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Author(s): Neil B. Niman

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# Henry George and the Intellectual Foundations of the Open Source Movement

By NEIL B. NIMAN\*

**ABSTRACT.** The emergence of a common development platform (either in the form of open source projects or proprietary products) and the corresponding economic communities that emerge to support those platforms is similar in scale and scope to the concept of the city found in Henry George's economics of time and place. A modern counterpart to the 19<sup>th</sup>-century focus on land can be found in the 20<sup>th</sup>-century concern with the establishment of intellectual property rights that fence off a portion of the creative commons in order to construct temporary monopolies. Captured in the open source movement where licenses that specify property rights are adopted in order to provide a great deal of flexibility in terms of how ideas are used and shared, a strong connection can be drawn between this modern movement and the work of Henry George. Building a connection between the two provides greater clarity in terms of understanding how in a modern technology-based economy, progress can be achieved without poverty.

## Introduction

Much of the success of the open source movement depends on the creation and nurturing of a community of developers, testers, and users in order to create a set of symbiotic relationships that ensure the contributions of one group are tried, tested, and improved by another within the community. Where community membership is open to all who have something to offer and can abide by the terms of the public license that governs how property rights will be assigned, an environment is created where the division of labor, no longer fettered by

\*The author is Associate Professor of Economics at the University of New Hampshire. Direct correspondence to: Neil B. Niman, Department of Economics, University of New Hampshire, 15 Academic Way, Durham, NH 03824; email: [neil.niman@unh.edu](mailto:neil.niman@unh.edu). This research was funded in part by the Shalkenbach Foundation.

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the strictures required by a publicly-traded corporate entity, can expand to the point where all of the gains associated with specialization can be appropriated by the community as a whole.<sup>1</sup>

The notion that communities have the ability to serve as the foundation for an expanded division of labor can be traced back to the work of Henry George. Using land as a proxy for what we would now call developer communities, George recognized that in order for the division of labor to take place and in fact flourish, individuals need to be brought together in a central location so that their skills and talents can be organized in a way that creates additional value. Such a connection between the work of Henry George and the modern open source movement can be made through the simple realization that the concept of location as an organizing principle can be expanded beyond physical space and time.<sup>2</sup> In the modern technological environment, location may not represent physical proximity, but rather a common platform that fosters working together by ensuring free and easy access to some structure where ideas are shared and tasks can be sub-divided in an efficient manner.

This essay begins by describing George's concept of community and why he believed they should be entitled to the subsequent gains that are created. Next, a more comprehensive discussion of the open source development model and its reliance on the concept of community will take place. Finally, connections will be drawn back to George's work in order to highlight the important role played by community development models in fostering economic progress. The end conclusion will call into question the widely held belief that the monopolization of intellectual property rights is an important prerequisite for achieving technological change.

### **The Economic Power of Communities**

The economics of Henry George is based on his ethical belief that individuals are entitled to the fruits of their own labor, but when it comes to gifts from nature such as the natural resources embodied in a particular tract of land, what is given to the community as a whole should reside within the collective body. Hence he is critical of the rents appropriated by individuals from a particular plot of land

because they give to the individual what belongs to the collective whole. Thus George contends that "Rent, in short, is the price of monopoly, arising from the reduction to individual ownership of natural elements which human exertion can neither produce nor increase" (1948: 167).

When it comes to the creation of such rents, George focuses on the contribution that a particular tract of land makes to the division of labor rather than its resource value (Niman 2009). Thus he contends that "the most valuable lands on the globe, the lands which yield the highest rent, are not lands of surpassing natural fertility, but lands to which a surpassing utility has been given by the increase of population" (1948: 242).

In order to illustrate the point that it is increases in population rather than some inherent quality in the land that creates value, George tells the story of the settler, who, upon being first to a new location, chooses the best land to construct a homestead. The settler and his family are able to enjoy whatever advantages are associated with owning the best piece of land, but it is still a struggle to create a comfortable life. It is not until the arrival of neighbors that life begins to improve in a noticeable way. The presence of neighbors not only feeds the soul, but it increases productivity because the corresponding expansion in the division of labor makes certain things possible that could not have previously been done without a helping hand.

It is the introduction of neighbors and the corresponding division of labor that arises with the creation of a community that greatly improves the quality of life. If one approached the settler and asked him whether he would be willing to sell out and once again move to new land, George contends that "He would laugh at you. His land yields no more wheat or potatoes than before, but it does yield far more of all the necessaries and comforts of life. His labor upon it will bring no heavier crops, and, we will suppose, no more valuable crops, but it will bring far more of all the other things for which men work" (1948: 238).

This additional bounty stems from the belief that there exists increasing returns to scale with the application of labor. He argues his case with the point that "in the midst of a large population their labor

would have become more effective; not, perhaps, in the production of corn, but in the production of wealth generally" (1948: 232). What is special about this process are what we might call the "gains from localization." Localization brings out the "superior power in labor," which does not attach to labor generally, "but only to labor exerted on particular land" (1948: 235). Why a particular piece of land? Because that piece of land serves as a central rallying point where tasks are divided and the gains from specialization can be realized. As a result, land becomes more productive not because it is fertile, but because it enables "the subdivided branches of production which require proximity to other producers" (1948: 239).

Just as the existence of the market is required in order to fully realize the gains from specialization through trade, George believed that location is a necessary prerequisite for the production of those gains that emerge from an expansion in the division of labor.<sup>3</sup>

While it was important to identify the source of the gains from specialization, George was more concerned with questions that revolved around the distribution of those gains. The central question for him was whether these gains emerge from the efforts of a single individual, or reside in the community that is formed when individuals come together in order to realize the gains associated with location. As George tells us:

Consider what rent is. It does not arise spontaneously from land; it is due to nothing that the land owners have done, it represents a value created by the whole community. Let the land holder have, if you please, all that the possession of the land would give them in the absence of the rest of the community. But rent, the creation of the whole community, necessarily belongs to the whole community. (1948: 365–366)

Implicit in this notion that the gains from location should belong to the community is the assumption that a community emerges through some process of self-organization. Settlers create homesteads near each other for a variety of reasons, but not as the result of some conscious direction by a single individual or a governing body. Since self-organization is not the result of the efforts of any single entity, and one is only entitled to the reward if it is tied to human effort, it is easy to see why he would conclude that any gains associated with greater specialization belong to the community.

It should be noted however that while the emergence of such a nexus for activity can occur as the result of happenstance, there is nothing to preclude an individual (entrepreneur) from putting together the elements required to divide labor.<sup>4</sup> The entrepreneur may purchase a piece of land that is large enough to support a population of workers who come together in a building (factory) where tools and a plan are provided that generate similar improvements in productivity. In contrast to the story of self-organization provided by George where settlers on their own, and without any conscious direction, adopt a lifestyle that enables the subsequent division of labor, it is the entrepreneur who is consciously organizing individuals according to a plan.<sup>5</sup>

Thus we might easily conclude that George does not really have any insights to offer because what we seem to be describing is nothing more than the existence of profit. Entrepreneurs create firms in part in order to take advantage of an increase in the division of labor and the organizational structure of the firm becomes a proxy for the implicit cooperation that takes place within a frontier community populated by settlers. However, it is important to remember that firms do not exist in isolation. Rather, they are part of a broader landscape; one that emerges spontaneously or by direction to take further advantage of an expanded division of labor.

While it may be the act of a single entrepreneur that prompts others to locate nearby, George would contend that such a decision is no more worthy of additional compensation than if firms came together because of the existence of some natural element that makes one location more desirable relative to another. Social benefits belong to society. Rewarding an entrepreneur because a particular location decision happened to generate positive externalities, does not mean that this will encourage the entrepreneur to create additional social benefits. The social benefit was created by the initial location decision and additional rewards will not expand something that was a one-time event. That is not to say that the entrepreneur does not receive anything for his or her efforts. They are still entitled to the benefits associated with an expanded division of labor within the firm, and can equally partake in any of the social benefits that arise from being in close proximity to other economic entities.<sup>6</sup>

In describing the economics of Henry George, John Whitaker (2001) contends that George made a significant contribution to the modeling of scale economies. Pointing specifically to his views about the spatial effects created by agglomeration, Whitaker describes the effect of location on the corresponding creation of what Alfred Marshall identifies as “external economies.” Marshall describes these external economies in the following way:

When an industry has thus chosen a locality for itself, it is likely to stay there long; so great are the advantages which people following the same skilled trade get from near neighbourhood to one another. The mysteries of the trade become no mysteries; but are as it were in the air, and children learn many of them unconsciously. Good work is rightly appreciated, inventions and improvements in machinery, in processes and the general organization of the business have their merits promptly discussed: if one man starts a new idea, it is taken up by others and combined with suggestions of their own; and thus it becomes the source of further new ideas. And presently subsidiary trades grow up in the neighbourhood, supplying it with implements and materials, organizing its traffic, and in many ways conducing to the economy of its material. (1961: 271)

In describing the relationship between the two thinkers, Whitaker remarks “. . . it is true that Marshall was more aware than George of the need to reconcile scale economies with the persistence of competition . . . George, on the other hand, deserves credit for his pioneering treatment of the economics of agglomeration, richer than Marshall’s rather sketchy treatment of external economies” (2001: 22). This is much more generous to George than the words used by George Stigler (1969) to introduce the “confrontation” that took place between Marshall and George at Oxford University in 1884. Drawing our attention to the “hilarious account of the proceedings,” Stigler tells us that “in any scientific sense of course there was no debate: Marshall used the theory of competitive markets, which George did not understand, to refute George’s charge of a monopoly in land” (1969: 183). However, upon reading the historical account, one might ask the question: Was it George’s lack of understanding of competitive markets, or Marshall’s rather sparse understanding of the spatial effects created by agglomeration that carried the day?

The main point of the debate between George and Marshall was a discussion that centered on what each perceived to be the biggest

impediment to economic progress. George believed that it was the monopoly rents associated with land ownership that held back progress by robbing people of the rewards associated with their hard work. To make his point, he used the example of an island where all of the land is owned by a single individual. It is the landowner by virtue of monopoly right who is able to appropriate any and all of the extra gains associated with the division of labor through the collection of rents. The appropriation of these monopoly rents became for George the key to understanding why poverty exists amidst plenty.

This did not make much sense to Marshall, who believed that weak economic growth resulted from a lack of thrift. On the other hand, Marshall's interest in thrift made no sense to George, who believed that any increase in savings would just flow to landowners, who, in discovering a new pool of funds, would merely raise their rents in order to appropriate additional funds from the thrifty. Marshall believed that landowners in the face of competition would have little if any power to penalize the thrifty by appropriating their savings for other uses. Thus, the confrontation reached a crescendo when Mr. Marshall "wanted Mr. George to prove in an island owned by many, who were not acting in combination but in competition, it would be possible for the landlord to screw the people down to the verge of subsistence" (1969: 224).

Here we have Stigler's potential victory in sight as George is forced to respond with fact by calling attention to the experience of the Irish and how rents have steadily risen while the standard of living for farmers has fallen. That being said, George had a different response he could have offered. It may be true that on an island of sufficient size and populated by a large number of landowners who each only own a small share, that competition among landowners may lead to a fall in rents. However, the economic benefits associated with agglomeration do not extend to the entire island, but rather, only to small sub-pockets where activity is concentrated in a relatively smaller space.<sup>7</sup>

It is the formation of what we have been calling an economic community based on a specific area that creates gains, and hence when one is discussing competition between landowners, what had before seemed like a large population, rapidly becomes a small



numbers problem. While the island may have a large population of landowners, specific regions on the island may not; and if these regions host a large proportion of the economic activity on plots owned by only a few landowners, then Marshall's notion of a competitive market for land rent may never come into being. Location serves as an effective barrier when the gains are restricted to a small sub-set of the entire surface area, and it is only on that small sub-set where all of the gains are generated and retained. Hence what is true for the entire nation may not be true where it matters most: that specific area where industrial activity is concentrated and hence where the gains from agglomeration are generated.<sup>8</sup>

Hence, rent emerges because what is true for the many may not hold for the lucky few. The landlord may receive a reward (rent) for no other reason than the fact that he or she owns a monopoly right that is embodied in the superior location associated with one plot of land relative to another. Thus, George believed that justification exists for taking away those rents that are created not by individual effort, but instead are associated with what we have called "being in the right place and time."

Therefore, it should come as no surprise that the loss of rents associated with the single tax is similar to what we would expect to see as the long run equilibrium in a competitive market. An entrepreneur who creates a new product (and what becomes an entirely new market) earns a reward that initially depends in part on productivity, and in part on uniqueness. It is the characteristic of uniqueness that forms a parallel with the notion of land rent that arises not because land is more productive, but rather because it can be utilized more productively.

A new product is often able to command a premium because it does (at least initially) possess a unique position within the broader context of the market for all goods. However, it is important to realize that if the product is successful and if it is not possible to erect any artificial barriers to prevent it from being copied, then those rents will eventually disappear as competitors enter with similar products that eliminate any of the extra-normal profits associated with holding a unique position in the market. What would persist at the end of this competitive process is those profits associated with superior business

acumen or greater productivity; all of which are attributed to the efforts of the entrepreneur. What would be eliminated are those returns associated with the uniqueness of the product.

### **Property Rights and Innovation**

To this point, we have tried to apply Henry George's basic tenets that: (1) a person should be entitled to the fruits of their labor; (2) only labor should be rewarded; (3) any gains associated with monopoly power should be at best non-existent, but in reality, of as short a duration as possible; and (4) the gains from a community should remain within the community. However, this logic stands in stark contrast to the traditional rationale that monopoly profits are needed in order to entice entrepreneurs to make the investments required to pioneer new products and markets (Arrow 1962). Without the promise of a monopoly, it is generally believed that innovation will not take place. The conventional wisdom tells the story that without the lure of monopoly profits, consumers would be subject to a stagnant set of choices as entrepreneurs shy away from investing in the development of new things (likely to fail) because they no longer can look forward to super-normal profits.

Henry George was adamantly against such temporary monopolies; particularly those that are manifested in the form of a patent. He writes:

The patent, on the other hand, prohibits anyone from doing a similar thing, and involves, usually for a specified time, and interference with the equal liberty on which the right of ownership rests. The copyright is therefore in accordance with the moral law—it gives to the man who has expended the intangible labor required to write a particular book or paint a picture security against the copying of that identical thing. The patent is in defiance of this natural right. It prohibits others from doing what has already been attempted. Everyone has a moral right to think what I think, or to perceive what I perceive, or to do what I do—no matter whether he gets the hint from me or independently of me. Discovery can give no right of ownership, for whatever is discovered must have been already here to be discovered. (1948: 411)<sup>9</sup>

Patents and the subsequent creation of a temporary monopoly are problematic not only because they may interfere with a system of

natural rights, they may also lead to socially undesirable outcomes (Niman 1995; Boldrin and Levine 2002). Instead of expanding the division of labor to include the most productive individuals or entities at each stage of the value chain, the entrepreneur has an economic incentive to limit the subsequent division of labor and hence the potential gains in productivity associated with the new idea. It is by limiting the division of labor in order to capture all of the rents associated with a new idea that the entrepreneur imposes a cost on society.

It is important to point out that in order to capture all of the rents associated with the monopoly property right conveyed to the entrepreneur, she must not only be an inventor, but also adept at manufacturing, sales, and marketing; in fact able to handle all facets of the value chain. Monopoly power therefore may lead to the additional socially undesirable outcome that the lack of competition enables entrepreneurs to enjoy the fruits of their own incompetence as it may exist along the various stages of the value chain.

Furthermore, to capitalize on a new invention, a firm must rely primarily on its own researchers and its own resources in order to maximize the probability of maintaining a secret, or being able to obtain a government sanctioned monopoly. Moreover, the firm is not under any competitive pressure to continuously improve its product or the methods used in production over and beyond what it would take to prevent consumers from defecting and purchasing an imperfect substitute. Furthermore, by codifying such a monopoly, other companies are prevented from using the knowledge inherent in the innovating product to build comparable or entirely different products.<sup>10</sup>

Those that are in favor of monopoly as an incentive to innovate may concede these points, but will inevitably revive the question of monopoly because of the existence of risk. If most new ideas fail, then why would the entrepreneur devote much time or resources to do something that may not have a substantial payoff? The conventional wisdom views invention as something similar to a lottery where the higher the potential payoff, the greater the number of individuals who can be enticed to purchase a ticket (Wright 1983). However, the problem may not be that the rewards are too low, but rather that there are too many seeking those rewards.

What I mean by this is that if the lure of monopoly profits is too great, there may be an overabundance of entrepreneurs looking to gain their share of these extra-normal profits. If existing distribution channels have only so much capacity or current stores only a limited number of shelves, then it can be difficult for one among the many vying for limited space or capacity to succeed. When such constraints exist, lower rewards may have the counterintuitive effect of actually bringing better products to market.

It is true that lower potential rewards might lead to less entrepreneurial effort and therefore fewer new products will be introduced into the marketplace. With fewer products being introduced however, the probability of failure would be lower. With a lower probability of failure, rewards to entrepreneurs would not need to be as high in order to induce them to invent. Rather than encouraging anyone and everyone to become an entrepreneur, only those who are particularly suited toward entrepreneurial activities would be engaged in the development of new products.

By offering abnormally high rewards to would-be entrepreneurs, the effect of such a policy is to distort the division of labor by making it too attractive for individuals to generate new product ideas (whether they are good ideas or not). It is similar to the dilemma faced by everyone who purchases a lottery ticket. On the one hand, the larger the number of ticket buyers, the higher the potential payoff. The downside of course is that the more who buy tickets, the less likely a particular ticket will be the actual winning ticket. As a result, one can imagine the entrepreneurial process becoming self-defeating because the bad entrepreneurs drive out the good ones by making it more and more difficult to succeed in an ever increasingly crowded market.<sup>11</sup>

The important lesson to be learned is that the creation of artificial monopolies may do more to generate excess economic activity that may not lead to the desired outcome of creating the maximum amount of additional value for the least amount of effort.<sup>12</sup> This was the central message to be gleaned from George's discussion of land speculation as the source for a downward spiral in economic activity. He believed that if the extra-normal rents associated with land in possession of a superior location were not taxed away, then economic activity would become more focused on the generation of rents on

existing activities rather than focusing efforts on the production of new value. The net result would be that less value is created because the profits associated with land speculation outweigh the potential returns associated with the production of goods and services.<sup>13</sup>

### Community-Based Innovation

An alternative to the traditional entrepreneur driven, firm focused, view of the innovation process, is one that has emerged with the open source movement in the development of software. In contrast to a process driven by monopoly where invention is based on a limited pool of knowledge and developed with a limited pool of resources, open source seeks to draw on the greatest possible division of labor in order to maximize the potential value of a new idea. Rather than achieving its benefits *ex post* (after the first innovation has been created), open source expands diffusion *ex ante* by drawing in as many as possible in the initial development of an idea. As a result, the number and abilities of contributors working on the product are not limited to those that exist within the boundaries of a single firm. Instead, each user becomes a potential source of new ideas for future directions in the product and the workload for implementing change is shared between an expanded group of contributors.

Changes to an open source product originate not from a small group of programmers under the leadership of a management team that thinks it understands the needs of the market, but rather from those who are actually using the product in real world situations. Thus, the open source process promotes a greater division of labor by drawing upon the “idiosyncratic knowledge” of its users (Hayek 1945). Changes are driven from a bottom up approach where end-users both initiate and implement modifications based on real needs, and not those imagined by a group of managers in a software company who have limited (or no) knowledge of the various applications for a particular product. Because of this process, the product eventually moves in a direction that is more in tune with the needs of its users than its developers.<sup>14</sup>

Promoting the development of higher quality software that is of more value not only in terms of its design, but also its application,

forms the basis for understanding the incentives for participating in the open source movement. Rather than the problem of the anticommons (Heller and Eisenberg 1998) associated with the patent system, open source creates a new form of commons. In the standard tragedy of the commons story, seas are overfished or pastureland is overgrazed because of a lack of property rights. Value is diminished as too many users utilize a single resource with a limited capacity to serve the needs of everyone. However, within the framework of open source, the commons represents a shared development platform, and it becomes *more valuable as it is used and modified by a growing number of individuals*.

Open source does not dispense with the notion that individuals work to further their own self-interest. Rather, open source creates an environment where individuals can share problems and collectively work toward common solutions. The greater the number of individuals who experience a similar need, or are stymied by a similar problem, the more likely participation will reach the critical number required to trigger a successful open source project. A project based in a common need becomes a vehicle for enabling the individual to leverage his or her efforts through an expanded division of labor in a way that reduces the amount of effort required on the individual's part.<sup>15</sup> With greater participation comes greater psychic rewards stemming from either the growing importance of the project, or the larger number of individuals who will be aware of a single contribution.<sup>16</sup> As a result, work on the common platform becomes self-reinforcing and does not require a temporary monopoly in order to generate a contribution.

The empirical work to date does suggest that the benefits created by and residing in the community are sufficient to attract participants. Lakhani and Wolf (2005) surveyed 684 software developers working in 287 F/OSS projects. They found that intrinsic motivation (inherent satisfaction)—the ability to express oneself creatively—provides a stronger motive than extrinsic factors such as monetary payments for generating participation in an open project. In addition to the ability to express oneself creatively while having fun, there exist nonpecuniary rewards that are associated with the opportunity to join a community. Similar results were obtained in a different survey encompassing over 2,700 respondents (Ghosh 2005).

What is interesting about the Ghosh survey is that he attempts to determine whether respondents believe they received more from participating in an open source project than they gave, or vice versa. He wanted to try and identify whether participants are odd representatives of the general population because they exhibit a disproportionate amount of “altruistic” behavior, or fit within the general assumption of self-interest. His result indicates that the majority of participants believe that they receive more than they give and hence are motivated more by self-interest than some form of altruism.

A recent empirical investigation by Fershtman and Gandal (2007) indicates that the amount of effort one freely gives to an open source project is in part determined by the restrictiveness of the public license. A restrictive license is one that forces all individual contributors to make whatever they contribute readily accessible to all other users. A restrictive license enables the contributor to achieve the ego enhancing goal of being listed as a contributor for all to see. However, once that status level has been achieved, it provides little motivation for a contributor to continue to expend a large amount of effort to the project. Hence Fershtman and Gandal contend that the more restrictive the license, the less one contributes because it forecloses potential avenues for gaining financial rewards. A less restrictive license, on the other hand, would enable contributors to create proprietary extensions to the common software platform and hence achieve some financial reward in return for their effort. Because it now becomes financially attractive to contribute more than what is required in order to be acknowledged as a contributor, they give more of themselves to the project.

The important point to take from all of these studies is that status may be sufficient to motivate an individual to contribute to an open source project. However, the extent to which one contributes is based on the traditional calculation that effort will be expended up to the point where the marginal benefit equals the marginal cost. What is perhaps different about open source participation is that the marginal benefits may take a form other than direct financial remuneration.

This seems to suggest that when we think about temporary monopolies, it must be with respect to the follow-on innovation that takes place where proprietary extensions are developed in a way

that generates financial rewards. However, in the case of proprietary extensions to a community-based effort, the risks associated with pioneering an entirely new platform or those associated with extending a commonly used and accepted platform, are greatly diminished. Proprietary extensions to a common platform are generally designed to satisfy a specific need in the marketplace. Additional effort in this regard becomes a matter of meeting a need that exists in the market rather than working on something in the hopes that *ex post* someone will be willing to pay for effort already expended. What emerges is a relationship based on work for hire rather than work for hope (grounded on a calculated gamble that someone will find what you have done has value). Therefore, the reward for participating beyond the point where status is attained or creativity is satisfied is not based on risk, but rather takes on the form of payment for services rendered.<sup>17</sup>

Thus in the case of proprietary extensions, just as in terms of participation in the project itself, a temporary monopoly is not a necessary condition in order to generate participation in an open source project. This returns us to the point that if the only way someone is willing to continue to innovate is because of the prospect of a government sanctioned monopoly, is this really the person we want innovating? In other words, is that the best use of society's resources? If we have to offer someone something beyond their opportunity costs, maybe their efforts would be better focused elsewhere. We want people innovating who are capable of generating returns beyond their opportunity costs as the result of their efforts. Anything else and we are merely distorting the efficient allocation of efforts throughout the entire economy. Let those who can earn an above normal return earn it and leave everyone else to find something else to do. We can adopt such an approach because individuals will continue to contribute at least some minimal effort to the community-based effort and as long as the effort can reach out to larger and larger pools of contributors, what perhaps otherwise would be considered to be a follow-on innovation will eventually become subsumed within the broader actions of the community as a whole.

However, if one limits their contributions to the community in order to exploit individual opportunities, will the open source movement



become plagued by free riders who contribute nothing to the public good? What is important to realize is that while anyone can utilize the source code for their own purposes without making a contribution, rather than reducing the value of the community, the exact opposite occurs. Individual adoption by any and everyone enhances the personal rewards for the programmer who is motivated by issues surrounding self-esteem; the more who use the product, the greater the potential for personal fame. In addition, as the user base grows, the ability to identify problems with the source code, or recruit a new pool of developers, is enhanced. Finally, the more widely a program is adopted, the greater the opportunities exist for being hired to do paid follow-on work to tailor the software for a particular purpose or support the individual needs of an adopter.

These benefits accrue to the community at large and anyone with the right experience and a solid reputation can exploit them for personal gain. However, achieving higher personal gain does not come at the expense of the community as a whole. In fact, any effort to try and limit individual gain would ultimately harm the community by altering the reward structure and hence the willingness of someone to participate. The bigger the challenge, the greater potential for my reputation to grow and thus the more likely I will be able to find someone to help solve my own individual programming problems. It is participation and not the assignment of property rights that creates benefits that all can draw from. Fencing off portions of what has become community property will do nothing more than to ensure that the area within a particular fence lies fallow.<sup>18</sup>

What exists for the individual can also be extended to organizations. Firms have similar incentives to participate in communities that foster innovation. The potential impact of open source on innovation is perhaps best illustrated in an *Information Week Research* survey of 420 business-technology professionals. In that survey, nearly 60 percent of respondents with revenues over \$100 million indicated that open source software creates more opportunities for innovation than commercial or proprietary software. For smaller companies, 75 percent indicated that open source promotes additional opportunities for innovation (D'Antoni 2004). The additional value is not the result of network effects where something becomes more valuable because

of an increase in the *use* of the product; rather, it becomes more valuable because there is greater participation in the *production* of the product.<sup>19</sup>

Computer companies like IBM view open source not only as a development tool, but also as a vehicle for selling value-added services. By expanding the size of the market with the introduction of lower cost or more powerful technology solutions, new opportunities are created for selling add-on services, support, or hardware. Similar attempts to “seed” a market in order to sell value-added services are already beginning to be seen in the biotechnology industry. Recently, Perlegen Sciences, a privately held Silicon Valley biotechnology company, agreed to make its \$1.2 million proprietary database of almost 1.6 million SNPs (single nucleotide polymorphisms) available to all researchers free of charge.<sup>20</sup> The company is also taking a leading role in the identification of SNPs for the HapMap project.<sup>21</sup>

The important question is why would Perlegen Sciences release its proprietary database into the public domain and also donate additional time to promote a public database? The answer is found in the idea that as more researchers contribute to the HapMap database, the faster it will be completed. A completed HapMap may increase the likelihood that its users will find new ways to make use of the data for the treatment of disease and the development of new drug therapies. The potential source of returns for a company like Perlegen Science is not the knowledge contained in the HapMap, *per se*, but rather in the expertise required to analyze the data in order to discover potential marketable solutions to medical problems more quickly for others.

### **Product Platforms as Innovation Communities**

In the modern age of information networks, the concept of community and the corresponding external economies that are created are no longer limited to a particular geographical area. A website can serve as a coordinating structure that transforms the economies generated from a central physical location and shifts them to a platform without boundaries. It is a website that takes the place of a geographical location and the ability to interact with a network of developers that takes the place of the heart of a city. Thus, it is the concept of bringing

together various contributors in order to expand the division of labor rather than the assignment of property rights that is important.

While open source may be the clearest example of an environment where property rights and the corresponding monopolies that are created based on those rights are not a necessary precondition for innovation to occur, we see a number of innovation communities emerge despite the existence of individual property rights. New products are created every day under our current patent system that provides the inventor with a temporary monopoly. However, despite the erection of a fence to stave off competitors from enjoying some of the rents associated with their monopoly position in the market, product platforms as the foundation for organized development communities are created every day.

A good example is the Apple iPod. Apple's iPod is based on a proprietary hardware platform, a proprietary software platform, and is designed to be used with a proprietary site for obtaining content. However, as the iPod has gained in popularity, other entrepreneurs have entered the market to sell compatible products designed to expand the functionality of the basic iPod. It soon became possible to listen to your iPod through the audio system in a car, home, or by the pool. These add-on products were not the creation of Apple, nor were they the result of any conscious direction of a single individual. Rather they emerged spontaneously and in doing so, transformed a technology platform into a thriving community.

Just as a settler may travel a long distance to find virgin territory to build a new home and quickly fences off an area in order to establish a claim (property right) to the land, a community eventually emerges that enables the creation of additional value from an enhanced division of labor. This value that is created by the community does not reside in the hands of a single individual nor can it be attributed to the existence of a particular set of property rights. Rather these gains are attributed to the benefits associated with a particular place and time. In the case of the settler, it is a particular physical location that serves as the means for the emergence of spontaneous order capable of supporting the creation of additional value as other settlers in search of new opportunities locate nearby. For Apple, it is the creation of a new product platform that provides the foundation for the subsequent

entrance on the part of other firms who then seed the market with complementary products designed to expand the value associated with the product platform.

Entrance by others and the corresponding extension of Apple's product platform does not require the lure of a temporary monopoly in order to promote participation. Rather it is the potential size of the market and the ability to share in the rewards that are generated by the creation of a community that prompts entry. Just as the contribution by many leads to the creation of an open source platform for the subsequent development of complementary services or product add-ons that creates a less risky opportunity for entry, the same holds true when the basic foundation of a community is created on a proprietary platform.<sup>22</sup>

What remains true whether we are talking about settlers, open source programmers, or companies that are solely interested in defending their property rights, everyone benefits from the establishment of a community as the foundation for an expansion in the division of labor. It is the emergence of a community and, along with it, participation on a significantly larger scale that creates a whole that is greater than the sum of its parts. Any attempt to restrict participation by asserting a property right runs the risk of "killing the proverbial goose that lay the golden egg." Participants will either be unwilling to participate in the community or limit their participation to such an extent that either a vibrant community never emerges, or what was once a thriving place quickly loses its appeal. In the case of a proprietary product platform such as the iPod, efforts to close the door and shut out the creation of such a community runs the risk of watching the entire community migrate to a different platform.

### **Conclusions**

The significance of a community-based innovation model is that it preserves the benefits of a meritocracy without also creating those forces that subsequently come into play and undermine a merit-based system. In a community-based environment, ideas are vested in the hands of the entire group and not a single individual or company. Therefore, any subsequent competition that may occur takes place on

a level playing field, where individual talent or hard work is then free to play a significant role in determining who are the winners and who are the losers. The control of a particular technology or piece of information cannot be used to enable a lesser competitor to gain victory over better-matched opponents either within a stage of the development process or between the various stages. As a result, the fundamental engine that drives economic efficiency remains available to promote economic innovation.

The emergence of a common development platform (either in the form of open source projects or proprietary products) and the corresponding economic communities that emerge to support those platforms is similar in scale and scope to the concept of the city found in Henry George's economics of time and place. The adoption of the single tax by George and his followers as a mechanism for eliminating the rents that emerge as land becomes a necessary cog in the creation of economic communities finds its modern counterpart in the form of opposition to the imposition of property rights designed to create temporary monopolies in an effort to fence off areas that might lead to the development of competing products based on a further expansion of the division of labor.

It is important to remember that by reducing the gains available by imposing a single tax on land, land no longer becomes a monopoly source for rent, but rather becomes a common framework that makes it possible for all to excel in terms of creating and keeping the value that results from human labor. As a result, everyone has free and unlimited access to that crucial building block required for generating additional value. When it comes to intellectual property, a similar principle holds true. Without any monopoly protection in the form of a patent, the best ideas can be developed along with the formation of a community that becomes the basis for generating the additional value that creates progress without poverty.

#### Notes

1. Two of the most prominent examples are the GNU General Public License (GPL) and the Berkeley Software Distribution (BSD) license.
2. George discusses the importance of space and time in *The Science of Political Economy*. Book III chapters V–VIII.

3. George's treatment of this subject is very similar to what appears later in Allyn Young's famous paper (1928) about increasing returns. Young's broader conception that "the division of labour depends in large part upon the division of labour" (1928: 533) and not just the extent of the market, bears a striking resemblance to George's notion that "It is not the growth of the city that develops the country but the development of the country that makes the city grow" (1948: 272).

4. In Book III chapter X of *The Science of Political Economy*, George (1898) makes the distinction between directed or conscious cooperation and spontaneous or unconscious cooperation. Here, the entrepreneur can be thought of engaging in directed cooperation while the community that springs forth is an example of spontaneous cooperation.

5. A more thorough discussion of why firms come into existence can be found in Niman (2004).

6. While Henry George and Alfred Marshall shared a mutual disdain for each other's economics, George's concept of the gains from community are similar to Marshall's assertion that gains from agglomeration exist within defined regions.

7. The existence of these sub-pockets is noted by Marshall who writes:

Again, in all but the earliest stages of economic development a localized industry gains a great advantage from the fact that it offers a constant market for skill. Employers are apt to resort to any place where they are likely to find a good choice of workers with the special skill which they require; while men seeking employment naturally go to places where there are many employers who need such skill as theirs and where therefore it is likely to find a good market. The owner of an isolated factory, even if he has access to a plentiful supply of general labour; and a skilled workman, when thrown out of employment in it, has no easy refuge. Social forces here co-operate with economic . . . (1961: 271–272)

8. This of course is nothing more than the application of Williamson's (1985) concept of asset specificity. Under this broad heading, location represents one type of asset considered by Williamson.

9. Disenchantment with the patent system in the 19<sup>th</sup> century is discussed in greater detail by Machlup and Penrose (1950).

10. Polanski (2007) uses a centipede-type model to show that when knowledge development takes place sequentially, an open source process may be more robust than one based on a proprietary regime.

11. This is analogous to the famous lemons problem. One would expect however that, over time, firms will emerge that can assist consumers in terms of identifying the "good" entrepreneurial efforts from the "bad." Thus over time, the bad entrepreneurs may be forced to exit the market. However, in the interim, many of the good ones might get lost in the shuffle.

12. Maximum result for minimum effort is the guiding principle underlying George's (1898) *Science of Political Economy*.

13. Fear of such speculative behavior of course lay at the heart of Keynes' theory of the business cycle. Keynes feared that if it was easier to make money buying and selling titles to real assets, eventually we might reach the point where little incentive remains to actually create the assets themselves. One conclusion that he reaches is "to make the purchase of an investment permanent and indissoluble, like marriage, except by reason of death or other grave cause, might be a useful remedy for our contemporary evils" (1936: 160). Alternatively, he might have reached the same result if, like George, he merely advocated that any gains beyond the normal rate of return should be taxed away by the government. With such a tax in place, the only way to "beat" the market would be by creating a superior value proposition.

14. This of course presupposes that there is some form of coordination to ensure that development of an open source project takes place in an organized and orderly fashion. The importance of coordination is discussed in Richardson (1972) and Loasby (1998). More recently, Niman (2008) discusses the important role that the manager played in Marshall's theory of the firm and how coordination within the firm was structured for Marshall in a way that mirrored Babbage's early conceptions of the computer.

15. The concept of a product platform used here is similar to the discussion of modular systems contained in Langlois and Robertson (1995).

16. Johnson (2002) develops a public goods model where as the size of the developer community increases, so does the amount of innovation.

17. The potential superiority of a reward system to that of a system based on patents is discussed in Shavell and van Ypersele (2001).

18. Osterloh and Rota (2007) make the point that donators are willing to contribute if their private opportunity costs are not too high. This is often associated with the size of the project where it has been found that as the number of participants expands, the needed contribution by any single individual experiences a corresponding decrease. However, while low cost situations appear to be a necessary condition, they also point out that programmers are reluctant to voluntarily contribute to a project unless they see others contributing as well.

19. The concept of positive externalities associated with an increase in the number of supply-side participants is introduced in Niman (2002).

20. This material was obtained from Hamilton (2005).

21. The International HapMap Project is a partnership of scientists and funding agencies from Canada, China, Japan, Nigeria, the United Kingdom, and the United States to develop a public resource that will help researchers find genes associated with human disease and response to pharmaceuticals.

22. The creation of a common platform not only benefits those companies who enter in order to contribute additional value to the initial product, but it places the founding company in a stronger position. With the existence of a common platform, the value that the original product contributes to consumer welfare will exceed the price that the consumer must pay to obtain it. Thus the inventing firm may find itself in the enviable position where it can sell a larger quantity at the existing price level or sell the existing quantity at a higher price in order to capture a share of the additional value that has been created.

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