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2017 and "Killer Apps" for the Transition

Kevin Carson

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On the Open Manufacturing Google Group, an email list for people interested in open-source industrial design and commons-based peer production models for physical production, Nathan Cravens raised the question of why peer-production of physical goods has had such a hard time gaining traction as an alternative to the corporate capitalist model:

Open source projects seem to lack the ability to scale, remaining hobbyist or academic. Successful products are "curated" and pounded with marketing, yet, a community focus on making a product intuitive and beautiful, while demoing the product as a lifestyle, because it is worth having, would be ideal?

As Cravens points out, open-source product design is still practically implemented, for the most part, within a capitalist paradigm of production for profit in corporate-owned facilities (the classic example is Elon Musk's various manufacturing ventures).

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Open-source organization is ideal for the design of industrial products, because digital design can be done stigmergically (the same modular, granular approach to leveraging small contributions that characterizes Wikipedia) by self-selected individuals designing components to plug into a larger platform ecology. Physical production, on the other hand, is a cooperative venture that requires at least some degree of administrative coordination by a number of people engaged in a common process. Members of an open-manufacturing ecology can't just manufacture components and sub-assemblies when they feel like it, and let them lie around until other groups of people also feel like producing the remaining necessary parts and assembling the final product. In the meantime, the shelves at Sears and Walmart are being stocked with goods — of inferior design and higher price though they may be — that are made to order in a timely fashion.

So the question is, what's the catalyst that will drive cooperative production of physical goods on a P2P model at the local level, so organized as to meet the real material needs of real human beings in a timely and efficient manner, and to provide an alternative preferable to going to Sears or Walmart?

In my opinion it's the present-day approach to commons-based peer production as a lifestyle choice or ideal, which Cravens seems to set forth as an alternative to hobbyist production, that's the problem. Societies undergo phase transitions to fundamentally new ways of organizing things only when the new technologies that were previously adopted as the lifestyle choice of those who could afford to secede from the existing system, as a matter of choice and privilege, are instead adopted as a means for survival by those who no longer have the choice of surviving in the existing system.

Technologists sometimes use the term “killer app” for a practical application that suddenly drives widespread adoption of a technology that had previously been sitting around for a considerable length of time, with nobody much paying any attention to it outside of hobbyist groups.

The “killer app” concept applies on the macro scale as well, to the adoption of new organizational and technological paradigms on a society-wide basis. Because of path dependency and culture lag, the technological feasibility of organizing society on a new basis tends to predate the phase transition to a society actually organized around the new technologies. That phase transition occurs only when the new technologies are widely perceived as offering the solution to real popular needs. And when it does occur, it is usually non-linear and is much faster than anyone anticipated when the tipping point is reached.

Ultimately material implementation of open source design projects will come from local network nodes composed of people colocated in physical space, who are driven by their own immediate material needs. In other words, our society and economy will shift to more liberatory, decentralized and abundant ways of organizing and producing things only when people see them as the obvious solution to real and immediate problems.

Resilient forms of organization are adopted in the face of turbulence and uncertainty. Large, centralized hierarchies of the kind that reached their peak in the 20th century — large oligopoly corporations and nation-states — function optimally only in environments that are controlled so as to artificially reduce complexity and render society predictable to managers and planners.

When complexity and uncertainty reach levels beyond the ability of hierarchical institutions to control, such institutions quickly begin to break down in the face of unmanageable turbulence. And societies — or rather, the people making them up — react to that turbulence by adopting new, more resilient organizational forms that are decentralized, networked and hardened at the end points.

At the same time, historically speaking, in periods of economic dislocation where increasing shares of the population have been unemployed or underemployed, and long-distance industrial supply and distribution chains have broken down, people have responded by relocalizing production and shifting the process of

meeting their own material needs from the wage system to direct production for use in the social economy.

And when social safety nets and wage employment break down together, people tend to coalesce into self-organized social units for mutual aid of the kind described by Pyotr Kropotkin and E.P. Thompson, and institutions for pooling costs, risks and money incomes among extended families or multiple households.

We're already seeing all these background conditions in spades. Capitalism is experiencing a number of steadily worsening terminal crisis tendencies. Thanks to Peak Oil and other crises of peak resource inputs, capitalism has reached the limits of extensive growth based on endless addition of artificially cheap, subsidized energy and other material inputs, mostly obtained through colonial enclosure and looting with the help of the state.

Along with the end of artificial abundance of material inputs, capitalism is hit from the other side by an equally devastating crisis: an end to the artificial scarcity of information — not only the open-source production of information as a counter-model (e.g. Wikipedia largely destroying the revenue of Britannica) but the growing unenforceability of copyrights and patents. Digital file-sharing has put an enormous dent in the revenue of proprietary content industries. And cheap micro-manufacturing technology means that production will be dispersed to hundreds of thousands of neighborhood shops, so that the transaction costs of enforcement render patents meaningless, and downloading pirated CAD/CAM files becomes as commonplace as downloading mp3s is now.

Industrial capitalism's chronic tendencies towards surplus investment capital and excess capacity are being rendered much worse by the implosion of capital outlays required for material and immaterial production. The crisis of surplus capital that had been temporarily ended by WWII was resumed around 1970; even increasing financialization and political attack on labor's earlier gains, which capital resorted to as a response, was insufficient. The desktop computer revolution and the Internet reduced the required

Eight years of a caretaker regime by the old dying neoliberal party establishment she represents, a demographic transition within the Democratic Party to a majority of Millennials who are both more socialistic and more libertarian (and with more Green and Pirate sympathies) than the Boomers they're replacing, and the implosion of the GOP into an irrelevant regional party of elderly white rageaholics. Today we can expect the transition to occur against a background more fraught with danger and repression. But the economic dislocation from Trump's trade wars, and the increased rate at which social safety nets are dismantled, may if anything increase the value of social and economic counter-institutions as lifelines for survival.

And the basic forces driving the transition — the political, material and technological exhaustion of the old capitalist system, and the irrepressible post-capitalist system which is emerging from it — are just as inevitable either way. The transition may be rockier. But we'll get there.

wise homeless, such centers may of necessity be the first adopters of micro-manufacturing technology, along with community gardens and off-grid power sources.

The decay of steady, secure employment and the shift to precarious freelance and temp employment is also leading to a huge outgrowth in experimentation with revived guilds, freelancers' unions and cooperative temp agencies. Such organizations provide collective bargaining services on the model of the old longshoremen's hiring halls, certify skill and provide continuing training on the guild model, and offer to provide temp workers on a cooperative basis without the middleman.

And as the old national governments either succumb to fiscal exhaustion and austerity, or are actually taken over by the likes of Trump, we also see an increasing shift towards horizontal networks of local platforms that bypass national governments altogether (and abandon them as irrelevant). The most notable example is the assorted municipal movements in Spain which grew out of M15 which, despite right-wing control of the national government, are creating rich ecologies of commons-based and cooperative institutions in the major cities. In the United States, the Evergreen initiative in Cleveland and the solidarity economy initiatives in Jackson under the late mayor Chokwe Lumumba. In the present atmosphere we can expect such local initiatives to increase in importance, and to proliferate along with horizontal ties between them. We can expect them also to link up with networked movements for resistance to repression and neoliberalism — movements like #BlackLivesMatter and #NoDAPL, local remnants of Occupy, cop-watch and Black Panthers armed patrols, and the like, as well as local initiatives like community land trusts and barter currencies.

There's an old saying that the first casualty of a plan is contact with the enemy. We have to negotiate transition in the scenario that we have, not the one we would like to have. Two months ago I fully expected the transition process we're discussing to take place against the more congenial background of a Clinton administration.

capital outlays for production by two orders of magnitude or more in the information industries. The micro-manufacturing revolution (especially in its open-source hardware manifestations) has similarly reduced the capital outlays required for physical production. That means that the problem of finding enough profitable outlets to fully absorb available investment capital, already serious, has become insurmountable.

Meanwhile, the United States reached peak wage employment in 2000 — even before the Great Recession — and labor force participation has declined steadily ever since. Among those still in the labor force, a steadily growing percentage are underemployed, and employment has shifted from secure full-time jobs to low-paying service jobs and precarious temp or gig economy work.

The combination of new production and communications technologies, along with new forms of organization, presents a level of insupportable complexity that the old-style hierarchies of corporation and state are able neither to limit, contain or adapt to.

States are unable to effectively respond to terrorist networks organized on a stigmergic, open source model. Their ability to anticipate and prevent attacks is near zero, thanks to the virtually insurmountable problem of false positives and the inferior agility of bureaucratic hierarchies. This means that chronic disruption from the potential of terrorist attacks will further degrade transportation infrastructures, power grids, and supply and distribution chains.

The rise to power of right-authoritarian governments in Europe and the United States means that nation-states are more useless than before as a source of solutions to these problems, and if anything add to the level of turbulence from which ordinary people need protection. And fiscal exhaustion and austerity, along with the ongoing disintegration of the corporate-centered economy, means that state- and employer-based safety nets are disappearing.

Put all these things together and the "killer app" for adopting post-capitalist technologies of abundance and libertarian counter-

institutions becomes clear: SURVIVAL.

The cyclical crises which provided the material incentive for previous waves of adopting alternative technologies, are eclipsed by the scale of necessity entailed in the new era of systemic crises we're entering. But at the same time as the material necessity for adoption surpasses anything in our collective memory, the sheer potential for abundance and freedom in the new technologies is also beyond our previous experience.

Decades ago, Jane Jacobs, Colin Ward and Karl Hess all argued for industrial relocation and decentralized production as means of community economic bootstrapping, and for enabling the unemployed and underemployed to produce directly for use in the social economy.

Jacobs presented the growth of the Japanese bicycle industry at the turn of the 20th century as a classic example of import substitution. Because existing bicycle manufactures in America and Europe were unwilling to open production facilities in Japan, Japanese bicycle repair shops frequently resorted to custom-machining their own replacement parts. This eventually grew into a networked industrial ecology where different shops specialized in different parts that were in particularly high demand, and finally entire bicycles could be produced by such networked shops.

Karl Hess argued similarly in *Neighborhood Power* that people in poor communities could pool their individual power tools and machinery in neighborhood workshops, and pursue a gradual course of import substitution starting from the first step of custom-machining the most needed replacement parts for home appliances that corporate manufacturers had either stopped making or price gouged customers for. From this beginning, they could apply the savings to expanding into larger product ecologies and meet a growing share of their need for manufactured goods outside the cash nexus.

Both Hess and Ward argued for such neighborhood workshops as means for the unemployed, underemployed and those on lim-

ited government benefits to produce directly for their own use as a supplement or partial alternative to the wage system.

And again, these three all wrote against the technological background of the 1950s, 60s and 70s. They predated the development of CNC machine tools scaled to medium-size shops, that fueled the rise of networked manufacturing in Emilia-Romagna and Shenzhen — let alone the development of open-source tabletop CNC tools during the present explosion of micro-manufacturing technology. A collection of open-source tools like cutting table, 3D printer, router, bending machine, induction hearth, etc., costing several months skilled blue collar wage and housed in a neighborhood shop, can produce the kinds of goods that once required a million-dollar factory. Even for a multi-family unit of a few households, the potential is becoming real to produce a huge share of total consumption needs through a shared workshop and intensive horticulture.

The towns that sprang up in late Medieval Europe were basically favelas or squatter communities that coalesced at strategic crossroads and fords, populated by runaway peasants. These squatter communities, with their networked guilds — originally democratic self-governed communities of craft workers — were the site of Europe's real first industrial revolution. Lewis Mumford called it the "Eotechnic" phase of technological history. The industrial revolution we're familiar with from the history textbooks developed steam as a source of motive force, and developed many of the specific applications for machine production. But the most important prerequisite — clockwork technology for the transmission of power — had already been developed in the guilds and monasteries.

The new communities around which the post-capitalist abundance economy crystalizes may likewise be favelas, squats and "de-industrialized" Rust Belt neighborhoods. As a shrinking share of the population has sufficient or regular hours of paid employment to meet its needs, and as abandoned malls and unfinished housing developments host unofficial communities of people who are other-