Article

European Journal of Social Theory
2016, Vol. 19(3) 409–430

DOI: 10.1177/1368431015611297
est.sagepub.com

The 'knowledge-based economy' and the relationship between the economy and society in contemporary capitalism

Loris Caruso
University of Milan-Bicocca, Milan, Italy

Abstract
According to the main theories of the knowledge-based economy (KBE), the recent transformations of capitalism are the origins of a general societal change. Managerial theories consider KBE to be a series of win-win mechanisms that simultaneously favour firms, workers and consumers. The cognitive capitalism theory perceives in the development of cognitive capitalism signs of the formation of a post-capitalist economy. This article discusses the main features of these two theoretical orientations and identifies some core ambivalences in KBE. The relationship between the market and society in KBE is marked by a dialectical process. The former incorporates mechanisms of potential economic valorization generated by informal social relationships. To this end, it must internalize actors, practices and cultures that are partially in conflict with it, given that it must make ever greater attempts to bring the overall process back within the ownership regime. One thus witnesses a reduction of the barriers between firms and society, that can simultaneously engender a more subtle dominance of the former over the latter, or the growth of autonomy, self-organization and peer cooperation among social actors. This second possibility relies entirely upon politics and collective action.

Keywords
capitalism, class conflict, information and communication technology, knowledge economy, new technologies

Corresponding author:
Loris Caruso, Department of Sociology, University of Milan-Bicocca, Via Bicocca degli Arcimboldi, 20126 Milan, Italy.
Email: loris.caruso@unimib.it

In the 1970s, the theory began to spread that the contemporary economy was no longer based on the production of material commodities, but rather on the quantity and quality of knowledge that capital and labour contain and produce (Toffler, 1970; Bell, 1974). According to theories of the knowledge-based economy (KBE), the recent technological and organizational transformations of capitalism are causing a general societal change. Toffler (1980) argued that the 'knowledge age' is a 'massive historical shift', Stehr (1994) has claimed that it has put an end to the age of labour and property, Drucker (2001) maintains that work, labour, society and politics will take forms that humanity has never previously experienced, and Florida (2012) contends that the distinction between capitalists and the proletariat has become obsolete. On the opposite side, other interpretations, mainly Marxist (Garnham, 2004; Jessop, 2004; Thompson, 2005; Fuchs, 2012), deny that the knowledge economy represents a radical discontinuity in the social organization and consider the theories of KBE as ideologies. Garnham (2004) traces the ideological element of these theories to their denial of the continuation of class relations and labour exploitation. According to this view, KBE implies a transformation in production forces, but it does not substantially alter the capitalist production relationships.

The KBE is defined as the production of goods and services based on knowledge-intensive activities that contribute to an accelerated pace of technological and scientific advance as well as equally rapid obsolescence. Its key components include a greater reliance on intellectual capabilities than on physical inputs or natural resources, combined with efforts to integrate improvements at every stage of the production process (Powell and Snellman, 2004). It is based on the constant production of new ideas and development of new goods, services and organizational practices (Drucker, 1993, Prusak, 1997). Castells (1996) claims that an informational mode of development directed towards the accumulation of knowledge and intellectual property, combined with self-programmable labour in flat, networked organizations, is the fundamental source of productivity and power. These processes apply not just to sectors of the economy that are central to KBE (such as information technology, biotechnology and nanotechnology), but also to manufacturing and services as a whole (Tapscott and Williams, 2006).

The most vindicatory interpretations of the KBE affirm that increases in the qualifications, autonomy and participation of workers are the main effects of the KBE on labour (Adler, 1992, Kelly, 1998, Florida, 2012). Such changes in workers' performances then serve to ensure significant increases in productivity and to arrange processes where the driving forces are fast problem-solving abilities, creativity, and the cognitive, linguistic and social skills of workers. Excessively hierarchical structures and overly strict control over labour, according to these views, impede production and the spread of knowledge.

The KBE is more than a theory and a set of concepts. It has also become political rhetoric and a set of public policies. According to Cushen and Thompson (2012), the KBE gained momentum as American capitalists and government leaders sought an effective reply to competitive threats. It was then translated into successful legal and social campaigns and norms. From there it has been embraced as a master narrative by virtually every international body of note – the OECD, the WTO, the IMF, the World Bank, the EU, the APEC, the ASEAN and NAFTA. These international bodies have adopted the KBE as a contemporary discursive resource to frame policy packages on competitiveness (Warhurst and Thompson, 2006). Jessop (2004) argues that the KBE

was initially presented as a response to the crisis of Atlantic Fordism and its competitive challenges from East Asia and Latin America, an economic imaginary able to invoke wide-ranging institutional innovation that reorganizes an entire social formation, thus becoming an effective solution to the search for a meaningful post-Fordist macro-economic order.

Currently, it is possible to identify two main theoretical orientations among the theories that consider the KBE to be a social 'great transformation'. The first, generally termed 'managerial', interprets the current economic change as a win-win process that brings benefits to firms, workers and consumers alike. The second orientation is the cognitive capitalism theory. This emphasizes the limitations and contradictions of the new productive system, but it also grants that the system can lead to a progressive autonomization of work from capital and the market's 'colonization' by peer and cooperative social relationships. Though partially contrasting, these two orientations share some core assumptions (Formenti, 2011): (1) the 'digital revolution' has sanctioned the end of the capitalist monopoly on the means of production; (2) gratuitous work and free cooperation play a key role in the new production model; (3) Web 2.0 favours the development of 'horizontal' forms of cooperation as an alternative to the traditional hierarchical organization of firms; (4) the new forms of 'cognitive' labour are much more autonomous and creative than traditional Fordist labour; and (5) the knowledge economy may evolve towards a capitalism without ownership, or even towards a sort of 'digital socialism'.

Do these assumptions correspond to the real functioning of the knowledge economy and contemporary capitalism? To address this question, this article aims: (1) to illustrate and discuss these two theoretical orientations, comparing their main features with other analyses and empirical studies on business models and work in the KBE; (2) to identify the main ambivalences in the KBE; and (3) to relate them to the relationship between firms and society and to knowledge work. The first two sections analyse and discuss the main theses of managerial literature and cognitive capitalism theory. The third section addresses issues concerning the relationship between work, autonomy and creativity in KBE. The Conclusion summarizes the main theoretical consequences of the previous analyses.

Economy, knowledge and cooperation

The managerial paradigm

Literature from the managerial perspective (Drucker, 1993; Stehr, 1994; Blackler, 1995; Nonaka and Takeuchi, 1995; Lessig, 2005; Benkler, 2006; Jenkins, 2006; Tapscott and Williams, 2006; Shirky, 2009; Rullani, 2011; Florida, 2012) considers the KBE to be a historical transformation in the mechanisms of value creation and in the relationship between economy and society. These authors argue that all work has become cognitive. In advanced capitalism there no longer exist jobs that do not require creativity or the use of mental faculties that are not functional to mere execution (Drucker, 1993; Stehr, 1994; Rullani, 2011; Florida, 2012). The value produced by cognitive work no longer depends on objective data (cost of production factors, time employed), but on the subjective meaning attributed to its products by their users. The direct correspondence between

input (labour disbursed) and output (value produced) is thus interrupted. Value is currently produced by the combination of standardized knowledge with a situated, contextual knowledge, which depends on the skills of individual workers and on the social environments in which production takes place.

The value of the knowledge propagated through supply chains no longer works to the exclusive advantage of the firms that produce it; rather, it reverts to its users: subsuppliers, imitators, consumers (Benkler, 2006, Tapscott and Williams, 2006). It therefore becomes increasingly difficult to bring value back within the confines of private ownership. Cooperation and sharing become two decisive aspects of value production in the knowledge economy. The production of knowledge relies on resources shared by others – other firms or collaborators in the production chain – and in some cases on expressly social resources, such as the basic knowledge furnished by a scientific system or the social capital that generates trust in a particular territory. Moreover, the products of the cognitive process acquire value only through their use. These two 'obligations to share' make it impossible to calculate the marginal productivity contributed by a single firm in projects carried out by networks of businesses, or for that matter, by any single economic actor participating in the value chain (Rullani, 2011). The only possible measure is the overall contribution of the entire production chain to the production of knowledge. Moreover, it is not possible to prevent, with certainty, those who do not participate in the production chain (whether consumers, users or competing firms) from using, enjoying or taking advantage of the knowledge produced.

If production is centred on innovation, scientific research and the application of specialized knowledge, then firms must seek skills, ideas and talents also externally. As a consequence, the firm becomes a network where a set of heterogeneous actors (employees, contractors, suppliers, business partners and consumers) all participate in creating value in the various phases of the production cycle: conceptualization, design, production and marketing (Powell and Snellman, 2004). This can happen in two different ways.

The first model is the business web (b-web). B-webs are networks that form predominantly on the Internet and sometimes expand to encompass hundreds or even thousands of companies. Unlike customary supply chains, suppliers in these webs may play an active role in developing the projects and in providing the knowledge needed to accomplish them (Nonaka, 1991; Shirky, 2009). The lead company must also share information and knowledge with its suppliers concerning the products to be made in the project. At the major aircraft company Boeing, in the past, suppliers would produce single components, but now, they deliver entire assembled portions of the final product, thanks to the fact that Boeing has handed them control over a portion of the thousands of functions and components that make up its airplanes. The car manufacturer BMW concentrates the majority of its own R&D budget on innovation in software and electronic devices with which the driver interacts, whereas mechanical engineering upgrades are increasingly being entrusted to partnerships with networks of suppliers and other businesses. Networks such as these are subject to several problems. The lead companies often struggle to find the right balance between which information and knowledge they should keep confidential and what they should share, in order to make the network fruitful without allowing partner firms to appropriate strategic knowledge and become competitors. Also, suppliers find themselves competing against each other for permanent partnership

roles with the lead company. Finally, it is difficult to verify the contributions to total value creation made by each of the various actors.

The second way in which production, knowledge development and information gathering are spread, thereby extending the firm's boundaries, is *crowdsourcing*. Crowdsourcing is defined as the outsourcing of work to a large group through an open call made possible through advances in technology (Barnes et al., 2015). 'Crowds' thus perform jobs that used to be assigned to a designated agent. This work can be paid or undertaken voluntarily. The open source movement is considered to be the foundation of crowdsourcing. A wide range of services are being crowdsourced, such as software/product development, design, writing and editorial services, and web development and design. In 2008, Apple itself released the iPhone Software Development Kit (SDK), which enables third-party developers to create applications for the iPhone and the iPad, and Google announced its open source Android platform for mobile phone development (OHA), a business consortium that consists of around 50 technology and mobile firms committed to open standards for mobile devices. By using the OHA to assemble mobile phone handset makers, Google has mobilized a range of manufacturers to develop products for the Android platform, outsourcing mobile applications development to a global base of freelancers (Bergvall-Kåreborn and Howcroft, 2013). In cases like these, the firm opens up some of its software and databases through an application and programming interface (API) to enable software developers to create new applications.

Other firms, such as Nokia, Microsoft, Amazon and BlackBerry, have emulated this model. Amazon grants a network of 140,000 software developers access to its product database so that they can create new product offers. The model is not limited to the information technology sector. Procter & Gamble has outsourced 50 per cent of its products and services ideation by creating InnoCentive, a network through which 90,000 scientists work with Procter & Gamble on R&D projects, obtaining a monetary reward without being directly employed by the firm. Similar experiences to InnoCentive have been seen with NineSigma, Eureka Medical and YourEncore.

The crowdsourcing phenomenon sometimes takes over without any input from the producer firm. Apple's users, who had grouped together via Internet consumer forums, autonomously created hundreds of applications for the iPod. One of these applications was Podzilla, which in all respects prefigured the iPhone, which was in turn developed by Apple itself. This type of mechanism has been referred to in the literature using the term *prosumers*, indicating the active voluntary (and often unpaid) participation of consumers in productive processes.

The overall picture that emerges in the KBE literature from the managerial perspective is that of an economy in which capital ownership and the exercise of control become secondary in firms, while of prime importance is the actors' participation in the learning of new knowledge and their ability to access previous knowledge. In this context, society, environment and people can give rise to bottom-up forms of development which do not require the presence of concentrations of capital or pre-existing organizational power.

According to Tapscott and Williams (2006), the KBE is a *revolution* centred around the growing participation of social groups and individuals in the value chain. The information technology needed to cooperate, create value and compete on the market is

available to all. This context enables the continuous formation of new collaboration projects among peers featuring autonomous organizational arrangements; these collaborative projects produce goods and services that can compete with large firms. To describe these mechanisms, the term most frequently used in the managerial literature is the *peer economy*, or *peering*, designating production by groups of peers enabled by the pooling of knowledge and strategic resources, made possible by digital platforms where vast cooperative networks can be created, replacing hierarchies and reducing the importance of power and ownership. The most commonly cited examples of such peer communities are Linux, Wikipedia, YouTube and Flickr. According to Tapscott and Williams, in the KBE only by applying the three principles of *openness* (to extend the borders of firms and build broad collaboration networks), *peering* (as described above), and *sharing* (the sharing of ideas, projects and knowledge along the value chain), can businesses grow and increase their profits. Participation thus becomes a necessary 'asset' for competition.

The central theoretical issue in these theories therefore concerns the increasing integration between firms and society. It does so from the point of view both of production (firms become increasingly able to draw value from processes that take place externally to them) and organization (a mimesis between firms' organization and the non-hierarchical forms of social cooperation). Lessig (2005) argues that the intellectual property regime should be eased so as to introduce real free competition into the immaterial sector of the economy. The consequent decrease in profits would be offset if firms were able to capture the value contained in those spheres of social reproduction that are not yet part of the formal market. The need for closer integration between the economy and society is also stressed by Jenkins (2006): firms should lower their intellectual property barriers on cultural products, letting them circulate online so that internauts can actively participate in their creation and distribution. This would make it possible to gauge people's tastes for marketing purposes at no cost, to draw on ideas that spread online, to improve products, to launch new ones online, and to select talents, thus reducing research and development costs. According to Benkler (2006), by enabling the production and free distribution of information, art, education, entertainment, and scientific knowledge, the KBE would allow a theoretical return to an economy based on free cooperation, and exchange in the cultural industry sector could be based on the desire of actors to accumulate social, reputational and cultural capital, instead of monetary capital. This change would enable firms to have an extraordinary potential to incorporate processes and actors of the informal economy into the formal one. To this end, they should be able to revolutionize their organizational structures so that they fully join the 'spontaneous' forms in which such processes unfold. If managed through the traditional hierarchical models, in fact, the 'self-generated contents' engendered by bloggers or by users of file-sharing networks and social media platforms have a dis-economic nature. Users of Flickr (the platform for sharing photographs) invest time in sharing and classifying their products; the same activity, if managed by a hierarchically organized firm, would impose costs high enough to erode profit margins. The same can be said of other digital environments for sharing videos (YouTube), texts (Wiki) and information (Facebook, Twitter). According to this literature, such experiences attest that now developing alongside the market economy is an economy based on free cooperation and equal sharing. According to Drucker (1993), Kelly (1998) and Shirky (2009), this may even become a post-capitalistic

economy, since the main production means are now limited to universally available resources such as computers and the Internet. This also enables small and medium-sized firms to compete at the same level with large firms – thus democratizing the market.

Rullani (2011) finds two main contradictions in this production model. The first is between the speed at which knowledge is diffused and the speed at which it is socialized. To gain profits, firms must accelerate the diffusion of knowledge and slow down its socialization. But socialization and diffusion are difficult to separate. The second contradiction ensues from the anomalous nature of knowledge as a production factor and as a commodity. Unlike the traditional production factors, knowledge is not scarce, because its virtual nature makes its use by different subjects non-rival; it is not divisible, since the costs of its creation are temporally and spatially dispersed; it is not excludable or protected, because it is difficult to prevent those who have not participated in its production from benefitting from it through imitation or learning; it is not an instrumental good, because it acts on the constitution of the goals and identities of the actors. How, in an economic context increasingly centred on a production factor which is in itself different from the commodity form, can the system of capital accumulation be reproduced? Rullani's answer is that knowledge is artificially made scarce, divisible and excludable (through intellectual property rights), and that this can happen only in a regime of monopoly or quasi-monopoly. Remedying these ambivalences depends on closer integration between firms and society (that is, social processes, social relations, collective identities). Rullani considers the value produced by knowledge to be the sum of the monetary value yielded by the knowledge production chain and the 'psychological incomes' acquired by consumers and users. It is therefore a spurious sum of exchange-value and use-value. Considering both poles of this dichotomy as value-makers may mean that it is considered difficult to bring the anomalies of commodity knowledge within the confines of the commodity form, and the modes of its exploitation produce a tension within the production system such that they cannot be contained in the forms of market regulation. In the managerial interpretation, this tension can be overcome by insertion into the value chain of the 'labour' of consumers and users, their employment of emotional and intellectual energies, their capacity to adapt the latter, through re-use and creativeness, to the needs of different contexts – that is by a subsumption of life spheres, tacit knowledge and territorial networks to capital accumulation.

The managerial paradigm: discussion

To what extent do the statements of the managerial literature correspond to the real functioning of these business models? Does crowdsourcing determine a greater sharing of strategic cognitive resources by firms? Are ownership and control over the production process becoming irrelevant? Is firm organization abandoning hierarchical models? Evidence from these production models leads to the answer to these questions for the most part being in the negative. Crowdsourcing is a production technique with which to respond to increasingly competitive markets which forces firms to achieve three main goals: (1) attract highly specialized skills; (2) monitor consumers' tastes and behaviour, and increase their identification with the firm, also by letting them play an active role in

the ideation and commercialization of products; and (3) reduce production costs, including those of R&D (McDowell and Cristopherson, 2009). On the basis of their research on Apple and Google, Bergvall-Kåreborn and Howcroft (2013) argue that the main outcome of crowdsourcing is that firms have easier access to a mass of skilled labour, so that the developers themselves are responsible for productivity. Capital is thus able to reap the financial benefits of their work while sidestepping the costs of recruiting, training and sustaining labour.

Network organization and the opening of firms to their social environment, moreover, do not replace hierarchical organization, but instead integrate it. According to Thompson (2005: 86), 'Network firms are a type of extended hierarchy, based on concentration without centralisation: production may be decentralised, while power finance, distribution, and control remain concentrated among the big firms.' Neither surveys nor case studies give any significant support to the idea that pyramidal hierarchies are being replaced by looser networks (Alvesson and Thompson, 2005). On the contrary, even local unit managers in large firms suffer a constant shift of competences to corporate executives more directly accountable to shareholders (Dore, 2008; Howcroft and Richardson, 2012).

As regards the relationships between firms, users and consumers, in social networks and the other digital platforms free activities and interactions on the Internet are sources of income for firms. As Fuchs (2012) argues, users who Google data, upload or watch videos on YouTube, or exchange contents via social networks constitute an audience commodity that firms sell to advertisers and which produces informational content appropriated by capital. Large ITC firms distribute services to users for free. But what the managerial literature consider to be a form of free economy seems functional to the commodification of informal interactions among social platform users. Blogs also are sources of ideas for advertising: communications between bloggers and commenters are used as focus groups, enabling firms to monitor market trends for free. The production of surplus value is therefore not limited to wage labour. It includes informal social relations as well. Almost all users of digital platforms can become *produsers* – as Bruns (2007) terms the merger between users and producers. The production and sharing of 'self-generated contents' by consumers and users can be seen as a form of unpaid labour.

This problem also concerns the non-commercial forms of intellectual property management, such as open source and free software (Linux). Firms can take open source codes for free, and then adapt and sell them (Zukerfled, 2014). IBM has invested US$100 million in adapting Linux to the company's needs, obtaining revenues for a sum that has been quantified at US$1,000 million (Tapscott and Williams, 2006). For-profit use of free software exists also in firms that sell only free software and related services. Red Hat, the largest of these firms, takes open source software and makes it consumable for enterprises (Zukerfled, 2014).

Two other assumptions of KBE theories can also be contested: the democratization of the market and the socialization of strategic knowledge. Quantitative analyses of the ratio between large firms and medium and small firms contradict the theory of the market's democratization. Start-ups and small and medium-sized firms fail in the medium term, are acquired by large firms, or work in their supply chains (Movitz and Sandberg, 2009; Marks and Huzzard, 2010). For example, Facebook purchased Instagram and

Whatsapp, Flickr has been purchased by Yahoo!, MySpace by News Corp, Skype by Microsoft.

In crowdsourcing and open source processes driven by firms, the latter share with other (smaller) firms and with freelancers, users and consumers a limited part of their strategic information and knowledge – only the part, that is, which is functional to extending their business platforms to wide production and commercial networks, achieving the above-mentioned three goals (to attract highly skilled expertise; to involve and activate consumers; to reduce costs). There are no signs that the importance of intellectual property rights on strategic knowledge is decreasing (Formenti, 2011). Liberal scholars, such as Benkler, Tapscott and Williams and Lessig, argue that, on the contrary, its importance for knowledge firms tends to grow, and that this process is not opposed but complementary to their experimentation of crowdsourcing and open source models: the advantages of 'peer production' can be obtained by firms without waiving the protection of industrial secrets.

Cognitive capitalism and post-workerism

The theory of cognitive capitalism can be considered the leftist, more influential account of contemporary capitalism from the viewpoint of knowledge and technology (Jeon, 2010). Contemporary capital is considered to depend on social work if it is to generate value and profits (Arvidsson, 2009). Its necessary adaptation to participatory modes of innovation and to open models of intellectual property is viewed as antithetical not only to industrial capitalism, but also to the cognitive mode of capitalism itself (Moulier-Boutang, 2002; Bauwens, 2009). Gorz (2003) conducted one of the most systematic analyses of cognitive capitalism, which, he states, represents the crisis of the capitalist mode of production. The nature of cognitive work and the types of performance that it requires challenge the measurability of work as a source of wealth and therefore wages.

Like the managerial perspective, Gorz and the cognitive capitalism theorists contend that the contribution of labour to the value of commodities can no longer be measured by time, as it was for the classical labour value theorists, Ricardo and Marx; instead, it can be measured by the surplus of knowledge and the symbolic value that a worker is able to put into a commodity. As such, labour's contribution to value becomes 'immaterial' and is thus difficult to quantify. Capital also 'dematerializes' and resists measurement: as the value of products is generated by their capacity to create identificatory symbols, fixed capital and labour lose importance and are increasingly rented. This predicament of labour's measurability leads to a similar predicament in measuring value in general: in an economy based on anomalous-knowledge commodities, there are no objective parameters to form a basis for measuring value.

Moreover, in Gorz's view, ongoing technological innovation destroys increasing amounts of social work, reducing the circulation of means of payment, while the quantity of produced commodities increases: a synchronism that is at the basis of every overproduction crisis. All this gives rise to a general crisis of exchange-value and of the system of equivalences that regulates market exchanges, to a decrease in profits, and finally to the formation of a free economy and forms of production based upon reciprocity and sharing. Firms resort to three strategies to avoid these problems: (1) the pursuit of

monopolistic incomes; (2) the concentration of technology, information, and knowledge in large firms; and (3) the transformation of collective goods like education, health, water and culture into artificial commodities. But these strategies are unable to stem the tendency to the socialization of an anomalous resource like knowledge, the diffusion of organizational structures based on cooperation, and the gratuitousness made necessary by its production and diffusion. The mode of production based on the commodity-form has been corroded from within by the need to incorporate organizational forms, practices and rules that progressively remove it from the social relationship on which it is grounded.

The theory of cognitive capitalism is significantly influenced by post-workerism, a strand of autonomist Marxism, whose major proponents are Negri, Hardt, Lazzarato, Fumagalli and Vercellone.[1] In a post-workerist perspective, under cognitive capitalism, production directly invests social reproduction and territories, engendering a major contradiction between the Marxian general intellect – the social knowledge embedded in machinery systems and in work organization – and 'living labour', that is, workers' creativity, abilities, skills, emotions and relations. Communication and linguistic interaction have become the core of production and value creation. Labour is thus defined as 'immaterial' because the production factors and outputs are largely immaterial. Digital technologies cannot be likened to industrial fixed capital because their function is not to command merely routine activities, but to intercept the creativity of activities that must be kept free to create value. Nevertheless, unlike the managerial literature, post-workerists interpret the relationship between living labour and the digital network as a conflict, and specifically as the contemporary form of class conflict. They approach Marxism in terms of Foucault's biopolitics (Negri and Hardt, 2009): cognitive capitalism does not produce only commodities, but together with them it also produces social relations and collective forms of life. It thus produces the subjectivity itself of those who come into contact with production processes. It is in this context that the category of 'multitude', which post-workerists place in the middle of the contradictions of current production models, acquires its meaning. That is because capitalism has become a mechanism that makes life itself a productive force, and the collective actor able to resist capital (the multitude) is the ensemble of all concrete singularities whose needs, wishes and experiences are in themselves in conflict with the attempts to subordinate all of them to the processes of economic valorization (Negri and Hardt, 2005).

Post-workerist theory shares two core assumptions with liberal orientations: (1) value creation derives from forms of social cooperation that are autonomous from capitalist command; and (2) the products of this cooperation are difficult to force within the boundaries of private property. But if liberal theorists see in this tension a new field of opportunities for business, according to post-workerism, it renews the Marxian contradiction between production forces and production relationships. Capital can appropriate social cooperation only through the transformation of profit into revenue (Lazzarato, 2004), because it is through intellectual property income that capital appropriates the value engendered by 'autonomous and creative work'. Nevertheless – this is the contradiction – the 'enclosure' of creativity through intellectual property limits its freedom, which is necessary for its valorization.

The theory of cognitive capitalism can been accused of a-critically assuming various assertions of the managerial literature (Jeon, 2010). The category of immaterial work and the main features that post-workerists attribute to it (creativity, autonomy from capital) are rarely supported by empirical evidence. As Thompson (2005) states, moreover, the key feature of capitalist production relationships is not the nature of the commodities produced (their material or immaterial nature), but the fact that they take the commodity-form, i.e. that they are produced through a double subordination functional to capital valorization: that of labour to capital, and that of use-value to exchange-value. These elements do not disappear in cognitive capitalism. On the contrary, according to post-workerists themselves, they are currently extended to the entirety of social reproduction. Critics of post-workerism also underline that the category of 'multitude' is defined only in philosophical terms, and it is therefore unsuitable for describing and interpreting the real relationships and conflicts among social actors. Finally, post-workerist theories at the same time claim that 'everything has become labour' (life as a whole has been embedded in production processes) and that 'nothing is labour' (the new production techniques are not comparable to subordinate work). If everything is labour, one cannot see where there exists any space for the constitution and the action of a conflictual subjectivity such as 'multitude'. If nothing is labour, the description of contemporary capitalism as a biopolitical process that includes the production of individual subjectivity itself loses its significance.

Managerial paradigm, cognitive capitalism theory and the ambivalences of the KBE

On the basis of the foregoing discussion of the managerial literature and cognitive capitalism theory, it is possible to formulate some intermediate conclusions on the relationship between market and society in the KBE. Particularly, but not only, in the ITC sector, firms are able to integrate practices, social networks and forms of free cooperation in the productive process by building networks of 'extended production' that involve freelancers, users and consumers. To achieve this goal, firms adopt partially open and 'horizontal' organizational forms, giving a certain autonomy to other firms, the networks of collaborators and 'prosumers' – also sharing some of their knowledge assets with them. These organizational forms, however, do not replace, but instead integrate, corporate hierarchy. Second, valorization of the commodity-knowledge at the same time implies its socialization and the restriction of access to knowledge that is essential for the valorization of capital. This contradiction creates serious difficulties for firms in reconciling two opposite requirements. Managerial theories argue that these tensions can be overcome through even greater integration between production and social processes. As we have seen, this is what many large firms are trying to do. Theories of cognitive capitalism instead state that these tensions can foreshadow a systemic crisis of the capitalist production mode. Both orientations comprise a fundamental contradiction. While they assert the crucial importance of cooperation and sharing and the loss of importance of ownership and command, they emphasize unprecedented processes of merger and takeover, the advent of conglomerates that raise barriers of access to the market, the existence of fierce 'wars' among large firms for command in the ICT industry, and the

constant transformation into exchange-value of informal social processes and individual behaviours. These contradictions are not merely theoretical, they are constitutive of the contemporary production paradigm itself. In fact, also a critical analysis of these two theoretical orientations, like the one being conducted here, cannot deny the actuality of three processes: (1) at present, knowledge, information and informal social interactions are essential means for value creation; (2) there exists a tension between the improper commodity-knowledge and the private property regime, as also attested by the crisis of entire industrial sectors such as music and media (newspapers, television, cinema), mainly due to the fact that digital technologies make it possible to produce and socialize cultural and informational goods for free; and (3) in order to attract highly specialized knowledge, to reduce research, production and commercialization costs, and to actively involve consumers in highly competitive and filled markets, firms must at least partially adopt open and egalitarian organization models, as far as possible involving their external environment into the production-consumption cycle, including also non-mainstream (and, in a certain way, non-market) cultures, identities and practices.

Working in a knowledge-based economy

Many different definitions of cognitive work have been given. Drucker (2001) defines 'knowledge workers' as workers identified no longer by their job descriptions but by their knowledge, skills, work experiences and goals. According to Thurow (1996), cognitive workers are those able to build and organize strategic knowledge in microelectronics, biotechnology, telecommunications, robot and computer sectors, performing a pull-function for work as a whole. Florida (2012) has spoken of a 'creative class', which includes scientists, musicians, engineers, architects, artists, managers, professional designers, and, in general, people engaged in conceptual or creative activity. He estimates the category as comprising 30 per cent of the working population in the USA, 26 per cent in the UK, 18 per cent in Germany and 13 per cent in Italy and Portugal. The expression 'hacker class' (McKenzie, 2004) has been used to denote a workforce which combines work and passion for technological innovation, self-exploitation and satisfaction. Bonomi and Rullani (2005) regard as crucial the figure of the 'personal capitalist', which includes self-employed workers, micro entrepreneurs and employees endowed with high degrees of autonomy. A recent survey conducted in Italy instead considers knowledge workers as 'professionals in organisations' (Butera, 2008), a category which includes managers, professionals and technicians. Butera (2008) itemizes the essential elements of cognitive work as follows: management responsibility for immaterial and uncertain work processes whose output is the economic valorization of knowledge; relative autonomy in managing roles and tasks; work performed in settings of self-managed cooperation; sharing of knowledge; and communication within professional and social communities supported by ITC technologies. Cognitive workers increase their control over means of production that become inseparable from their person (a computer, a connection, their personal skills), thus generating conflicts between labour and firms over ownership of the knowledge produced.

An interpretation largely shared by the managerial perspective and cognitive capitalism theorists is that knowledge-based work contributes to the formation of a new kind of

business organization. The most frequently used metaphor is that of the 'network-firm': within firms, self-managed process units, project teams, temporary organizations that produce and manage innovation and problem-solving processes develop. In the context of these transformations, project-based work takes on central importance. Large corporations are even termed 'project-based organizations' or 'multi-project environments'. Projects are temporary configurations of (human) resources situated within a larger 'permanent' organization, where individuals have other 'homes' before, during and after being involved in this temporary organization (Lundin and Söderholm, 1995; Yeow, 2014). Employees and freelancers can take part in several projects simultaneously, for one or more firms, potentially assuming different roles and responsibilities in each one. This, according to some, individualizes labour relationships and can help workers become more autonomous with respect to firms.

Knowledge-value resists formalized and rigid processes, while functional to its development is the presence of 'communities' within the organization that create a sense of identity and the sharing of values and purposes, partly self-managed cooperation processes, modes of knowledge circulation and sharing, and intensification of internal and external communication. This has important consequences for one of the main components of the capitalist mode of production. Vercellone (2008) and Marazzi (2008) hypothesize an inversion of the Fordist hierarchy between living labour and fixed capital. The new living labour centred on knowledge has come to predominate over fixed capital, and this implies a tendency for capital's control over labour to decline. Language skills, ethical tendencies, and aspects of subjectivity become the means of production and outputs of the process, and this ''immateriality'' of the actors and the means of production hinders the subjugation of living labour to capital, because labour is now more connected to faculties and skills that belong to the workers themselves, as well as to processes that require at least partial autonomy to execute. The subjugation of labour to capital thus ceases to be 'real' and returns – as in the times prior to the development of industrial capitalism, according to Marx – to being only 'formal': cooperation and knowledge-sharing in labour relations potentially become autonomous from capital, and only thereafter is capital able to extract a surplus from the labour process, which remains indirect and external to the labour process itself.

All the elements that define 'knowledge work' are nevertheless controversial. First, such elements are not attributable to all knowledge work. So-called immaterial labour is made up of a plurality of professional figures, among which one can identify two main heterogeneous segments (Formenti, 2011): (1) an upper social rank of highly-skilled personnel or freelancers, who are the sources of innovation and value for firms and have some bargaining power in the labour market; and (2) a lower or medium level of routine workers devoid of bargaining power, with medium or medium-low incomes, and subject to a corporate hierarchy which gives them scant margins for creativity and autonomy. The current economic crisis restricts the former segment and expands the latter, causing a decrease in incomes and an increase in job insecurity for 'cognitive labour'. In Western societies, new employment creation mainly concerns the lower tertiary sector (Cushen and Thompson, 2012), also because of the increased productivity resulting from technological innovation and the delocalization of planning, management, control and even research activities. Second, the set of phenomena termed 'crowdsourcing' or 'peer

economy' entails, as we have seen in the previous section, the participation in the production cycle by an increasing number of temporary collaborators, consumers and users who, to a certain extent, replace paid work.

Also ambiguous are the core components – creativity and cooperation – to which the break by cognitive work from the Fordist model of production is attributed. When discussing the cognitive abilities required of the new labour force, Carr (2011) has referred to 'digital Taylorism': only rarely is cognitive work truly more autonomous, self-organized, variegated and creative than Fordist work; the 'intellectual' performance of workers is organized by the planners in a way similar to that in which engineers streamlined material work in the Fordist economy. The work often consists of the incorporation of the worker's memory, mind and identity into technology (computers, software and the Web): digital media involve levels of attention, elaboration and depth lower than those required by traditional alphabetical thought, and they favour a cognitive routine focused on immediate decision-making and problem-solving. The specific component of knowledge working is a set of mainly applicative skills tied to specific situations, technologies, and work processes. Only 30 per cent of cognitive labour consists of 'original thinkers', while the remainder are engaged in the integration and application of already available knowledge (Butera, 2008). The theory of an inversion of the hierarchy between living labour and fixed capital therefore appears overstated. It is also possible to observe the process in reverse: it is the productive knowledge work based on the use of machines, standardized processes and softwares that incorporates working and productive intelligence, thus subsuming tasks and professional identities.

Criticism can also been made of the relationship between cognitive work, increased workers' autonomy, and cooperation. Firms currently tend to incentivize the construction of internal pseudo-communities sustained by managerial discourses that aim to foster a sense of belonging, identity and dedication mainly based on the 'libertarian' freedom-cooperation binomial. In this regard, as Kunda (2006) and Boltanski and Chiapello (1999) have argued, contemporary managerial ideology assumes some of the criticisms of business hierarchy and labour alienation made by the social and labour movements in the 1960s and 1970s. But supposedly creative and self-managed teamwork is subject to increasing monitoring and evaluation by firms. This occurs also within knowledge-intense firms and among professionals who might be expected to be the most committed to autonomy and creativity such as, for example, R&D engineers and scientists (Gleadle et al., 2012). Scarbrough (1999) emphasizes that such environments are characterized by constant tension between settings of trust and autonomy, which favour the production of knowledge, and the rationalized and highly structured conditions which secure its appropriation. As Gleadle, Hodgson and Storey (2012) emphasize, also large high-tech firms that used to adopt post-bureaucratic forms of organization, ensuring operative autonomy to knowledge workers, have recently returned to more traditional and hierarchical models, due to increasing international competition and the requests by financial shareholders for measurable goals and short-term profits.

With regard to project-based work, where projects do exist, project management tends to follow, accompanied by codified formulas and routines of planning and budgeting, often in jarring conflict with the nature of work and the expectations and self-perceptions of workers in creative industries (Briand and Hodgson, 2013). Brian and

Hodgson's (2013) research on teamwork in the video game industry shows that these processes also involve professions that are commonly considered to be the most creative and those for which it is more difficult to establish clear links among work time, personal performance and outputs such as, in this field, game designers or animators. Their work is constantly monitored and subject to instructions from team leaders and managers that significantly bind it, with negative consequences for projects. The autonomy of teamwork from these instructions is very limited. The partition of work into specific and measurable steps and phases, the definition of the outputs expected, and the distribution of individual responsibilities are often managed through computer software (Chen and Ross, 2007; Holtgrewe, 2014; Jeske and Santuzzi, 2015). It is to this set of processes and mechanisms that Carr's definition of 'digital Taylorism' can be applied.

Turning to the category of so-called personal capitalists or independent workers, it cannot be said that cooperation is their distinctive feature. As Florida (2012) notes, independent work is connoted by strong individualizing pressures that jeopardize the capacity for collective action. According to Bergvall-Kåreborn and Howcroft (2013), recognition within the 'community' of producers and users is correlated to the developers' product commercialization and their commercial value. Social relationships and cooperation therefore acquire an instrumental nature. As regards the autonomy of these workers, the big firms for which they work can arbitrarily and at any time decide not to accept or to withdraw their products from the market. The forms and times of work performance and the constraints on the use of creativity and the elaboration of knowledge are set by firms. Their work is highly characterized by job insecurity, uncertainty and low incomes (Pongratz and Voss, 2003). In this resides the internal dialectic of independent cognitive work: the split between networking and individualism, between freedom and the need to match the profiles required by firms, between autonomy and individual assumption of entrepreneurial risk.

In general, recent evidence on this categories of workers clearly points to a series of trends (Warhurst and Thompson, 2006; Wells et al., 2007; Movitz and Sandberg, 2009; McDowell and Christopherson, 2009; Marks and Baldry, 2010; Holtgrewe, 2014; Jeske and Santuzzi, 2015): a weakening of the separation between personal life and work; a constant shift from stable jobs to precarious jobs with lower pay; growing pressures on knowledge workers to improve both the quantity and quality of their job performances, yet often without any compensation in terms of occupational stability, salary or career development opportunities; this divergence between requested performance and compensation individualizes job relations and diminishes workers' loyalty to and even involvement in the firm, thus reducing the potential for internal cooperation and knowledge sharing; finally, an expansion of monitoring activities, used to regulate the performances of these workers in ever greater detail, and hence diminishing (instead of increasing) their power of discretion and autonomy.

We must add to these problems the decisive issue of technological unemployment. According to an important contribution by Collins (2013), until the 1980s and 1990s mechanization chiefly displaced manual labor. Information technology has now just begun to displace administrative and communicative labour, greatly downsizing the middle class. Robotization, electronization, and the development of Artificial Intelligence, summed to mechanization, can lead to unemployment rates that, according to Collins,

can affect 50 per cent of workforce by the year 2040. Computerization is now still in its youth and the computerization of middle-class labour is proceeding at a much faster pace than the mechanization of the manual labour force. IT does not generate paying jobs at the same rate that it eliminates them. If Collin's predictions are confirmed, the effects on knowledge workers will be those of an extreme radicalization of the current negative trends that evidence highlights, regarding wage levels, employment opportunities and working conditions, and also a significant disappearance of cognitive work. But Collins argues that these processes could also lead to wider consequences. As the working class shrank through mechanization, capitalism was saved by the rise of the middle class. Now capitalism cannot compensate for the digitalization of middle-class labour with a corresponding creation of new jobs. According to Collins, these processes will lead to a systemic crisis of capitalism before the twenty-first century is over, as capitalism cannot support unemployment rates of 50 per cent or more and systems in which wage labour is a minority of the active labour force.

Conclusion

In the 'knowledge economy', the relationship between firms and society and the relationship between firms and work exhibit similar contradictions. As regards the work/firm relationship, this structural dynamic manifests four pairs of tensions:

1. Socialization of the production process/individualization of the employment relationship. The individualization of the employment relationship, together with job insecurity and the pressure for horizontal competition among workers exerted by firms, comprise a tendency to socialize production processes and to diffuse ownership of the means of production. This is a tendency, however, that cannot be annulled owing to the specificity of the commodity-knowledge.
2. Cooperative exchange/market exchange. The social contents of work – relational activity, diffused knowledge, logical skills – are constantly injected into the production-consumption cycle. What the worker may perceive as cooperative exchange within the firm or between the firm and its external environment is re-interpreted by firms as a market relationship. The contradictory link between 'self-production' through work and cooperation, on the one hand, and formal value of the market, on the other, is currently the driving force of productivity. The effects of this antagonism may be diverted by firms into individual outflow channels (through internal competition among workers and the individual assumption of entrepreneurial risk), but the causes of the instability that they create can hardly be removed.
3. Collective participation in decision-making/verticalization of decision-making processes. Workers are induced to participate in formally horizontal decision-making processes, but the rhetorical invitation to participate actively is mainly functional to reorganizing command methods and to a substantial verticalization of decision-making processes. Horizontality is confined to decisions concerning the most immediate work processes, whereas on strategic choices the hierarchy and the verticality of structures are strengthened. Nevertheless, the rhetorical call

for active participation is essential for firms, on both the work and consumption sides, becoming a 'competitive asset'.

4. Autonomy of labour/digital Taylorism. Work based on knowledge and partial cooperation among peers raises problems for capital from the point of view of the complete objectification of work, the measurability of work performance, and the governance of cooperative exchange. On the other hand, such problems seem currently resolved through the rigidification of immaterial ownership and the Taylorization of a significant part of knowledge production.

As regards the relationship between firms and society (social networks, individual and collective identities, free cooperation), we have seen in the first section of this article that the new dynamics of production delineate a potential conflict between the intensification of firm command and the autonomy of collective actors. This field is marked by a dialectic between economy and society. The former incorporates mechanisms of potential economic valorization generated by the latter. To this end, it must internalize subjects, practices and cultures that are partially in conflict with it, given that it must make ever greater efforts to bring the overall process back within the ownership regime. The general tendency of organizations is that of 'going to' social actors (workers and consumers) and social processes, trying to interpret and to acquire for themselves the formal and tacit knowledge, the identities, emotions, and forms of cooperation that develop in social life, and even to mimic their forms of interaction. The contemporary dialectic between economy and society is characterized by this 'going to' dynamic. Subjectivity and spontaneous cooperation are, on the one hand, encouraged to develop, and on the other, are incorporated into processes of exchange-value creation. One thus witnesses a reduction – organizational, normative, cultural – of the barriers between firms and society, a mutual 'precipitation' of one into the other: 'structure' (production) and 'superstructure' collapse into each other, and society is crossed by a process of de-differentiation among social sub-systems. This dialectical overlap between economy and society can simultaneously engender a more subtle dominance of the former over the latter, or the growth of autonomy, self-organization and peer cooperation among social actors. Currently, nevertheless, the first process is sharply overcoming the second.

It is not the aim of this article to deny the importance of knowledge as a production factor in the contemporary economy. However, it has rejected two different but partially converging. interpretations. The first (the managerial paradigm) considers the KBE to be a series of win-win mechanisms that simultaneously favour firms, workers and consumers. Together with Fuchs (2012), Garnham (2004) and other critics of the KBE theory, we can, on the contrary, consider this interpretation of the knowledge economy as an ideology. As shown above, the main features that the managerial literature attribute to the KBE are ambiguous or non-existent. The second tendency (the cognitive capitalism theory) perceives in the development of cognitive capitalism signs of the endogenous and spontaneous formation of a post-capitalist economy. As discussed above, and as many critics of the cognitive capitalism theory and post-workerism assert (Thompson, 2005; Jeon, 2010; Formenti, 2011), there is no evidence of such a process in contemporary economy, but rather the signs of the

reverse process are visible: a progressive commodification of all life spheres and social relationships, which dialectically develops through ambivalent processes and ambiguous forms.

As has always occurred in the history of the relationship between capital and labour, the possibility that the production process will shift in a direction favourable to labour mainly depends on the capacity for coalition and conflict and on the bargaining power of the latter. These elements develop within the labour relationship also thanks to the support of dynamics (politics, cultural, organizational) and actors external to the production process, as the history of the workers' movement demonstrates (Bartolini, 2000).

Regarding the relationship between production and social relations, a spontaneous inversion of the hierarchy between social cooperation and market exchange is not feasible. The extension of the former to the detriment of the latter is possible only if pursued by a voluntary – and therefore political – action of expansion and reinforcement of the processes and actors that, by establishing a dialectical and ambivalent relationship with the economic system, avoids merely mercantile rules. This requires building dynamics of social cooperation directed to the production of collective goods, which in turn entails the constitution of areas of cooperation and economic exchange independent from capital. Second, what is necessary for this hierarchical inversion is the elaboration of a political culture that unifies the demands and values of the 'creative class' and the 'Internet culture' with the needs of those social actors (comprising the lower strats of the tertiary service sector, manual workers and quasi-subordinate workers) for which cognitive capitalism means, especially in a phase of economic crisis, job insecurity and impoverishment. It is essential for such projects to identify the precise social counterparts that appear parasitical and inertial in comparison to the full development of the knowledge-based society, and to develop conflictual processes – held by workers, users and consumers – in which the ambivalences of the contemporary production models are played out by concrete collective actors. This would require working on the mechanism, well known to the sociology of collective action, of unfulfilled promises, grasping the potentialities and possibilities that are inherent in contemporary production processes but are not developed. Once again, this concerns social, cultural and political projects that cannot spontaneously spring from any kind of technological change.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

Note

1. Post-workerism is the successor to workerism, a neo-Marxist theoretical tendency that took root in Italy in the 1970s. In the workerist and post-workerist perspective, the transition from one stage of capitalism to another is driven by class struggle and by capitalist attempts to overcome it. The transition from the Fordist to the post-Fordist era of production has brought about the decline of the 'mass production worker' as the dominant type of worker (at the heart of social

conflicts in the 1960s and 1970s) who performed chiefly perfunctory tasks on the assembly line. In the shift to post-Fordism, workerists have posited that the successor to the mass production worker in the class struggle is the *social labourer* – a collective actor comprised of the young proletariat, the working class on the outskirts of urban areas, along with new feminist and environmentalist movements. The concept of social labourer heralds analysis under a paradigm of cognitive capitalism. The essential idea is that all anti-capitalist struggles can be interpreted as manifestations of a single core contradiction: the contradiction between the Marxian *general intellect* and living labour.

References

Adler PS (1992). The 'learning bureaucracy': New United Motor Manufacturing, Inc. *Research in Organizational Behavior* 15:111–94.

Alvesson M and Thompson P (2005) Post-bureaucracy? In: Ackroyd S, Batt R, Thompson P and Tolbert P (eds) *The Oxford Handbook of Work and Organization*. Oxford: Oxford University Press.

Arvidsson A (2009) The ethical economy: towards a post-capitalist theory of value. *Capital and Class* 33(1): 13–29.

Barnes S, Green A and de Hoyos M (2015) Crowdsourcing and work: individual factors and circumstances influencing employability. *New Technology, Work and Employment* 30(1): 16–31.

Bartolini S (2000) *The Political Mobilization of the European Left, 1860–1980. The Class Cleavage*. Cambridge: Cambridge University Press.

Bauwens M (2009) Class and capital in peer production. *Capital and Class* 33(1): 121–41.

Bell D (1974) *The Coming of Post-Industrial Society*. London: Heinemann.

Benkler Y (2006) *The Wealth of Networks: How Social Production Transforms Markets and Freedom*. New Haven, CT: Yale University Press.

Bergvall-Kåreborn B and Howcroft D (2013) The future's bright, the future's mobile: a study of Apple and Google mobile applications developers. *Work, Employment & Society* 27(6): 964–81.

Blackler F (1995) Knowledge, knowledge work and organizations: an overview and interpretation. *Organization Studies* 16(6): 1021–46.

Boltanski L and Chiappello E (1999), *Le nouvel esprit du capitalisme*. Paris: Gallimard.

Bonomi A and Rullani E (2005) *Il capitalismo personale* [Personal Capitalism]. Turin: Einaudi.

Briand L and Hodgson D (2013) Controlling the uncontrollable: agile teams and illusion of autonomy in creative work. *Work, Employment and Society*, 27(2): 308–25.

Bruns A (2007) Produsage, Generation X, and their effects on the democratic process. In *Proceedings of the Conference: Media in Transition* 5, MIT, Boston. Available at: http://web.mit.edu/commforum/mit5/papers/Bruns.pdf

Butera F (2008) Chi sono, perchè sono tanti e così importanti i lavori e i lavoratori della conoscenza [Who knowledge workers are and why they and the knowledge works are so many and so important]. In: Butera F, Bagnara S, Cesaria R and Di Guardo S (eds) *Knowledge Working*. Milan: Mondadori.

Butera F, Bagnara S, Cesaria R and Di Guardo S (eds) (2008) *Knowledge Working*. Milan: Mondadori.

Carr N (2011) *The Shallows: What the Internet Is Doing to Our Brains*. New York: W.W. Norton.

Castells M (1996) *The Rise of the Network Society*. Malden, MA: Blackwell.

Chen J and Ross W (2007) Individual differences and electronic monitoring at work. *Information, Communication and Society* 10(4): 488–505.

Collins R (2013) The end of middle-class work: no more escapes. In: Wallerstein I, Collins R, Mann M, Derluquian G and Calhoun C (eds) *Does Capitalism Have a Future?* Oxford: Oxford University Press, pp. 37–70.

Cushen J and Thompson P (2012) Doing the right thing? HRM and the angry knowledge worker, *New Technology*, *Work and Employment* 27(2): 79–92.

Dore R (2008) Financialization of the global economy. *Industrial and Corporate Change* 17(6): 1097–112.

Drucker P (1993) *Post-Capitalist Society*. New York: Harper Business.

Drucker P (2001) A century of social transformations: emergence of knowledge society. In: Drucker P *The Essential Drucker*. New York: HarperCollins.

Florida R (2012) *The Rise of the Creative Class\ Revisited: 10th Anniversary Edition*. Revised and Expanded. New York: Basic Books.

Formenti C (2011) *Felici e sfruttati. Capitalismo digitale ed eclissi del lavoro* [Happy and Exploited. Digital Capitalism and Labour Eclipse]. Milan: Egea.

Fuchs C. (2010) Labor in informational capitalism and on the internet. *The Information Society* 26: 179–96.

Fuchs C (2012) Capitalism or information society? The fundamental question of the present structure of society. *European Journal of Social Theory* 16(4): 413–34.

Garnham N (2004) Class analysis and the information society as mode of production. *The Public* 11(3): 93–104.

Gleadle P, Hodgson D and Storey J (2012) 'The ground beneath my feet': projects, project management and the intensified control of R&D engineers. *New Technology, Work and Employment*, 27(3): 163–77.

Gorz A (2003) *L'immateriél*. Paris: Galilée.

Hardt M and Negri A (2005) *Multitude: War and Democracy in the Age of Empire*. New York: Penguin Books.

Hardt M and Negri A (2009) *Commonwealth*. Cambridge, MA: Harvard University Press.

Heller MA, Howcroft D and Richardson H (2012) The back office goes global: exploring the connections and contradictions in shared service centres. *Work, Employment and Society* 27(1): 111–27.

Holtgrewe U (2014) New new technologies: the future and the present of work in information and communication technology. *New Technology, Work and Employment* 29(1): 9–24.

Jenkins H (2006) *Fans, Bloggers, and Gamers: Exploring Participatory Culture*. New York: New York University Press.

Jeon H (2010) Cognitive capitalism or cognition in capitalism? A critique of cognitive capitalism theory. *Spectrum: Journal of Global Studies*, 2(3).

Jeske D and Santuzzi A. (2015) Monitoring what and how: psychological implications of electronic performance monitoring. *New Technology, Work and Employment* 30(1): 62–78.

Jessop B (2004). Critical semiotic analysis and cultural political economy. *Critical Discourse Studies*, 1: 159–74.

Kelly K (1998) *New Rules for the New Economy: 10 Radical Strategies for a Connected World*. New York: Viking.

Kunda G (2006) *Engineering Culture: Control and Commitment in a High-Tech Corporation*. Philadelphia, PA: Temple University Press.

Lazzarato M (2004) From capital-labour to capital-life. *Ephemera* 4(83): 187–208.

Lessig L (2005) *Free Culture. The Nature and Future of Creativity*. New York: Penguin.

Lundin R and Söderholm A (1995) A theory of the temporary organization. *Scandinavian Journal of Management* 11(4): 437–55.

Marazzi C (2008) *Capital and Language*. Cambridge, MA: MIT Press.

Marks A and Baldry C (2010) Stuck in the middle with who? The class identity of knowledge workers. *Work, Employment and Society* 23(1): 49–65.

Marks A and Hubbard T (2010) Employability and the ICT worker: a study of employees in Scottish small businesses. *New Technology, Work and Employment* 25(2): 167–81.

McDowell L and Christopherson S (2009) Transforming work: new forms of employment and their regulation. *Cambridge Journal of Regions, Economy and Society* 2(3): 1–8.

McKenzie W (2004) *A Hacker Manifesto*. Cambridge, MA: Harvard University Press.

Moulier-Bourtang Y (2002) Nouvelles frontières de l'économie politique du capitalisme cognitive. Communication au Colloque Textualités et Nouvelles Technologies, 23–25 octobre, Musée d'Art Contemporain de Montréal, *Revue éc / artS* 3, pp. 121–35.

Movitz F and Sandberg A (2009) The organisation of creativity: content, contracts and control in Swedish interactive media production. In: McKinlay A and Smith C (eds) *Creative Labour*. London: Palgrave Macmillan.

Nonaka I (1991) The knowledge-creating company. *Harvard Business Review* 69: 96–104.

Nonaka I and Takeuchi H (1995) *The Knowledge-Creating Company*. New York: Oxford University Press.

Pongratz H and Voss G (2003) From 'employee' to 'entreployee': towards a 'self-entrepreneurial' work force. *Concepts and Transformation* 8(3): 239–54.

Powell W and Snellman K (2004) The knowledge economy. *Annual Review of Sociology* 30: 199–220.

Prusak L (1997) *Knowledge in Organizations*. Boston, MA: Butterworth-Heinemann.

Rullani E (2011) *Ökonomie des Wissens. Kreativität und Weltbildung im Netzwerkkapitalismus*, Vienna: Verlag Turia Kant.

Scarbrough H (1999) Knowledge as work: conflicts in the management of knowledge workers. *Technology Analysis & Strategic Management* 11(1): 5–16.

Shirky C (2009) *Cognitive Surplus: Creativity and Generosity in a Connected Age*. London: Penguin.

Stehr N (1994) *Knowledge Societies*. London: Sage.

Tapscott D and Williams AD (2006) *Wikinomics. How Mass Collaboration Changes Everything*. Portfolio Trade.

Thompson P (2005) Foundation and *Empire*: a critique of Hardt and Negri. *Capital & Class* 29(2): 73–98.

Thompson P, Warhurst C and Callaghan G (2001) Ignorant theory and knowledgeable workers: interrogating the connections between knowledge, skills and services. *Journal of Management Studies* 38(7): 923–42.

Thurow L (1996) *The Future of Capitalism*. London: Penguin.

Toffler A (1970) *Future Shock*. New York: Random House.

Toffler A (1980) *The Third Wave*. New York: Bantam.

Vercellone C. (2008) La loi de la valeur dans le passage du capitalisme industriel au capitalisme cognitif, *European Journal of Economic and Social Systems* 23(2): 75–88.

Warhurst C. and Thompson P (2006) Mapping knowledge in work: proxies or practices? *Work, Employment & Society*, 20: 787–800.

Wells D, Moorman R and Werner J (2007) The impact of the perceived purpose of electronic performance monitoring on an array of attitudinal variables. *Human Resource Development Quarterly* 18(1): 121–38.

Yeow J (2014) Boundary management in an ICT-enabled project-based organising context. *New Technology, Work and Employment* 29(3): 237–52.

Zukerfeld M (2014) Inclusive appropriation and the double freedom of knowledge: on the capitalist exploitation of non-for-profit software, contents and data producers. *Sociologia del Lavoro* 133: 145–58.

Author biography

Loris Caruso received his PhD in Comparative Social Research at the University of Turin in 2008. In 2009, he received a research fellowship in Political Science for 12 months at the University of Turin. At present, he works in the Department of Sociology and Social Research at the University of Milan-Bicocca, where he has a four-year research fellowship in Political Science. His main research interests are political participation, social movements, political communication, and labour studies.