CHAPTER 6

Conclusion: From Capital to Commoning

> '...the new technology is itself a product of a particular social system, and will be developed as an apparently autonomous process of innovation only to the extent that we fail to identify and challenge its real agencies. But it is not only a question of identity and defence. There are contradictory factors, in the whole social development, that may make it possible to use some or all of the new technology for purposes quite different from those of the existing social order: certainly locally and perhaps more generally. The choices and uses actually made will in any case be part of a more general process of social development, social growth and social struggle.'
>
> (Williams, 1975: 135–136)

The quote from Raymond Williams above emphasises the contradictions inherent in the ways in which new technologies are put to use. On the one hand, new technological developments may usher in a period of optimism or utopian thinking when assessing the potential uses of the technology. On the other hand, new technologies are also susceptible to co-optation by existing power structures. In this sense, all technology is dialectically situated within 'a general process of social development, social growth, and social struggle.' The goal of this struggle, especially for those interested in finding alternatives to the prevailing system, is to find ways of changing existing power structures to advance the cause of human dignity, mutual aid, trust, and conviviality.

The purpose of this book was to demonstrate how one such technology – free and open source software – is dialectically situated between the commons and capital. To illuminate the ways in which these forces struggle over free and open source software, my task was to 'identify and challenge' the 'real agencies' of free and open source software as commons under capitalism. In doing so, I identified the specific ways in which capital incorporated the forces of commons-based peer production into capitalist enterprises, the motivations for doing so, and the ways in which communities of free and open source

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software developers cope with unwanted interference in their projects. Moreover, I approached this study historically, paying close attention to the historical forces that enabled both the rise of commons-based peer production as well as the incorporation of those forces into capitalist production. In this concluding chapter, I summarise some of the main findings from the case studies and reflect on their significance for advancing the commons under capitalism.

6.1. Major Findings

This study complicates and extends theorisations of commons-based peer production by investigating sites where the idealism of FLOSS production meets with the material realities of capitalism. These contested sites make up the case studies in this research project, for they are where commons-based peer production has been incorporated into the corporate structures of capitalist firms. By employing a critical political economic approach, this study focused on the power relations that exist between corporations that rely on capitalist, market-driven production, and the broader FLOSS communities that rely on non-market, commons-based peer production. An important part of this focus was to position the commons and capitalism as operating according to different systems of value. At times, these two systems are capable of working together by coupling through the commodity form. The processes of commodification were demonstrated in those case studies that illustrated how FLOSS projects have been incorporated into commercial offerings. However, at other times, these systems diverge, which can lead to an antagonistic relationship between capital and the commons.

In previous literature, major projects like the Linux kernel or Wikipedia have been lauded as examples of effective and productive commons-based peer production (Benkler, 2006; Lessig, 2006; Weber, 2004). Significantly less studied, however, is how capitalist firms can use commons-based peer production to supplement their commercial offerings. The case studies for this project, particularly the discussion of Red Hat and Sun Microsystems, provided an in-depth look at how capitalist firms rely on the innovations and bug fixes from within the FLOSS community for implementation in their commercial products. That said, however, these case studies should not necessarily be viewed as generalisable across all FLOSS projects. The broader ecosystem of FLOSS projects features certain projects that are completely supported by their community of developers and do not rely on investment or sponsorship from corporate firms.

By selecting cases in which capitalist firms are incorporating commons-based peer production, this study was able to yield a novel insight into how intellectual property is used both within the FLOSS community and corporations. Specifically, the case of Red Hat demonstrated how a firm is able to profit from intellectual property that is covered by the GPL and, therefore, not amenable to enclosure by traditional copyright. Because Red Hat cannot exclude others from using its source code by relying on copyright, the company uses its

trademarks to prohibit competitors from making a direct use of its products. However, Red Hat's trademarks cannot prevent someone from using the underlying source code, which is protected by copyleft. Indeed, this was the case with CentOS, which was designed as a functionally equivalent operating system to that offered by Red Hat Enterprise Linux, Red Hat's core commercial product. Similarly, Red Hat controls the types of licences that can be included in its Fedora Project, which is the FLOSS project that generates the code included in its commercial offerings. The ways in which Red Hat controls the intellectual property included in its commercial offerings complicates the claims made about the productive autonomy within FLOSS communities.

In the vast majority of work on FLOSS, one of the defining features of its novelty is often traced back to its protection under more permissive copyright licences, or copyleft licences (Lessig, 2001; Stallman, 2002; Benkler, 2006). In addition, the software industry has been broadly plagued by a surge in patent infringement claims. However, the issue of trademark is an often-overlooked feature of software development. Red Hat uses trademark protections to circumvent the permissive nature of the GPL and the other licences that do not allow it to claim exclusive ownership of the code used in its core products. Although Red Hat is just one example and, perhaps, an exceptional one, the case serves as a contradictory example to the overarching claims made about the degrees of freedom, democracy, and autonomy within FLOSS production.

Further complicating these claims are the often-overlooked Contributor Licensing Agreements within FLOSS production, particularly when a project has a corporate or other institutional sponsor. While these agreements are not uniform across all FLOSS projects, the organisations that issue them rely on these agreements to maintain control over their projects. However, control is achieved in at least a couple of different ways. The CLAs may ask contributors to surrender the rights to their submissions so that the organisation can defend itself from intellectual property claims. Similarly, the CLAs may be used to control the types of licences that are allowed into the code base. This was seen in the Red Hat case study, whereby Red Hat wanted to guarantee to its customers that they would not be in danger of intellectual property infringement suits. A common theme running throughout the Red Hat chapter was the extent to which copyright separates authorship from ownership. In this sense, the current project contributes to this critical understanding of copyright by demonstrating how FLOSS labourers are forced to abandon claims to ownership of their work in order to contribute directly to certain FLOSS projects.

6.2. Case Studies

Each of the case studies presented here provides lessons for understanding the relationship between capitalism and the commons. The cases chosen were purposely selected because of their prominence within both corporate and FLOSS

communities. Red Hat, Microsoft, and Oracle represent some of the largest and most publicly visible software companies in the world. This is primarily the reason for selecting these companies, but also means that the findings from each case study may not be applicable to a broader range of corporations or FLOSS projects. Furthermore, not all FLOSS projects have corporate sponsors. In this sense, the study provides a snapshot of the ways in which corporations incorporate the FLOSS commons. When considered together, however, these case studies illuminate some of the general dynamics occurring at the intersection of corporations and the commons. In what follows, I discuss the more specific implications of each case study for understanding this phenomenon.

6.2.1. Microsoft Corporation

Microsoft has a long history of opposition to FLOSS. This stance began as early as 1976 when Bill Gates authored the 'Open Letter to Hobbyists', in which he railed against the culture of sharing software within the community. He argued that this practice harmed the ability of others to produce software and be compensated for their work. However, this stance contradicts some of Microsoft's own history, as it relied on others' designs to produce some of its most successful software. This was particularly the case for the MS-DOS operating system and the graphical user interface of Windows, which were built on top of previously existing technologies developed in Gary Kildall's CP/M operating system and Apple's graphical user interface. Both of these technologies were instrumental to Microsoft's success throughout the 1980s and 1990s, especially when paired with its strategic partnerships with IBM and other OEMs, which allowed the company to gain widespread adoption of its software. The same can be said of its Internet Explorer web browser, which the company packaged with distribution of its Windows operating system. This practice ensured that the company's web browser would win the first of the Browser Wars, but it also was one of the primary business practices that led to its conviction for antitrust violations by the Department of Justice.

Microsoft's ascent to the top of the personal computer software market culminated around the same time that it was being investigated for antitrust violations. When the United States Department of Justice (DOJ) issued its decree in 2001, Microsoft was forced to divest its operating system and applications operations. However, after the original District Court judge recused himself from the case after making some public comments that gave the impression of bias against Microsoft, the subsequent judge no longer sought divestment. Rather, Microsoft needed to agree to a series of consent decrees that were designed to prevent the type of predatory and non-competitive behaviours that led to its conviction. The consent decrees were intended to last for five years, but they were renewed twice and finally came to an end in 2011. However, the decrees did little to affect Microsoft's economic performance, as the company's annual

revenues and profits continued to climb in the wake of the DOJ's decision. Nevertheless, as argued in Chapter 3, the antitrust suit marks a major historical moment both for Microsoft and the software industry more generally. Most notably, the antitrust suit forced Microsoft to make its APIs more openly available to other developers so they could design software that could interact with Microsoft's technologies. The antitrust decision also coincided with the bursting of the dot-com bubble in 2001, the emergence of Linux as a commercially viable business model, and the emergence of the so-called Web 2.0 era, which shifted the business focus of many high-tech companies during that period.

The antitrust conviction also signalled to Microsoft that it needed to find new ways of doing business. Because Linux was becoming more widespread, Microsoft could no longer take an antagonistic stance toward open source. Instead, it needed to find ways to ensure that its products could function on devices that use Linux. To facilitate greater interoperability between Microsoft and non-Microsoft technologies, Microsoft expanded its Shared Source program and, in 2012, opened an entire division of the company dedicated to promoting and supporting open source, open standards, and open platforms. The trend toward embracing open source software continued even after Microsoft closed its Microsoft Open Technologies division, as the company now claims that it is unnecessary to have a separate division devoted to open source. Rather, they argue that open source has become instrumental to everything they do. Indeed, Microsoft also purchased GitHub, the world's leading software development platform, which is used primarily to host open source software projects. This shift in Microsoft's stance toward open source is indicative of the fact that FLOSS, by many measures, has proven to be an effective and commercially viable production model. The shift in supporting open source projects suggests that Microsoft is trying to accomplish two primary goals: harnessing the power of commons-based peer production to supplement its own commercial goals as well as promoting interoperability between its technologies and other systems.

The Microsoft case study is indicative of a company undergoing a transformation in its stance toward FLOSS. In part, this shift was driven by the antitrust conviction in 2001, but the leaked Halloween Documents suggest that the company was already concerned with the FLOSS phenomenon and how to combat it in 1998. Perhaps not coincidentally, this is the same year that the antitrust investigation began. The Microsoft case study is useful for understanding the relationship between FLOSS and corporations because of Microsoft's dominance of the software market. As such, it is instructive to trace its history of software development, especially since the company spans both the 'Web 1.0' and 'Web 2.0' eras. During this time, its business practices and overall strategy shifted to take advantage of the emerging threat of FLOSS development. The company sought ways to incorporate the commons into its existing business operations in part because of the antitrust convictions but also because FLOSS development was proving to be a successful competitor to the company's own development practices.

6.2.2. Red Hat, Inc.

In the case of Red Hat, which still maintains a relatively good relationship with the FLOSS community, the company was able to harness (which is to say, centralise) the collective labour power of the FLOSS community and transform it into a profitable business strategy. Red Hat was created with the intention of providing a formalised institution that could bring the power of free software to the market. However, since the underlying source code for free software was protected by the GNU General Public License (GPL), Red Hat was unable to rely on using copyright protection to exclude others from providing similar software and services. As a result, the company began offering customised versions of free software that could be packaged and protected under the Red Hat corporate logo. As such, the company's products could be protected by trademark. The software that the company provides, then, is protected by the Red Hat trademark, and the company sells customised subscriptions for its software and services. However, Red Hat still needed a way to protect its customers against potential intellectual property infringement claims. Consequently, the company needed a way to control the types of licences allowed in its software offerings. To accomplish this, Red Hat first required all contributors to its software to sign an Individual Contributor License Agreement (ICLA), which would assign the rights to protect the code to the company. The ICLA later changed to the Fedora Project Contributor Agreement (FPCA), which served as a mechanism to control the range of possible licences that could be included in contributions to its Fedora project. Nonetheless, the consequence of controlling the commons was the same.

From one point of view, Red Hat might be viewed as a pragmatic solution to the problem of organising commons-based peer production so that it can become conducive to the establishment of a capitalist enterprise. In effect, Red Hat serves as a formal organisation that can accept liability for the products and services it provides to other businesses. In other words, the problem of organising commons-based peer production under capitalism was solved by establishing a legally recognisable and formal institution that serves as a mediator between corporations and the commons. To accomplish this, however, Red Hat needed to find a way to control what types of code – or at least the types of intellectual property licences – were included in its software so that it could protect itself and its clients against intellectual property infringement claims.

In this sense, Red Hat functions as a curator of the commons. Just as a curator is responsible for collecting, organising, and interpreting artefacts for the purpose of public display, Red Hat performs a similar function for its subscribers. In each case, the curator charges a fee to the public for entrance to a purposefully organised and constructed display of artefacts that has been interpreted in a particular way. The key difference, however, is that Red Hat does not rely on the collection of artefacts exactly as they existed previously. Rather, Red Hat relies on commons-based peer production from its FLOSS project, Fedora, for

inclusion into its customised distributions of Red Hat Enterprise Linux. Moreover, the contributions to Fedora are controlled by worker agreements that all contributors to the Fedora Project must sign. Importantly, however, because Red Hat is transparent about its intentions, the company has been able to enjoy a relatively good relationship with the broader FLOSS community throughout its history.

Whereas Red Hat is situated as a mediator between corporations and the commons of free software production, the Fedora Project Board also serves as a boundary organisation (O'Mahony and Bechky, 2008) between the community of programmers who contribute to the Fedora Project and Red Hat. As such, it is here where the boundaries between Red Hat and the Fedora Project community are negotiated. Similar organisations exist in other FLOSS projects and serve as a useful mechanism for negotiating the boundaries between capital and the commons. Through these processes, as well as the mechanisms used by Red Hat to use FLOSS production as part of its business model, the Red Hat case study represents the ways in which the value of FLOSS production can move from the commons to capital.

6.2.3. Oracle's Acquisition of Sun Microsystems

The third case study, Oracle's acquisition of Sun Microsystems, most directly addresses the question of what happens when a corporation exerts unwanted influence on a FLOSS project as well as how a FLOSS community can cope with the unwanted influence. The chapter illustrated how the FLOSS community has coped with undue corporate influence into its projects by focusing on three different FLOSS projects that were supported by Sun Microsystems prior to its acquisition by Oracle: the OpenSolaris operating system, the MySQL relational database management system, and the OpenOffice office productivity suite of software. What becomes clear from the case study is that FLOSS projects may not be able to avoid corporate influence altogether, especially when those projects are sponsored or supported by a particular company. However, given the nature of FLOSS code, the FLOSS community maintains the ability to abandon production on a particular FLOSS project by forking the project and continuing development under a new name. This is precisely what happened in each of the three cases discussed in Chapter 5.

Furthermore, the case study also provides evidence that FLOSS projects are not immune from the corporate manoeuvering – acquisitions, integration, takeovers, buyouts etc. – that is commonplace in a capitalist system. That is, although the projects may find a corporation willing to provide support through sponsorship, financing, or partnerships, those relations can become strained in the wake of an acquisition in which the acquiring company is unwilling to provide the same level of support as the previous company. If this is the case, the community of developers who contribute to the FLOSS project have technical,

legal, and governance strategies at their disposal to resist undue corporate influence in the project. Technically, code can be reproduced ad infinitum without any substantial reinvestment costs. Legally, most code that is used in FLOSS projects is protected by permissive licences that allow the community to fork their project and begin development under a new name. Coinciding with the process of forking the project is the transitioning of the governing board members to oversee the new project.

The Oracle Corporation's acquisition of Sun Microsystems illustrates how the power dynamics existing between FLOSS communities and the corporations that rely on their projects are complex and varied. While the community still retains the power to abandon production on a project in the face of undue corporate influence, this still places the community in a precarious position with respect to the long-term survivability of their projects. The community retains the ability to fork the project and begin new development, but it cannot rely on the same level of support it received from its corporate sponsor unless it can find new investors. For instance, the OpenIndiana, MariaDB, and LibreOffice projects were able to find additional investment capital, although to varying degrees. In other words, the ability to fork a project is just one step in assuring productive autonomy. However, the productive autonomy of those who contribute to projects that are sponsored by other organisations may always be at risk of undue influence. In those situations, the community can take steps to try to reduce such influence.

6.3. On the Benefit of the Commons Paradigm

In extrapolating from the lessons learned in these three case studies, we can also draw some lessons for the commons more generally, especially the commons paradigm that has been used to understand FLOSS production and reproduction. The benefits of the commons paradigm can be summarised in three different ways that are all interconnected. The commons paradigm is simultaneously universal, adaptable, and teleological.

It is *universal* in the sense that it establishes a framework for understanding how collective resources ought to be governed to ensure their survival and reproduction over time. This framework can be used by any commons-based movement regardless of the unique conditions within any local context. Indeed, various commons movements can learn from what other commons-based movements are doing, then make a decision as to whether such a change should be implemented within their own governance structures.

In this sense, the commons framework is also *adaptable* in that it provides a flexible framework that can be applied across a variety of social struggles. In other words, it is not normative in that it does not posit only one way of accomplishing collective governance. This is perhaps why it has found currency within autonomist Marxism. The autonomous approach focuses on workers' ability to define themselves independently from capital, while focusing on the

different strategies for resistance that are possible in all aspects of social life. The specific dynamics of each community's struggle, however, are determined by a couple of different factors. First, these struggles are confronted with local, national, regional, international, or global forces that shape the institutional or political–economic arrangements within which each community is situated. These forces are not mutually exclusive categories; rather, the struggles may be shaped by some combination of these broader forces. Second, these struggles are also shaped by the unique historical, social, and cultural dynamics of each community. Within FLOSS production, the primary concern is creative autonomy, but other communities connect the survival of commons-based resources with the survival of an entire way of living within ecological contexts. Regardless of the particular struggle, commons-based movements generally want to preserve their shared resources from exploitation or destruction.

Finally, the commons paradigm is *teleological* in that it helps us imagine a post-capitalist future that is on the horizon. As was discussed in Chapter 2, commons movements and the activity of commoning can be understood as 'ways of becoming,' denoting a process by which social change is possible. As such, they serve the purpose of demonstrating the ways in which an alternative future is possible. Commons movements rely on the shared values of mutual aid, trust, conviviality, cooperation, and solidarity. Moreover, these values are also intertwined with the complex histories, cultures, and ecologies of the communities within which they are situated. These values are antithetical to capitalism, which values profit maximisation, self-interest, and competition. The question remains, however, as to how we can continue to build commons-based movements, as well as linking them together so their collective power no longer remains fragmented.

6.4. Political Organisation from Below

There is a contradiction that exists today for organising political resistance.[36] On the one hand, the spread of digital technologies has assisted diverse and fragmented publics in linking with others to form networked communities of interest. Such communities, like those involved in free software projects, rely on inputs from a distributed community of contributors who can collaboratively produce goods, services, or create new meanings for cultural texts. On the other hand, these communities continue to operate from within existing institutions, which operate according to liberal-democratic logics. These networked publics have challenged previously held assumptions.[37] As just two examples of this, consider the challenge to assumptions about ownership (i.e. the rise of copyleft licences to challenge traditional copyright protection), and to production bounded to a specific nation-state and its regulatory policies (i.e. globalised commodity supply chains and the question of whether a product is 'Made in the USA' or any other single country).

This raises the question of what organisational form political resistance should take from within this context. On the one hand, we want to preserve the relative autonomy of local communities to organise in ways that make the most sense for the community. On the other hand, we are confronted with existing institutions that require the coordination of diverse movements to effect change within those institutions. As it concerns the digital commons, Dulong de Rosnay and Musiani (2016) have developed a typology of centralised versus decentralised peer production that is instructive here. The typology can be seen below in Table 6.1. The goal for the digital commons would be to move increasingly toward the decentralised models presented in the table. Doing so would allow local communities to respond to unique needs and simultaneously preserve the highest degree of autonomy for the community.

DuLong de Rosnay and Musiani (2016) are not the only scholars wrestling with how to advance decentralised peer production forward to mount a challenge to capitalism. One such debate took place in a series of articles published in *tripleC: Communication, Capitalism, and Critique* in 2014. The debate stemmed from a proposal made by Bauwens and Kostakis (2014). Noting the contradictions of commons-based peer production being co-opted by capitalist firms, as well as the growing co-operative movement and worker-owned enterprises, Bauwens and Kostakis (2014) propose a convergence that they call 'open co-operativism' that would 'combine Commons-oriented open peer production models with common ownership and governance models such as those of the co-operatives and the solidarity economic models' (356). To facilitate such a movement, the authors suggest the creation of an alternative intellectual property licence that would require reciprocity to benefit the commons. They frame this as a shift from a 'communist' licence like the GNU General Public License (GPL), which allows anyone – including capitalist firms – to use the commons-based resource, toward a 'socialist' commons-based reciprocal licence which, they argue, is exemplified by the Peer Production License (PPL) as proposed by Kleiner (2010). Such a licence would allow for commercial use

Table 6.1: Centralised Versus Decentralised Peer Production (Dulong de Rosnay and Musiani, 2016: 196).

	Ownership	Technology	Governance	Rights	Value
Centralised	Company Major platforms	Central server controlled by platform owner	Top-down decision-making by platform owner	Exclusive rights assigned to platform owner	Concentrated in platform owner
Decentralised	Cooperative non-profit Informal, unstructured collaboration	Several user-controlled computers/ nodes linked in a peer-to-peer network	Participative democracy Autonomy of peers	Terms of contribution leaving some rights to contributors	Redistributed within community and/or society at large

of the licenced resource, but would require reciprocity to the community. This means that licensing fees would be charged to for-profit companies that use the resource. This, then, would allow the community to establish a co-operative, which could receive the licensing fees as income that could then be used to maintain the commons. In effect, the goal is for the community to retain the surplus value of their production. The authors further argue that the goal of this project is to transform the mode of production toward the commons. Furthermore, they claim that without such a transition commons-based peer production 'would remain a parasitic modality dependent on the self-reproduction through capital' (Bauwens and Kostakis, 2014: 360).

Meretz (2014) critiqued Bauwens and Kostakis's proposal on a couple of fronts. First, Meretz critiques the 'logic of exclusion' embedded within the proposal for licensing. He argues that free software is not a commodity; it can be appropriated and used by everyone, but the GPL prevents its transformation into a commodity. Second, he critiques the authors' use of 'reciprocity' by claiming that licences are never reciprocal. Rather, licences grant or deny access or use. Reciprocity must involve people who are reciprocal in a social relationship.

Meretz's own view is that social transformation is not possible by building a counter-economy for progressive social movements. In his words, 'it is not possible to out-compete capitalism … to be better than capitalism on its own terrain in order to finally get rid of it' (Meretz, 2014: 364). Rather, we need a *new social logic of producing our livelihood*, which will not be built upon existing logics of exclusion that mark commodity production. Indeed, capitalism must constantly open up spaces for new logics to emerge so that they can be exploited. In the end, Meretz views the proposal for a new socialist licence as a mechanism for *accessing* the economy rather than a means for societal transformation.

Rigi (2014) offers his own views on these proposals by revisiting some foundational concepts from Marx's work (i.e. value, profit, surplus value, and rent), then demonstrating how Bauwens and Kostakis fall short in their application of these concepts. His point is not to impose Marx's own views on Bauwens and Kostakis, but rather to suggest that they offer concrete definitions for how they use these terms, which would aid in the development of a theory. In addition, Rigi agrees with Meretz's claim that further engagement in the market economy on behalf of peer production communities would only lead to those practices being assimilated into capitalism. However, he also critiques Meretz for underestimating the communist nature of the GPL. Rigi's point is that the GPL already requires reciprocity by stipulating that any derivative work produced with GPL-licenced code must also be made available under the same licence. In this regard, Rigi argues that the GPL abolishes knowledge rent, as there is no 'owner' of the commons who can charge rent for using the commons. Furthermore, Rigi points to companies like IBM who decided to release their proprietary code to the commons so that it could be integrated with Linux. In so doing, the scope of available commons-based code expanded through the specific mechanism of the GPL.

In the final section of his article, Rigi (2014) outlines his own vision for how radical social transformation is possible. His goal is to examine how it would be possible to use the principles and lessons from the production of digital commons to revolutionise material production. Rigi identifies two fundamental problems that must be overcome for this to be possible: territorialisation and automation. First, the production of Linux can occur regardless of geographic location, and contributions to the digital commons can be shared easily across space in very little time. This is because anyone with access to a computer (and the necessary coding skills) is able to contribute to Linux or another FLOSS project. The same cannot be said of material production. Noting both the transportation and ecological costs associated with moving material production across space, Rigi concludes that any attempt at applying commons-based peer production to material production must be geographically bounded so that the production site is in close proximity to the consumption site. Second, material production is increasingly automated, and the human contribution in this sphere is increasingly relegated to science, design, and software. Therefore, 'a combination of a Linux mode of cooperation with automation will generalise peer production to all branches of production' (Rigi, 2014: 400). However, certain spheres of social life will remain untouched by automation: symbolic activities (like artistic expression, knowledge, etc.), and care for humans and nature (education, ensuring ecological survival, etc.). Rigi concludes his article with some speculative proposals for how we might bring about some of these changes by specifically arguing for something he calls 'revolutionary peer producing cooperatives'. I will revisit this proposal later in the conclusion, as it dovetails nicely with some of my own proposals.

In the meantime, however, one can begin to imagine how a set of diverse and distributed communities could begin to implement practices associated with commons-based peer production. Indeed, we have already seen examples of this around the world, but these communities still need to be linked through common interests to mount a significant challenge to existing institutions. This is where De Angelis's (2017) use of 'boundary commoning' becomes useful. In this final section, I outline how a commons praxis might overcome these two difficulties. First, I discuss the problem of organisational form by building upon lessons from recent critical scholarship. Second, I discuss 'subversive commoning', which would address the need for a progressive political project for moving the commons forward.

6.5. Boundary Commoning

De Angelis's (2017) formulation of circuits of commons value, which was discussed in detail in chapter 2, provides a useful analytical tool for understanding how value is produced and reproduced by commons-based movements. However, these movements still intersect with capital accumulation circuits in

the course of their commoning activities. Therefore, the coupling of commons circuits of value with capital accumulation circuits, whether willingly or out of necessity, still does not overcome many of the contradictions of the commons. De Angelis's formulation, then, seems to leave us with a picture of a 'long social revolution', which would proceed primarily through the autonomous development of an emergent alternative value system from within capitalism. Such a value system would privilege commons value rather than capital accumulation. But there is another element in De Angelis's work that he draws from systems theory and cellular biology, which seems to contain the possibility of linking diverse commons movements. That is the concept of 'boundary commoning', which is defined as:

> the commoning that exists at the boundaries of the commons systems and that creates social forms of any scale, opens up the boundaries, establishes connections, and sustains commons ecologies, or that could reshape existing institutions from the ground up through commonalisation and create new ones. (De Angelis 2017: 24)

Boundary commoning has the potential to provide an organisational model for how diverse and distributed commons-based movements can work together toward a common goal. Through the multiplication of commoning activity and the interweaving of commons-based communities through boundary commoning, a commons movement could potentially lead to a tipping point at which social transformation is possible. In addition, De Angelis claims that commons movements could link with social movements to form a hybrid movement with the combined power to bring about social revolution. As he explains, these 'are not movements of fragmented subjectivities sharing a particular passion, but movements of connected subjectivities whose connection is further increased by their social movement' (Ibid., 387). Therefore, boundary commoning allows specific communities to retain their autonomy, while also linking with other organisations through common interests. While similar organisational structures have been used in the past – namely, the federated approach taken by Indymedia (see Pickard, 2006) – the commons offer a framework that is widely applicable and capable of linking diverse movements under a common framework. Importantly, however, such a movement ought to be based on an antagonistic understanding of the commons' relation to capitalism. In short, we continue to need a form of commons praxis for advancing the cause of the commons.

6.6. Commons Praxis

The task for a commons-based praxis is to overcome at least two hurdles. First is the task of determining an organisational form that would incorporate

the lessons of critical scholarship on the commons. Critical scholarship has exposed some of the limitations of liberal-democratic or reformist approaches that seek to transition to a commons-based society from within existing institutions. While this is undoubtedly necessary to bring about change, we are still left with the limitation of radically transforming the organisation of society and social relations from within existing institutions, which are based on hierarchical organisational structures that tend to privilege political and economic elites with the requisite capital necessary to exercise influence by shaping policy agendas. These institutions cannot account for the multitude of distributed, diverse, and unique needs of local communities, and yet their existence will continue unless commons-based movements provide alternatives. This problem has become even more acute now that local publics can network with other communities of interest across national and international geographic boundaries. Second, a commons praxis needs to overcome the persistent problem of growing and sustaining commons-based movements over time. In this sense, a commons praxis needs to move beyond a *politics of subsistence* and institute a more progressive politics that would actively seek to grow the commonwealth available to commoners. I refer to this political project as 'subversive commoning'.

6.6.1. Subversive Commoning

The unique characteristics of the digital commons – low rivalry and low excludability – make it possible for the products of peer production to be appropriated by the state and capital. Similar arguments have been made within critical scholarship on the commons, more generally. Indeed, this book demonstrated how capital incorporates FLOSS production into commercial offerings in various ways. To actively promote the growth of both the subjective and objective qualities of the commons, commons-based movements will actively need to work to subvert capital logics by positioning their activities in an antagonistic relationship to capital.

By seeking reformist agendas from within existing institutions, such movements risk remaining small-scale, fragmented, and only capable of temporary subsistence rather than formulating a coordinated alternative to prevailing logics. Therefore, commons-based movements need to move beyond a *politics of provision* (based on the granting of individual rights, open access, etc.). Such a politics would not only provide rights of access to community members, but the sources of their commonwealth would also continue to be susceptible to capital and state appropriation. To be sure, the inroads made by movements informed by liberal–democratic political economy have led to the widespread adoption of particular commons-based resources (see especially Linux and the technologies of free and open source software). But insofar as these resources

are available to capital, they only exacerbate or accelerate the inequities involved in circuits of capital accumulation.

One of the most well-developed proposals for reforming existing institutions to bring about a commons-based society comes from the P2P Foundation (2019) and its Commons Transition Plan. The plan outlines policy prescriptions toward a commons-based society where citizens are treated as commoners. As I have outlined throughout this paper, however, the dilemma of how to ensure that the value created by commons-based movements remains within the commons persists. Bauwens and Niaros (2017) explore this dilemma through an analysis of value within the commons economy. The authors argue that economic theory is experiencing a 'value crisis' in light of the emergent practices of commons-based communities. They argue that whereas value within capitalism is *extractive*, a shift to a *generative* value model would enrich the communities and resources directly involved in production. The open cooperative and platform cooperative (Scholz, 2014) are organisational forms that have been developed as a means for directly enriching those involved in production. However, the specific tactics used by open cooperatives to ensure that the value created by their contributors stays within the commons varies. Bauwens and Niaros (2017) provide case studies that illustrate these differences. Most important for the purpose of my argument, however, is the question of how value can be actively re-appropriated from capital and placed into the commons value circuit.

My argument is that we need a form of 'subversive commoning', which would actively seek to incorporate resources into commons value circuits. Just as capital operates according to a logic of capital accumulation by dispossession (Harvey, 2004), so too can commons-based movements reverse this logic to establish a site of social struggle. This could be framed as *commons pooling by capital dispossession*, although there are a couple of caveats to such an expression. First, I use the term 'pooling' here to signal an opposition to the private accumulation of capital. However, commons-based movements need to find ways of actively growing their commoning capacity over time. Doing so could accelerate the pace of the social revolution described by Marx, as well as more recently by De Angelis. Second, 'dispossession' is not necessarily an entirely accurate term when applied to the digital commons. Rather, digital resources could be appropriated by commons-based movements to serve their own needs.

Bauwens and Niaros (2017) use the term 'reverse co-optation' to describe the ways in which commons-based movements can 'use capital from the capitalist or state system, and subsume capital to the new logic' of the commons (3). The example given by the authors is the open cooperative, Enspiral, which uses a policy of 'capped returns' to protect its operations from the perpetual returns that investors often seek when investing in a company. In essence, shares in a new company are offered to investors along with an option for the company to repurchase those shares at an agreed upon price in the future. The idea is that

the interests of the investor and the cooperative become aligned; both have an interest in seeing the cooperative succeed. The investor will be guaranteed some return on the initial investment, and the cooperative will have full control of its finances. In the case of Enspiral, once the capped return contract has been fulfilled, all resources are then given to the commons. In this sense, Enspiral provides an example of how an open cooperative can actively grow common-pool resources.

While Enspiral provides one example of how the commons can grow, my idea for 'subversive commoning' would include many other examples. At a general level, we can think of movements to reclaim farming, housing, forests, and other natural resources by either occupying abandoned space or actively resisting the enclosure of ancestral lands. These activities are directly subversive to capital because they actively re-appropriate sites of capitalist production into cooperative or commons-based movements. But we also have examples from within the digital commons. For example, organisations like RiseUp or Saravá provide 'online communication tools for people and groups working on liberatory social change' (RiseUp, 2019). In addition, FemHack provides a space for feminist and queer hackers to 'hack patriarchy, capitalism, and other systems of oppression', and the group actively works to encode non-hierarchical values into their technologies and networked infrastructures (foufem, 2016). These organisations, which have been effectively built from nothing, have the subversion of the logic of capital at the core of their foundational principles. Apart from within organisations that provide digital infrastructures, tools, and services to assist in the project of bringing about social change, subversive commoning can also be seen in attempts to release knowledge and information that has been closed off from public access. Aaron Schwartz's downloading and release of academic articles held in the JSTOR database provides an example of commoning knowledge that was enclosed by the capitalist logic of publishing companies. What all these examples have in common is the subversive nature of their activities in attempting to undermine prevailing capitalist logics that either enclose knowledge and information behind paywalls or institute hierarchical systems of management, surveillance, and control over information resources. Any attempt to subvert these logics could provide an example of subversive commoning. Subversive commoning responds by appropriating these resources and re-encoding them within the logics of commons value circuits as well as within subjectivities that emphasise care, trust, mutual aid, and conviviality, while recognising the social value in social production.

By incorporating a critique of capitalism within commons-based movements, we can move closer to truly anti-capitalist commons. Caffentzis and Federici (2014) describe anti-capitalist commons in the following way:

> Anti-capitalist commons, then, should be conceived as both autonomous spaces from which to reclaim control over the conditions of our reproduction, and as bases from which to counter the processes of

> enclosure and increasingly disentangle our lives from the market and the state. Thus they differ from those advocated by the Ostrom School, where commons are imagined in a relation of coexistence with the public and with the private. Ideally, they embody the vision that Marxists and anarchists have aspired to but failed to realize: that of a society made of 'free associations of producers', self-governed and organized to ensure not an abstract equality but the satisfaction of people's needs and desires. (Caffentzis & Federici, 2014: 101)

Rigi's (2014) proposals for 'revolutionary peer producing cooperatives' have some of these hallmarks as well. His criteria for such cooperatives are twofold: 1) 'the cooperatives must be revolutionary', and 2) 'they must break with the market as much as they can' (401). In visualising how material production would pair with knowledge commons, Rigi claims that each cooperative would produce its own food on its commons of land, but the material commons (land, food, etc.) would only belong to the members rather than be open for all like the knowledge commons. He also claims that the cooperative must be open to new members, but there would be a cap on the total number of people who are allowed to join, which would be determined by the number of people who can be supported by the land. Rigi also suggests that any surplus of material goods could be made available to other cooperatives through a networked system of exchange between other revolutionary cooperatives. Therefore, these communities should try to develop their own communication and transportation networks to the greatest extent possible. To reduce the distances between such communities, Rigi envisions such cooperatives to be a series of smaller communities (approximately 200,000), which would require massive movements of people out of urban centers and back to the countryside. The goal here is to reduce the strain on urban environments and ecologies, while revitalising some of the areas that have been left behind as now more than half the world's population resides in urban areas.

Undoubtedly, there will be disagreements on how to most effectively accomplish such a mass mobilisation. The end goal, however, is to design a more equitable and sustainable future for the planet and people. While this may seem like an unobjectionable goal, too often progressive social movements become mired in debates about the appropriate means to achieve these goals, as if there were one singular means for achieving social change. My own view is that we ought not to be entirely dismissive of any effort at bringing about change, especially if that change is aimed at combatting the injustices of global capitalism. Rather, to truly mount a substantive challenge to the tendencies of global capital, we will require a multifaceted approach that accounts for the unique specificities within local contexts. The point is not to provide a general prescription for how things ought to be done. Rather, as Marx reminds us, the point is to change the world. And change requires that we remain open to the unique histories, challenges, and opportunities with which we are presented.

6.7. Concluding Thoughts on Capital and the Commons

As the quote from Raymond Williams at the beginning of this chapter reminds us, technologies are just one part of a more general social struggle. Commons-based peer production, such as the type occurring within FLOSS communities, should not be viewed as a comprehensive solution to the unequal social relations of a capitalist system. Rather, commons-based peer production may be viewed as one part of a broader social struggle against global capital. More specifically, commons-based peer production can be viewed within the context of a broader resistance movement that seeks to reclaim commons of all types, whether they be tangible goods like land, water, and air, or the intangible goods of data, information, or knowledge that provide the infrastructure for social relations.

When Karl Polanyi authored *The Great Transformation*, he critiqued the then-emerging market fundamentalism of the Austrian School of economics, exemplified by Friedrich Hayek and inspired by the work of Ludwig von Mises, for its dis-embedding of market relations from social relations. For Polanyi, the market and market relations had historically been embedded within social relations, such that the social bonds connecting communities of people together were not subjected to a market logic. Rather, the market existed within and as a part of social relations. This, however, transformed after the market became elevated to a degree whereby all other relations became moulded according to its logic. This dis-embedding of the market from social relations has the normative effect of creating certain 'fictitious commodities,' like land, labour, and money that had all previously been important infrastructural elements of social life. In other words, when land becomes a commodity, concerns about its long-term sustainability become subsumed under a market logic that seeks profit from its exploitation. The same applies to labour, which is to say, human beings, who become exploited and valued according to a market logic. Finally, money becomes something to be hoarded for its intrinsic or future value rather than its function as a universal equivalent for exchanging different goods.

Polanyi's critique could, perhaps, be expanded to include information as a fictitious commodity. This would offer a framework for situating information dialectically between the market and social relations, as well as the increasing tendency to extract information out of its social function and treat it as a commodity. Indeed, Schiller (2007) draws this distinction between information as a commodity and information as a resource. When treated as a commodity and enclosed by intellectual property protections, information becomes highly valued as a privileged resource that can only be accessed by those who are willing to pay for access. When treated as a resource and made freely available for all, information can be studied, modified, adapted, and redistributed to others who can also benefit from access to it. Thus, we arrive at two conceptualisations of information: as a privatised resource transformed into a commodity, and as a commonly held resource available for all.

Corporations, like Microsoft, have sought to transform information into a privatised resource that can be protected by copyright. The FLOSS community has sought ways to preserve information as a commonly held resource for all to use, most notably through copyleft licences like the GPL. By doing so, the community has been able to establish a knowledge commons that resists enclosure. However, the knowledge commons under capitalism may be facing a similar fate to the commons of the past, although with certain careful distinctions. This project has demonstrated how capital has readjusted its relatively inflexible position in relation to commons-based production. It needed to reorient its strategies to incorporate without enclosing the commons. By doing so, capitalist firms pursue profits while finding a variety of ways to give back to the community, whether by making code freely available under free software or open source licensing, or by supporting the informal institutions that govern various open source projects. While this may provide ad hoc support for commons-based production, it may not provide a long-term solution to commons-based labour. Instead, commons-based peer labour may be placed in an ever-more-precarious position of depressed or non-existent wages while corporations make commercial use of their contributions. What will be needed as this type of involvement continues is a sustainable way to protect the commons, but also a way to ensure investment in commons-based peer labour. In other words, not just investment in institutions, organisations, technologies, or innovations, but long-term and sustainable investment in the true source of their value, which is to say, people.

Notes

[36] The ideas in this section originally appeared in Benjamin Birkinbine. 2018. Commons Praxis: Toward a Critical Political Economy of the Digital Commons. *tripleC* 16(1): 290–305.

[37] For more on these contradictions and a critical call for media and communication scholars to formulate a newly emergent politics of the left, see Fenton, Natalie. 2016. *Digital, Political, Radical*. Cambridge, UK: Polity.