Shen, Jeffrey
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The Economic Benefits of Open Source Software

In theory, the idea of open sourcing proprietary software seems detached from any economic reality. After all, individuals and companies who make their code open source are giving away thousands of hours of work and valuable intellectual property for *free*. However, the world of open source software is not some hippy, post-capitalist market. Like most other rapidly growing fields, it remains governed by the basic principles of the free market. Many papers have already addressed why developers make their code open source and whether or not it is sustainable to do so. This paper will focus on open source companies, and raise the argument that these companies can publish open source software for commercial gain. Ultimately, open source software is not only profitable, but also has unique economic benefits that enables it to outperform traditional proprietary software models, if utilized properly.

So, how do companies make money off of open sourcing their software? First, they can adopt a variety of income streams, such as paid additional features for enterprises or a certification model where individuals pay to become certified as competent in that specific open source project. However, the primary and most profitable way to generate revenue as an open source company is to pair open source software, which by itself cannot make money, with a complementary service, tailored for non-technical or enterprise customers. Take Automattic, the company that runs Wordpress.com. Wordpress.com is built on the open source software of the same name and was created by one of the founders of that project.[1] Wordpress.com cannot be successful without the open source Wordpress's popularity, so

[1] "Who Owns WordPress and How Does WordPress Make Money?," wpbeginner, last modified February 1, 2016, accessed January 6, 2018, http://www.wpbeginner.com/beginners-guide/who-owns-wordpress-and-how-does-wordpress-make-money

Automattic can be considered a company whose success depends primarily on open source software that they, in large part, developed. Wordpress.com offers a stripped-down, user-friendly version of the open-source Wordpress, but many of these features are placed under advertisements and paywalls to make money.[2] Thus, if there is a completely free and arguably superior version of Wordpress available, how is Automattic able to earn enough to be worth more than a billion dollars?[3] In short, Wordpress.com makes money by charging the less tech-savvy consumer, who may not want to go through the additional steps required with traditional Wordpress. Automattic is able to remain profitable while reaping the benefits of open source software by building support and convenience on top of their own open source project. (Technically, Automattic does not own Wordpress's trademark, but they previously owned it and currently are one of the most prominent backers and contributors to Wordpress.)

Another example of a support model tailored at enterprise customers or average consumers is RedHat, a company centered around its open source version of Linux that they market towards corporations. RedHat is currently valued at over two billion dollars,[4] and makes money by charging enterprise customers fees for support, services, and enhancements.[5] RedHat's success is indicative of the profitability of open source as a whole, which is further evidenced by the fact that "more than 180 young companies that [gave] away their software raised roughly $3.2 billion in financing from 2011 to 2014,"[6] and "HP claims it has started to make higher margins from open source than proprietary software in some

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[2] Ibid.

[3] Victor Luckerson, "WordPress.com Parent Automattic Joins the Billion-Dollar Club," *Time Magazine*, May 5, 2014, accessed January 6, 2018, http://time.com/88025/wordpress-parent-automattic-joins-the-billion-dollar-club/

[4] Steven Vaughan-Nichols, "Red Hat becomes first $2b open-source company," *ZDNet* (blog), entry posted March 22, 2016, accessed January 10, 2018, http://www.zdnet.com/article/red-hat-becomes-first-2b-open-source-company/

[5] Peter Levine, "Why There Will Never Be Another RedHat," *TechCrunch* (blog), entry posted February 13, 2014, accessed January 5, 2018, https://techcrunch.com/2014/02/13/please-dont-tell-me-you-want-to-be-the-next-red-hat/.

[6] Max Schireson, "The Money in Open-Source Software," *TechCrunch* (blog), entry posted February 9, 2016, accessed January 5, 2018, https://techcrunch.com/2016/02/09/the-money-in-open-source-software/.

instances."[7] Ultimately, there is concrete evidence that the decision to publish open source software is profitable.

Open source business models are not only profitable, but can be economically superior to traditional proprietary software models for a variety of reasons. Notably, open source products are often superior to closed source counterparts, require less overhead costs, inspire passionate communities, generate good publicity and establish trust in ways that traditional software companies can't replicate.

Products built through open source are often better than their proprietary equivalents, as evidenced by countless examples across many years: Linux, Apache, MySQL, and Perl, to name a few. Often times, the superiority of OSS over proprietary software enables it to be highly profitable. Consider the case of Mozilla Firefox, an open source browser intended to compete with Microsoft's proprietary Internet Explorer browser, at its height in 2008. Mozilla was only able to compete with Microsoft by creating a superior product with their open source community, and monetizing this product through various advertisement and search deals.[8] Essentially, Mozilla was able to take on Microsoft in a David-and-Goliath battle by making Firefox open source. In general, open source companies can compete with proprietary companies because open source inherently produces better products.

Developing open source software is often cheaper than developing proprietary software because many popular open source projects cultivate fanatic communities that can be leveraged for economic gain. By making their code open source, companies can use their users as bug-fixers, and can accept helpful pull-requests whenever these users run into bugs.[9]

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[7] Richard Thurston, "Open source can be more profitable than proprietary," *ZDNet* (blog), entry posted October 29, 2006, accessed January 5, 2018, http://www.zdnet.com/article/hp-open-source-can-be-more-profitable-than-proprietary/.

[8] Yuen Lo, "How Does Mozilla Firefox Make Money?," *How does it make money?* (blog), entry posted July 7, 2016, accessed January 6, 2018, http://howdoesitmakemoney.com/how-does-mozilla-firefox-make-money/.

[9] Josh Lerner and Jean Triole, "Some Simple Economics of Open Source," *Journal of Industrial Economics*, no. 52 (June 2002): 18, accessed January 5, 2018.

This way, the code base can be updated easily and organically, as opposed to traditional proprietary models where all code is written in-house. In essence, companies that leverage their open source community can capitalize on free work while only paying for several core maintainers, developers, and evangelists. Consider the case of Richard Stallman, for example. One of the reasons Stallman founded the famed Free Software Movement was that he was wanted to improve Xerox's printer program for his own personal use, but was unable to because Xerox used proprietary code.[10] If Xerox had made their code open source, Stallman could have made his changes, sent them over to Xerox, and Xerox would have had a better product and a much more loyal customer. By failing to make their code open source, and by failing to cultivate a community around their product, many companies are unable to access a crucial resource: Free development work. Another example of how developing open source software can be considerably cheaper than developing proprietary software is the so-called "Alumni effect": Companies that have popular open source projects spend less money on training new programmers because their code is freely available and can be learned ahead of time.[11] For example, Facebook, which created the popular open source project "React", doesn't have to spend extra money training their React developers because they can just hire programmers who already know React. This would not be possible if React was proprietary software. Ultimately, companies who leverage the power of open source pay significantly less for development than a corresponding proprietary company, which enables them to sell a far cheaper product.

There is also a large market for open source software. Companies that publish open source software benefit from how easy it is to proliferate their products: After all, it is very easy to convince users to adopt open source software because it is free.[12] While clicks and

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[10] Ibid, 19

[11] Lerner and Triole, "Some Simple," 16

[12] Schireson, "The Money," *TechCrunch* (blog).

downloads don't always translate into revenue, a well-built product can become more easily adopted, and therefore more easily monetized, when it becomes open source. Furthermore, individuals and companies often have an incentive to use open source products over corresponding proprietary software. Since open source products are significantly cheaper, customers or corporations will be more likely to use them.[13] Thus, a well monetized open source company like Redhat can easily profit from corporate customers who choose the price and convenience of open source software over competing proprietary products. In addition, there is large demand for open source products in general, as evidenced by the examples of open source market share below:

- *Web Servers:* In a February 2017 survey, 45.78% of active websites use the open source Apache.[14]
- *Server Operating Systems:* According to a survey by W3Tech, 36.8% of web servers run Linux as their operating system.[15]
- *Databases:* According to a survey by Stack Overflow, 44.3% of respondents use the open source databases MySQL, 21.2% use PostgreSQL, and 16.8% use MongoDB.[16]

Because open source software is attractive, innovate, and altruistic, it often generates positive publicity. Making code open source allows a company to improve their reputation (say, if they produced a widely used library), which can help attract more customers. Furthermore, companies that make their software open source are generally more attractive to

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[13] Sandy McKenzie, "Economics of Open Source," *Kitware Blog*, entry posted October 10, 2014, accessed January 5, 2018, https://blog.kitware.com/economics-of-open-source/

[14] "February 2017 Web Server Survey," Netcraft, last modified February 2017, accessed January 15, 2018, https://news.netcraft.com/archives/2017/02/27/february-2017-web-server-survey.html.

[15] "Usage statistics and market share of Unix for websites," W3Techs, last modified January 2018, accessed January 15, 2018, https://w3techs.com/technologies/details/os-unix/all/all.

[16] "Developer Survey Results," Stack Overflow, last modified 2017, accessed January 15, 2018, https://insights.stackoverflow.com/survey/2017?utm_source=so-owned&utm_medium=blog&utm_campaign=dev-survey-2017&utm_content=blog-link#technology.

talented developers, because these developers want to work for a company that has a good reputation, and where others can see their work.[17] Better talent means better products, and better products create more money. Moreover, open source software generally inspires trust in both users and investors. For example, investors may be more willing to invest in companies based on open source software because they are able to see the status of a project, which gives that company capital to survive and expand. According to Lerner and Tirole, "There is also substantial evidence that open source work may be a good stepping stone for securing access to venture capital" because open source work signals talent to investors.[18] Furthermore, open source software is inherently more trustworthy than proprietary software because users will be able to see everything that the software is doing. Many users will still use proprietary software, but the transparency of open source is attractive and even critical for many software users. For instance, many developers refuse to use security or database software if it isn't open source because they fear it won't be secure or reliable.[19] In this case, proprietary companies would not be able to compete with open source companies because they would have near zero market share. However, even outside of these markets, companies can attract more users and potentially more profits by making their code open source.

In the end, open source software is not only profitable, but also has unique economic benefits that can make it superior to traditional proprietary software models. Open source companies, or companies that put out open source software, often make better products, spend less time and money on development and bug-fixes, and are viewed more favorably by

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[17] Philip O'Toole, "The Strange Economics of Open-Source Software," *Vallified* (blog), entry posted September 23, 2015, accessed January 5, 2018, http://www.philipotoole.com/the-strange-economics-of-open-source-software/#comments

[18] Lerner and Triole, "Some Simple," 21

[19] O'Toole, "The Strange," *Vallified* (blog).

the public. Many people[20] hastily point out that there are few open source companies that have surpassed a billion dollars in revenue, but these people also forget to mention that there are many "hybrid" companies like Facebook, HP, and Google that embrace and profit off of open source software. In fact, companies that develop both open source and proprietary software are very common: more than 25% of a sample of 2,300 companies in fifteen countries employ a hybrid model.[21] Many companies are also hesitant to make any of their software open source because they feel that they are throwing defensibility out the window. However, open source products are no less defensible than traditional companies so long as they are superior to proprietary products, have a good reputation and brand name, and are constantly updated and improved. Ultimately, many of the criticisms regarding open source companies also apply to proprietary software companies. Open source software is not an economic silver bullet, and companies that employ open source still need to produce better products, but there are unique benefits of open source that companies can, and should, adopt. In this regard, companies that make their code open source, or at least employ a "hybrid" model of proprietary and open source code can capitalize on the superiority of open source software and remain competitive in an increasingly crowded industry. After all, how can a traditional software company compete with open source software that is cheaper, better, and more well-liked?

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[20] Stephen O'Grady, "The Economics of Open Source: Why the Billion Dollar Barrier is Irrelevant," *RedMonk* (blog), entry posted June 21, 2010, accessed January 5, 2018, http://redmonk.com/sogrady/2010/06/21/opensource-billion-dollar-barrier/.

[21] Chaim Fershtman and Neil Gandal, "A Brief Survey of the Economics of Open Source Software," *CEPR Discussion Paper*, no. DP8434: 7, accessed January 5, 2018, http://www.tau.ac.il/~gandal/opensource_survey.pdf.

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