ATTENTION SEEKING: TECHNICS, PUBLICS AND FREE SOFTWARE INDIVIDUATION

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In his widely-cited article, 'The Attention Economy and the Net', Michael H. Goldhaber argued for a transformation in the nature of economic life in the network age. The industrial model, having displaced the feudal economy, was now itself being replaced by an economy where attention was the scarce resource and not material wealth or labour. Since the allocation of resources is the very business of economics, this change was to result in a transformation of the laws governing economic life. As Goldhaber put it, 'economics is about the overall patterns of effort and motivation that shape our lives, and it is these patterns and motivations that are changing. That implies a wholly new set of economic laws that replace the ones we all have learned' (Goldhaber, 1997). Essentially, human attention, being inherently in short supply, was to become the source of economic value. Goldhaber was not alone in his thesis about this economic shift. Davenport and Beck argued that 'in the factories of the Industrial Revolution, physical manpower drove the economy .... now, as flows of unnecessary information clog worker brains and communication links, attention is the rare resource that truly powers a company' (2002: 17) Although Goldhaber didn't tie the arrival of the attention economy exclusively to the appearance of digital networks it was clear that the Net provided the paradigmatic example of the change he describes. In a later essay, 'The Value of Openness in an Attention Economy', Goldhaber puts it like this:

> [the] Attention Economy is the natural economy
> of the Internet. But not just the Internet, in fact,
> increasingly of all of society. In my view, this
> economy, while in certain ways very old, is now
> moving to be the dominant economy in which
> humans live. It is fast replacing, not merely
> transforming, the economy based on money, on
> the market, and on the industrialized exchange,

> distribution and production of standardized material goods. The rise of the net itself is merely one indication of this trend. (Goldhaber, 2006)

In this later essay Goldhaber also argues that openness is a key component in the attention economy. Openness and sharing online is motivated not by altruism but by the need to 'increase one's supply, not of money or material goods, but of a very different, but intrinsically scarce entity, namely the attention of other human beings' (Goldhaber, 2006). The relationship between openness and attention is illustrated in part by reference to the world of free, libre and open source software (FLOSS). For Goldhaber the value of a programmer sharing in the context of software production is to garner new forms of attention and recognition by 'having others align their minds with that of the coder' (2006). The users and creators of free software can thus be seen as a form of 'fan-base' or 'entourage'. In this essay I will contest the idea that FLOSS practice can be explained mainly or primarily as an attention economy. But first, I wish to explore briefly what I see as problematic aspects of Goldhaber's understanding of the attention economy.

The primary assumption of Goldhaber's account is that attention replaces material things and money as the measure of value. It is easy to find examples in the online world of attention as a measure of value. From the early days of the Internet page hits and visitor numbers have been used to encapsulate the value of a particular website. Social media makes the visible enumeration of friends or followers the measure of an individual's importance and social worth. Numerous companies provide tools that enable companies to evaluate the level of 'attention' their brand is garnering in social media. There are even companies such as klout.com who seek to measure the extent of a particular individual's influence (or clout) online. However, Goldhaber's arguments go beyond simply saying that attention is a measure of value: on the contrary, it is *the* measure of value, replacing material and other sources of wealth. Moreover, and crucially, attention is not simply a measure but the source of value, being for him 'desirable and valuable' in itself and a 'prerequisite for survival' in childhood (1997). Yet it's not clear what the innate value of attention really is. At different points for Goldhaber the craving for attention is an instinct learned in infancy, the result of an innate tendency to imitation encapsulated in mirror neurons, or due to a desire to influence people and achieve immortality. But the argument that attention's intrinsic value allows it to take the place of material commodities in a new form of

economic organisation seems to fall prey to the most basic of Marx's arguments about the commodity, which is that material things are not valuable in and of themselves but are only the form of appearance of value in commodity exchange. As Marx argues, the inherent properties of the 'ordinary sensuous thing', a coat for example, only come to embody value when it is exchanged for another commodity and becomes the form of appearance of that other commodity's value (1976: 147, 163). Similarly one might well argue of Goldhaber's examples that at best attention is the *form of appearance of value* online.

If attention is to play the role that material things or money play in commodity exchange it is surely because it is capable of representing value in an abstract fashion. Arguably just as one can't understand gold money by analysing the chemical properties of gold, one can't understand an attention economy simply through studying the cognitive or biological aspects of attention. Marx famously claims that the value of commodities is a function not of their material usefulness but the 'socially necessary labour time' involved in their production, in other words their value depends on how production is organised in a given society at a given point in history (1976: 129). Perhaps this insight is equally applicable to the attention economy described by Goldhaber – what is important is not the nature of attention in itself but what 'paying attention' tells us about the organisation of production online. Certainly it is difficult to see how the enormously qualitatively varied experience of 'attention' can be made to function quantitively as a 'universal equivalent', like gold and its aliquot parts. As Bernard Stiegler has asserted, commenting on a similar argument in Nacer Gasmi and Gilles Grolleau (2002):

> Businesses must now be attention-capture mechanisms for all their products and means of distribution, 'because only a limited amount of attention is available' – as if attention were a fluid whose volume and pressure could somehow be measured; as if it were not the result of education as the formation of the individual as such, through the interiorizing of psychotechniques crossing an organological set of connections resulting in construction and expansion of consciousness (i.e. discernment) and the critical capacity to analyze; that is, intelligence. (Stiegler, 2010b: 95)

A further problem with the concept of attention economy is the highly simplistic historicisation of economic life which Goldhaber's analysis calls for. The simple division into 'feudal', 'industrial' and 'attention' economies compresses the whole course of economic development since the industrial revolution into a single, presumably homogeneous phase, ignoring the transformations of capitalism over the last two hundred years. It says nothing about the difference between industrial production in the eighteenth century and modern consumer capitalism. It is particularly egregious, given the topic of attention, that Goldhaber has nothing to say about the tendency of consumer capitalist economies to organise attention through the agency of advertising and public relations. Taking these two problems together, it seems hard to see how attention can play the simple economic role that he envisages.

Despite these reservations, there is clearly something interesting and important about the development of the discourse around attention economy. The concept is one of a series of ways in which writers have tried to think about apparently profound shifts in the nature of labour and production online: other examples include gift economies (Barbrook, 1998; Bergquist & Ljungberg, 2001); wikinomics (Tapscott & Williams, 2006); and theories of peer or nonmarket production (Benkler, 2002, 2006). These writers try to make sense of the vast and diverse nature of net production, a production which is often not the result of either market relations (as traditionally understood) or the organisational form of the company. The 'poster child' for these emerging forms of production very often is the world of free, libre and open source software. The production of free and open source software very often seems to act as a form of synecdoche for net production in general. For example, the term 'open source' is sometimes employed to refer to a whole range of online practice that don't in fact involve 'source code' in the original sense. There are several reasons that this should be so. One is the strong association between free software and the development of the Internet: much of the early software used to build it, such as the Apache web server, the Sendmail mail software and BIND DNS software was free or open-source software. As Chistopher Kelty puts it, '… the Internet looks the way it does because of Free Software' (Kelty, 2008: 17). Another is that the software sphere is one in which new forms of production have competed directly and successfully with the old. Free software, such as the Linux operating system, competes directly with products, such as Microsoft Windows, sold on the market and produced in a traditional manner by paid employees within a single company. Yet in many instances

free and open source software has prevailed. It is not surprising therefore that observers of these developments have sought to divine what economic principles lie behind this success and apply them more widely.

For Goldhaber and others, the key is that the open nature of free software is better equipped to channel attention (both in the form of users and peer recognition from other programmers) (Goldhaber, 2006: 14-5; Lerner & Tirole, 2002: 213-4). Richard Barbrook has asserted that the phenomena needs to be understood in terms of the operation of a new 'hi-tech gift economy' (Barbrook, 1998). Yochai Benkler and others have argued that digital networks have led to a radical lowering of what the economist Ronald Coase called 'transaction costs', enabling a form of production managed by a group of decentralised individuals to compete with the traditional organisational form of the corporation (Benkler, 2002; Coase, 1937; Tapscott & Williams, 2006). However, the tendency to seek economic explanations of free software has significant problems. It assimilates large and potentially complex social and cultural changes to relatively simple changes in the nature of economic motivation and organisation. It often also ties these changes very narrowly to the emergence and evolution of digital networks. As David Berry has argued in relation to Benkler's *The Wealth of Networks* this can be seen as a form of 'weak technological determinism' (2008: 369). Building on Tiziana Terranova's acute analysis of the neglect of labour in discussions of network culture, I have criticised elsewhere Benkler's explanation of the economics of peer production in terms of the arrival of cheap computers and distributed networks (Terranova, 2000; Roberts, 2011). In particular I argue that Benkler relies on the emergence of a special form of 'creative labour' and a highly autonomous form of working practice which is able to organise itself in a distributed manner. While the network obviously facilitates this type of working it can't entirely explain the emergence of this new type of labour. Indeed as Luc Boltanski and Eve Chiapello show in *The New Spirit of Capitalism* these new forms of autonomous working can be seen as part of large scale shifts in the nature and 'spirit' of capitalism over the last three decades and should not simply be traced to the arrival of digital networks. Moreover, as they argue, it is crucial to understand the social and cultural aspects of these transformations in order to 'break with a fatalistic vision of technological determinism' (2007: xix).

It is in this context that Christopher Kelty's *Two Bits: The Cultural Significance of Free Software* (2008) makes a particularly important

intervention. Kelty's book is an ethnographic study of people involved in making, distributing and using free software. However, it is also distinctively different from the narratives just mentioned, in that he is concerned with 'a *cultural* reorientation, not only an economic or legal one' (2008: 7). Kelty interprets free software in the context of wider forms of free speech and debate, as an integral part of the creation of what he calls a 'recursive public', a kind of public that 'includes the activities of making, maintaining, and modifying software and networks, as well as the more conventional discourse that is thereby enabled' (2008: 29). The concept of recursion therefore refers to a public that is built through many different technical, legal and discursive levels:

> Coding, hacking, patching, sharing, compiling, and modifying of software are forms of political action that now routinely accompany familiar political forms of expression like free speech, assembly, petition, and a free press. Such activities are expressive in ways that conventional political theory and social science do not recognize: they can both express and 'implement' ideas about the social and moral order of society. Software and networks can express ideas in the conventional written sense as well as create (express) infrastructures that allow ideas to circulate in novel and unexpected ways. At an analytic level, the concept of a *recursive public* is a way of insisting on the importance to public debate of the unruly technical materiality of a political order, not just the embodied discourse (however material) about that order. (Kelty, 2008: 8, my emphasis)

There are a number of points that I want to make about Kelty's concept of the 'recursive public'. One is that the focus here is on a political and moral account of free software creation, not on the more utilitarian economic explanations favoured by Benkler and Goldhaber. Kelty emphasises the relationship between free software, free speech and the defence of the specific forms of freedom that the Internet has come to represent: 'Geeks share an idea of moral and technical order when it comes to the Internet: not only this, but they share a commitment to maintaining that order because it is what allows them to associate as a recursive public in the first place' (2008: 50). Another concept to note is that of recursion. Recursion

in the domain of computer programming refers to a situation where a procedure or function calls itself, often iteratively in order to complete a particular process. Kelty uses it in order to indicate that the kind of public he is concerned with is both constitutive of, and constituted by, the activity which goes on within it. As he puts it, 'geeks use technology as a kind of argument, for a specific kind of order: they argue about technology, but they also argue through it' (2008: 29). Kelty's point about recursion seems important because it marks an important distinction between free software and other forms of participatory culture online. One might think, for example, that there are obvious similarities (although, perhaps rather surprisingly, *Two Bits* doesn't draw them) between the geek culture that Kelty describes and fan culture, a well established subject of ethnographic and other investigation in cultural studies (Hills, 2002; Jenkins, 2006; Sandvoss, 2005). Fan culture also involves a form of creative production or 'unruly materiality' in the form of fan fiction, websites and so on. Both groups make use of the Internet to bring together a geographically dispersed community around a particular interest. As Gabriella Coleman has recently charted, the online free software community has increasingly also manifested itself in forms of face-to-face sociality, such as the hacker conference, a type of meeting which might bear comparison to the fan convention (2010). However, crucially, the creativity to be found in fan culture doesn't have the recursive form that Kelty identifies in free software. While fans may shape the infrastructure of their own culture (or public), for example, through the creation of websites, this is a very shallow form of recursion. Free software, as described by Kelty, is a form of public that manifests itself in layers of technical, legal and discursive infrastructure from low level protocols through the creation of software licenses to public discussion in mailing lists. It is a type of culture that is not only inextricable from its technical infrastructure, but comes into being through the creation of that infrastructure.

Another point that seems important in Kelty's account is the question of the *public*. As he admits, there is nothing new about applying the concept of the public sphere to the Internet. Kelty argues, however, that whereas much work in this area is concerned with 'pronouncing whether or not the Internet fits Habermas's definition of the bourgeois public sphere', his concern is rather to refine the concept. Nonetheless, Kelty's project has similarities with other attempts to apply the idea of the public sphere, such as Benkler's argument for a 'networked public sphere' in *The Wealth of*

Networks. This is evident, if nothing else, from the rhetorical questions which Kelty poses at the end of his introduction:

> Are Habermas's pessimistic critiques of the bankruptcy of the public sphere in the twentieth century equally applicable to the structures of the twenty-first century? Or is it possible that recursive publics represent a reemergence of strong, authentic publics in a world shot through with cynicism and suspicion about mass media, verifiable knowledge, and enlightenment rationality? (Kelty, 2008: 23)

Kelty declares Habermas's understanding of the bourgeois public sphere conceptually inadequate to the domain of free software practice that he is describing. Yet it is clear from the quotation above that at the same time its strength and authenticity remain, in some sense, the yardstick by which the recursive public is to be judged. The concept of the public is thus crucial to his narrative, but it is a concept reviewed, in particular, through the lens of the 'social imaginary' drawn from the work of Charles Taylor (2004). What Kelty stresses in Taylor's account is its sense of a social imaginary as a 'metatopical' space, that is a space not defined, like an assembly, theatre or coffee shop, by a geographic locale. Instead the metatopical public 'knits together a plurality of such spaces into one larger space of nonassembly' through 'common understandings' (Taylor, 2004: 86). As Kelty points out, when it comes to forms of discussion online, such as a mailing list, the distinction between topical and metatopical is not so clear cut: there's a sense in which such a virtual space is itself a *topos* and also a sense in which it brings together discussions from other topical spaces, both geographical and non-geographical. However, for Kelty, individual mailing lists, the development of software and protocols and so on are themselves brought together in 'the public' or the social imaginary which is 'the Internet'. Another point which he underlines in Taylor's concept of the social imaginary is his refusal of the 'dichotomy between ideas and material practice' (Taylor, 2004: 86; Kelty, 2008: 39). In other words, the social imaginary is not to be understood as an ideal world separate from material practice and yet, at the same time, 'the materialist thesis' is not the 'crucial explanatory factor' (Taylor, 2004: 32). Similarly, the recursive public of free software is to be understood as a social imaginary in the sense that the creation of software, networks and legal documents (licenses) also blur this distinction between the ideal and the material (2008: 39-40). At the

heart of free software culture is therefore the social imaginary of the Internet itself:

> ... *there is only one Internet.* Its singularity is not technically determined or by any means necessary, but it is what makes the Internet so valuable to geeks. It is a contest, the goal of which is to maintain the Internet as an infrastructure for autonomous and autotelic publics to emerge as part of The Public, understood as part of an imaginary of moral and technical order: operating systems and social systems. (Kelty, 2008: 51)

As is evident from his arguments here, while seeking to evolve the concept of the public from that of the Habermasian public sphere, Kelty nonetheless seems to share many of the political assumptions of Habermas and deliberative theory more generally. Put simply, while the concept of the public is refined and complicated, its normative status as an ideal of moral and social order is not. Therefore many of the criticisms which have been directed at the concept of the public sphere, as an understanding of the political or political culture, are equally applicable to Kelty's account of the culture of free software as recursive public. As a social imaginary it relies on a consensual ideal of 'the Internet' as an imagined order, one shared between geeks and fiercely independent of government and other forms of control. This is summed up succinctly in David Clark's statement, quoted by Kelty, 'We reject kings, presidents, and voting. We believe in rough consensus and running code' (Kelty, 2008: 58). Habermasian ideas around the public sphere have long been criticised for the assumption that the goal of politics is the achievement of consensus through rational debate, free from existing power relations. Chantal Mouffe, in particular, has argued that 'every consensus exists as a temporary result of a provisional hegemony, as a stabilisation of power and that always entails some form of exclusion' (1999: 756). The move which asserts the independence of the public from other forms of power (e.g. the state) ignores the reality of the power relations at work. The rational consensus of publics, especially *the* public or *the* Internet, excludes difference as a foundational concept in political debate. As Mouffe puts it: 'By postulating the availability of a public sphere where power and antagonism would have been eliminated and where a rational consensus would have been realised, this model of democratic politics denies the central role in politics of the conflictual dimension and its crucial role in the formation of

collective identities' (1999: 752). At a very basic level, conceiving free software as a public means describing that world, with all its division and complexities, in terms of a wider moral and technical *order* rather than disorder.

Another problem with the concept of the recursive *public* is that, as we have seen, recursion for Kelty means the public is constituted on many different levels, from the activities of programming software to online debate. However, Kelty's understanding of these different levels or types of behaviour as a *public* might lead one to wonder if his 'cultural reorientation' is not privileging the discursive. In a sense this is summed up by the phrase I have already quoted, 'geeks use technology as a kind of argument .... they argue about technology, but they also argue through it' (2008: 29). The emphasis here is on software as argument; this is Kelty's radical gambit in treating free software as culture. But there is a difference between arguing for the inseparability of the technical from the discursive and subordinating technical activity to a discursive model of argument, or of the public sphere. It must be recognised here that Kelty is trying to reconceptualise the public in order to include activities (such as coding) that would not usually be considered as discourse. Nonetheless, arguably his concept of the recursive public describes a hierarchy of levels (technical, legal, moral, political and so on) in which the individual and the technical are subordinate to the collective 'social imaginary'. There is a risk that the question of the relationship with the technical is ultimately marginalised within Kelty's account.

What I would like to suggest is that what Kelty's concept of recursive public, Goldhaber's attention economy and Benkler's concept of peer production as 'decentralised individual action' share, in admittedly *very different* ways, is an interest in questions of organisation and order. In the case of Goldhaber it's the appearance of new forms of organisation and order (individuals and an attention economy) at the expense of the old (companies and industrial production). In the case of Kelty (and Benkler in *The Wealth of Networks*) it is the reappearance or rejuvenation of a form of order, the public, which is at least as old as the modern era. However, it might be useful to ask not what free software can tell us about new forms of order and organisation online but rather about the question of *how* such new structures come about. That is, we may want to think about these changes in terms of process rather than an achieved entity: a new economy or new type of public. It is here that the work of Gilbert Simondon provides a helpful perspective, one

which has inspired much recent thinking on the relationship between the technical and the social (Stiegler, 1998; Mackenzie, 2002; Galloway & Thacker, 2007; Massumi et al., 2009).

Simondon is useful here because of his focus on how things become the things that they are, the need, as he puts it, 'to understand the individual from the perspective of the process of individuation rather than the process of individuation by means of the individual' (1992: 300). Simondon's emphasis on process here is crucial: the focus of his philosophy is individuation as becoming rather than individual as being, ontogenesis rather than ontology. The individual itself is not a stable entity but only a phase in a wider process of becoming, a 'partial and relative resolution', the product of a metastable equilibrium. Individuation here is not just that of the human individual (which Simondon calls the psychic individual) but also, for example, the crystal in the process of crystallisation, the biological individual, or the evolution of the collective social group. As I have argued elsewhere in relation to Benkler's essay 'Coase's Penguin, or, Linux and "The Nature of the Firm"', this understanding of the metastability of the individual can be usefully applied to the relationship between companies and FLOSS development. The company as individual, a seemingly indissoluble component of the capitalist economy, is revealed as only a metastable entity that becomes partly displaced by the emergence of new forms of organising production. Consisting of an interior milieu organised on a hierarchical command and control basis and an exterior milieu organised by the market, it can, in Simondonian terms, be thought of as 'a partial and relative resolution manifested in a system that contains latent potentials'. The philosophical point here is that instead of trying to understand peer production by extending a presumably immutable set of economic laws (Benkler's approach) we see it as the product of an ongoing ontogenesis, operating according to an emergent set of rules.

Another important aspect of Simondon's account is his argument that we need to understand the psychic (human) individual and the collective as 'individuating' together. He calls this 'systematic unity of internal individuation (psychic) and external individuation (collective)' the transindividual (1992: 307). Essentially what I am contending here is that the transindividual may be a better way of thinking about what Kelty calls a recursive public. The concept of recursion already implies a process of public-making that takes place at many levels: technical, legal, political and so on. However, as I have suggested, the emphasis is always on the collective or social

dimension, the 'public'. Moreover, the concept of public (or social imaginary) implies an ideal of social order, of the Internet as encapsulating a certain idea of freedom that informs the activities of geeks operating at different levels of recursion. Simondon's concept of the transindividual, on the other hand, does not privilege the collective dimension but instead insists on the unity of individuation and places the emphasis on the process: public making rather than public, in Kelty's terms.

Ultimately Kelty's radical insight into the way that discursive concepts are materialised in software and technical infrastructure somehow tends toward what Simondon would think of as a *hylemorphic* model of individuation: 'software and networks ... express ideas' (Kelty, 2008: 8), form shapes matter. It is precisely the limitations of the hylemorphic and substantive approaches to individuation that Simondon is trying to counter.

This approach is also evident in his understanding of the relationship between the technical object and other forms of individuation, particularly as that argument is developed in *Du mode d'existence des objets techniques* (*On the Mode of Existence of Technical Objects*) (1958). There Simondon counters the opposition between culture and technics, whereby the technical object is seen as either a tool of no consequence or a threat to the human. As Michel Tibon-Cornillot points out, the aim is therefore twofold (2002: 162). On the one hand Simondon seeks to understand technical objects in their specificity, as having their own form of evolution and not simply as products of scientific progress. On the other hand he also wants to show how technical objects are part of human reality.

Just as is the case with the recursive public, forms of human organisation are bound up with forms of technical organisation, in that Simondon asserts the relationship between the technical object and the transindividual:

> The technical object taken according to its essence, that is, the technical object in as much as it has been invented, thought and willed, assumed by a human subject, becomes the support and the symbol of this relation which we would like to name transindividual ... Through the intermediary of the technical object an interhuman relationship is created which is the model of transindividuality (1958: 247–8, my translation).[1]

As Jean-Hugues Barthélémy has argued, there is a slight ambiguity here between the technical object as the 'model' of transindividuality and as the 'support' of the transindividual (2005: 142). Simondon's approach in general does not go as far as some would like in asserting the 'prosthetic' relationship between the human and the technical. Indeed Bernard Stiegler has criticised Simondon for failing to understand fully the intrinsic relationship between psychic and collective individuation, on the one hand, and technical individuation on the other (Stiegler, 1993). Nonetheless Simondon's approach to technical objects and the domain of technicity in general has compelling implications for our understanding of free software practice.

Of course, writing in the 1950s, Simondon's focus is not the world of software development, but more that of the factory, where he identifies labour itself and not surplus value as the source of the worker's alienation. Because the worker is just an operator of the machine, their activity does not extend the process of technical invention, from which it is separated. In an important passage from the conclusion of *Du mode d'existence des objets techniques*, Simondon points out that this alienation results in a separation of technical invention from the operation of machines:

> The machine is then known and used through labour and not through technical knowledge; the relation of the labourer to the machine is inadequate, because the labourer operates the machine without their action extending the activity of invention ... The alienation of the labourer translates itself into the rupture between technical knowledge and conditions of usage. This rupture is so pronounced that in a large number of modern factories the function of the tool setter (*régleur*) is strictly distinct from that of the user of the machine, that is, the worker, and it is forbidden for workers to set their own machine themselves. Moreover, the activity of tool setting is the one which extends most naturally the function of invention and construction: maintenance is a perpetuated invention, however limited (Simondon, 1958: 249–50, my translation).[2]

So there is a crucial separation here between knowledge about and use of the machine. But this rupture between the creation and use of technical objects does not stop at the gates of the factory. As consumers we are increasingly both prevented and forbidden from modifying or even fixing the tools we use. Nowhere is this more clear than in the case of software, where standard industry practice has been to sell software in a form that makes it very difficult if not impossible to modify (only the binary code, understandable by the computer and not the source code as written by the programmer, are provided). As Bob Young, the former CEO of FLOSS-oriented software company Red Hat, puts it, purchasing proprietary software is like buying a 'car with the hood welded shut' (Woo, 1999). This situation can be seen, as Stiegler argues, as a tendency in what he calls 'hyperindustrial' societies toward a generalised proletarianisation in which we are deprived of the ability to create or modify the industrial cultural objects which are the objects of our consciousnesses (2010a: 56). Even when modification is technically feasible, draconian extensions of copyright law to enforce software licenses can be used to block 'tinkering'. Lawrence Lessig takes the example of the Sony Aibo pet dog: an owner who had put online instructions on how to hack the robotic dog to 'dance jazz' received a notice under the US Digital Millennium Copyright Act (DMCA) to take down their site because modifying their 'dog' was deemed by Sony's lawyers to be interfering with a 'copyright protection device' (2004: 92–5).

The starting point of free software, on the other hand, is precisely a 'freedom to tinker', that is, the potential, as Simondon puts it above, to extend the activity of invention. Free software creates, as we have seen, a kind of community around the modification of technical objects, in this case software. As Kelty has argued, this community is simultaneously discursive, intersubjective and technical. One might argue that in the free software community of hackers and users we see a transformation in the alienated relationship Simondon describes between worker and machine. It is interesting therefore to consider a late passage from *Du mode d'existence des objets techniques*, where Simondon addresses what it would mean to have an 'adequate' relationship with the technical object:

> The relation to the technical object cannot become adequate individual by individual, except in rare and isolated cases, it can only be instituted to the extent that it happens to bring into existence that collective interindividual reality,

which we call transindividual, through creating a coupling between the inventive and organisational capacities of several subjects. There is a relation of causality and of reciprocal conditioning between the existence of clear, non-alienated technical objects, used according to a rule which does not alienate, and the constitution of such a transindividual relation. One could wish that industrial life and businesses included, at the level of company boards, technical boards; in order to be efficient and creative, a company board should be essentially technical. The organisation of information channels in a business must follow the technical lines of operation and not those of the social hierarchy or purely interindividual relations, inessential in relation to the technical operation.[3] (Simondon, 1958: 253)

What I want to suggest is that the form of organisation that Simondon imagines here, where the hierarchical form of the company board is replaced by a purely technical form of organisation, is in some ways a rather useful way of thinking about the role that the free software 'project' has come to occupy in relation to the software industry. That is, the 'project' comes to stand for a form of organisation along 'technical lines of operation' rather than commercial considerations. One might regard Linus Torvalds and the other leading Linux developers as a kind of technical board that organises the production of the Linux kernel. However, the difference here from Simondon is that this technical board itself exists outside the borders of the company, or outside the borders of a particular company. Many of the Linux developers continue to work inside commercial companies, such as Red Hat, Intel, IBM and Google but coordinate their work via the wider 'project' (Corbet, 2011; Kelty, 2011: 473). The point here is not that management hierarchy has been usurped by 'decentralised individual action' as Benkler (2006) would have it, but rather that it has been replaced or supplemented by another form of organisation, a new form of hierarchy that is recognised in the role of Torvalds and his lieutenants. As Bruce Kogut and Anca Metiu put it,

> In practice, the development process is centralized, being distributed but subject to hierarchical control. New code is submitted to Torvalds, who decides whether or not to accept it,

> or request modifications before adding it to the
> Linux kernel. In this sense, Torvalds is the
> undisputed leader of the project, but there is no
> official organization that institutionalizes this role.
> (2001: 253)

As the Linux case suggests, the 'project' is a rather curious entity. It may be simply defined by the code itself and an associated network of contributors and users of that software. Alternatively it may be supported by a nonprofit organization (for example, the GNOME, Mozilla and Apache Software foundations). In the case of the Debian project, a community distribution of Linux, the project can go as far as producing its own democratic infrastructure, including its own version of the Condorcet voting method for electing its leaders (Debian Project, n.d.). But in any case projects go beyond simply the organization of production and include aspects of social and cultural identification as we have already seen in relation to Kelty's recursive public.

Simondon offers us a useful way of thinking about the free software project in terms of a new transindividuation, a disturbance in the metastable equilibrium between individuals and companies. This is an important alternative to simply seeing it as the effect of some new economic law, be it the 'attention economy' (Goldhaber) or 'peer production' (Benkler). This is not a case of technology simply providing a way to free decentralised individuals from the collective dimension of the corporation. Rather, it points to the metastability and malleability of the corporation and the potential for new forms of psychic and collective individuation to operate both inside and outside its boundaries. In this sense the free software project is both a more and less radical 'symptom' than the visionaries of a new attention economy might have imagined.

Endnotes

[1] 'L'objet technique pris selon son essence, c'est-à-dire l'objet technique en tant qu'il a été inventé, pensé et voulu, assumé par un sujet humain, devient le support et le symbole de cette relation que nous voudrions nommer *transindividuelle*.'

[2] 'La machine est alors connue et utilisée à travers le travail et non à travers le savoir technique; le rapport du travailleur à la machine est inadéquat, car le travailleur opère sur la machine sans que son geste

prolonge l'activité d'invention … L'aliénation du travailler se traduit par la rupture entre le savoir technique et l'exercice des conditions d'utilisation. Cette rupture est si accusée que dans un grande nombre d'usines modernes la fonction de régleur est strictement distincte de celle d'utilisateur de la machine, c'est-à-dire d'ouvrier, et qu'il est interdit aux ouvriers de régler eux-mêmes leur propre machine. Or l'activité de réglage est celle qui prolonge le plus naturellement la fonction d'invention et de construction: le réglage est une invention perpétuée, quoique limitée.'

[3] 'La relation à l'objet technique ne peut pas devenir adéquate individu par individu, sauf en des cas très rares et isolés ; elle ne peut s'instituer que dans la mesure où elle arrivera à faire exister cette réalité interindividuelle collective, que nous nommons transindividuelle, parce qu'elle crée un couplage entre les capacités inventives et organisatrices de plusieurs sujets. Il y a relation de causalité et de conditionnement réciproque entre l'existence d'objets techniques nets, non aliénés, utilisés selon un statut qui n'aliène pas, et la constitution d'une telle relation transindividuelle. On pourrait souhaiter que la vie industrielle et les entreprises comportent, au niveau des comités d'entreprise, des comités techniques ; pour être efficace et créateur, un comité d'entreprise devrait être essentiellement technique. L'organisation des canaux d'information dans une entreprise doit suivre les lignes de l'opération technique et non celles de la hiérarchie sociale ou des relations purement interindividuelles, inessentielles par rapport à l'opération technique.'

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