Open Source Finance Hacking

Potentials and Problems

BRETT SCOTT

The global financial system is a notoriously opaque and alienating complex. The system is implicated in social injustice and ecological destruction around the world, and the key financial institutions, such as banks and funds, wield unhealthy levels of political power. The financial sector – that cluster of institutions that sit in the center of the financial system – have at least five problematic dimensions.

Firstly, the financial sector routinely steers money into projects that are hardwired to breach planetary ecological boundaries. It is thus premised on ecological *unsustainability*. Secondly, it is an active agent of *inequality*. Not only do financial professionals reap outlandishly large salaries, but financial instruments like shares and bonds are conduits for powerful cartels of investors to direct money into the powerful corporate sector, often in ways that do not benefit ordinary people.

Thirdly, even if you do not believe that the sector creates inequality, it exhibits high levels of *complexity* and *opacity*, which, when combined with the fact that the system is highly interconnected, translates into high levels of *systemic risk*, the ability for financial crashes in one country to shake the entire global economy.

Fourthly, the sector hosts a particular *culture of finance*. This tends to be portrayed in the press by pictures of obnoxious traders swilling champagne, but the much deeper issue is the pervasive denial of agency and responsibility found in the sector: Financial institutions like to portray their profession as an apolitical agent of economic efficiency, rather than accepting the highly

political nature of allocating credit and facilitating investment processes around the world.

Fifthly, there is the process called *financialization*. In basic terms it is the creeping sense that the culture and drives of the financial sector are taking over many aspects of life previously untouched by it, turning everything into investable and tradable commodities. Thus, land and atmospheric pollution rights become parceled into land investment funds and commodity investment baskets, while people's life insurance policies get parceled into structured investment products for hedge funds to speculate on.

These trends, when taken together, have a way of creating ever more alienating and obscure financial phenomena, which appear incomprehensible and uncontrollable to the average citizen. Take, for example, high-frequency algorithmic trading, portrayed by those involved as a force for rational efficiency, but creating hitherto unknown levels of systemic risk.

It is notoriously difficult to try imagine alternatives to our dominant financial, and broader economic, system, though. We can sometimes see promise in individual initiatives that we support – for example, an alternative currency, or a social lending platform, or a co-operative – but we struggle to see how they represent any broader program of change.

Indeed, many standalone alternatives to mainstream finance actually end up getting critiqued by radical thinkers because they do not offer such an overall program. Thus, Bitcoin has moved from being viewed as an interesting, subversive technology to being viewed as a conservative techno-libertarian get-rich-quick project. Microfinance gets slated for reproducing the politics of debt on a micro level. The promise of crowdfunding is critiqued for reproducing the illusion of ›everyone can be an entrepreneur‹.

For every interesting new innovation, there are dismissive and demotivating critiques waiting to be discovered. While the technology conferences host happy-clappy ›everything is awesome‹ innovation fetishists and elitist ›entrepreneurship will save the world‹ types, activist conferences are full of ›everything is shit‹ critical theorists, waiting to sledgehammer down whatever proposals come out of the tech conferences.

THE HACKER NARRATIVE

It is a fine line trying to walk between these poles, to maintain a critical mind whilst not weighing yourself down with the implications of your own critique. In 2013 I attempted to articulate such a line in my Pluto Press book, *The Heretic's Guide to Global Finance: Hacking the Future of Money*, sketching out a critical but positive vision. In the book I drew on hacker philosophy to suggest approaches to exploring the financial sector, jamming some of its negative elements and building alternatives.

Of course, it goes without saying that the terms ›hacker‹ and ›hacking‹ come with a certain amount of political and cultural baggage. Hacking really refers to an *ethic* or an impulse, rather than any specific class of action. ›Hacker‹ is not really something you can put on a business card like ›plumber‹ or ›accountant‹. It has a similar dynamic to terms like ›mystic‹, or ›leader‹, or ›innovator‹: I may have mystical tendencies, or leadership skills, but as soon as I concretize those terms and explicitly call myself a mystic or a leader, I have missed the point in some way. They are not concrete roles. They are loose sets of characteristics that are hard to formalize.

In recent years though, the term has come to have a second problematic interpretation. This is the Silicon Valley version, which presents the geeky but successful male coder-entrepreneur as a ›hacker‹. As the computer industry has become exponentially more powerful, and as tech startup culture has risen to cult status, this definition of hacking has risen too.

Rather than carrying a subversive edge, this version of the term gets applied to all manner of generic computer-based innovation undertaken by preppy, Stanford-educated entrepreneurs. With their mainstream success comes a ›revenge of the nerds‹ triumphalism, and ›hacker‹ comes to refer to an exclusive club of soon-to-be-wealthy business-focused masters of tech.

This in turn has given the ›hacker‹ more legitimacy in innovation scenes in general. The gentrified version of the term is even seeping into public sector parlance and the NGO world, where ›hackathons‹ are held and computer language like ›beta testing‹ and ›2.0‹ are applied to all manner of activities. The true cores of hacking, though, do not correspond with either the criminal interpretation, or the Silicon Valley ›Mark Zuckerberg‹ interpretation. To seek the soul of hacking, we need to go deeper into the underlying impulses and dynamics.

A major foundation of hacking is the *exploration impulse*, the desire to explore and understand those things that most people in society are not encouraged to explore or understand. It is thus a drive to *de-alienate* a world which might otherwise appear confusing and unwelcoming. For example, urban exploration, or ›urbex‹, crews explore abandoned buildings, infrastructure, underground train lines and logistics centers. Hardware hackers explore the moving parts of machines. Computer hackers explore lines of code.

In its positive interpretation, this adventuring is underpinned by a rebellious *curiosity*. Applying this mentality to the financial sector is useful, because many people are told that finance is something for experts, not something for ordinary people to either understand or be curious about. The perception that finance is ›too complicated to understand‹ subsequently serves to create a layer of protection for the financial sector, much like the perception that computers are too hard to understand forms a layer of protection for groups like Microsoft.

The desire to challenge those perceptions and explore, though, also happens to border on illegality a lot of the time, because roaming past set barriers can involve breaching boundaries encoded in law in society. There is a natural tendency towards *deviance* from social norms built into the hacker ethos. Given that powerful institutions tend to have a strong role in setting such social norms and laws, hacker exploration can occasionally veer into what is defined as ›criminal‹.

The figure of the hacker thus comes with a certain unpredictability, an unstable identity. A core element of the original hacker ethic is the love of tinkering and do-it-yourself maker culture, but what distinguishes it from normal hobbyists is that there is a distinct *mischievous* element to it, often with a dark twist. There is an element of the trickster, like the mythological woodland sprite Puck.

The creativity is not just about building new things, it is about playfully messing with things, bending rules, recombining elements, and especially, using elements of existing systems in ways they are not supposed to be used. Thus, for example, Richard Stallman's concept of ›copyleft‹ is considered a classic hack because it takes the rules of copyright and bends them to create a license that opposes copyright.

In the realm of finance, such hacks can include the subversive use of shares for shareholder activism, the creation of activist hedge funds – such as Robin Hood Minor Asset Management – and mischievous artistic projects

like Paolo Cirio's *Loophole for All* tax haven hack. More generally though, the do-it-yourself spirit of hacking extends into the realm of alternative currencies, peer-to-peer platforms, sharing economy technologies and cooperatives.

One powerful social phenomenon to emerge from hacker culture is the *open source* movement. It started with people working on *collective* software projects, but as *individuals*, organized via open mailing lists rather than traditional leadership structures. Open source culture is an attempt to fuse elements of individualistic hacker ethics with overt public and community goals. It thus has potential to serve as a model for how to overcome the limitations of standalone hacker culture.

The goal of the original open source movement was to build alternatives to proprietary corporate software programs that are protected by copyright laws. The idea was to create programs with underlying code that was visible to all and available for use under open source ›copyleft‹ licenses. The movement has since expanded into fields beyond software, from Creative Commons music to open source architectural design models. The underlying theme is to disrupt centralized authorities – like large corporates – but to do so by building useful, usable and accessible alternatives for people.

There remain many limitations to the concept. For example, open source culture is definitely technology-centric. I use great open source software like GIMP, Scribus, and Inkscape, but making software widely available does not guarantee anything like broad empowerment. For example, you need support structures to train people.

Furthermore, despite being sometimes cast as a covert ›Marxist‹ movement from some conservative quarters, the open source community itself carries lingering elements of conservative libertarian culture, particularly the idea that self-empowered individuals can shape the world by voluntarily building stuff and then allowing others to opt in. This dynamic has been seen clearly in the Bitcoin community, which operates on open source principles, but which has nevertheless developed a highly unequal demographic of users with unequal levels of access. In other words, Bitcoin arguably *replicates* elements of existing power structures.

The underlying potential is there, though, and there is something authentically powerful about the open source framework. It may be the closest working model we have to an alternative hybrid economic system. It is defi-

nitely not entirely separate from the mainstream – after all, open source programmers often have day jobs at large tech companies, and large companies often use open source software – but it is building precedents that nevertheless challenges core precepts of the mainstream economic system. For example, it challenges the idea that people only work for their own gain and not for the public good, and that people demand payment, patents and power.

APPLYING THE CONCEPT OF OPEN SOURCE TO FINANCE

Open source culture thus might be a useful way of framing the initial broad changes we might want to see in the financial system. After all, we are stuck within a massively powerful incumbent system, and need to find ways to build anew from that starting point.

Software code is used to build rule systems that steer energy into activating hardware towards particular ends. So, extending this as an analogy, what might financial ›code‹ look like? A financial system, in a basic sense, is supposed to distribute claims on human energy and resources (›money‹), via financial instruments (often created by financial intermediaries like banks), into new economic production activities (›investments‹), in exchange for a return over time.

Here, for example, is a rough financial circuit: A person manages to earn a surplus of money, which she deposits into a pension fund, which in turns invests in shares and bonds (which are conduits to the real world assets of a corporation), which in turn return dividends and interest over time back to the pension fund, and finally back to the person.

Shares and bonds are extractive financial conduits that plug into a corporate structure, but if you looked for how they are coded, you would discover they are built from legal documents that are informed by regulations, acts of parliament, and social norms. They are supported by IT systems, payments systems and auxiliary services.

But it takes more than clearly-worded documentation to be able to create financial instruments. The core means of financial production, by which we mean the things that allow people to produce financial services (or build financial instruments), include having access to networks of investors and companies, having access to specialist knowledge of financial techniques,

and having access to information. It is these elements that banks and other financial intermediaries really compete over: They battle to monopolize relationships, monopolize information, and to monopolize specialist knowledge of financial techniques.

And indeed, that is why production of financial services mostly occurs within the towering concrete skyscrapers of the ›financial sector‹, spinners of webs of financial code that is mostly unknown to most people. We have very little direct access to the means of financial production ourselves, very little say in how financial institutions choose to direct money in society, and very little ability to monitor them.

We have, in essence, an intense concentration of power in financial intermediaries, who in turn reinforce and seek to preserve that power. And while I may be happy to accept a concentration of power in small specialist industries like Swiss watchmaking, a concentration of power in the system responsible for distributing claims on human society's collective resources is not a good thing. It is systematically breaking our planetary hardware, whilst helping to fuel a culture of bland individualistic materialism in increasingly atomized communities.

OPENING ACCESS, RECONNECTING EMOTION, LIBERATING CREATIVITY

At core, Open Source is supposed to be a philosophy of access: access to the underlying code of a system, access to the means of producing that code, access to usage rights of the resultant products that might be created with such code, and (in keeping with the viral quality of copyleft) access to using those products as the means to produce new things. Perhaps the ethos is best illustrated with the example of Wikipedia. Wikipedia has:

1. A production process that encourages participation and a sense of common ownership: We can contribute to Wikipedia, which is to say it explicitly gives us access to the means of production.
2. A distribution process that encourages widespread access to usage rights, rather than limited access: If you have an internet connection you can access the articles. We might call this a *commons*.

3. An accountability model that offers the ability to monitor and contest changes: An open production process is also one that is more transparent. You can change articles, but people can monitor, discuss and contest your changes.
4. A community built around it that maintains the ethic of collaboration and continued commitment to open access. It is more than just isolated individuals, it is a culture with a (roughly) common sense of purpose.
5. Open access to the underlying software, which can be tailored and altered if the current incarnation of Wikipedia does not suit all your needs. Look, for example, at Appropedia or Conservapedia.

You can thus take on five conceptually separate, but mutualistic roles: producer, consumer, validator, community member, or (competitive or complementary) breakaway. These same five elements can be the pillars underpinning a future system of Open Source Finance. So let us look briefly at each pillar in turn, along with examples of the types of initiatives that exemplify them.

PILLAR 1: ACCESS TO THE MEANS OF FINANCIAL PRODUCTION

Right now, production of financial services is limited to a closed, elite group of professionals – bankers, fund managers, traders, and so on – who reap very large rewards. They might possess talent, but they are also known to not always act in the public interest, and to occasionally cause giant economic crashes. The goal of encouraging wider participation in financial production would be to bring more diversity into the system whilst empowering people.

Very few of us perceive ourselves as offering financial services when we deposit our money in banks. Mostly we perceive ourselves as passive recipients of services. Put another way, we frequently do not imagine we have the capability to produce financial services, even though the entire financial system is foundationally constructed from the actions of small-scale players depositing money into banks and funds, buying the products of companies that receive loans, and culturally validating the money system that the banks uphold.

Interestingly, one of the original movements to bring wider participation in financial life was the rise of *day-trading* by stay-at-home semi-professional traders using discount brokerages to play the stock and currency markets. Despite being portrayed by the industry as a movement for empowerment, it is entirely based on the same toxic mentality of short-term speculation encouraged by financial elites. Furthermore, the industry is run by brokers who reap far larger rewards from the system than the actual participants. Lastly, the participants do not offer any real services to society, other than the banal claim made by all speculators that they help to ›increase liquidity‹ in markets.

A much more meaningful movement is the peer-to-peer (P2P) finance movement. We all intuitively understand what P2P finance is: If you decide to lend money to your friend, it is a direct P2P action, and you directly perceive yourself as offering them a service. P2P finance platforms, such as Zopa, extend that concept beyond your circle of close contacts, so that you can directly offer a financial service to more distant people who request those services. In so doing, such platforms offer you access to an active, direct role in producing financial services, rather than an indirect, passive one.

There are also many interesting examples of actual open source financial *software* aimed at helping to fulfil the overall mission of an open financial system. Examples include Mifos, Cyclos, and Community Forge's Hamlets, all of which are designed to help people set up their own financial institutions or currency systems.

Certainly, currency is one active area of experimentation. The concept of ›producing‹ a currency is probably strange to most people, given that many people are inaccurately taught that currency just emerges magically from the government. Designing alternative currencies, though, brings a much more acute awareness of how currency, and confidence in currency, has to be constructed. Bitcoin is fascinating to the public partly because of the incredulity at the idea that people can produce the currency themselves. In using such a currency, I feel aware of my role in upholding – or producing – the system. The scope to construct currency goes far beyond crypto-currencies, though: local currencies, time-banks, and mutual credit systems are emerging all over.

One final area to consider is the drive to add third party customization on top of existing financial services. The Open Bank Project, for example, is trying to open up banks to third party apps that would allow a depositor to have much greater customizability of their bank account. It is not aimed at

bypassing banks in the way that P2P is, but it is seeking to create an environment where an ecosystem of alternative systems can plug into the underlying infrastructure provided by banks.

PILLAR 2: WIDESPREAD DISTRIBUTION

Financial intermediaries like banks and funds serve as powerful gatekeepers to access to financing. To some extent this is a valid role - much like a publisher or music label will attempt to only publish books or music that they believe are of high enough quality - but on the other hand, this leads to excessive power vested in the intermediaries, and systematic bias in what gets to survive. When combined with a lack of democratic accountability on the part of the intermediaries, you can have whole societies held hostage to the (arbitrary) whims, prejudices and interests of such intermediaries.

One such prejudice built into the current financial system is the way it tends to steer money to those who already have it. For example, huge amounts of money are being lent to hedge funds, while entrepreneurs with small businesses that are useful to society, but that are not sexy like Facebook, get ignored by big investors and banks. Expanding access to financial services is thus a big front in the battle for economic democratization.

Financial inclusion is a whole field in its own right, with a significant history of innovation, mistakes and political wrangling. This includes the credit union movement trying to extend finance into poorer communities that get overlooked by large banks. It also includes microfinance, and international development finance that offers concessionary loans or grants to poorer countries.

Financial inclusion also overlaps with the realm of ICT4D – information and communication technologies for development. One big area of right now, for example, is *mobile banking and payment systems*, which has important implications for international development. Well known innovations include M-Pesa in Kenya, a technology to use mobile phones as proto-bank accounts. These technologies do not necessarily guarantee inclusion, but they do have potential to expand access to lower cost financial services to people that most banks ignore.

On the cutting edge right now, though, is the rise of *crowdfunding*. In the dominant financial system, you have to don a suit and suck up to the small

set of gatekeepers, hoping they will not exclude you. Crowdfunding, though, has expanded access to receiving financial services to a whole host of people who previously would not have had access, such as artists, small-scale filmmakers, activists, and entrepreneurs with little track record. It is no secret that crowdfunding can be most effectively used by those with existing social networks, but it has a lot of potential to serve as a micro redistribution system in society, offering people a direct way to transfer wealth to areas that traditional welfare systems might neglect.

PILLAR 3: THE ABILITY TO MONITOR

When we deposit money into large commercial banks, we are helping to provide them with a reserve buffer against which they extend new credit in the form of loans. Do you know where they lend to, though? Chances are that you do not, because most banks will not reveal their lending activity, under the guise of commercial secrecy and confidentiality. It is like they want to have their cake and eat it, claiming to be acting as intermediaries on your behalf, but without offering any accountability. And what about the money in your pension fund? Also very little accountability.

We have nascent examples of banks that buck the trend and that explicitly open themselves up to scrutiny. For example, small UK banks like Triodos Bank and Charity Bank publish exactly what projects they lend to. This gives you the ability to hold them to account in a way that no other bank will allow.

Trying to bring more general transparency to the system of financial intermediaries is very difficult, but different interest groups are pushing for it. Governments value transparency because it allows them to monitor taxation and facilitate regulation, especially in an era where huge numbers of hidden inter-bank derivative relationships can form intense webs of systemic risk. Activists want transparency so that they can be more effective watchdogs. Free-market crusaders value transparency in theory, since markets are supposed to only work when there is perfect information.

The transparency agenda goes beyond financial companies. Corporations in general are vehicles for extracting value out of assets and then distributing that value via financial instruments to shareholders and creditors. Corporate structures, though, have reached a level of complexity approaching pure obfuscation. There can be no democratic accountability when you cannot see

who owns what, and how the money flows. The corporate open data movement, exemplified by groups like OpenCorporates and OpenOil, though, are offering new tools to shine a light on the shadowy world of tax havens, ownership structures and contracts.

There is something about the sheer scale of corporate-level finance that brings a culture of low accountability on the part of both large lenders and large borrowers. It is interesting to contrast this with peer-to-peer models: When people are treated as mere account numbers with credit scores by banks, the people in turn feel little accountability towards the banks. On the other hand, if an individual has directly placed trust in me, I feel much more compelled to respect that.

PILLAR 4: AN ETHOS OF NON-PRESCRIPTIVE COLLABORATION

The prevailing culture of finance is split into two toxic camps. On the one hand there are passive retail investors who put money into banks and pension funds but who do not expect much in the way of accountability. On the other hand, there is the high-flying world of glory-boy traders and corporate financiers who care little about financial inclusion.

People do not always want to have to take full responsibility for their financial life, but it would be great to encourage opportunities for more collaborative, creative participation. At the heart of open source movements is a deep DIY ethos. This is in part about the sheer creative joy of producing things, but it is also about asserting individual power over institutionalized arrangements and pre-established officialdom. It carries, as discussed earlier, the search to remove individual alienation: You are not a cog in a wheel, producing stuff you do not have a stake in, in order to consume stuff that you do not know the origins of.

This ethos of individual responsibility and creativity stands in contrast to the traditional passive frame of finance that is frequently found on both the Right and Left of the political spectrum. Indeed, the debates around ›socially useful finance‹ are seldom about reducing people's alienation from their financial lives. They are mostly about turning the existing financial sector into a slightly more benign dictatorship. The essence of open source, though, is

to band together, not via the enforced hierarchy of the corporation or bureaucracy, but as part of a likeminded community of individuals creatively offering services to each other.

It is very easy to romanticize that notion, but examples of this ethos are becoming more common. For example, the indie beer company BrewDog raised money through its ›Equity for Punks‹ share offering. Such an offering is probably only going to attract beer-lovers, but that is the point: You get together as a group with mutual appreciation for a project, and you finance it, and then, when you are drinking the beer, you will know you helped make it happen in a small way. Similarly, community shares offer local groups the ability to connect to, and finance projects that are meaningful to them in a local area, whether it be a solar cooperative, a pub, or a ferry boat service.

This underlying ethos is also found in crowdfunding platforms. They offer would-be crowdfunders the chance to connect personally to projects that excite them. That does not guarantee that such people offer equal levels of financing to all types of projects, but it does mean that they feel more connected to those things they do finance.

PILLAR 5: THE RIGHT TO FORK

No financial system is ever going to be perfect, and any particular model inevitably comes with tradeoffs. For example, deposit insurance was initially put in place to protect small-scale depositors, but it has subsequently contributed to people's complacency towards banks. Our goal should not be to try design a stable utopia, but to build institutions that preserve peoples' ability to challenge whatever dominant system is in place at any one time.

The right to dissent is a crucial component of a democratic society. In the open source movement, this right to dissent is referred to as the ›Right to Fork‹, the ability to take pre-existing code, and to modify it or use it as the basis for your own. The right to fork is supposed to be both a check on power, but also a force for diversity and creativity.

In the mainstream financial system, there are extensive blocks on any such right, many of them actively enforced by financial regulators. They make it hard for new banks to start, and apply inappropriate regulation to small, new financial technologies. The battle for the right to fork, therefore, is one that has to also be fought at the regulatory level.

It also needs to be instilled as a principle into the design of any alternatives to mainstream finance. I do not want to replace a world where I am forced to use national fiat currencies with one in which I am forced to use Bitcoin. The point is to create meaningful options for people.

BUILDING POSITIVE FREEDOM INTO OPEN SOURCE

Perhaps the biggest weakness of open source approaches, though, is this assumption that this right to fork alone is enough to ensure that dissent is built into the system. To use the language of political philosophy, we might say the concept is based on *negative liberty*, the situation where nobody is directly blocking your freedom. It is exemplified by the phrase ›nobody is stopping you‹.

Merely saying one has the right to dissent, but without providing people with the tools to act on their theoretical freedom, can have conservative overtones. For dissent to be effective, it has to be *actionable*. Indeed, the mainstream financial sector can probably claim that the right to fork already exists. People are indeed free to voice their displeasure, even if they find it very difficult to actually *act* on their displeasure. The banks can say, *sure, you're welcome to leave. Nobody is stopping you. Good luck out there*. It can have the feel of conservative free market ideology: *Nobody is forcing you to take this underpaid job. It's your own choice. Get another job if you don't like it.*

More recently, we have seen the politics of negative liberty played out on multiple levels in the Bitcoin community. The source code might be open, but there are few support structures for how to meaningfully deploy that into creating alternatives, and the existing Bitcoin community can be very unsupportive of attempts to create alternative crypto-currencies. Furthermore, there is increasingly a dog-eat-dog disregard for solidarity in the system, with triumphalist Bitcoin millionaires patting themselves on the back for being early adopters that outcompeted the slow, dim-witted individuals who were too ›risk-averse‹ to get involved early. And, much like the mainstream financial sector, the new Bitcoin elite is cloaking themselves in a layer of techy jargon that serves to preserve their power.

For dissent to be an actionable, empowering force, it has to be informed, constructive and effective, rather than reactive, regressive and theoretical. Building the basis for that involves many different elements, but there is not

scope in this essay to do them justice, other than to say one crucial element is meaningful *education*. It is very hard to articulate ideas about what's wrong with a system when one cannot articulate how the current system operates. The ability to conceptualize alternatives relies on breaking down the wall of jargon that the financial sector cloaks itself in. It has to involve opening intellectual access to the deepest layers of financial code, from the cultural and political underpinnings of money itself, to the institutions, instruments and networks that move it around. Quite how we achieve that remains a work in progress.

AHOY! WE SET SAIL FOR THE OPEN SEAS

When viewed in isolation, many of the examples and initiatives mentioned above perhaps do look insignificant. When viewed collectively as pioneers of potential future trends, though, they point to something powerful. If indeed we can make inroads into making elements of the financial sector more authentically inclusive and authentically creative, we have a foothold from which to build and advocate more profound economic alternatives.

We may be in the early phase of a slow-moving revolution, which will only be perceptible in hindsight. As projects within these five pillars emerge, the infrastructure, norms and cultural acceptance for more open financial system may begin to emerge and coalesce into reality.

And so, a final word on hacking. The open source hacker ethic is powerful, but it needs to be extended and augmented. It is still too tied up in the ›revenge of the nerds‹ politics of the male geek, and relies too much on those who already have the resources to act as heroic Robin Hood figures. Rather than sticking with the stereotype of the outsider rogue male, hacker culture needs to be balanced (or perhaps *queered*) by a warmer and more feminine spirit, and also needs much more focus on social and ecological processes, rather than just technical disruption. Building a holistic financial hacker culture is an exciting prospect going forward.