Tripping Over Our Bootstraps: Open Source Ecology and the Promise of Liberational Technology

Configuring tools as a mode of straightforward escape from oppression, be it poverty or unfulfilling work, risks ignoring existing material practices and organizations that hold us to systems of inequity.

— by Anne Pasek on June 9th, 2015

They say that with $80,000 and 200 acres of land, you can bootstrap yourself out of capitalism. With access to the right tools, you can secure food and shelter, modern comforts, and freedom from scarcity. This is the premise of Open Source Ecology (http://opensourceecology.org/) (OSE), a non-profit open source hardware group that collaboratively designs and distributes blueprints for imagined, autonomous communities both within America and low-income countries abroad.

The cornerstone of Open Source Ecology’s platform is a group of fifty prototype designs called the Global Village Construction Set (http://opensourceecology.org/gvcs/) (GVCS). These include subsistence farming tools such as combines and seeders, a fabrication workshop with a circuit board mill and a plasma cutter, and wind and steam power technologies. Designed with resilience, modularity, and simplicity in mind, the GVCS expresses a distinctly utopian ethos, promising (http://issuu.com/amakaruk/docs/civilization_starter_kit_-_v.0.01_-_pdf/290) “the greatest possible empowerment... by unleashed human productivity fueled by open access to information and enabling hardware.” Once design work is completed, this new technical means of subsistence could afford its users greater financial independence with minimal physical toil, thereby contesting systems of poverty or simply the economic necessity of a 9-5 job. All participants would have to do is front the capital to buy some land and materials with which to replicate OSE’s designs.

The initiative was created by Marcin Jakubowski, a physics PhD seeking to escape the silo structure of academia. Like the president of a startup vying for venture capital, Jakubowski secured multiple fellowships and hundreds of thousands of dollars in foundation funding after a highly successful TED talk (http://opensourceecology.org/video/open-sourced-
blueprints-for-civilization-ted-2011/) in 2011. Since then, intensive work on the GVCS has followed, including networked working groups, design sprints, and project visits to OSE's workshop and prototyping site, Factor e Farm. To date, over 100 GVCS prototypes have been replicated (http://opensourceecology.org/wiki/Replication) across 8 different countries, indicative of a growing enthusiasm for open source hardware and the associated ethos of personal independence and material sovereignty.

However, because technology is an inexorable part of systems of power, its use and design invariably brings a host of costs and restrictions that can be hard to outmaneuver; attempts to realize the values of liberational technology can produce unanticipated, even self-sabotaging effects.

**Visions of Liberatory Technologies**

“El Hombre en la encrucijada” Diego Rivera (1934), CC-BY Xenophon (http://en.wikipedia.org/wiki/Man_at_the_Crossroads#/media/File:Palacio_de_Bellas_Artes_-_Mural_El_Hombre_in_cruce_de_caminos_Rivera_3.jpg)
Labor and counter-culture theorists have long written about the need to harness the transformative powers of machines. Karl Marx (https://www.marxists.org/archive/marx/works/1857/grundrisse/ch13.htm) decried the dehumanizing effects of mechanized factories, yet noted that if properly designed and compassionately managed, mechanization could serve to meet the needs of the many, creating the very “condition of [labor’s] emancipation.” Murray Bookchin (https://libcom.org/files/Postscarcity%20Anarchism%20-%20Murray%20Bookchin.pdf) later revisited these ideas in light of the cybernetic and microprocessor revolution of the 1960s. He advocated for a decentralized and automated manufacturing network that privileged human dignity and environmental stewardship over profit. He maintained that the unpleasant necessity of laborious toil could be abolished, as it was only the cheapness of human labor and the lack of moral systems designs that inhibited the realization of liberational technosystems.

These ideas enjoy a distant afterlife in America’s IT industry. In its formative years, ground was laid by the Whole Earth Catalog (http://www.wholeearth.com/index.php), a magazine and mail-order business aimed at West Coast communes and hippies. Its slogan “Access to Tools” premised the distribution of technologies distinctive in price, quality, or capacities to disrupt political and economic hierarchies and reimagine community life. Although the magazine and its associated communes folded by the 1970s, its network and values endured and reinvented themselves (http://www.nytimes.com/2006/09/25/arts/25conn.html?pagewanted=all) through a lasting association within the nascent Bay Area tech culture. The magazine’s editorial team would go on to organize a proto-internet service in the 1980s and found Wired in 1993. Steve Jobs (http://www.openculture.com/2011/01/steve_jobs_on_life_stay_hungry_stay_foolish.html) later attributed much of the Apple Computer’s ethos of difference to the Whole Earth.

Although mainstream tech culture has drifted from the more radical premises of liberational technologies, free and open-source software (F/OSS) has certainly creatively troubled liberal values (http://gabriellacooley.org/Coleman-Coding-Freedom.pdf) of proprietary ownership, bringing intellectual copyright and other information restrictions under greater scrutiny. For users, free software can be immensely helpful in overcoming economic barriers, or when expanded functionality and adaptive technologies are sought outside the norm. The capacity to build and distribute goods at a distance from capitalism is indeed a profoundly hopeful thing.

Despite such potential, open source software never wholly escapes capitalism and is thus subject to a pattern of exclusions. Its production requires the free gift of labor on the part of skilled developers and non-coders alike (https://modelviewculture.com/pieces/non-coding-contributors-in-open-source). These volunteer workers are, by necessity, fairly privileged (https://modelviewculture.com/pieces/the-open-source-identity-crisis) economically and in
their intersecting positions along lines of class, race, and gender. This lack of diversity creates a toxic mix of exploitative pressure (https://modelviewculture.com/pieces/what-your-open-source-culture-really-says-part-one) for unpaid work, a lack of equitable leadership and direction between participants, and the potential for internal harassment. (https://modelviewculture.com/pieces/leaving-toxic-open-source-communities) While these outcomes aren’t fated for every open source community, they nevertheless suggest that, even in the case of nonrivalrous goods such as software, something definitely does not come from nothing.

**OSE Trials and Tribulations**

![PERCENTAGE OF COMPLETION](https://example.com/chart.png)

*GVCS State of Completion* (http://opensourceecology.org/wiki/GVCS_State_of_Completion)

If volunteer workers were supported by an autonomous, post-scarcity community, these pressures might be different. However, bootstrapping oneself out of material constraint proves to have just as many setbacks. Although Jakubowski estimated that preliminary work on the GVCS would be finished by 2013, the design and testing of prototypes is only near completed in one of the fifty (http://opensourceecology.org/gvcs/) technologies. Difficulties with prior patents and inconsistent volunteer participation have slowed progress on hardware whose absence ties OSE to the economic system it seeks to escape. For instance, most
technologies used or prototyped at Factor e Farm and at its replication sites are still powered by gasoline or the rural electrical grid, adding to OSE’s expenses and dependence on external resources. Similarly, work on fabrication hardware has taken priority over food production tools, such that little of Factor e’s land is actively farmed. Instead, residents source their food (http://www.bloomberg.com/bw/articles/2012-11-01/the-post-apocalypse-survival-machine-nerd-farm) from grocery stores miles away. While foundation grants bore the weight of the initial material costs of the project, they have now been wholly exhausted (http://blog.ted.com/ted-fellow-marcin-jakubowski-on-his-adventures-in-extreme-manufacturing/). Under these conditions, it is difficult for free labor to be free.

If utopia is a place that one is forever moving towards, yet never reaching, then perhaps the best way to assess the success of such projects is by the trajectory of their ideals. In this way, the inspiring scale of the GVCS and its imagined community has done much to keep the dream of liberational technology alive. What is curious, however, is that over the past four years OSE appears to have shifted its politics and goals towards less revolutionary ambitions.

Since the end of 2011, Jakubowski’s language has grown more libertarian than liberational, arguing less for community autonomy and more for the creation of competitive open source businesses. As he notes, “the concept has evolved (http://opensourceecology.org/wiki/Open_Source_Ecology_Paradigm) to a platform for creating distributive enterprise as a solid foundation for a sound economy—a third economic option beyond capitalism or socialism.” Jakubowski envisions a network of digitally-accessible open source hardware blueprints, with the GVCS as its kernel, that entrepreneurs could access globally and build locally in order to sell for a profit. Owing to the presumed superior quality of the designs and the anticipated cost reduction of local sourcing and manufacturing, he argues that such a strategy will overturn traditional markets, lower barriers to entry for entrepreneurs, and bootstrap new international development efforts. In Jakubowski’s eyes, “this is a solution to poverty” and “the next trillion dollar economy.”

Within Factor e Farm, OSE has refocused its efforts on internal revenue generation. Instead of seeking funds through crowdsourcing or foundation grants, it has expanded its workshop offerings and monetized both participation in these educational initiatives and the sale of hardware manufactured over the course of training. Its compressed earth brick press, the most developed technology so far, has been recast in terms of its potential to provide a “killer app (http://opensourceecology.org/ose-4-year-review/)” in the American housing market writ large. Moreover, collaborators seeking to visit Factor e to work on a prototype now must include (http://opensourceecology.org/wiki/Dedicated_Project_Visits) the development of a distributive business model within the project outcomes. Little mention of the project’s commitment to labor politics remain in evidence.
Open Culture Assets (http://opensourceecology.org/wiki/Open_Culture_Assets)

To what could this conservative turn be attributed? While it would be easy to fit this story into a narrative of the youthful naïveté of big dreams and their subsequent re-assessment, there are deeper forces at work, ones that invite us to reconsider the stakes of the open source ethos and the politics of bootstrapping.

The Price of Autonomy

One of the enduringly difficult things to apprehend in open source is that all materials and practices, be they in relation to software or hardware, have a cost and thus a tollgate for participation. In order to contribute to the Global Village Construction Set, volunteers must not only have the free time, training, and economic affluence to be able to gift their labor, they must also access numerous supply chains of electrical and digital infrastructures and front their costs. OSE similarly, in prototyping and dogfooding (http://opensourceecology.org/ose-4-year-review/#comments) its own designs, inexorably joined itself to a larger supply network, even as it sought to oppose its hegemony. Reviewing the design briefs for the GVCS, one cannot fail to notice that the vast majority of parts required for assembly are sourced from a centralized online distributor whose business practices would seem to be an anathema to the economic model championed by OSE. And yet, even with an established lab and cheap supply chains, financial woes endure. Both within its own facilities and in the lives of its collaborators, established social and material infrastructures play a large role in determining...
the viability of OSE’s goals.

OSE’s Life Tractor. Photo credit: Sean Church (https://www.flickr.com/photos/sean_church/4919414820/in/album-72157624665572279/)

All this suggests that there are some significant problems hidden within the idea of bootstrapping. Increasingly endemic to startup culture (http://www.fastcompany.com/3038208/10-tips-for-bootstrapping-your-startup), the idea of self-financing, staffing, and otherwise sustaining a nascent project has been widely celebrated and mythologized. It conveniently fits within treasured models of individual entrepreneurs and their singular leadership. However, this focus on the individual and his (to gender this motif appropriately) internal merit and self-reliance omits larger structures of power and practice that are inequitably distributed and acknowledged. Breaking free of material constraint is not a one-time thing, but must instead be negotiated slowly and with continued difficulty. To presume otherwise is to reinforce a problematic ethos of radical self-sufficiency, a fantasy possible only to the few.

This is particularly worrying in relation to OSE’s proposed solution to global inequality. If OSE, with all its privilege, financial and human resources, cannot bootstrap a fabrication
facility, then this solution seems poorly matched to the material resources of communities living in acute poverty.

**Thinking Through Technology Together**

In contrast to OSE, we might look at the Detroit Water Brigade (http://detroitwaterbrigade.org/), a group of volunteer advocates and activists which, over the past year, has crowdfunded (http://www.amazon.com/registry/wedding/IH3ZZPKTLGZYL) the receipt of bulk amounts of water and water filtration supplies for local residents, distributing them to homes subject to sudden shutoffs. Detroit citizens are also rumored to be sharing knowledge on alternative ways to retain access to the civic grid (http://www.npr.org/2014/08/01/337145827/a-right-or-a-privilege-detroit-residents-split-over-water-shut-offs), pouring concrete over water mains to keep lines open and trafficking in municipal keys to restore water when it has been turned off. Rather than relying on security through self-autonomy or generic solutions to specific cases, such actions in Detroit are made possible by the collective mobilization of advocates within and against larger infrastructural systems. While the Water Brigade's larger goals include the creation of citizen-led eco-villages and decentralized rainwater collection systems, their pragmatic orientation to technology and highly local focus are much closer than OSE in enacting any kind of liberation. This suggests that collective control over infrastructure is equally as important, if not more so, than access to tools.
While articulating an important vision of alternative material relations, OSE’s over-emphasis on technology ignores the ways in which power is maintained through infrastructure and its inequitable tolls. Configuring tools as a mode of straightforward escape from oppression, be it poverty or unfulfilling work, risks ignoring existing material practices and organizations that hold us to systems of inequity. It is these ties, rather than the individual technologies themselves, that more often determine the success of such projects, their reach, and their stakes. Would-be liberational technologies, if they are to support open participation and greater equality, must prioritize these fronts, through both technical and non-technical means.
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