there is still legal liability for patent infringement. I thank one of the anonymous reviewers for making this point clear.

122. Telephone Interview with Brian Behlendorf, supra note 119, at 1-2, 7, 8. See also van Wendel de Joode et al., supra note 78, at 82-83 ("ASF serves the developers ... by protecting them against possible lawsuits from companies. . . . [T]he ASF provides the developers with insurance against legal action by companies and against patent infringement."); Catherine L. Fisk, Credit Where It's Due: The Law and Norms of Attribution, 95 GEO. L.J. 49, 91 (2006) (describing how the ASF bears potential liabilities for individual contributors).

123. Telephone Interview with Allison Randal, supra note 1 17, at 5.

124. Telephone Interview with John Sullivan, supra note 108, at 3.

**Footnote**

125. Software Freedom Conservancy, Overview, <http://conservancy.softwarefreedom.org/overview/> (last visited Apr. 23, 2010).

126. What the Software Freedom Conservancy provides to member projects is its organizational formality, which can shield individual developers from potential liability. See Software Freedom Conservancy, Mercurial Joins Software Freedom Conservancy: Retains Services of Software Freedom Law Center, Sept. 19, 2006, <http://conservancy.softwarefreedom.org/news/2006/sep/19/mercurial/>.

127. According to the Software Freedom Conservancy, "[t]he Conservancy is a tax-exempt 501(c)(3) organization, so member projects can receive tax-deductible donations to the extent permitted by law. The Conservancy files a single tax return that covers all of its member projects and handles other corporate and tax related issues on behalf of its members." Software Freedom Conservancy, Overview, <http://conservancy.softwarefreedom.org/overview/>.

128. Id.

129. The Perl Found., How TPF Works, [http://www.perlfoundation.org/how\\_tpf\\_works](http://www.perlfoundation.org/how_tpf_works) (last visited Apr. 24, 2010).

130. Of course, informal coordination mechanisms, such as individual or group leadership and social norms, are also very important for F/OSS communities. See Feller & Fitzgerald, supra note 73, at 91, 95-97; Kieff, supra note 68, at 355-59; Lerner & Tiróle, supra note 73, at 222.

131. See, e.g., Telephone Interview with Mike Milinkovich, supra note 117, at 3; Eclipse Found., About the Eclipse Foundation: Development Community Support, <http://www.eclipse.org/org/#IP%20Management> (last visited Apr. 20, 2010); The Perl Found., supra note 129.

132. Lerner & Tiróle, supra note 73, at 223; Weber, supra note 94, at 92, 110, 186-87.

133. See Apache Software Found., How the ASF Works, <http://apache.org/foundation/howit-works.html#pmc> (last visited Apr. 20, 2010).

134. Id.

**Footnote**

135. Telephone Interview with Brian Behlendorf, supra note 1 19, at 3.

136. The Perl Found., supra note 129.



137. The Linux Found., supra note 90.

138. For example, Microsoft has successfully made application-programming interfaces (APIs) an industry standard so that various applications can be built on the Windows system. See, e.g., Jyh-An Lee, *New Perspectives on Public Goods Production: Policy Implications of Open Source Software*, 9 VAND. J. Ent. & TECH. L. 45, 87 (2006).

139. Telephone Interview with Jim Zimlin, supra note 1 17, at 1.

140. Feller & Fitzgerald, supra note 73, at 121.

#### **Footnote**

141. See Lohmann, supra note 76, at 17-21; see also Boyle, supra note 20, at 195 (noting that a large number of commons production and sharing activities are nonprofit).

142. Boyle, supra note 20, at 58-59.

143. Raymond Dart, *Being "Business-Like" in a Nonprofit Organization: A Grounded and Inductive Typology*, 33 NONPROFIT & VOLUNTARY SECTOR Q. 290, 292 (2004).

144. See Paul J. DiMaggio & Walter W. Powell, *The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields*, 48 Am. Soc. Rev. 147, 148-50 (1983); see also DiMaggio & Anheier, supra note 37, at 144 (introducing the ecological approach to NPO studies, an approach claiming that the success of each organizational form is "determined by material and ideological environments"); Steven Rathgeb Smith & Kirsten A. Grønberg, *Scope and Theory of Government-Nonprofit Relations*, in THE NONPROFIT SECTOR: A RESEARCH Handbook 221, 235 (Walter W. Powell & Richard Steinberg eds., 2d ed. 2006) ("institutional theories stress that nonprofit organizations represent the choices of individuals that are in turn shaped by their institutional environment").

145. This is the general and theoretical link of NPOs and the commons environment. In the real world, however, as one of the anonymous reviewers wrote, it is possible that "the type of people who can run F/OSS projects well tend to favor the [nonprofit] structure over standard corporations." If that is the case, it would be interesting to find out why these people favor nonprofit structures over for-profit ones. This section will provide some possible answers to that question.

#### **Footnote**

146. See Feller & Fitzgerald, supra note 73, at 143, 161; Tapscott & Williams, supra note 73, at 81, 83 (using G?? as an example to explain that proprietary ownership of IP is against the norms in F/OSS communities); see also Sunstein, supra note 69, at 153-54 (noting that authorship over Wikipedia content is never claimed or rewarded).

147. Zittrain, supra note 75, at 189. Cf. Heverly, supra note 16, at 1184 ("certain individual attributes of information cannot be owned"). Even if in some projects, such as the Apache, it is possible to accurately identify the ownership status of F/OSS, the identifying process still involves a significant amount of transactional costs. I thank one of the anonymous reviewers for making this point clear.

148. James Leach, *Modes of Creativity and the Register of Ownership*, in CODE: COLLABORATIVE OWNERSHIP AND THE DIGITAL ECONOMY 29, 38 (Rishab Aiyer Ghosh ed., 2005); VAN WENDEL DE JOODE ET AL., supra note 78, at 21.

149. VAN WENDEL DE JOODE ET AL., supra note 78, at 21; Yochai Benkler & Helen Nissenbaum, *Commons-Based Peer Production and Virtue*, 14 J. Pol. PHIL. 394, 395-96 (2006). See also Lessig, supra note 75, at 157 (describing one of the norms underlying the Wikipedia community as "nobody owned Wikipedia exclusively"); Clay Shirky, *Here Comes EVERYBODY: THE POWER OF ORGANIZING WITHOUT ORGANIZATIONS* 50 (2008) ("The litmus test for collaborative production is simple: no one person can take credit for what gets created . . .").

150. DEEK & MCHUGH, supra note 72, at 212; Lessig, supra note 75, at 240-41.

151. Frumkin, supra note 37, at 5, 8, 14, 16.

152. John Simon et al., *supra* note 42, at 268; Weisbrod; *supra* note 39, at 73.
153. Frumkin, *supra* note 37, at 14. Frumkin also refers to NPOs' character as "ownerless character." See *id.* at 58, 62, 87.
154. *Id.* at 87.
155. *Id.* at 5. But see Hansmann, *supra* note 39, at 561-62 (describing the scenario where NPOs are controlled by their patrons).
156. Deek &McHugh, *supra* note 72, at 225 (stating that contributors of the Linux and Apache projects are copyright owners of their contribution); Frumkin, *supra* note 37, at 7 (noting that only certain parties have legal standing for NPOs in the court); Cahir, *supra* note 15, at 63940 (recognizing the *de jure* owners of the commons); Fisk, *supra* note 122, at 89 (recognizing the ownership of F/OSS); Leach, *supra* note 148, at 38 (noting that in the Linux operating system, each contributor owns her or his contribution); Merges, *supra* note 113, at 1181, 1189 (recognizing that G? ownership belongs to Wikipedians and F/OSS communities); Samuelson, *supra* note 31, at 799 (noting that authors of F/OSS can invoke IP protection); Steinberg, *supra* note 38, at 118 (perceiving NPOs' board members as owners with rights less than usual ownership); Wu, *supra* note 114, at 337, 342, 344, 348 (acknowledging the fact that F/OSS and Wikipedia content are copyrighted).

#### Footnote

157. Some may raise the issue that when an NPO is assigned the IP rights collectively by the community, this organization is able to exert exclusive control over such rights. However, via licensing terms, such as the F/OSS licenses, an NPO is not able to control the IP rights exclusively as for-profits would do in the proprietary world.
158. Telephone Interview with Brian Behlendorf, *supra* note 119, at 9.
159. *Id.* at 1-2. According to Behlendorf, this rationale also can be applied to the nonprofit status of Mozilla Foundation. *Id.* at 10 ("when you're building something that is intended to be a public resource ... it seems like a nonprofit structure is the best way to go").
160. See, e.g., CHRISTINE HAROLD, OURSPACE: RESISTING THE CORPORATE CONTROL OF CULTURE 136-37 (2007); TAPSCOTT & WILLIAMS, *supra* note 73, at 26-27; see also Markoff, *supra* note 40 (discussing the tension between information sharing and profit incentivizing in Silicon Valley).
161. See Goldstein, *supra* note 70, at 193 (describing the fact that source code is regarded "as a company's 'crown jewels'" in the software industry).
162. See Richard M. Stallman, The GNU Project, in FREE SOFTWARE, FREE SOCIETY: SELECTED ESSAYS OF RICHARD M. STALLMAN 17, 17 (Joshua Gay ed., 2002), available at <http://www.gnu.org/philosophy/fsfs/rms-essays.pdf>.
163. See *id.* at 17; Richard M. Stallman, Why Software Should Not Have Owners, in FREE SOFTWARE, FREE SOCIETY: SELECTED ESSAYS OF RICHARD M. STALLMAN 45, 46-47 (Joshua Gay ed., 2002), available at <http://www.gnu.org/philosophy/fsfs/rms-essays.pdf>.

#### Footnote

164. Stallman, *supra* note 162, at 21-22.
165. According to Raymond, FSF stands for the anticommercial ideology in the F/OSS movement. However, there is another group of pragmatists in the movement that is more open to various commercial applications of F/OSS and relationships with the business world. Even for the typical pragmatists, certain concerns with proprietary firms still exist, and pragmatists' attitude is "moderately anticommercial." Eric S. Raymond, Homesteading the Noosphere, *First Monday*, Oct. 5, 1998, <http://firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/article/view/621/542>.
166. O'Mahony, *supra* note 46, at 394.
167. See, e.g., BOLLIER, *supra* note 8, at 27; Eric von Hippel & Georg von Krogh, Open Source Software and the "Private-Collective" Innovation Model: Issues for Organization Science, 14 *Org. Sci.* 209, 209-10 (2003).
168. Helen Nissenbaum, Hackers and the Contested Ontology of Cyberspace, 6 *NEW MEDIA & Soc'y* 195, 197

(2004); see also STEVEN LEVY, HACKERS: HEROES OF THE COMPUTER REVOLUTION 40-41 (1984); Weber, *supra* note 94, at 144.

169. Eric S. Raymond, *The Cathedral and the Bazaar: Musings on Linux and Open Source by an Accidental Revolutionary* 115-16 (2001). But see Richard Steinberg & Walter W. Powell, Introduction, in *The Nonprofit Sector: A Research Handbook* 1, 4 (Walter W. Powell & Richard Steinberg eds., 2d ed. 2006) (asserting that the gift perceived by anthropologists is not always about purely giving things away for free, but occasionally contains the meaning of obligation or hostility).

170. See, e.g., Lessig, *supra* note 75, at 151-54; Shirky, *supra* note 149, at 131-33, 258; Tapscott & Williams, *supra* note 73, at 288; Fisk, *supra* note 122, at 89-90; Lastowka, *supra* note 28, at 58-62; Lee, *supra* note 138, at 79; David W. Opperbeck, *The Penguin's Paradox: The Political Economy of International Intellectual Property and the Paradox of Open Intellectual Property Models*, 18 *Stan. L. & Pol'y Rev.* 101, 126 (2007); Quiggin & Hunter, *supra* note 73, at 219-20, 227-29. See also Bollier, *supra* note 8, at 41 (interpreting one's self interest broadly).

171. Duran Bell, *Modes of Exchange: Gift and Commodity*, 20 *J. SOCIO-ECON.* 155, 163 (1991); see also Bollier, *supra* note 8, at 187 (arguing that the commons "is not as intent on achieving the maximum 'throughput' of production and sales"). Cf. Lessig, *supra* note 75, at 119 ("Money in the sharing economy is not just inappropriate; it is poisonous").

#### **Footnote**

172. Goldman & Gabriel, *supra* note 31, at 38; see also Lessig, *supra* note 75, at 174 (introducing the concept of reciprocity based on Peter Kollock's work).

173. See, e.g., Benkler & Nissenbaum, *supra* note 149, at 407-08 (noting the "gift culture" underlying commons-based peer production projects); Bollier, *supra* note 8, at 40 ("gift exchange is a powerful force in creating and sustaining the commons").

174. See, e.g., SUNSTEIN, *supra* note 69, at 157, 222.

175. See Quiggin & Hunter, *supra* note 73, at 230 (describing the conflicts between gift motives and profit motives).

176. See, e.g., Benkler & Nissenbaum, *supra* note 149, at 399<sup>100</sup>; Lessig, *supra* note 75, at 192-93; Shirky, *supra* note 149, at 33-39.

177. See Sendmail Consortium, *Welcome to Sendmail.org*, <http://www.sendmail.org/> (last visited June 4, 2010).

178. Mozilla, *What Is Mozilla?*, <http://www.mozilla.com/en-US/about/whatismozilla.html> (last visited Apr. 23, 2010).

179. Telephone Interview with Frank Hecker, *supra* note 95, at 4.

180. *Id.* at 4-5.

#### **Footnote**

181. Wikipedia, *Open Directory Project*, [http://en.wikipedia.org/w/index.php?title=Open\\_Directory\\_Project&oldid=93810243](http://en.wikipedia.org/w/index.php?title=Open_Directory_Project&oldid=93810243) (last visited Apr. 24, 2010).

182. Open Directory Project, *About the Open Directory Project*, <http://dmoz.org/about.html> (last visited Apr. 23, 2010).

183. See *id.*

184. Section 1 of the Open Directory License provides: "Netscape grants you a nonexclusive, royalty-free license to use, reproduce, modify and create derivative works from, and distribute and publish the Open Directory and your derivative works thereof, subject to all of the terms and conditions of this Open Directory License." Open Directory Project, *Open Directory License*, <http://www.dmoz.org/license.html> (last visited June 4, 2010).

185. Benkler, *supra* note 10, at 440. Cf. Lessig, *supra* note 75, at 239 (documenting Brewster Kahle's point that

communities will feel betrayed if the project hosts go into commercialization and the commons are therefore taken away).

186. Project Gutenberg 2 Raises Some Hackles, <http://yro.slashdot.org/article.pl?sid=04/03/17/0254241> (Mar. 17, 2004, 05:29).

187. Id. ; David Rothman, Mt. Hart Erupts in Hawaii, We Reply, Kentucky Fried PG Debate Gets Slashdotted, TeleRead: Bring THE E-Books Home, Mar. 17, 2004, <http://www.teleread.org/2004/03/17/mt-hart-erupts-in-hawaii-we-reply-kentucky-fried-pg-debate-gets-slashdotted/>.

188. Rothman, *supra* note 187.

189. Telephone Interview with Greg Newby, CEO, Project Gutenberg Literary Archive Found. 5 (May 5, 2008) (transcript on file with author).

#### Footnote

190. Id. at 6-7. See also Project Gutenberg, Gutenberg: The Project Gutenberg License, [http://www.gutenberg.org/wiki/Gutenberg:The\\_Project\\_Gutenberg\\_License](http://www.gutenberg.org/wiki/Gutenberg:The_Project_Gutenberg_License) (last visited Apr. 20, 2010).

191. Lessig, *supra* note 75, at 161 (describing the Wikimedia Foundation's significant decision not to run ads that would have supported the underlying project).

192. Shirky, *supra* note 149, at 273-74.

193. Interview with Michael Godwin, Gen. Counsel, Wikipedia Found., in S. F., Cal. 5 (Mar. 10, 2008) (transcript on file with author).

194. Id. at 3.

195. Of course, there are a lot more stories about how commons communities oppose the commercial exclusion of the shared resources. For example, Lessig describes how Gracenote CD database lost its contributors because of the commercial licensing of access to the database. See Lessig, *supra* note 75, at 237-40.

#### Footnote

196. See Kevin C. Robbins, The Nonprofit Sector in Historical Perspective: Traditions of Philanthropy in the West, in THE NONPROFIT SECTOR: A RESEARCH HANDBOOK 13, 17-19 (Walter W. Powell & Richard Steinberg eds., 2d ed. 2006).

197. See, e.g., Lise Vesterlund, Why Do People Give?, in THE NONPROFIT SECTOR: A RESEARCH HANDBOOK 568 (Walter W. Powell & Richard Steinberg eds., 2d ed. 2006); LOHMANN, *supra* note 76, at 11-12, 67.

198. TAPSCOTT & WILLIAMS, *supra* note 73, at 67, 69.

199. O'Mahony, *supra* note 46, at 396-97; see also Lerner & Tiróle, *supra* note 73, at 220 (stating that "[a] successful open source project . . . requires . . . an organization consistent with the nature of the process").

200. See, e.g., LOHMANN, *supra* note 76, at 196-214 (discussing volunteer labor in the nonprofit context); WALDEMAR A. NIELSEN, THE THIRD SECTOR: KEYSTONE OF A CARING SOCIETY 5 (1980) (arguing that NPOs provide "outlets for . . . altruism"); John H. Goddeeris & Burton A. Weisbrod, Conversion from Nonprofit to For-profit Legal Status: Why Does It Happen and Should Anyone Care?, in TO PROFIT OR NOT TO PROFIT: THE COMMERCIAL TRANSFORMATION OF THE NONPROFIT SECTOR 129, 134 (Burton A. Weisbrod ed., 1998); Laura Leete, Work in the Nonprofit Sector, in THE NONPROFIT SECTOR: A RESEARCH HANDBOOK 159, 166-67 (Walter W. Powell & Richard Steinberg eds., 2d ed. 2006); Smith & Grønberg, *supra* note 144, at 225. See also Kevin E. Davis, The Role of Nonprofits in the Production of Boilerplate, 104 MICH. L. REV. 1075, 1094-95, 1098-99 (2006) (discussing NPOs' superior access to voluntary contract drafting resources); Telephone Interview with Brian Behlendorf, *supra* note 119, at 6 ("being a nonprofit certainly made it easier to ask for . . . contributions").

201. Telephone Interview with John Sullivan, *supra* note 108, at 5.

202. Telephone Interview with Greg Newby, *supra* note 189, at 4.

#### Footnote

203. See *infra* note 214 and accompanying text.
204. Benkler suggested that "individuals would be more willing to contribute their time and effort to ... a nonprofit enterprise than to a debugging site set up by Microsoft." Benkler, *supra* note 10, at 440.
205. FRUMKIN, *supra* note 37, at 3.
206. Interview with Michael Godwin, *supra* note 193, at 2, 4-5.
207. See *supra* Part III.B.
208. The Perl Found., Grant Benefits, [http://www.perlfoundation.org/grant\\_benefits](http://www.perlfoundation.org/grant_benefits) (last visited Apr. 24, 2010).
209. The Linux Found., *supra* note 117; TAPSCOTT & WILLIAMS, *supra* note 73, at 70.

#### Footnote

210. See The Linux Found., *supra* note 117 (stating that developers financially supported by the Linux Foundation "can maintain independence while working full time to improve Linux").
211. The Perl Found., *supra* note 208.
212. WEBER, *supra* note 94, at 1 10.
213. *Id.*
214. Paul Krill, Eclipse: The Billion-Dollar Baby?, INFO WORLD, Sept. 18, 2006, [http://www.infoworld.com/article/06/09/18/38NMmain\\_1.html](http://www.infoworld.com/article/06/09/18/38NMmain_1.html).
215. See, e.g., Quiggin & Hunter, *supra* note 73, at 218-19.
216. Professor Lessig reaches the same conclusion after analyzing the success of Red Hat. See Lessig, *supra* note 75, at 183 ("So long as the work was not turned proprietary - so long as the code remained 'free' in the sense of freedom - neither Stallman nor Linus Torvalds was going to object.") (citation omitted) (internal quotation marks omitted).
217. Lee, *supra* note 77, at 1503 (user-generated content "is typically noncommercial at least in this sense: it is all free").
218. BOLLIER, *supra* note 8, at 38.
219. This argument is not meant to suggest that no NPOs will be influenced by commercial power. Compared to for-profits, NPOs are usually in a more neutral position in terms of the governance of contributions.

#### Footnote

220. Bell, *supra* note 171, at 156 (emphasis omitted); see also Lessig, *supra* note 75, at 145 (noting that the access to culture in the sharing economy "is regulated not by price, but by a complex set of social relations"), 148 ("Gifts . . . are . . . devices for building connections with people.").
221. BOLLIER, *supra* note 8, at 31. See also David Bollier, The Growth of the Commons Paradigm, in UNDERSTANDING KNOWLEDGE AS A COMMONS: FROM THEORY TO PRACTICE 27, 29 (Charlotte Hess & Elinor Ostrom eds., 2007); (arguing that the commons is "a social solidarity with each other"). Cf. Brett M. Frischmann, Cultural Environmentalism and The Wealth of Networks, 74 U. CHI. L. REV. 1083, 1125 (2007) (noting that in the digitally networked environment, "users develop meaningful associations with others that may coalesce in groups, communities, and social networks").
222. Leach, *supra* note 148, at 38-39.
223. *Id.* at 39.
224. GOLDMAN & GABRIEL, *supra* note 31, at 64. See also LOHMANN, *supra* note 76, at 129 ("people would organize a commons [because] they wish to associate with one another for some particular reason").
225. GOLDMAN & GABRIEL, *supra* note 31, at 52; ERIC VON HIPPEL, DEMOCRATIZING INNOVATION 165 (2005); Capek et al., *supra* note 73, at 253; Sonali K. Shah, Open Beyond Software, in OPEN SOURCES 2.0: THE CONTINUING REVOLUTION 339, 343 (Chris DiBona et al. eds., 2006).
226. FELLER & FITZGERALD, *supra* note 73, at 150-51.
227. Bollier, *supra* note 31, at 1; LOHMANN, *supra* note 76, at 61-62; Allen K. Yu, Enhancing Legal Aid Access Through an Open Source Commons Model, 20 HARV. J. L. & TECH. 373, 374 (2007); see also Ostrom & Hess,

supra note 14, at 43<sup>4</sup> (noting that "successful commons governance requires an active community").

228. See GOLDMAN & GABRIEL, supra note 31, at 52-53; see also Capek et al., supra note 73, at 253 (noting the importance of the community to the F/OSS idea); FELLER & FITZGERALD, supra note 73, at 161 (stating that "[t]he [F/]OSS movement is often portrayed as highly community-centered"); Schweik, supra note 31, at 284-86 (describing F/OSS projects' community attributes); Shirky, supra note 149, at 278; Interview with Michael Godwin, supra note 193. But see Lessig, supra note 75, at 180 (documenting an interview with Robert Young who said that regarding free software, "there's no such thing as a community. It's simply a bunch of people with a common interest.").

#### Footnote

229. See generally David Zeitlyn, Gift Economies in the Development of Open Source Software: Anthropological Reflections, 32 RES. POL'Y 1287 (2003). Cf. BENKLER, WEALTH OF NETWORKS, supra note 15, at 50-51 (describing "[m]usic in the nineteenth century [as] a relational good").
230. Kieff, supra note 68, at 357; see also Yochai Benkler, Sharing Nicely: On Sharable Goods and the Emergence of Sharing as a Modality of Economic Production, 114 YALE L.J. 273, 282 (2004) (arguing that "non-price-based social relations play" the role of providing information and incentive for resource allocation in the sharing economy). Cf. Madhavi Sunder, IP3, 59 STAN. L. REV. 257, 324 n.370 (proposing a cultural approach to G? laws that takes into account the relationship between individuals and communities).
231. Bollier, supra note 31, at 5. Cf. LEWIS HYDE, THE GIFT: IMAGINATION AND THE EROTIC LIFE OF PROPERTY 56 (Vintage Books 2004) (1979) (noting that "a gift establishes a feeling-bond between two people" whereas "disconnectedness" is the characteristic of the commodity economy).
232. Cf. BOLLIER, supra note 8, at 32 ("Relationships in a market are impersonal, episodic, and based on monetary gain."), 179-80 (discussing the conflicts between transacting shares of a for-profit and "the organic integrity of the community"); Lessig, supra note 75, at 120-21 (arguing that the currency in commercial economies is money); ZITTRAIN, supra note 75, at 145 ("Wikipedia shows us a model for interpersonal interaction that goes beyond the scripts of customer and business."); Bernard Enjolras, Coordination Failure, Property Rights and Non-Profit Organizations, 71 ANNALS PUB. & COOPERATIVE ECON. 347, 352 (2000) (stating that transactions involving personal links, gifts, and voluntary work are not coordinated by the market-price mechanism); Quiggin & Hunter, supra note 73, at 231 ("[P]eople act differently, and are expected to act differently in relationships mediated by money as opposed to relationships in other social contexts.").
233. Michael A. Heller, The Dynamic Analytics of Property Law, 2 THEORETICAL INQUIRIES L. 79, 87-88 (2001).
234. See, e.g., Ben-Ner & Gui, supra note 39, at 16 (arguing that NPOs have created better personal relationships among stakeholders than for-profits); Douglas, supra note 58, at 43 (citing the Wolfenden Committee's 1978 report about voluntary organizations).
235. Ben-Ner & Gui, supra note 39, at 14-16; see also Lohmann, supra note 76, at 58 ("memberships in (and presumably the benefits of) different types of voluntary organizations are not interchangeable").

#### Footnote

236. Ben-Ner & Gui, supra note 39, at 19.
237. FRUMKIN, supra note 37, at 44.
238. Id. at 32, 45.
239. Id. at 29.
240. Karen S. Cook et al., Cooperation Without Trust? 176 (2005).
241. Telephone Interview with Brian Behlendorf, supra note 119, at 9.
242. In making this argument, I am aware that some F/OSS communities are developed or hosted by for-profit firms. For example, Sun Microsystems hosts the Jini and the NetBeans communities. See GOLDMAN & GABRIEL, supra note 31, at 55-59. Oracle acquired Sleepycat, a F/OSS database company, and, thus, hosts

the Berkeley DB community. See Waters, *supra* note 73, at 27. Drawing from several successful examples, Professor Lessig describes how for-profits can build communities in the sharing economy. Lessig, *supra* note 75, at 179-224.

243. BRIAN E. DOLLERY & JOE L. WALLIS, *THE POLITICAL ECONOMY OF THE VOLUNTARY SECTOR: A REAPPRAISAL OF THE COMPARATIVE INSTITUTIONAL ADVANTAGE OF VOLUNTARY ORGANISATIONS* 9, 14-15 (2003).

244. Hansmann, *supra* note 38, at 850, 869.

#### **Footnote**

245. *Id.* at 846<sup>18</sup>; Hansmann, *supra* note 39, at 505-07.

246. Hansmann, *supra* note 38, at 846<sup>48</sup>.

247. Hansmann, *supra* note 39, at 505.

248. Hansmann, *supra* note 38, at 843-44, 850; Hansmann, *supra* note 39, at 505. See also WEISBROD, *supra* note 38, at 30 (noting that the "informational handicap" resulting from proprietary firms' nature may reduce donors' willingness to deal with these organizations).

249. Hansmann, *supra* note 38, at 846-48. But see Steve E. Permut, *Consumer Perceptions of Nonprofit Enterprise: A Comment on Hansmann*, 90 *YALE L.J.* 1623 (1981) (arguing that the nondistribution constraint does not significantly increase consumer confidence in the trustworthiness of NPOs).

250. Hansmann, *supra* note 38, at 850-51.

251. *Id.* at 850.

252. *Id.* at 850-51.

253. Although Hansmann acknowledges that NPOs may distribute their earnings by overcompensating their employees to some extent, he asserts that, in some circumstances, the NPOs still cause fewer inefficiency-based losses than do their for-profit counterparts. *Id.* at 844<sup>15</sup>. In actuality, agency costs rise when NPOs and their officials do not honestly follow their donors' expectations. See PAUL MILGROM & JOHN ROBERTS, *ECONOMICS, ORGANIZATION, AND MANAGEMENT* 524 (1992) (describing scandals from NPOs, including the Red Cross, Christian evangelists' PTL organization, the Covenant House, and Stanford University); see also Davis, *supra* note 200, at 1089 (describing the potential agency costs resulting from NPOs' inability to hold their agents accountable); Steinberg, *supra* note 38, at 126-27 (identifying a number of NPO-associated agency costs as "voluntary failure").

254. Hansmann, *supra* note 38, at 845.

#### **Footnote**

255. See WEBER, *supra* note 94, at 178. For example, HP released code to the Linux community. Lerner & Tiróle, *supra* note 73, at 225. IBM donates code to the Apache projects. WEBER, *supra* note 94, at 125. Sun released its source code for the Solaris operating system. Extreme Overclocking Forums, Sun Announces Open Source License for Solaris Operating System, <http://forums.extremeoverclocking.com/showthread.php?t=154012> (last visited June 4, 2010).

In fact, for-profits' strategic donation to NPOs are quite common in various nonprofit scenarios. See, e.g., DiMaggio & Anheier, *supra* note 37, at 146; Joseph Galaskiewicz & Michelle Sinclair Colman, *Collaboration Between Corporations and Nonprofit Organizations*, in *THE NONPROFIT SECTOR: A RESEARCH HANDBOOK* 180, 189-91 (Walter W. Powell & Richard Steinberg eds., 2d ed. 2006).

256. See, e.g., Ascher, *supra* note 111, at 5 (noting that without a legal entity, the Python community cannot have its own bank account).

257. For example, the ASF has made it clear that "[t]he Foundation was formed primarily to . . . create an independent legal entity to which companies and individuals can donate resources . . ." Apache Software Found., *Frequently Asked Questions - Why Was the Apache Software Foundation Created?*, <http://www.apache.org/foundation/faq.html> (last visited Apr. 20, 2010). The history of the Python Software

Foundation is also related to obtaining financial backing for Python development. Ascher, *supra* note 111, at 5, 8. Beyond the F/OSS realm, the Wikimedia Foundation was incorporated to "enable people to give charitable donations to [the Wikipedia Project] more easily." Interview with Michael Godwin, *supra* note 193, at 1. The Project Gutenberg Foundation was also established for the purpose of receiving donations. Telephone Interview with Greg Newby, *supra* note 189, at 1.

258. O'Mahony, *supra* note 46, at 396-97.

259. For example, the ASF states that the donated "resources will be used for the public benefit." Apache Software Found., *supra* note 257.

260. KENNETH J. ARROW, *THE LIMITS OF ORGANIZATION* 26 (1974).

261. FRUMKIN, *supra* note 37, at 31.

#### **Footnote**

262. The term peer production has been popularized by Professor Yochai Benkler. He defines peer production as "production systems that depend on individual action that is selfselected and decentralized, rather than hierarchically assigned." BENKLER, *WEALTH OF NETWORKS*, *supra* note 15, at 62. In other words, peer production represents "a process by which many individuals, whose actions are coordinated neither by managers nor by price signals in the market, contribute to a joint effort that effectively produces a unit of information or culture." Benkler, *Freedom in the Commons*, *supra* note 15, at 1256. See also TAPSCOTT & WILLIAMS, *supra* note 73, at 11 (defining peer production as the phenomenon wherein "masses of people and firms collaborate openly to drive innovation and growth in their industries"). Other scholars may use different terms to denote similar concepts. For example, Feller and Fitzgerald use "parallel development" to refer to "the practice of individual (or small groups of) developers working on one aspect of a large system at the same time that other individuals (or groups) work on another aspect of the same system." FELLER & FITZGERALD, *supra* note 73, at 85. Tapscott and Williams use "peer production" and "mass collaboration" interchangeably. TAPSCOTT & WILLIAMS, *supra* note 73, at 297. Cooper and Shirky use "collaborative production" to denote the same phenomenon. Cooper, *supra* note 3, at 126; SHIRKY, *supra* note 149, at 109.

263. See *supra* Part III.B.

264. See, e.g., Bollier, *supra* note 31, at 7; Yu, *supra* note 227, at 376.

265. Benkler, *Freedom in the Commons*, *supra* note 15, at 1253-56; see also Benkler, *supra* note 10, at 440 (noting that individuals are more willing to contribute to an NPO than to Microsoft).

266. Benkler, *supra* note 10, at 375-77; TAPSCOTT & WILLIAMS, *supra* note 73, at 18, 6869. See also Cooper, *supra* note 3, at 146-147, 149-50, 152-53 (illustrating the efficiency resulted from F/OSS processes); FELLER & FITZGERALD, *supra* note 73, at 88 (stating that F/OSS development eliminates similar obstacles stemming from organizational boundaries in the traditional software-development arena).

267. Benkler, *supra* note 10, at 403.

#### **Footnote**

268. See *supra* notes 105-36 and accompanying text. See also BOYLE, *supra* note 20, at 204 (noting the coordination problem in the commons sphere); SHIRKY, *supra* note 149, at 53 ("Collective action involves challenges of governance"); TAPSCOTT & WILLIAMS, *supra* note 73, at 70-71 (pointing out that to be sustainable, peer-production communities need leadership, coordination mechanism, rules for cooperation, and ways of continuously motivating contribution); Schweik, *supra* note 31, at 298 ("[T]he design of governance structure is a critical factor in determining whether the commons can be 'long-enduring.'"); Wu, *supra* note 114, at 345 (acknowledging the cost of coordination between actors in an open or collaborative system).

269. See *supra* notes 105-36 and accompanying text.

270. FELLER & FITZGERALD, *supra* note 73, at 79.

271. Mann, *supra* note 74, at 21.

272. McGowan, *supra* note 31, at 245, 278-79 n.189; Weber, *supra* note 94, at 175.



273. Kieff, *supra* note 68, at 345 (defining coordination as "the process by which many diverse individuals interact with each other for a particular activity to be achieved effectively"). See also BOYLE, *supra* note 20, at 186 (admitting the fact that distributed production still needs centralized coordination and governance); Ostrom & Hess, *supra* note 14, at 49 (highlighting F/OSS communities' high degree of coordination).

274. BENKLER, WEALTH OF NETWORKS, *supra* note 15, at 33; Benkler, *supra* note 10, at 379-80; Benkler & Nissenbaum, *supra* note 149, at 401-02; Cooper, *supra* note 3, at 153; Fisk, *supra* note 122, at 88-89; Kieff, *supra* note 68, at 355-59.

275. McGowan, *supra* note 31, at 286.

276. See generally R.H. Coase, The Nature of the Firm, 4 *ECONOMICA* 386 (1937).

#### **Footnote**

277. See FONTANA ET AL., *supra* note 117, at 13 (stating that the formal organization provides continuity to an F/OSS project regardless of whether individual contributors stay or leave); Lohmann, *supra* note 76, at 130 (noting that less formal interaction with a commons community may be problematic in the absence of community leaders). Behlendorf expressed a similar idea in an interview regarding the incorporation of the ASF. Telephone Interview with Brian Behlendorf, *supra* note 119, at 2 ("We started to realize that with any project like this that was going to be successful, we needed to have some sort of credible story about how it was going to outlive its participants, the original founders. And also we wanted to provide a reassurance to the public that this wasn't something that we were all just going to get tired of one day and go do other things. There would be some sort of a continuance of it.").

278. See W. RICHARD SCOTT, ORGANIZATIONS: RATIONAL, NATURAL, AND OPEN SYSTEMS 24-25 (5th ed. 2003) (introducing the durability capability of all organizations).

279. Hess & Ostrom, *supra* note 21, at 5; see also Ostrom & Hess, *supra* note 14, at 43 (noting that the "[e]ffective design [of commons institutions] requires successful collective action and self-governing behaviors"); ZITTRAIN, *supra* note 75, at 143 ("Wikipedia - with the cooperation of many Wikipedians - has developed a system of self-governance").

280. FELLER & FITZGERALD, *supra* note 73, at 44-46 (identifying the ASF, the GNOME, and the Python Software Foundation as coordinators for F/OSS projects). Cf. Enjolras, *supra* note 232, at 355-56 ("organization may be defined as a governance mechanism i.e. a hierarchical and complex mechanism for coordinating and motivating individual's activities").

281. See *supra* notes 79-82 and accompanying text. See also FELLER & FITZGERALD, *supra* note 73, at 44 (noting the fact that small- and medium-scale F/OSS projects are usually hosted by individuals or informal groups).

282. See Baker, *supra* note 95, at 12 (describing the Mozilla experience concerning the right time to create an NPO for the Mozilla project).

283. See *supra* notes 274-79 and accompanying text. Behlendorf similarly stated that the incorporation of the ASF is related to the fact that the Apache project was "quickly growing larger than what a single development project could handle, just in terms of the number of developers, the size of the web server project." Telephone Interview with Brian Behlendorf, *supra* note 119, at 2. Cf. SHIRKY, *supra* note 149, at 275 ("the more members have to interact with one another . . . the more complex the rules governing their relations have to be").

#### **Footnote**

284. Telephone Interview with Cliff Schmidt, *supra* note 109, at 5.

285. Ostrom & Hess, *supra* note 14, at 44.

286. Telephone Interview with Mike Milinkovich, *supra* note 117, at 1-2.

287. Mann, *supra* note 74, at 12.

288. Michael Olson, Dual Licensing, in *OPEN SOURCES 2.0: THE CONTINUING REVOLUTION* 71, 71, 75 (Chris DiBona et al. eds., 2006).

289. Mann, *supra* note 74, at 12.

290. Wikipedia, Sleepycat Software, [http://en.wikipedia.org/wiki/Sleepycat\\_Software](http://en.wikipedia.org/wiki/Sleepycat_Software) (last visited June 4, 2010).

291. Telephone Interview with Keith Bostic, Architect, Oracle Corp. (June 19, 2007). Bostic also stated that after the incorporation, probably only five developers were outside of the employee group.

**Footnote**

292. 1. R. C. §501(c)(6) (2006); see *supra* note 48 and accompanying text.

293. See *supra* Part III.A.

294. See, e.g., Eclipse Found., About the Eclipse Foundation: What Is Eclipse and the Eclipse Foundation, <http://www.eclipse.Org/org/#about> (last visited Apr. 20, 2010); Telephone Interview with Mike Milinkovich, *supra* note 1 17, at 1 .

295. See, e.g., Samuelson, *supra* note 73, at 24 (noting that IBM shares the expenses of building F/OSS infrastructure resources with other companies, such as Nokia, Intel, and Hotachi); see also Lim, *supra* note 73, at 325 (noting that "open source solutions like Linux provide the basic infrastructure on which software developers can build applications and businesses"); Telephone Interview with Jim Zimlin, *supra* note 1 17, at 2 (stating that "[the Linux standard base is] really something you need to have in order to compete with Windows, which does have [a standard. Businesses build the Linux standard base] collectively, rather than individually.").

296. Mann, *supra* note 74, at 1 1 ; Telephone Interview with Jim Zimlin, *supra* note 1 17, at 2.

297. Telephone Interview with Jim Zimlin, *supra* note 1 17, at 1,2.

298. Mann, *supra* note 74, at 24-25. See also TAPSCOTT & WILLIAMS, *supra* note 73, at 84, 91 (noting that F/OSS, such as Linux, Apache, and Perl/PHP, is perceived as a foundation for business development); Hansmann, *supra* note 39, at 557 (stating that trade association activities "are public goods so far as members of the trade are concerned").

**Footnote**

299. Mann, *supra* note 74, at 11, 23. Cf. Hansmann, *supra* note 39, at 557 (the nonprofit form of trade association gives its members "more assurance that their contributions are being used exclusively for their benefit").

300. Telephone Interview with Jim Zimlin, *supra* note 1 17, at 2.

301. Mann, *supra* note 74, at 23-26.

302. *Id.* at 25.

303. See Ben-Ner & Gui, *supra* note 39, at 7-8 (explaining how the demand revelation occurs in certain NPO scenarios); Enjolras, *supra* note 232, at 362 (noting that NPOs are superior to the government "in terms of demand revelation").

304. Telephone Interview with David J. Kappos, *supra* note 120, at 1-2, 3.

305. See Ben-Ner & Gui, *supra* note 39, at 16; see also Hansmann, *supra* note 39, at 557 (noting that the nonprofit form of trade association provides its members with "the opportunity to communicate with each other relatively easily").

**Footnote**

306. See, e.g., DOLLERY & WALLIS, *supra* note 243, at 9, 167. See also FRUMKIN, *supra* note 37, at 67, 69, 70 (introducing the "contract failure theory" based on the concept of trust); Enjolras, *supra* note 232, at 359 (noting that Hansmann's main point is that NPOs are more trustworthy than for-profits).

307. See, e.g., Andreas Ortmann & Mark Schlesinger, Trust, Repute, and the Role of Nonprofit Enterprise, in THE STUDY OF THE NONPROFIT ENTERPRISE: THEORIES AND APPROACHES 77, 78-79 (Helmut Anheier & Avner Ben-Ner eds., 2003).

308. Hansmann, *supra* note 38, at 896.

309. Cf. Kenneth J. Arrow, Uncertainty and the Welfare Economics of Medical Care, 53 AM. ECON. REV. 941, 965 (1963) (observing that in medical care, "[t]he very word, 'profit,' is a signal that denies the trust relations");

Enjolras, *supra* note 232, at 353 ("The potential trustor's] .... decision will depend on his estimation of the probability that the trustee complies to the norm of reciprocity").

310. Hansmann, *supra* note 38, at 846-47.

311. See *supra* notes 245-46 and accompanying text; *infra* note 312 and accompanying text.

312. FELLER & FITZGERALD, *supra* note 73, at 96.

313. It is also possible for for-profit firms to adopt the peer-production model for information production. For example, YouTube (<http://www.youtube.com/>) is a popular free videosharing Web site owned by Google. The site allows users to upload, view, and share video clips. Other examples of the commercial adoption of the peer-production model include Amazon's book reviews, Google search engine's PageRank algorithm, and Slashdot's moderation system. See, e.g., BENKLER, WEALTH OF NETWORKS, *supra* note 15, at 75-80; Lessig, *supra* note 75, at 194-96; Lee, *supra* note 77, 1507-08, 1513; Lim, *supra* note 73, at 302, 309-11; Quiggin & Hunter, *supra* note 73, at 226. Among all these examples, some businesses have decided to release peerproduced information as intellectual commons. Such examples include Netscape's Open Directory Project and Yahoo's Flickr Web site. The former is a peer-produced directory of the World Wide Web under Open Directory License, and the latter is a photo-sharing Web site adopting Creative Commons licensing by default. See, e.g., LESSIG, *supra* note 75, at 192-93; SHIRKY, *supra* note 149, at 33-39; Benkler & Nissenbaum, *supra* note 149, at 399-400.

#### Footnote

314. Hess & Ostrom, *supra* note 21, at 11-12.

315. Bollier, *supra* note 31, at 1.

316. Ostrom & Hess, *supra* note 14, at 66.

317. TOMALES BAY INSTITUTE, *supra* note 76, at 3; see also Ostrom & Hess, *supra* note 14, at 43 (noting that "[effective design [of commons institutions] requires . . . trust . . .").

318. Lerner & Tiróle, *supra* note 73, at 226. Cf. Waters, *supra* note 73, at 27 (reporting the opinion of Mark de Visser, an F/OSS company's marketing officer, that "Fm not convinced any corporate entity can own an open source project").

319. Cf. Peter Levine, Collective Action, Civic Engagement, and the Knowledge Commons, in UNDERSTANDING KNOWLEDGE AS A COMMONS: FROM THEORY TO PRACTICE 247, 253 (Charlotte Hess & Elinor Ostrom eds., 2007) (stating that "corporate power represents a constant threat to the knowledge commons. . . . [T]here is always a possibility that . . . firms will enclose or undermine the commons.").

320. Telephone Interview with Frank Hecker, *supra* note 95, at 2.

321. Telephone Interview with Brian Behlendorf, *supra* note 119, at 10.

#### Footnote

322. Such understanding is consistent with Benkler's argument that unilateral appropriation is a threat to peer production projects because it may conflict with contributors' motivations. Benkler further indicates that one example of unilateral appropriation is the "commercialization of the common efforts for private benefit." See Benkler, *supra* note 10, at 439. Cf. LESSIG, *supra* note 75, at 226-27 (stating that some artists use signals to "encourage!] others to participate in the sharing economy, giving them confidence that their gift won't be used for purposes inconsistent with the gift").

323. Telephone Interview with David J. Kappos, *supra* note 120, at 7-8.

324. Telephone Interview with Mike Milinkovich, *supra* note 117, at 4.

#### Footnote

325. *Id.* at 1, 2. In the discussion of for-profits' role in Apache projects, Schmidt similarly stated: "Something would be very controversial or debated if a for-profit company wants to provide for free some infrastructure to Apache. It might be fine, but it would be something that will have a lot of questions be raised about [it], like unnecessarily endorsing this company, or we've been locked into particular technologies. . . . As far as how it will

affect users of Apache, I think it probably would reduce the reputation of the Foundation as being a non-biased entity that isn't part of any corporation." Telephone Interview with Cliff Schmidt, *supra* note 109, at 2-3.

326. DEEK & MCHUGH, *supra* note 72, at 109; van Wendel de Joode et al., *supra* note 78, at 83.

327. See VAN WENDEL DE JOODE ET AL., *supra* note 78, at 84.

328. KDE Free Qt Found., <http://www.kde.org/community/whatiskde/kdefreeqtfoundation.php> (last visited Apr. 22, 2010).

329. Ascher, *supra* note 111, at 5-6.

330. *Id.* at 6.

#### Footnote

331. See, e.g., DEEK & MCHUGH, *supra* note 72, at 225; Telephone Interview with David Ascher, *supra* note 110, at 1; Telephone Interview with Brian Behlendorf, *supra* note 119, at 4-5; Telephone Interview with Cliff Schmidt, *supra* note 109, at 4-5; Capek et al., *supra* note 73, at 251; Mann, *supra* note 74, at 15; ROSEN, *supra* note 1, at 47; Apache Software Found., The Apache Software Foundation Individual Contributor License Agreement V2.0, <http://www.apache.org/licenses/icla.txt> (last visited Apr. 20, 2010); Eben Moglen, Why the FSF Gets Copyright Assignments from Contributors, <http://www.gnu.org/licenses/why-assign.html> (last visited Apr. 19, 2010); The Perl Found., Contributor License Agreement, [http://www.perlfoundation.org/contributor\\_license\\_agreement](http://www.perlfoundation.org/contributor_license_agreement) (last visited Apr. 24, 2010). See also FONTANA ET AL., *supra* note 117, at 9 (identifying legal certainty as the primary reason of copyright ownership transfer in F/OSS projects).

332. Telephone Interview with John Sullivan, *supra* note 108, at 3.

333. The Linux Found., Patent Commons Project, How to Contribute, <http://www.patentcommons.org/about/support.php> (last visited Apr. 24, 2010).

334. Rosen, *supra* note 1, at 95.

335. Mann, *supra* note 74, at 27 n.117.

336. Telephone Interview with David J. Kappos, *supra* note 120, at 8.

337. Lerner & Tirole, *supra* note 73, at 226-27.

338. *Id.*

339. *Id.* at 226.

#### Footnote

340. Baker, *supra* note 95, at 5.

341. *Id.* at 5, 11.

342. GOLDMAN & GABRIEL, *supra* note 31, at 63-64.

343. LESSIG, *supra* note 75, at 161-62.

344. Guy Pessach, [Networked] Memory Institutions: Social Remembering, Privatization and Its Discontents, 26 CARDOZO ARTS & ENT. L.J. 71, 96-97 (2008); Rebecca Tushnet, My Library: Copyright and the Role of Institutions in a Peer-to-Peer World, 53 UCLA L. REV. 977, 1023 (2006).

345. Interview with Brewster Kahle, Dir. and Cofounder, Internet Archive, in S. F., Cal. 1- 2 (May 6, 2008) (transcript on file with author).

346. Cf. DEEK & MCHUGH, *supra* note 72, at 212. ("Collaboratively sharing and seeking information from or with others requires an appropriate organizational incentive structure.")

#### Footnote

347. See, e.g., Feller & Fitzgerald, *supra* note 73, at 125-26; Goldman & Gabriel, *supra* note 31, at 64-65; Benkler, *supra* note 10, at 424; McGowan, *supra* note 31, at 285; Quiggin & Hunter, *supra* note 73, at 218. See also Lerner & Tirole, *supra* note 73, at 200, 202 (stating that the Internet widely expands F/OSS activities).

348. See, e.g., Shirky, *supra* note 149, at 47 (arguing that social tools based on technologies have enabled loosely organized groups to cooperate on complex projects without institutional direction); Weber, *supra* note 94, at 171 (citing Kevin Kelly's and Donald Tapscott's works as examples of this type of argument); Open, But

Not as Usual, *Economist*, Mar. 16, 2006, at 7375. But see Jack Goldsmith & Tim Wu, *Who Controls the Internet? Illusions of a Borderless World* 68-77 (2006) (refuting the alleged disintermediating effects of the Internet by pointing to government regulation over it).

349. Cf. Michael W. Carroll, *Creative Commons and the New Intermediaries*, 2006 MICH. ST. L. REV. 45, 45 (2006) (describing disintermediation and reintermediation in the Internet age); Elkin-Koren, *supra* note 16, at 384-85 (stating that digital networks reduce the role of old intermediaries but bring in new intermediaries); Lawrence B. Solum, *Download It While It's Hot: Open Access and Legal Scholarship*, 10 LEWIS & CLARK L. REV. 841, 857-59 (2006) (describing the disintermediation and reintermediation of legal scholarship in the Internet world); Weber, *supra* note 94, 186 (stating that "[t]he Internet modifies demand for formal organization but does not erase it.").

350. See, e.g., Lessig, *supra* note 20, at 764-65.

351. Richard A. Epstein, *Why Open Source Is Unsustainable*, FIN. TIMES, Oct. 21, 2004, available at <http://www.ft.com/cms/s/78d9812a-2386-11d9-ae55-00000e2511c8.html> [hereinafter Epstein, *Unsustainable*]; Richard A. Epstein, *A Reprise on Open Source Software*, FIN. TIMES, Nov. 9, 2004, available at <http://www.ft.com/cms/s/78d9812a-2386-11d9-ae55-00000e2511c8.html> [hereinafter Epstein, *A Reprise*].

#### **Footnote**

352. Epstein, *A Reprise*, *supra* note 351.

353. Weber, *supra* note 94, at 171.

354. Lawrence Lessig, *The Limits in Open Code: Regulatory Standards and the Future of the Net*, 14 BERKELEY TECH. L.J. 759, 764 (2001); Lessig, *Code Version 2.0*, *supra* note 15, at 149-52.

355. Lessig, *supra* note 354, at 764. But see McJohn, *supra* note , at 64-66 (stating that the open nature of F/OSS makes F/OSS more vulnerable to government regulation).

356. Weber, *supra* note 94, at 178-79.

357. Mann, *supra* note 74, at 21.

358. Lessig, *supra* note 354, at 766.

359. Cf. McGowan, *supra* note 31, at 270-71 (stating that Lessig's argument is correct only for small and less complex F/OSS projects that require less coordination).

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