

# Finding an Alternate Route: Towards Open, Eco-cyclical, and Distributed Production

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## Abstract

Open source networks have the potential to radically influence areas which have traditionally been under the purview of governmental and corporate entities. Traditional manufacturing, for instance, has often relied on institutions of scale for capital, distribution, and bureaucratic support. However, with the proliferation of open source networks, small, independent actors can collaborate with one another without relying on broad institutional support. This circumvention may potentially bring with it a number of economic, environmental, and psychological benefits. With these ideas in mind, this paper explores the logic of the distributed, open architecture of a “reMaker society,” focusing in particular on the problems of meaning and alternative modes for the provision of public goods. To unravel the connections between political economy, technology, and problems of meaning and behaviour, we propose the concept of the “reMaker society,” which places value in community based manufacturing practices, localized distribution networks and shifts markers of social prestige from consumption to making.

After a literature review examining classical sociological texts (e.g. Weber), political economy and open source movements, this paper looks at how a reMaker society might circumvent traditional models of manufacturing, collaboration, and economic growth. Particular attention is paid to the *ethos* characterized by the organization, Open Source Ecology (OSE), whose vision is to ‘create an open source economy – an efficient economy which increases innovation by open collaboration.’ OSE, based out of the United States, is developing a series of open source industrial machines and offering the designs openly online. One of the primary goals of OSE is to provide collaboratively produced blueprints for relatively inexpensive agricultural machinery, such as tractors, backhoes, and compressed earth brick presses for constructing buildings.

Yet, in spite of the potential benefits of OSE and the reMaker society, several challenges arise. Most notably, like all emerging technical movements, open source networks are often accompanied by a techno-utopian rhetoric which potentially obfuscates their ideological underpinnings. We suggest confronting such rhetoric with a healthy scepticism. Furthermore, open source networks depend upon their users to have access to the internet and other tools. This is not always the case, especially in rural areas. Lastly, although the designs are freely available, production requires both materials and technical skillsets. This highlights a challenge of open source networks more broadly.

## 1. INTRODUCTION

Whether mass collaboration and ‘wikinomics’ does indeed ‘change everything’ is open to debate (Tapscott and Williams 2010). Hyperbole in relation to telematics is as old as computers. But with increased access to computing technologies and the proliferation of open source networks, a substantial shift in manufacturing and distribution models may be on the horizon.

Over the last five hundred years, the arc of social transformation has been in one direction – namely towards the expansion and integration of markets and the loosening of the cultural matrix embedding economic transactions into the social life of particular communities and places. Karl

Polanyi (1944; 1968) identified the 'disembedding' of economic life as the single most important feature of capitalist modernity. From this perspective, successive phases of economic and societal expansion are all but episodes in an overarching process of capitalist modernization: the enclosure of common land to facilitate capitalist agriculture in early Modern England; the invasion and settling of the New World; the emergence of the international Victorian liberal economy and England, as in Disraeli's words, the 'workshop of the world'; Bretton Woods, the establishment of Keynesian mixed economies and 'the Long Boom' (Aglietta, 1976) the subsequent pattern of neo-liberal privatization and retrenchment; and since the 1980s the process of globalization that has seen the enthronement of capital mobility and the emergence of China as a serious challenger to America as unrivalled economic and military hegemon. This great arc of disembedding has everywhere been characterised by:

- Processes of individualization (Beck 1992) in which increasing *interdependency* between individuals and groups is less connected to physical *interactions* in particular places.
- The *rationalization* and *formalization* of social life associated with *disenchantment* and loss of meaning (Weber 1921; Curry 2011).
- *Alienation* (Marx 1844; Ollman 1977).
- *Place versus space*: The weakening connection between processes of consumption in particular communities and places, and market-driven production organised across flexible, contingent and abstract economic space.
- An enormous expansion in social complexity and the functional division of labour.

Above all, modernization has involved the rampant monetization of 'common pool resources', goods and services previously exchanged freely in the context of relationships of reciprocity (Polanyi 1944; 1968; Eisenstein, 2011; see also Ostrom 2010). As Eisenstein says, the monetization of social capital amounts to the 'strip mining of community' – a process that is intrinsic to the logic of unrestrained economic growth (2011: 76).

In a variety of ways sociologists have sought to capture the directionality of these processes, contrasting i.) the cosmopolitan society ('*gesellschaft*') of mobile individuals linked by abstract process operating at the level of market and state (Tönnies 1887; Durkheim 1893) with ii.) the organic, place-bound and integrated communities organised around the principle of reciprocity and the predominance of common pool resources ('*gemeinschaft*') – the latter everywhere disappearing into the rear-view mirror of pre-modernity.

For several centuries, technological change has invariably been the handmaiden of this disembedding – fostering change in the direction of the abstract society of individuals, with unruly markets sometimes more and sometimes less regulated by the state. Throughout this time, utopian Romantics have sought to reverse this process and re-embed economic activity in the social life of very specific, more place-bound communities whilst sustaining continuing technological progress. Radical dreamers such as Kropotkin, Gandhi, Geddes, Mumford and later bioregionalists and greens of many stripes, sought an alternative, 'neotechnic' (Mumford 1934) modernity in which the fiduciary value of money, the dominance of price setting markets and the fungibility of valued goods and services are restrained and contained within limits. In practice, radical politics foundered because such dreams seemed to require the wearing of a 'hair shirt': technological modernity and social emancipation seemed inextricably tied to a world of ceaseless growth, abstraction, and mobility.

Now in the twenty first century, concatenating environmental crises and systemic limits to growth provide a new context for such dreaming (Rockstrom et al. 2009). Climate change, a systemic energy crunch, crashing biodiversity, resource shortages underpin an endemic crisis of growth. Marginalised by the discourse of sustainable development, limits thinking has come back into the mainstream of environmental politics (Jackson, 2009; Victor 2008). Particularly in Anglophone countries, the Transition movement has advanced a community-based model of relocalization premised on the twin shocks of peak oil and climate change (Quilley 2008; 2014). Elsewhere proponents of 'degrowth' (D'Alisa, Demaria, and Kallis 2014; Kallis, Kerschner, and Martinez-Alier 2012; Sekulova et al. 2013), are developing the case for proactive embrace of economic stabilisation and even controlled contraction. Degrowth represents a real challenge to Keynesian welfare systems and the trajectory of technical innovation, both of which depend on steady economic expansion driven by the consumer society (Quilley 2013). However, whilst there have been attempts by economists to model a low/no growth society (Victor 2008), the realization of this model on the ground is sparse to say the least. Even at its epicentre in Totnes, Transition has nowhere had a significant impact on the metabolism of a local economy. Relocalization remains an aspiration and relocalizing communities remain completely dependent on global production chains and fiscal transfers organised through a national welfare-taxation system. And as the continuing crisis in Europe demonstrates, both sides in the politics of austerity remain absolutely committed to and dependent upon growth: health and welfare systems, public infrastructure, technical innovation, military capabilities and internal political stability all depend upon it.

But now for the first time, technological innovations in telematics (communication, coordination and organization) and micro- fabrication are combining to make possible a shift in the opposite direction. Open production and the distributed economy make it at least conceivable that high tech production and innovation can be achieved i.) more sustainably, using eco-cyclical patterns of resource use in smaller-scale, bioregional contexts, and ii.) in more place-bound and communitarian contexts that reduce the spatial scope of interdependency whilst increasing the intensity of interactions in place. However, whilst technical developments make possible a more fractal and distributed model of production, technical solutions alone will not resolve the problem of over-consumption. The post-consumer society intimates problems of meaning [ontology], societal values and non-rational drivers of behaviour. Even more difficult is the extent to which open-architecture production models involve the informalization of economic activity. Because 're-embedding' economic activity in this sense involves the contraction of that part of the formal economy that is 'visible' to the state, and therefore taxable, the open economy presents a terminal threat to the established models of public infrastructure, redistribution and welfare provision. In what follows, we explore the logic of the distributed, open architecture 'reMaker society', focusing in particular on the problems of meaning and alternative modes for the provision of public goods. To unravel the connections between political economy, technology, problems of meaning and behaviour, we propose the concept of the "reMaker society," which places value in community based manufacturing practices, localized distribution networks and shifts markers of social prestige from consumption to making.

## 2. THE REMAKER SOCIETY

*Making is fundamental to what it means to be human. We must make, create, and express ourselves to feel whole. There is something unique about making physical things. Things we make are little pieces of us and seem to embody portions of our soul. (Hatch 2013, 11)*

The world of 'makers' starts from the idea that to 'make' is to be 'human'. Echoing Marxist sentiments (Marx 1844), alienation from work strips a person (and their project) of deeper meaning (Anderson 2012). In this way, the 'impoverished worker' (Giddens 1973: 11), becomes captive to the object. In contrast, Makers may reclaim the 'object' and reinvigorate creative agency and expression lost through a period of efficiency and specialization.

Ushered in with new technological possibilities, the modern maker movement started with the reclamation of electronic and software production. Online exchange opened up the possibility for incorporating the physical marketplace into a larger network of ideas and entrepreneurial creativity with previously proprietary, slow, and/or expensive production – modernizing DIY counter culture movements. Punk rock zines moved to desktop publications and blogs, garage bands moved to 'GarageBand', and investigative real-time journalism and social activism took to a variety of phone apps and start-ups.

Networks of exchange have evolved, riding on the human drive for sharing (Eisenstein 2011), to a point where things and ideas are easily accessed through a variety of sharing networks. This contributes to a shift towards 'collaborative consumption' (CC), with the same telematics infrastructure facilitating the re-emergence of 'product service systems', redistribution markets, and 'collaborative life-styles' (Botsman and Rogers 2010). The defining feature of this movement, according to Botsman, is that access to services and functions is beginning to trump ownership of things. CC thrives on a new expectation of reciprocity and philosophy of open source, a redefinition of lost commons. CC gives access to necessary equipment and networks that may be difficult to obtain as a part-time, or tangentially interested, journeyman. Tool libraries, online forums and maker spaces become integral to supporting the maker base and providing the necessary tools for building, creating, and sharing. These spaces open up two important opportunities. First, they are a safe-space for creative and innovative 'play' with the help of experts and collaborative design with other makers. Second, these spaces make possible the creation of a place-based community.

These spaces, accompanied by open source as a new modern version of 'the commons' is a revolution against the enclosure of land privatization and propriety knowledge that removes public and individual capacity for learning, sharing, creating, exploring, and making what one desires, rather than what the capitalist cycle of innovation dictates is desired. Inspired by the durability and traction of open-source software and online applications, attention has been switching to the idea of open hardware (Platt 2009; Monk 2013; Scherz and Monk 2013). Maker spaces across the world are thus developing as hot-spots, not only for the creation of new physical goods that contribute to an informal economy, but as a movement toward a modular consumer economy and radically new business models (Anderson 2012).

The vision, occasionally explicit in this burgeoning maker scene, is of a post-consumer society in which fabrication of everyday material artefacts is routinely practiced in domestic and community contexts. This is supported through collaborative design across networks, off-grid systems engendering a parsimonious energy regime, and citizen participation in material production. While remaining critical of the techno-utopian rhetoric which often surrounds the maker movement—discussed in greater detail below—we propose that the open source 'distributed' economic model now coming into view has the potential to become truly disruptive, as demonstrated by the growing system of makers, informal economic activity, interest in repair and modularity, maker faires, and online shops and exchanges. Participatory fabrication has the potential to challenge the logic of passive consumption through communities based on sharing and creativity. These communities engender a new kind of community-based economy emphasising tacit and community knowledge, co-operative ownership, and implicitly removing one's self from mainstream economic activity. Such

changes have potentially drastic implications for a distributive political economy and a new reMaker society.

## 2.1. reMaker Distributive Political Economy

Recalling earlier models of distributivist political economy (e.g. Chesterton), proponents such as Mark Hatch (2013) advance a 'maker manifesto' which starts from a vision of human nature as fundamentally cooperative and creative. For Hatch this premise leads directly to an open source, sharing economy of producers in which products are designed for self-build, self-maintenance, modification, and recycling.

Pointing to a new political economy 'in-line' with leftist ideals for environmentalism, this reMaker distributive political economy provides a number of opportunities for localized economic systems, redefining social, economic, and technological progress, decoupling the social compact and socio-technical innovation from growth (Daly 1990; Victor 2008; Jackson 2009). Disruptive technologies and open-Wiki architectures fused with countercultural social innovations in business modelling, ownership, and political views point to possible new trajectory for modern society. For instance, the commonly-used culture and architecture of Wiki platforms demonstrates a democratization of knowledge that lays the foundation for sharing of ideas and things, directly challenging any idea of 'ownership' (Botsman and Rogers 2010), bringing back a culture of the 'commons'. The maker culture combines the commons with new micro fabrication technologies that bring manufacturing to the people (e.g. 3D printing) (Gershenfeld 2013), and into a community context (Anderson 2012). This suggests that such a combination makes possible self-sufficient communities that are also highly technical and science-based (Carson 2010; Rifkin 2014).

Such a society would be much more decentralised with a great deal of active participation in the making, repair, and recycling of everyday goods, thus possibly presenting a significant growth in the informal economy. The potential for a modern green distributive political economy is one in which the goods produced are much cheaper and sustainable to make (Hatch 2013), relies on open design and flexible fabrication (Jakubowski 2008), collaborative design and funding (crowdsourcing), modularity, and electronic re-invention based on need, rather than want. The potential primary social and economic outcomes of such a new society emerge from the interplay of new social milieu and re-focusing of technological innovation. We have outlined potential outcomes of such an interplay in a set of eight propositions below, summarized in Table 1. These potential outcomes are situated against the technics of the mainstream political economy, heavily situated in corporate capitalism with a tendency toward globalised modernity.

### INSERT: Table 1: Corporate versus Open-Source Technics

- a. *Radical business and innovative remodelling engenders a 'steady state' economy, rather than one motivated by growth.*

Early contribution to the recognition and discussion on limits to growth were technocratic and tied to a global agenda for resource planning and governance. The influential MIT study, *Limits to Growth*, explicitly envisaged a steady state enviro-economic global system (Meadows et al. 1972). A significant contribution to limits thinking later emerged in an entropy-based approach to economic thinking – ecological economics (EE) (Daly 1990). EE is now a prominent piece of environmental approach to socio-ecological development that put at the centre a steady-state and equilibrium approach to environmental planning (Victor 2008; Norgaard, Martinez-Alier, and Schlupmann 1990;

**Commented [J1]:** Again, I'd take this out, or make it clear that we aren't talking about digital making alone. Many people don't have access to these technologies.

Kallis, Kerschner, and Martinez-Alier 2012) – that is through balances and governance strategies to employ low enough growth to live steadily within biospheric limits to growth.

The achievability of a ‘steady state’ within a low-growth narrative is highly debatable (Quilley 2015) because cyclical creative destruction is characteristic of systems as highly complex as modern society and because that complexity engenders vulnerability. A steady state is difficult to achieve when the foregrounding of steady-state activists lies within the complexity they explicitly seek to dismantle. Left-liberal-environmental activism is rooted in decades of individual rationalism that tend to underplay ontological approaches to change. However, maker groups have the potential to succeed where steady-state environmentalists are doomed to fail by providing a sufficiently radical approach to socio-economic relocalization and implicit simplicity.

Low-energy throughput technologies remove some need for global economic systems of trade, consumer-driven innovation, and disposable goods while physically ‘making’ things provides a deeper sense of ontological satisfaction outside of consumer society. The reMaker society does this without discontinuity and a loss of scientific and technological knowledge. The inclusion of the commons and early signs of embeddedness in place suggest that the reMaker society would reform ideas of liberal commitments to individualism over a propensity for commons and community. Such a society is much more likely to embody the characteristics of a ‘steady state’ than of liberal-governance strategies that often overlook the importance of deeper meaning to remove individuals from the cycle of consumerism.

- b. Local, repairable, recyclable, and upgradeable goods bring to the forefront visible and readable impacts on bioregional ecological systems, challenging imperceptible global production systems.*

Maker and do-it-yourself activities have always challenged the idea that buying things makes people happy. The reMaker society seeks to break the connection between a throw-away consumer culture characteristic of inbuilt obsolescence while still encouraging technological innovation and socially complex structures of meaning, community, and social capacity.

Wasteful consumption, and the seemingly pointless passive innovation that accompanies it, is challenged in two primary ways in the reMaker society. First, prioritization of modularity ensures that repairs, upgrades, and customizable hacks are easily accessible to all users. For example, Open Source Ecology (OSE)<sup>1</sup> is an organization which hopes to ‘see a world of prosperity that doesn’t leave anyone behind’ (Open Source Ecology: About 2014). OSE designs and provides open source blueprints for a ‘Global Village Construction Set’ (GVCS), described as ‘a set of the 50 most important machines that it takes for modern life to exist’ (Open Source Ecology: GCVS 2014). These include tractors, earth-brick presses, ovens, and circuit makers. OSE calls their pieces of machinery ‘lego’ as they can be interchangeable and designed to fit user needs. One of the primary goals of the GVCS is to provide an alternate means for procuring equipment essential for self-sufficiency at a fraction of the cost of retail machines. For instance, according to OSE’s website, a John Deere Utility Tractor may cost upwards of \$44,487; a tractor built according to OSE’s designs, however, may only cost \$9,060 (Open Source Ecology 2014). By implementing a system which emphasizes modular design, individuals do not need to purchase manufacturer specific components or pay exorbitant labour

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<sup>1</sup> For the purposes of transparency it should be noted that the authors have worked with Open Source Ecology in the past, e.g. organizing an OSE ‘powercube’ workshop in August of 2014.

costs; instead, they are potentially able to construct, repair and modify their equipment when necessary.

This design strategy is becoming increasingly popular, such as Google's new modular cell phone or the start-up modular cell phone, Phonebloks. Phonebloks's tagline, "A phone worth keeping", points to a new future of technological consumption – one where individuals buy a central piece of equipment and upgrade, repair, and change out pieces based on need and trends. The central functioning technology remains largely the same. Maker spaces provide access to equipment to do modifications of the equipment locally, without having to support or interact with a corporate body.

Modular consumables are only possible due to the second primary way that the reMaker society challenges passive global consumption systems – open source designs. While some companies could continue to produce proprietary pieces to modify the technology, modularity suggests a kind of open source approach to consumption. Freedom to hack one's own hardware means the information for it needs to be available. Looking again to Open Source Ecology, the blueprints for their machines are fully available on their Wiki pages. This approach to design and consumption is highly characteristic of the maker movements. Instructables, IkeaHack and Make Magazine widely publish schematics and plans on how to hack, make, upgrade, repair, and recycle goods and materials.

Active engagement with the source, design, and production of goods has the additional result of putting the impacts of consumption into a more localized view. Building and creating on-site brings to the forefront the amount of time, energy, and materials required to produce goods. Whether exemplified through the material required for feeding a 3D printer or the physical energy exerted while actually making a good – the work and material required is more visible to the consumer. When the energy required is made more readable by the consumer, this inevitably redefines waste.

- c. Personal fulfilment and lengthy time commitments to projects and community development lead to personal satisfaction of a more limited set of needs, challenging mainstream artificial needs.*

A reMaker society would need to address the links between psychological motivation, attitudinal change, and changes in behaviour (Quilley 2012). In the past, commentary on modernization has always pointed to a modern 'crisis of meaning', popularized by Max Weber as 'disenchantment' (Weber 1921). More recently, this becomes specifically referred to as 'ontological insecurity' (Giddens 1987) – a psychological problem stemming from three processes of modernization: i.) individualism, ii.) stanch rationalisation, and iii.) removal of economic life from community and cultural contexts.

These three processes weaken traditional sources of spiritual or cosmic meaning, with consumption taking over as a defining feature of identity and self-worth (Lasch, 1979; Dittmar 1992, 2008; Douglas and Isherwood, 1996). Consumerism has become the dominant 'hero/immortality project' of modern individuals (Becker 1975; Dickinson 2009). Environmental and social justice attacks on consumerism are essentially unable to penetrate such a deep ontological investment as citizens have become deeply connected to a culture of consumerism. The reMaker society begins to unpick this socio-psychological dependency on consumerism by i.) changing the culture of consumption, and ii.) providing an embedded sense of community in one's economic and consumer habits.

The reMaker society has the potential to redefine capital since there is high access to low-cost short-run tools. Labourers are able to buy or rent capital as needed, and maker spaces provide an even easier and more efficient method for doing this. The combination between low-cost capital, micro-

investment, free innovation, open source knowledge and networks, and community support/requirement for engagement presents opportunity for a redistribution of wealth and a shift in economic ownership to consumers. This is potentially transformative as the social needs of community and involvement in the creation of 'things' feeds a more deeply rooted need for ontological security while contributing to a disruptive political economy. This begins to reverse individualisation and encourages community fabrication. It also provides deeper senses of meaning without completely stripping the community of scientific and rational approaches to innovation and life.

- d. *The modern industrial system is predicated on accelerating expansion and a division of labour where a new reMaker political economy is contractive and stable through open source production.*

A reMaker society is predicated on a much smaller economic scale and reintegration of workers in the production of goods. An open source and reMaker economy is contractive and stable, which is apparent in a set of dichotomies presented in Table 2. This has two significant implications. First the importance of decentralization in a contracting economy, and second, new ways of rewarding individuals for their work – such as a basic income or a new philosophy of money.

The commons and open-source provide 'better quality, higher reliability, more flexibility, lower cost, and an end to predatory vendor lock-in' (Open Source Initiative 2014). The burden and restriction of access to knowledge, information, and goods through financing and ownership from governments, companies, and bureaucracy that has long bred inequality is removed. The reMaker society empowers knowledge transfer, founded on transparency, truth, and trust, that sustains community commitments to the network (Steele and Bloom 2012: 20). Steele argues that through sharing humanity can have more productive networks of knowledge, open to greater social innovation favouring community driven wealth and well-being.

**INSERT: Table 2: Open Source Production, Open Design, and Flexible Fabrication (Adapted from Jakubowski 2008: slide 7)**

Of particular interest to the reMaker society is the opportunity for new fiscal transfers built on cryptocurrencies, crowd-sourcing, and transition from mega rich oligopolies to a larger number of smaller gains from a plethora of people (e.g. UBER, AirBnB, Etsy). These systems greatly rely on a level of trust and a communal commitment to accountability through decentralization. Every actor or community group in the network is accountable to the other actors and every actor is a source of potential information for all other actors (Moglen 2015).

The commons and DIY culture greatly challenge inequality that is inherent within modern capitalism. With the 20th century exclusion and division of wealth was an inevitable necessity of the system. The commons facilitates knowledge transfer at no cost, DIY culture utilizes that knowledge and low energy technologies help make it shareable (wired blacknets, 3D printers). Prosumers are producing and sharing goods online at a near-zero marginal cost, shrinking economic growth and traditional revenue streams of the music industry, news outlets, book publishing, and video game makers (Rifkin 2014).



- e. *Modern education trains monofunctional specialists with limited critical capacity and minimal technical skill sets while reMaker education and training emphasises a more holistic species-being approach with inherent focus on artisanal, prosumer, and polymath education*

A large number of counter-cultures have shared a preoccupation with renewed human potential for collaborative and creative activity. Maker discourse, with a focus on shared experience associated with making things in a community context, undermines the one-dimensional understanding of human motivation (Sennett 2009; Ingold 2013). The need to reintegrate hand-brain learning and connection is a theme that runs throughout early commentary on modernization and alienation (Marx, 1846), through to the Arts and Crafts period of William Morris (1890) and John Ruskin (1862), and later to Ivan Illich on *Deschooling Society* (1973). This translates into a modern interest in traditional craft skills as central to modern work, leisure, and well-being (Sennett 2008; Quilley 2009; Greenhalg 2002; Ferraro et al 2011; Adamson 2009; Yair 2010), commonly featured in green (Hopkins 2014) and radical education critiques riffing off of Illich (c.f. Gibson 1979: 254; Robinson 2013).

In *The Deschooling of Society*, Illich argues that education suffers from over institutionalization (using Weber (1921)). He suggests that approaches for addressing this issue must include hands-on learning and prioritization of tacit knowledge, a sentiment echoed repeatedly in maker discourse (Sennett 2009; Turner and Turner 1985; Anderson 2012; Hatch 2013). Realizing this vision, though admittedly quite hazily, maker discourse incorporates a neo-technic vision of a decentralized society with a coupling of modern technology and attuned craftsman. Aligned with radical green projects, this vision has the opportunity to take advantage of ephemeralization and micro-scaled technologies, alongside commons ownership (Steele and Bloom 2012; Botsman and Rogers 2010; Rifkin 2014; Carson 2010; Gershenfeld 2013) to realize a reMaker future.

- f. *While corporate capitalism depends on abstract trust and blind dependence on the global systems of trade and expertise, citizens of the reMaker society are personally engaged with relationships of interdependency within networked place-bound communities.*

Structures of trust in society evolved during the process of modernisation, as displayed in Table 3. Pre-modern networks of trust were characterised by a small, local group of kin relationships with stable ties across known scales of time and place. 'Place' was a clearly defined territory of life, shared with community. The cosmologies and traditions defining the political and economic structures of pre-modern life left little room for risk or surprise. Modernity ushered in abstracted definitions of time, place, and relationships, rife with uncertainty, change, and risk (Beck 1992). Development of modernity disintegrated old forms of community; the private sphere took on bureaucratic forms to organize mass-society and depersonalize experience for the sake of efficiency. In this process, meaning and trust begins to transform into a personal, rather than shared, experience.

### **INSERT Table 3: Structures of Trust in Pre-Modern and Modern Society**

The reMaker society, balancing on philosophies of common ownership, trust through networked systems, mentorship programs, and re-embedding economic and cultural life, changes the system of trust into a mixture of these two phases. Makers are engaged with relationships of interdependency,

yet are able to do so through abstracted networked systems. Where modern individuals are at the mercy of expert trust relations (mechanics), makers may either reskill to perform tasks on their own or have a networked system of trusted relationships.

Situated on a ground between estrangement and familiarity, the reMaker society slows the juggernaut and crushing power of economic modernity by reintegrating intimacy and personal ties into the system of economic and material production. It can only do so through the successful implementation of alternative uses of networks and commons internet structures. This provides on-demand production of local needs, radically influences traditional areas under the purview of governmental and corporate entities, and engenders a neotechnic-community economy. The inclusion of a technologically modern network differentiates this future of trust from a pre-modern version of trust by activating open commons trust, decentralized governance, and social networks of exchange.

- g. Aspirations transform from status associated with personal accumulation to self-actualisation through family, community, and creativity.*

Aspiration and social identity are formed through personal and autonomous characterisation of the interplay between social and ecological surroundings, including community philosophy, social and political connections, and cultural norms and practices. The moral foundations that prioritize one particular norm, truth, or decision over another are formed from the intersection of one's meaning framework, community structure, and autonomous priorities (Pinker 2012: 624). The intersection of these three building blocks for moral construction and decision making suggest that a multi-scale approach for restructuring values is required – a structure that overhauls the communal, personal, and spiritual expectations of individuals.

The role of a particular woman, for instance, may focus on wood working. The personal and spiritual aspects of this have been explored above (as an experience of a dealienating green hero/immortality project), but the community must also be ready to support a shift in priorities to redefine success as an expression of the woman's creativity and capacity to participate in her community and family. This requires an entire community structure willing to support such a shift and through such support she might begin to derive further personal and spiritual satisfaction from the production of artisanal goods.

The vocation does not directly challenge established power or ideology; however, the redirection of life energy toward family, creative expression, and simplicity makes a large statement for a community overall. Any act of non-participation is an act of rebellion against the corporate capitalist system. Change making in the reMaker society comes from internalizing new structures that find satisfaction beyond material and monetary gain.

The open source technic provides opportunity for this as sharing and conviviality are at the heart of open source production. Mentorship, collaborative consumption, tool libraries, community spaces, and online networks of free learning all contribute to a redefinition of a productive and fulfilled life. There is also potentially less interference from government and less bureaucratic barriers on individual passion since there is greater potential for implementing new creative solutions and ideas in an efficient manner and a community to support redesigns of life and goods.

- h. A shift from supraterritorial abstract space to particularities toward delimited place-bound communities.*

After trade became highly regulated with price-setting markets, a distinctive sociological feature occurred – the shift removal of community ties from the economy resulted in what Tönnies (1887) characterized as a transition from *Gemeinschaft* to *Gesellschaft*. This is a shift from strong social integration rooted in ties to kin and place-bound communities to impersonal, contextual, and functionally instrumental associations with markets, occupations, and other actors of the economy (Polanyi 1986). The reMaker society is one that is i.) rooted in place, ii.) deeply ingrained into a community and iii.) requires community engagement for the success of the market. Thus, the reMaker society instigates a shift from a dominance of abstract space over particularities and connection to place-bound community to a more place-bound relationship and dependence on community. This particular shift ingrains all of the above aspects of the reMaker society as the activities involved in the economy become inherent and deeply relevant to community and place.

#### *Summative Remarks*

While there is no reason to suppose that any or all of this is happening on a large scale or threatening manufacturing companies, the open source technic and ‘internet of things’ present a paradigmatic case of disruptive innovation (Bogue 2013; Grynlol 2013; Lindtner 2014). The propositions outlined above point to opportunities that are emerging in maker discourses and on-the-ground action that are beginning to advance new visions of sustainable commons rooted in community. Communities representing all, or some, of the above propositions are growing, such as Open Source Ecology, the hundreds of maker spaces across the world, online maker Wiki’s, the growth of commons ownership, collaborative consumption start-ups, and crowdsourcing as an increasingly common source of funding. These examples are beginning to assemble a new model of distributive economics that feature radical business models, disruptive collaboration and design to hack existing products, complete redefinitions of the relationship between citizenry and the state, and profoundly different cultural framings of success and ‘the good life’. Such a change is fundamentally reliant on communities with technologically innovative approaches to knowledge and social collaboration.

### 3. CRITIQUES

#### 3.1. Techno-utopian rhetoric

In spite of the promises of open source networks and the reMaker society noted above, many technical, socio-political and rhetorical challenges remain. Indeed, it is important that we remain sufficiently critical of the emancipatory claims which accompany emerging technical systems (Mosco 2004) since such claims often ignore the ideological underpinnings inherent in the notion of progress. Critiquing rhetorics of progress and the perceived emancipatory capacity of new communicative technologies is not a recent nor an uncommon phenomenon. Such critiques date back—at the very least—to Plato’s scepticism of writing in the *Phaedrus*. More recently, writers such as Leo Marx (1964; 1987), David E. Nye (1996) and Vincent Mosco (2004) have examined how progress is typically associated with the “good,” and more importantly, how this association potentially obfuscates the power structures which govern them. Faith in what Don Ihde calls the ‘technological fix’—the belief that technological progress is the primary factor for overcoming humanity’s greatest challenges—potentially causes us to ‘overlook both the need for and the results to be obtained by a critical reflection upon our lives within this technologically textured ecosystem’ (Ihde 1990: 3). Thus, keeping a critical eye on techno-utopian rhetoric is not so much a denunciation of technological advancement or ambitious technical pursuits *per se*, but merely seeks to help us better understand our relationship to, and repercussions of, technological advancement.

This holds especially true when examining utopian discourses surrounding the internet and open source networks, since such discourses continue to proliferate. As Vincent Mosco argues, 'one cannot understand the place of computer technology without taking account of some of the central myths about the rise of global computer, communications systems, particularly those identified with the Internet' (Mosco 2004: 19). For Mosco, 'It is particularly important to view the computer with one eye on mythology today because the technology... is still in a strong mythic phase' (Mosco 2004: 20). One early example of techno-utopian rhetoric related to the internet can be found in John Perry Barlow's (1996) "A Declaration of the Independence of Cyberspace." It is worth reading in its entirety, but some exemplary claims include: 'We are creating a world that all may enter without privilege or prejudice accorded by race, economic power, military force, or station of birth,' and 'In our world, all the sentiments and expressions of humanity, from the debasing to the angelic, are parts of a seamless whole, the global conversation of bits.' Although Barlow's manifesto is nearing twenty years old, similar claims of revolution continue to regularly appear in publications like *Wired* and in countless Ted Talks or start-up pitches. The problem with such mythic proclamations is that, as Dale Bradley remarks, they remove 'cyberspace from its embedded relationship with existing sociopolitical structures and declare... it to be a virtual (outopic) and independent environment,' while simultaneously characterizing it 'as an eutopic ("good") place wherein the errors of the past might be avoided' (Bradley 2005: 596). In other words, techno-utopian rhetorics often focus too much on technicity and not enough on the complex social, economic and political factors which accompany the use of technology.

Turning towards maker, hacker and open source movements specifically, we see similar utopian rhetorics at play. Bradley traces what he calls the "anarcho-utopianism" of the hacker ethic from William Morris' *News from Nowhere* (1890), which

posits a pastoral twenty-second-century society in which decentralized craft production replaces centralized industrial production and the abolition of money leads to the free distribution of goods produced not only on the basis of necessity, but for the joy of artful production itself. The parallels and potential affinities with FLOSS' [Free/Libre and Open Source Software] hacker ethic are clear. Morris' and FLOSS' utopianism both envision profound changes to property and labour relations, but do so by way of grounding their visions quite firmly within a fairly circumscribed set of practices related to one's personal attachment to joyful and artful activities of production. (Bradley 2005: 594)

As Bradley notes, 'Even though [Morris'] primary concern was to retain and/or reinstate craft-based production, he did so in terms of a rejection of the social relations of production that organized technological practices - industrialization, private property, and centralized governance' (Bradley 2005: 600). The logic of craft-based production which characterizes maker culture and FLOSS is thus ontologically linked with a pastoral, utopian *ethos*.

Turning our attention once again to Open Source Ecology (OSE), we see a similar rhetoric at play in the organization's "Vision" statement:

This work of distributing raw productive power to people is not only a means to solving wicked problems – but a means for humans themselves to evolve. The creation of a new world depends on expansion of human consciousness and personal evolution – as individuals tap their autonomy, mastery, and purpose – [t]o Build Themselves – and to become responsible for the world around them. One outcome is a world beyond artificial material scarcity – where no longer do material

constraints and resource conflicts dictate most of human interactions – personal and political. (Open Source Ecology 2014)

Granted, this is only one paragraph; however, OSE's founder, Marcin Jakubowski has made similar claims in other venues, such as his 2011 [Ted Talk](#), entitled, "Open-Sourced Blueprints for Civilization." In OSE we see the belief that the power of networked communication and the open source *ethos* are truly emancipatory. They not only provide people with a means towards self-sufficiency, but may also lead to a world free of 'artificial material scarcity,' a leading cause of hunger, poverty, and war. These are lofty and noble claims, to be sure.

But in reading OSE's vision statement one cannot help but be reminded of the sort of techno-utopian rhetoric found in Barlow's treatise, or even the Transhumanist movement, (e.g. More 1990) which sees technological advancement as the key to overcoming aging, sickness, and even mortality. Although Transhumanism and OSE clearly have different aims, they both share the view that technological progress can—or perhaps already has—lead to a fundamental improvement in how human beings exist and interact with each other. Again, this is not to denounce Transhumanism or OSE. Both make claims which are clearly noble. In the latter's case, the promise of helping a low-income farmer build desperately needed agricultural equipment for a fraction of the cost is of course commendable. But in looking at organizations like OSE, are such promises always fulfilled, if ever at all?

In an editorial note for the fifth issue of this publication, the editors ask, 'We now have the means of production, but where is my revolution?' (Maxigas and Troxler 2014). As many of the articles in the fifth issue note, the revolutionary promises of maker culture, FLOSS, etc. have largely failed to materialize. One article which is particularly relevant to our discussion of OSE and the emancipatory rhetoric surrounding maker culture is Wolf et al's (2014) examination of "Fab Labs" or fabrication laboratories. Like OSE, Fab Labs 'have the ambition to share digital fabrication blueprints as well as operating instructions for using the machines in the worldwide community' (Wolf et al 2014: para. 2). As the researchers found, however, there are significant 'motivational, social, technological and legal barriers' (para. 3) which make it difficult to achieve this ambition. Indeed, they note that 'within the Fab Lab community global open knowledge sharing is far from the norm, despite the high claims of the Fab Charter' (sec. 4.1, para. 3). Like OSE, members of these fab-labs are well-intentioned and many are altruistic in their aims. Yet, significant challenges remain, such as the issue of accessibility discussed below, and a critical assessment of the associated techno-utopian claims can help us address them.

### 3.2. Dependence on capitalist system and problems of access

In addition to the pitfalls of techno-utopian claims, the reMaker society also has problems of continued dependence on the larger economic system and an unbreakable link between capitalism and social systems of individualisation and freedom.

First, this dependence is logistical. Maker spaces are not typically able to supply, by making for themselves, the tools necessary for production. While most spaces are equipped with 3D printers, these printers would be unable to print a metal blade for a rotary saw. Even more difficult, is obtaining the metal to make the saw, or the rare Earth metals to create the computers for operating CAD and the software to use the 3D printer. Without specific levels of technology, it is impossible to say what kind of scale of economy could independently exist in a reMaker society. There is no clear idea about the minimum scale of technology required for a single functioning maker space, let alone a community based on these ideas. This extends to the problem that 'not all societies are at the

same level of informational development, that the revolution is well entrenched in the rich countries and is only beginning in the poorest' (Mosco 2004: 18). This may make it difficult for developing countries to shift to a reMaker society without first going through an industrial revolution of their own – demonstrating the difficulty in suggesting a political economy that is dependent on the foundation that it seeks to challenge.

The second argument for dependence on the capitalist system comes from complexity theory – that there is no trivial consumption. Economic responses to biophysical limits to growth need to consider broad, long-term social development consequences. Degrowth literature (Kallis, Kerschner, and Martinez-Alier 2012; Sekulova et al. 2013; D'Alisa, Demaria, and Kallis 2014) commonly assumes that the political structure of degrowth will allow for the values of social inclusion, justice, peace and development to be reconciled with limits to growth. However, Ophuls demonstrates that this would come with significant and important complexity constraints and trade-offs between societal consumption and characteristics of cultural progress (Ophuls 1977). For instance, individualisation and freedom of choice come with a thermodynamic price tag associated with consumption and tax revenues. Social freedom liberating individuals to shift to a maker culture are tied to material and energy throughput. A decline in capitalist consumption has unknowable consequences for the social, political, and cultural structures that uphold the foundations for maker communities to exist. The decline in the scale of the economy would be accompanied by, what Elias refers to as, a process of 'decivilisation' (Mennell 1998). Quilley expands on this argument extensively in his paper 'Degrowth is Not a Liberal Agenda' (2013).

## CONCLUSION

The reMaker society offers a number of possibilities for community structures centred on open source technics of relocalization. While still dependent on global production chains, the ongoing aspiration for relocalization is for the first time supported by technological innovations and micro-fabrication that give hope for a shift away from a corporately dominated political economy. Such a political economy, bolstered by growing support for open-source/commons ownerships and approaches would be more likely to achieve a 'steady-state' by a) making visible impacts on local bioregions and ecological systems and b) restructuring satisfaction toward a more limited set of needs. It would also redefine ownership, both of goods within a community and toward a single produced good. Citizens would be engaged, embedded in community and place, gaining satisfaction through family, community, and creative activities. All of this sounds like the idyllic visions of a post-growth society. However, open production and the distributed economy make conceivable such social structures in conjunction with high tech production and technological innovation. With satisfaction coming from community and kin ties, a potential post-consumer, yet high tech, society becomes possible.

At the same time, we must keep a watchful eye on the utopian rhetorics surrounding progress and potentially emancipatory technology, while also remembering that this is not a condemnation of it. Indeed, as ambitious and utopian as it may be, the OSE project, for instance, is noble in its pursuits. However, by better understanding the limits of open source networks—technical, rhetorical, economic, and socio-political—groups such as OSE and Fab will be better positioned to make good on their goals. In looking at OSE, the risk is not so much that its adherents will exploit those they purport to help, but rather, that in getting too caught up in what can be accomplished technically, they unwittingly ignore the complex network of human factors upon which their success depends.

Additionally, the amount to which an open-source distributed political economy relies on the corporate capitalist system remains an open question. This suggests two significant areas for future work and investigation. First, to select a set of various social outcomes of the corporate capitalist

system and examine the consequences when each of those outcomes is threatened by a reduction in governmental and centralized support (i.e.: health care). Second, to explore the likelihood of having technology without reliance on larger global systems of trade and distribution.

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