Noosphere rising: Internet-based collective intelligence, creative labour, and social production

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Abstract
Our article relocates the debate about creative labour to the terrain of peer-to-peer interneting as the paradigmatic form of nonmarket – social – production. From Yann Moulier Boutang we take the point that creative labour is immaterial; it is expressed through people connected by the internet. Drawing on two social systems thinkers, Francis Heylighen and Wolfgang Hofkirchner, we transpose this connectedness up to a conception of creative labour as a supra-individual collective intelligence. This intelligence, we argue, is one of the internet's emergent properties. We then present a model of internet development that flags the potential of digitally-evoked collective intelligence to facilitate what the Marxist philosopher George Caffentzis calls 'postcapitalist commoning'. Yoking together systems theorizing about the internet and socialist envisioning of social transformation, we identify two sets of internet tools for coordination that can assist with the convivial reconstruction of society along the lines of peer-based production.

Keywords
Collective intelligence, creative labour, internet, peer production, systems thinking

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Introduction

One of the new economic sociology's greatest insights is that economic activity under capitalism is embedded within dense networks of social relations (Granovetter, 1985; Swedberg, 2003). Yet, the social substrate can no longer be thought of as a mere support system for the operation of markets and hierarchies; it is the seedbed for new forms of value-generating productive activity. With the development of nonmarket, non-hierarchical, peer-based production spurred by the internet, the everyday lifeworld is being transformed – perhaps now more than ever before – into a productive site. Based on digital architectures of cooperation and platforms for collaboration, new principles for ordering production are developing that are not automatically and unambiguously sub-sumed by – and indeed have the potential to transform – existing norms and relations of production (Rifkin, 2014). Arguably, what is emerging is no less than a new *social* mode of production that is upending market-based forms of economic ordering and their attendant property rights frameworks, which have been central to the economic institutions of capitalism since they historically emerged in the West (North and Thomas, 1973).

Hilary Wainwright suggests that non-propertarian peer-based production opens up new opportunities 'to release, develop and extend the creativity of labour in its broadest sense' (Wainwright, 2012). If interlinked processes of digitalization, informationaliza-tion, and mediatization permeate the social sites of peer production, then creative labour is encapsulated within a digital envelope. Commenting on the rise of the internet, the systems theorist and doyen of creativity researchers, Keith Sawyer, detects a shift 'away from the Western cultural model of creativity – away from individualist conceptions and toward collaborative, sociocultural conceptions of creativity' (Sawyer, 2012: 429). In this article we explore one such conception: creative labour as a form of collective intelligence emergent through the internet. We approach creative labour from the standpoint of a broad philosophy of the social mind in which the internet is regarded as an expression of the noosphere: an emergent global realm of human thought (Lévy, 2000).[1]

Taking our cue from Wainwright, we detach the discussion of creative labour from the 'creative industries' per se (cf. Hesmondhalgh and Baker, 2011), and relocate it to the terrain of peer-to-peer 'interneting' as the quintessential type of social – nonmarket – production. But we give the screw an extra twist. In line with Fumagalli's (2011) tenth thesis on con-temporary capitalism, we believe that the phrase 'creative labour' implies challenging capital's dominance through collective action. Consequently, we focus on creative labour as a force for transformational change rather than on opportunities for its artful expression within existing enclaves of peer-based digital (social) production. For capitalism to be unseated, as Kliman (2012) points out, new relations of production must already be in existence in incipient form at least; but there must also be a political will to spread these relations – they cannot be sustained within isolated commons havens. We argue that (a) new relations are evident in the social mode of production; and (b) the internet supplies social mobilizing tools that have the potential to extend these relations through 'postcapitalist commoning' or 'expanding the commons into new areas of social life' – as Caffentzis (2013: 90–1) puts it so well. There is one caveat we want to stipulate upfront. We do not try to position creative labour within the class structure, but rather talk in more general terms of immaterial labour as the central form of creative labour (Hardt and Negri, 2009).[2]

Our discussion proceeds as follows. After reviewing debates about social production's capacity to displace capitalism, we identify two perspectives on creative labour as internet-based collective intelligence. The first stresses the 'labour' side of the creative labour equation; it is epitomized in the work of Yann Moulier Boutang, who propounds the thesis that collective intelligence is *exploited* in cognitive capitalism. The second perspective applies systems thinking to the internet in a version of sociocybernetics. Creativity is regarded as a function of an emergent supra-individual collective intelligence, with the internet emerging as the basis for a Global Brain. Each perspective, we argue, has its limitations. Moulier Boutang's work has a strong economizing streak and lacks a fully theorized conception of how the internet's emergent systemic properties are augmenting human creativity. Understanding these properties is where sociocybernetics excels; but the idea of labour as a productive force, and recognition of capitalism's very existence, risks erasure within the more techno-utopian strands of global brain theorizing (cf. Goertzel, 2002). Holding these shortcomings in abeyance, we combine the insights of the two perspectives for conceptualizing creative labour. The resulting synthesis we apply as a method for understanding the internet's potential to foster social production by challenging capitalistic production norms.

Social production and the institutions of capitalism

Peer-based social production's potential as an alternative to market and organizational hierarchical economic coordination has risen to prominence within academic literature in the last decade. In *The Wealth of Networks* – a pathbreaking depiction of a sea change in production regimes – Benkler (2006: ch. 4) described peer production within the internet commons as being decentralized, modular (comprising modules or packets of tasks that can be worked on independently by many diverse contributors), and highly granular (based on small-scale modules requiring little by way of time and effort from each individual participant). While his analysis was ahead of its time, Benkler took for granted that capitalism will continue to be the institutional framework within which peer-based production occurs. Increasingly, scholars and social commentators are questioning this assumption.

Whether digital capitalism is fundamentally challenged by, or seamlessly able to absorb, new forms of peer production is a matter of current debate (Orsi, 2009; Schiller, 2011). Coming down on the side of challenging capitalist norms, Bauwens (2012) argues that a process of prefiguration is happening:

> The new mode of peer production has features that prefigure a new productive system in the sense that the sharing of knowledge, code or design essentially follows a logic similar to communism as described by Marx: anyone can contribute, and anyone with access to the network can access the resource. (Bauwens, 2012)

In a short manifesto-like book, Siefkes (2008) provides a point-for-point contrast between peer production and capitalist production. His conclusion is as follows:

> a society based on peer production will be characterized by manifold cooperation both *within* and *between* peer projects. We have seen that a society is possible where all

economic activity is arranged in this way. In this society, production will be driven by demand and not by profit. There will be no need to sell anything and hence no unemployment; competition will be more a game than a struggle for survival; there won't be a distinction between people with capital and those without, or between people living in a center and those living in the periphery. In this society, it would be silly to keep your ideas and knowledge secret instead of sharing them; and scarcity will no longer be a precondition of economic success, but a problem to be worked around. (Siefkes, 2008: 132, emphasis in original)

Although their writing is thought-provoking, Bauwens and Siefkes present a set of largely ahistorical prognostications. Recent – more rigorous – work by Jakob Rigi and Jeremy Rifkin renders the ascendency of social production more conditional.

Rigi historicizes peer production, like many commentators dating its emergence to the 1980s free software movement, but setting it within a conceptually solid Marxian foundation as a new mode of production within the totality of a society's relations of production that comprise a social formation. Simply put, peer production 'is a new historical, though still emerging, mode of production, and not merely an epiphenomenon on the margins of capitalism' (Rigi, 2013: 397). Moreover, the extent of this nascent mode of production's encroachment upon capitalism is contingent upon 'social and political struggles' aimed at eliminating the remaining institutions of private property (Rigi, 2013: 412).

Struggle is notably absent from Rifkin's (2014) book-length treatment of peer production. He assumes peering will, without any mass political mobilization, eventually crowd out capitalism. We disagree with Rifkin's incrementalist view of social change and his preference for marginalism over value theory. Yet, the potential he sees in the fast-developing Internet of Things – a multitude of devices and people connected in real time 'allowing every human being and everything to communicate with one another in searching out synergies and facilitating interconnections' (Rifkin, 2014: 13) – provides a steppingstone to the type of collective intelligence that we explore in this article. Rifkin also usefully extends the historical contextualization of peer-based production back into the social commons. The feudal commons gradually dissipated and then later, in the 19th century, what emerged were 'new kinds of self-governing Commons' including charitable societies, cooperatives, and voluntary associations involved in the peer production of housing, credit, medical services and other pillars of civil society (Rifkin, 2014: 17). His point is that the Internet of Things, to the extent that it 'enables billions of people to engage in peer-to-peer social networks', and thus 'lateral peer production', brings 'the social Commons out of the shadows, giving it a high-tech platform to become the dominant economic paradigm of the twenty-first century' (Rifkin, 2014: 18).

The remainder of our article addresses the sociopolitical implications of the Internet of Things potentially 'connecting everyone and everything in a global neural network' (Rifkin, 2014: 77). Arguably, the internet facilitates the paradigmatic forms of social production Rifkin identifies, including the creation of digital materials, knowledge goods, shareable green electricity, and prosumer-led 3D printing. But the internet also supplies the tools for channelling creative labour in the form of a collective intelligence that has the potential for framebreaking institutional change; and, likewise, the tools for

coordinating social production. As an exercise in social envisioning, our subsequent discussion of these internet potentials has an affinity with the socialist 'design, pre-requisites, transitions' paradigm advocated by Laibman (2013).[3] We turn now to outline two – not incompatible – ways of understanding creative labour in terms of collective intelligence evoked by the Internet of Things.

Moulier Boutang at economism's limits

Moulier Boutang's discussion of creative labour and collective intelligence is embedded within his broader thesis of cognitive capitalism. The thesis is about how capitalism is morphing from an industrial to an intelligence and knowledge-based accumulation regime. Simply stated, value-creation in the industrial era was based on units of labour-time expended within the firm's confines, the equivalence of which was, in the final instance, determined quantitatively by the market. By contrast, under cognitive capitalism value increasingly derives from hard to quantify 'intelligent, inventive and innovative labour' that 'mobilises the cooperation of brains in networks' (Moulier Boutang, 2011: 55). The internet and creativity is at the core of this capitalism, in which capital 'accumulation is based on knowledge and creativity' expressed in digital networks (Moulier Boutang, 2011: 56). In this framework, 'the Internet, as the network of networks, is a resource that has no equivalent' (Moulier Boutang, 2011: 65).

In line with the work of Hardt and Negri (2009), Moulier Boutang argues that immaterial labour comes to the fore. To be sure, he is quick to point out that physical labour:

> does not disappear, but it loses its centrality in favour of a cooperation of brains in the production of the living by means of the living, via the new information technologies, of which the digital, the computer and the Internet are emblematic. (Moulier Boutang, 2011: 57)

In short, immaterial labour *is* creative, and creative (immaterial) labour is a function of collective intelligence that stems from 'the cooperative labour of human beings joined together in networks by means of computers' (Moulier Boutang, 2011: 57). Here is a succinct formulation of this proposition:

> the resource that capitalism seeks to prioritise today is collective intelligence, creativity distributed through the entirety of the population. (Moulier Boutang, 2011: 34)

Free software production is cognitive capitalism's prototypical model of production, the paradigmatic example of creative labour, and the primary site of 'cognitive play' where people cooperate (Moulier Boutang, 2011: 90–91). This is one of cognitive capitalism's contradictory features. At the same time as (surplus) value is being created and siphoned off from creative activities, the peer-based nature of production opens a production space beyond the firm and market that is potentially liberating.

The whole notion of cognitive capitalism is not without its critics (Starosta, 2012). For our purposes, however, the important thing is the link Moulier Boutang makes between capitalism and creative labour as collective intelligence expressed through the internet.

The idea of creative labour as a function of collective intelligence encapsulates a key form of creative labour in the age of interneting. Moulier Boutang's consistent focus on the 'labour' side of creative labour is all the more important given the fact that co-creation is tapped by firms seeking new sources of value based on the exploitation of citizen-labourers' creativity (Zwick et al., 2008).

To the extent that Moulier Boutang identifies the internet as the centrepiece of accumulation in contemporary capitalism, he is a rare breed even among heterodox economists. But the source of this insight, his economism, is the very thing that also constrains his analysis. Though he regards the internet as 'a creation of human intelligence in society' and recognizes its recursive capacity to 'modify human cooperation and the production of collective intelligence' (Moulier Boutang, 2011: 152, 37), he fails to push these points to their maximal limits. Significantly, he does not transpose the idea of creative labour as collective intelligence up to the level of an emergent property inherent to the internet itself as a self-organizing and evolving system (cf. Hofkirchner, 2007). Moulier Boutang simply does not entertain the idea that there are 'emergent system properties that are not possessed by the [system's] parts' (Sawyer, 2009: 73).[4] To be sure, in a tantalizing series of remarks early in *Cognitive Capitalism*, he chomps at the economistic bit as he talks of the noosphere:

> For the first time human beings have moved higher in society, having a brain that is equipped and extended by networked computers.... Collective intelligence is suddenly multiplied, even as it touches the frontiers of the modification of living and of its production and the reinterpretation of its position in biosphere and in the universe. (Moulier Boutang, 2011: 36)

Ultimately, however, he is unable to move beyond the limits economic discourse imposes upon him. For him, collective intelligence is just the sum of its parts, and computers are merely tools in the hands of users. They supply no creativity.

We want to take several steps further than Moulier Boutang does. We turn to Global Brain theorists who upscale collective intelligence by understanding it as an emergent property of a self-organizing organological system in which there is no firm bar between human creativity and computer creativity. In turn, we maintain, self-organization – in the sense of automation and augmentation of social processes and functions – provides a powerful mechanism for mobilizing support to extend social production. What is lacking in this social organology perspective, however, is precisely what Moulier Boutang recognizes: that the digital islands of social production are immersed in a sea of capitalism.

Creative labour as emergent collective intelligence

The Global Brain is a shorthand label for understanding society as a vast, decentralized neural network with the inherent capacity for self-organized problem-solving. This idea predates the internet and has spawned a voluminous literature (Maturana and Varela, 1980; Stock, 1993; Mingers, 1995; de Rosnay, 2000). The variant we explore is associated with the Belgian cybernetics expert Frances Heylighen, who helped found the Principia Cybernetica website and currently is Director of the Global Brain Institute.[5] His work helps us to reconceptualize creative labour as internet-based collective

intelligence from a systems thinking standpoint, and to explain how the internet can stimulate collective action. This, we argue, is important for accentuating the 'labour' element of creative labour as a force for challenging capitalism.

Heylighen differs from Moulier Boutang in that he thinks a creative form of collective intelligence is emerging from the internet that is not merely the sum of its parts; and the creative parts are not just people in their capacity as internet users (or produsers) but also computers connected by the internet. Creativity is thereby repositioned as an expression of collective intelligence. Reframing Surowiecki's (2004) popularizing 'wisdom of crowds' notion, Heylighen explicitly theorizes this intelligence in systems-theoretic terms. He believes that 'a self-amplifying explosion of [globally distributed] intelligence' through people connected by the internet is resulting in a form of collective intelligence that is the basis for the development of a Global Brain (Heylighen, 2013: 3). This entity, in turn, is the nervous system of a Global Superorganism that is self-organizing (capable of autopoiesis) and evolves (Heylighen, 2007).

This techno-futurological vision of society as an autopoietic superorganism is, for our purposes, less important than Heylighen's conception of collective, creative intelligence as an emergent property that has nonhuman elements. From the standpoint of understanding the 'creative' aspect of creative labour, the important point is that the distinction between humans and computers as agents no longer holds. Distributed – collective – intelligence emerges from multi-agent systems comprising people and computers connected by the Internet of Things (Heylighen, 2013). This intelligence is distributed because it is the result of a multitude of agents making contributions to the collective. And the agents are not just people but computers (Heylighen, 2012). Stated in more familiar sociological terms, they are 'actants' with agential properties (Cerulo, 2009). This has profound implications for understanding the locus of creativity. As one author puts it:

> as we develop more capable socially intelligent computational systems and systems that enable collective intelligence among humans and computers, the boundary between human creativity and computer creativity blurs. (Maher, 2012: 67)

Heylighen dissolves human creativity, and by implication creative labour, into a sociotechnical system that has the recursive ability to reproduce and improve upon itself. This collective intelligence is 'intelligent' and 'creative' in the sense that it has the potential to solve social problems. The upshot is this: human creativity melds with computer creativity and collective intelligence is seen as an emergent systems-level property of the internet, which is not reducible to the individual intelligences that comprise it (Heylighen, 2012). Enhanced problem-solving abilities are the net result.

This collective intelligence emerges through coordinated action prompted by 'challenges'; the key coordination mechanism is 'stigmergy' (Heylighen et al., 2013). How it works can be illustrated with respect to Wikipedia:

> The principle is that the work of one individual (e.g. an edit of a Wikipedia text) leaves a public trace (e.g. a change in the corresponding web page) that can stimulate one or more other individuals to continue the work (e.g. add further details or correct the grammar).

> Thus, independent contributions build further the one on top of the other, producing a collective result much richer and more complex than could have been achieved via any traditional, centralized form of organization. There are no obvious limits to such a self-amplifying process of contributions eliciting further contributions. (Heylighen, 2013: 7)

Despite a gradual decline in the number of active Wikipedia contributors since 2010,[6] studies assembled in the *Collective Intelligence Handbook* (Malone and Bernstein, in press) suggest that Wikipedia still rates as the exemplar of peer production and collective intelligence.[7] The most interesting point for us is the connection Heylighen makes between collective intelligence, spurred by the mechanism of stigmergy, and collective action through social technologies – including social media. These media are prime examples of 'mobilization systems' from which collective action and collective intelligence develop (Heylighen et al., 2013).

Collective action is sparked by the inbuilt features of social technologies. The iterative editing characteristic of Wikipedia is combined with 'challenge propagation, as challenges (incitements to act) are transmitted from person-to-person along a technologically supported network (e.g. using social media), until the challenge is completely dealt with' (Heylighen et al., 2013: 131). This process accumulates collective intelligence by aggregating the results of iterative refinements:

> Aggregation of results in a communal memory is the essence of collective intelligence, as it synthesizes the diverse points of view, experiences and knowledge of a group of individuals into a 'wisdom of the crowd'. (Heylighen et al., 2013: 131)

Heylighen and his co-authors have used simulations to show that the propagation of challenges (posted material, that is) within a Facebook-type social medium can support the accumulation of distributed intelligence that maximizes the ability to solve problems (Heylighen et al., 2012). This is a game-changer for how we understand the new media environment in which creative labour can become a vector for framebreaking institutional change. In the next section we seek to cash out these insights, tempered by awareness that capitalism is absent from Heylighen's systems thinking framework.

Internet tools for consensualization and convivial reconstruction

In this section we talk about the internet as supplying a set of tools for consensualization (Web 2.0-based social media) and tools for the convivial reconstruction of society (Web 3.0 and beyond) from capitalism to peer-based social production. We derive the names of these tools from Laibman (1995, 2007) and Illich (1973) respectively. We begin with social media, and write at more length about it. This is because social media embodies much of what we see as a new logic for creative labour, when understood as a form of collective intelligence based on a 'spontaneous coordination mechanism' (stigmergy) that serves as a starting mechanism for collective action (Heylighen, 2013: 20). Our discussion, of necessity, is general because we deal more with the possibilities for digital platforms to channel the societally transformative potential of creative labour, rather than specific instances of digital activism or 'e-tactics' (Earl and Kimport, 2011: 8). To

recapitulate, our goal is to conceptualize creative labour as a systemic outgrowth of the internet's emergent dynamical – powerful and ever-improving – capacities for the accumulation of collective intelligence.[8]

Social media as tools for consensualization

Following van Dijck (2013: 8), we use social media as a cluster concept to refer to an 'ecosystem of interconnected platforms and applications', based on Web 2.0, that encompass 'social network sites' – such as Facebook – and sites where user-generated content is created and exchanged (Wikipedia, the Google-owned YouTube and the like). Ten core principles underlie the functioning of social media platforms which differentiate them from traditional broadcast mass media and other forms of communication and collaboration (see Appendix).

As a social mobilization technology, social media can assist with what Laibman (1995) describes as 'consensualization' – ultimately manifest in the collective will necessary to challenge existing *capitalist* norms of production and to advance alternative production models such as peer-based social production. Heylighen says that the mechanism he identifies as being the key to creativity as collective intelligence – stigmergy – has the potential to 'align the scattered wishes, desires and intentions of millions of people, thus gathering the momentum, engagement and "political will" necessary to tackle truly global problems' (Heylighen et al., 2013: 138). Tantalizingly, he talks of the potential of social mobilization technologies to assist with the formation of 'a broad consensus on what to do next' (Heylighen et al., 2013: 140). Though he takes the capitalistic framework of market-based coordination between competing firms as a given (Heylighen, 2007), his analysis of social mobilization technologies is nonetheless congruent with the idea of consensus formation as a precursor to instituting the norms and practices of social production.

From Laibman (2007: 15) we take the idea that consensualization is a precondition for the transition from capitalism to a non-capitalist (in his case a *socialist*, in ours a *social*) mode of production. We follow his lead by using

> the term consensualization to indicate the complex process of communication, shared activism, development of empathy: the shaping of diverse and highly articulated individual wills and motivations into a coherent social unity. This unity is, and should be, a fuzzy reality, not to be confused with any sort of monolithic identity of wills. The point is to achieve a general quality of agreement concerning the overall shape of the social process, and its projection into the future. (Laibman, 1995: 87)

As a social mobilization technology that can – through the spontaneous coordination mechanism of stigmergy – potentially align diverse views on the way forward, social media has potential to achieve what Laibman (1995: 85) calls the 'coordination of wills'.

There is, of course, no particular reason why this coordination should be in the direction of any form of institutional change, let alone generating large-scale opposition to capitalism. Social media is dominated by profit-seeking firms, including Facebook, Twitter, and Google through YouTube and Google+ (Fuchs, 2013). As a consensualization tool, privately-owned social media can just as easily function to foster a

consensus that supports, rather than challenges, the capitalist relations of production in which the firms that own these platforms are immersed. In the act of maximizing profits social media firms block – albeit indirectly and unintentionally – the transformation of collective intelligence into a political will that seeks to transform existing economic arrangements. These blockages operate both at the level of social media *code* (or software) and the level of social media *content*. We will briefly consider each in turn.

The self-organizing stigmergy coordination mechanism that Heylighen identifies as supporting the development of collective intelligence is situated at the level of *code*. Yet the code underlying private social media platforms is governed by proprietary algorithms that are closely guarded secrets. In the case of Facebook they are geared to the implementation of business strategies for maximizing advertising revenues. The code is beyond everyday user control and it can stymie digital activism as a medium for the stigmergic propagation of challenges that elicit fast, cumulative responses and activity cascades. A recent study identifies a fundamental

> mismatch between the commercial logic of platforms such as Facebook and the needs of activists using social media as public information infrastructure. The fundamental problem is that social media governance, both in terms of code-as-law and the rule of policies and user terms, is driven by necessary commercial considerations, namely monetization. Companies must appeal to broad classes of users and advertisers, which both can help activists and lead to policy changes that constrain them.... As the platforms were not designed to cater to activist users, changes in rules and architectures can have negative, unintended consequences for activists. (Youmans and York, 2012: 317)

At the level of users' perceptions and understandings, social media code has wider effects too. Morrison (2005: 321) says that when creativity is understood 'in terms of agents taking decisions' then 'the decision can also be to do nothing, to remain the same'. This, he argues, can be explained by factoring into systems theory the concept of habitus: culturally supplied perceptual frameworks and dispositions. Lewis et al. (2010: 356) identify *social media habitus*, based at the level of code, which reinforces existing norms. Drawing on Bourdieu, they say that:

> the online social media 'habitus' generated by and within these categories of perception and action generates a 'doxa', a system of thought within which the social world appears natural and common sense. (Lewis et al., 2010: 356)

Facebook's code makes personal information visible, and gives the platform the appearance of being wholly decentralized while at the same time obscuring 'any awareness of a central hub' (Trottier, 2012: 40). If Bauman and Lyons (2013: 11) are correct, this is post-panoptic surveillance's sine qua non, as forceful authorities can retreat 'into sheer inaccessibility' – in this case behind the social media platform's architecture.

The post-panopticizing surveillant properties of capitalistic social media subject users to consumerist imperatives. At the level of *content*, the drawing off of user data to promote advertising targeted to a user's consumer profile leads to the reconstitution of users' social imperatives in accordance with extant market relations. Users are thereby

subsumed into libidinal economies of consumption (Stiegler, 2010), and their creativity exploited as co-creators of value (Thrift, 2006). Post-panopticizing surveillance continually threatens to reconstruct social media users, in line with market requirements, as producer commodities whose user data is sold on to firms for advertising purposes and then re-presented (in the sense of returning back to the users) in the form of targeted advertising (Andrejevic, 2011). Arguably, this process leads to the commodification of social media users themselves and exposes them to exploitation in the specifically Marxian sense, thus perpetuating social inequality (Fisher, 2012).[9] By fostering conformity to a scopophilic culture that prizes being seen (Mateus, 2012), the surveillant properties of commercial social media threaten to dull the internet-channelled institutional-transformative impulse of creative labour.

Conceptually wrapping social media habitus within systems thinking protects against the risk of overstating social media's hegemonic role. Agency is implicit within the concept of social media habitus; just as it is implicit within a systems theoretic perspective on the internet and social media, and especially so when social media habitus is embedded within this perspective. From the standpoint of complex systems theory, habitus can be seen as constraining and *enabling* (Fuchs, 2003). This delicate balance is nicely captured by Sarah Lewis and her co-authors who insightfully observe that social media

> enable some forms of social interaction, but also limit the visibility of many other possibilities that may lie hidden in the gaps inherent within such systems of meanings. Herein lies opportunity – for the hidden possibilities that form through these disjunctures enable changes in the system, even as they are hidden by its own logic. (Lewis et al., 2010: 356)

They go on to argue that social media's power 'lies not in its ability to offer individual expression anytime anywhere so much as in its yet-to-be-realized potential to foster collaborations, on a scale and in tighter time cycles than ever seen before' (Lewis et al., 2010: 358). While they are talking specifically about learning processes, the idea of yet-to-be-realized potentials succinctly captures the point we are making about social media as a mechanism for coordination of wills. It dovetails with our view of the internet's potential as a mechanism for coordinating social production on an economy-wide scale. It is to this latter point that we now turn.

Tools for convivial reconstruction

When Laibman (1995: 84, emphasis in original) says that 'coordination of *wills* … is a necessary precondition for efficient coordination of *activities*', he means that consensualization is the necessary platform on which any new system of production will be built. Any non-capitalistic system of production – whether social or socialistic – implies that people accept certain 'possibilities and constraints and willingly act within that range' (Laibman, 1995: 84). Social production is unlikely – at least in the short term – to usher in Heylighen's (2013) 'Garden of Eden' scenario of limitless abundance. In the transition from capitalist to peer production there is much scope for economic trade-offs. This brings to the fore the internet's role as a coordination mechanism for determining the frontiers of production possibilities and deciding between different economic goals.

We proceed now to nestle the distinction between coordination of wills and coordination of activities within a systems-theoretic perspective on social media and the internet as a self-organizing system. For this, we turn to the third wave of system thinking within sociology which focuses on emergent properties of dynamical social systems (Sawyer, 2009).[10] We draw on work by Hofkirchner (2007), who uses this approach to describe the internet as a self-organizing, evolving system. Retaining the notion of collective intelligence developing through the internet as an emergent phenomenon, he argues that 'the next step required ... to enhance collective intelligence is extending co-operation in cyberspace with the aim of enhancing co-operation in the real world' through 'communities of action supported by means of the Internet' (Hofkirchner, 2007: 497). We combine his stage model of how the internet is developing with the idea of the coordination of wills (through social media) as a precondition for coordinating activities along the lines of peer-based social production.

To do this, we use Illich's (1973) concept of tools for the convivial reconstruction of society towards a form of cooperative – non-capitalistic – production. Our yoking of a systems theoretic view of the internet to radical notions of social change may, to some, seem an unusual move. Yet there is complementarity at a meta-theoretical level because Illich's discussion is littered with systems-theoretic concepts such as entropy and homeostasis (Illich, 1973: 49, 78). Convivial reconstruction implies achieving dynamic equilibrium that trades off the benefits of institutional change against the constraints of new forms of production. In Figure 1 we substitute two things into Hofkirchner's stage model: Laibman's distinction between the two forms of coordination (of wills and activities) necessary for transforming production regimes, and Illich's concept of convivial reconstruction.

Hofkirchner sees the internet as having developed in three (by no means discrete) stages which align with the digitalization of three key information-based social processes: cognition, communication, and cooperation. The articulation of these processes 'resembles the build-up of a complex system' as 'to co-operate you need to communicate and to communicate you need to cognize' (Hofkirchner, 2007: 495). Where Web 1.0 had hypertext-based websites that assisted cognition, Web 2.0 has enabled social media which Hofkirchner refers to as 'social technologies' that create platforms for communication and collaborative learning. In the foregoing discussion, we identified these media as potentially providing the basis for an algorithmically assisted (stigmergy-based) coordination of wills to promote the acceptance of peer production as a viable alternative to capitalist production.

The next stage is cooperation, which Hofkirchner conceptualizes merely in terms of Rheingold's (2002) 'technologies for cooperation'. By contrast, we see this as the level at which the collective intelligence accumulated through technologies of mobilization and other Web 2.0 platforms can be used as a basis for the convivial reconstruction of society. This is the province of Web 3.0 providing what we have called Tools for Convivial Reconstruction.[11] This potential development of the internet would make possible the *coordination* of peer production, which needs some element of centralized coordination running in parallel with the inherently decentralized nature of peer-based activity. Were it to be completely decentralized, social production would amount to an anarchistic set of economic arrangements.
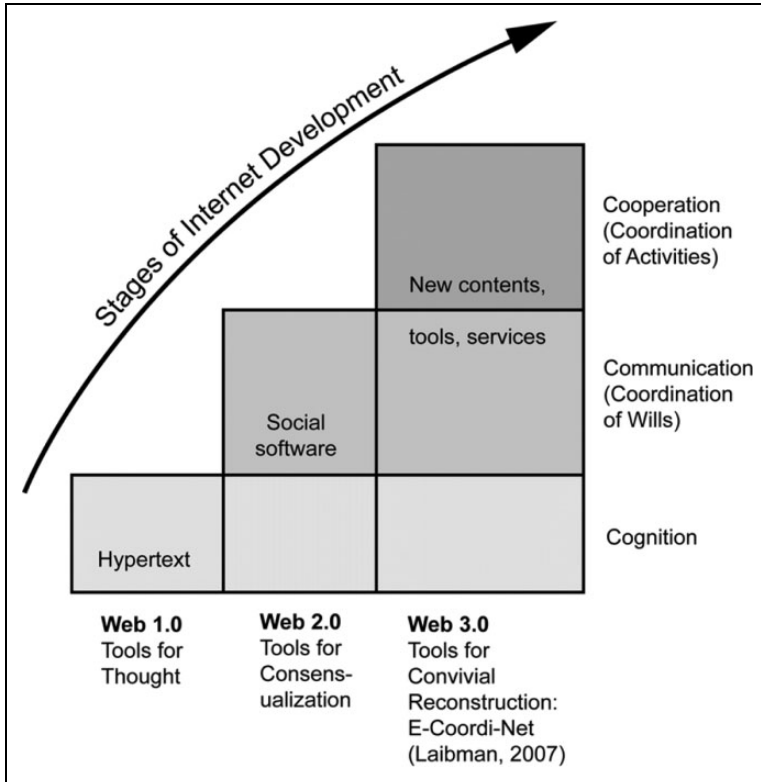
Figure 1. Implications of internet development for societal transformation. Adapted from Hofkirchner (2007: 496).

There are many possibilities – all of them hypothetical – for how Web 3.0 might enable the coordination of activities in the peer economy. We single out just one: the E-Coordi-Net that Laibman (2007: 169) postulates as a coordination mechanism for reaching agreement on 'such things as the growth-consumption trade-off'. This would be an internet tool that could enable 'continuous referenda' – such that 'popular votes on economic parameters could be registered and tabulated continuously' (Laibman, 2007: 169). More broadly, it would function as an automated system for accumulating and 'processing the continually shifting flows of economic data', setting social prices of production, and so on (Laibman, 2007: 168). This is but one possible outcome of creative labour as a form of self-organizing collective intelligence emergent from the internet, which supplies the tools by which to overcome the limitations of market-based socio-economic ordering.

Conclusion

The concept of a social mode of production refers to an array of peer-based production arrangements based on internet-enabled social technologies that bring the issue of

creative labour to the fore. In this article we have argued for the potential of this labour, defined as internet-based collective intelligence, to extend and augment social production. Our recasting of creative labour in systems theoretic terms, as a function of mediatized social collaboration, displaces the conceptualization of this labour from interiorizing discourses of creativity as expressing inner drives or the heroic entrepreneurial impulses of individuals (cf. Florida, 2012). Arguably, this better reflects how the internet, and the various forms of openness it sustains, democratizes creativity by challenging established hierarchies of knowledge production and eroding the cognitive division of labour.

There is no reason to think that subsequent iterations of the internet will solve all the world's problems, and we are not saying that they will. But, at minimum, we have shown complementarity between the idea that the internet supplies tools (technologies) to challenge capitalist production and to coordinate the peer economy, on the one hand; and longstanding debates within socialist circles over participatory involvement in economic activities, on the other. The internet answers, at least in part, the question of how to enable 'willful and thoughtful individuals' to 'mutually shape and acknowledge their core beliefs about the quality of social life' and how to achieve the purposeful democratization of economic processes (Laibman, 1995: 85).

Still, is there not some element of dissonance between conscious, deliberative decision-making and the marshalling of public sentiment in the algorithimicized, technologically-mediated recesses of the internet? Sebastian Vehlken, for one, sees little that is liberatory about collective or 'swarm' intelligence. Labelling it merely as part of 'the current media culture', he doubts 'the grass-roots-democratic "nature" of human techno-collectives' (Vehlken, 2013: 126). As 'operationalized and optimized multitudes have emerged from the uncontrollable data drift of dynamic collectives', the present is becoming a totalizing machinic nightmare from which, as be bluntly puts it, 'there can be no escape' (Vehlken, 2013: 127).

In a succinct book simply titled *The Immaterial*, originally published in French in 2003, André Gorz presciently envisions a starkly contrasting scenario. To be sure, he debunks the whole notion of artificial intelligence displacing human intelligence, dismissing talk about devising a 'global algorithm' that produces worldwide peace as nonsense (Gorz, 2010: 167). Though Gorz criticizes post-human vistas of social evolution, he insists that there is every reason to think collective intelligence is paving the way for a new form of society. He foresees an increasingly 'intelligent society' based on rising collective intelligence in which:

> Free Networks could be said to be the common matrix – a non-hierarchical structure in centreless horizontal networks ceaselessly producing and organizing themselves, based on the principle of 'democracy by consensus' in which any proposal is considered, debated, enhanced and further elaborated by everyone's contributions. (Gorz, 2010: 126)

As the Internet of Things evolves and connects up evermore people and digital devices, the networks in question will undoubtedly be self-organizing hybrid networks comprising both human and computer elements. More work is needed to explore the interplay between the emergent properties of these networks and the coproduction not

just of material or immaterial commodities, but new forms of sociality and principles of social organization.

Appendix

Ten Core Principles of Social Media

1. Participation: user-participation taps projects of mass collaboration and mobilizes the community to generate collective intelligence; user-generated content is the basis of social media: 'the user is king'.
2. Collective intelligence: users 'collect', share and modify user-generated content, which is stored and can be iteratively updated.
3. Transparency: each participant gets to see, use, reuse, augment, validate, critique and evaluate others' contributions, leading to collective self-improvement.
4. Decentralization: from the logic of 'one to many' that characterizes industrial media to the flat structures of 'many to many' that characterize social media – interactive anytime, anyplace collaboration independently of other contributors.
5. Virtual community: sociality based on 'conversations' that are relationship-seeking.
6. Personalization: personalization refers to the process of tailoring and customization of digital processes based on the individual's preferences and behaviour.
7. 'Design is politics': this feature is an explicit recognition of the dimension of power in design: how a social media site is designed determines how people will use it.
8. Emergence: emergence refers to self-organizing social structures, expertise, work processes, content organization and information taxonomies that are not a product of any one person.
9. Revisability: social media can be altered, unlike industrial media; it can be infinitely updated and added to and allows group editing and individual contestation.
10. Ownership: social media are accessible and available at little cost, unlike industrial media that require large investments.

Source: Besley and Peters (2013: 4–5), based on a compilation from many works including Benkler (2006), Rheingold (n.d.), and Bradley (2010).

Notes

1. Our article's title, 'Noosphere Rising', is from an episode of the television series *Touch* (Series 1, Episode 7), starring Kiefer Sutherland (as Martin Bohm) and David Mazouz (playing his autistic and presciently observant young son, Jake Bohm). The series is about a form of global connectedness and supra-individual consciousness periodically glimpsed by Jake. For an account of this particular episode, see http://www.imdb.com/title/tt2362873/.
2. Regarding the issue of how immaterial labour might map onto class groupings or fractions, see Fuchs (2011: 284).

3. While one referee was concerned that what we say about the internet is futuristic, our article sits squarely within a tradition of socialist envisioning of technological capabilities and new social institutions whose contemporary exponents include David Laibman. We do not, however, subscribe to his stagist approach. For an overview, see Laibman (2007).

4. This problem arises because Moulier Boutang is entrenched within an economic perspective associated with what Sawyer (2009) labels the 'second wave' of systems thinking that does not properly theorize emergentism.

5. See the biographical entry at http://en.wikipedia.org/wiki/Francis_Heylighen. For information about the institute, see http://pespmc1.vub.ac.be/GBRAIN-L.html.

6. For this trend, see http://en.wikipedia.org/wiki/File: ActiveWikipedians.PNG.

7. The editors have made a draft of the *Handbook* fully available online at: http://thegovlab.org/the-collective-intelligence-handbook-an-open-experiment/. In particular, see Chapter 8 by Benkler, Shaw and Hill.

8. In subsequent work, we will address the capacity of internet-based self-organization to rival the self-organizing properties of markets.

9. Because zero wages are paid to social media users, and using wages as a surrogate for variable capital in the classical Marxian rate of exploitation (surplus value/variable capital), users are not merely exploited but hyper-exploited. For a discussion along these lines, see Fuchs (2010: 191).

10. The first wave of social systems theory, according to Sawyer (2009), is Parsonsian; the second wave draws on general systems theory (including the work of the Austrian biologist Ludwig von Bertalanffy). Neither of these waves tackled the issue of 'how successive symbolic interactions among autonomous individuals result in the emergence of collective phenomena' (Sawyer, 2009: 21–2). This is the third wave's primary concern.

11. One of Hofkirchner's co-authors, Christian Fuchs, distils the difference between Web 2.0 and Web 3.0 down to a greatly increased capacity of the internet to function as a coordination mechanism for the orchestration of activities, as opposed to being merely a platform for communication (Fuchs et al., 2010).

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